

**Tax Policy and Public Financial Management  
Architecture in Transitional States**

by

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A thesis submitted to the Faculty of Graduate and Postdoctoral Affairs in  
partial fulfilment of the requirements for the degree of

Doctor of Philosophy

in

Public Policy and Administration

Carleton University

Ottawa, Ontario

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## Abbreviations

|        |  |           |   |
|--------|--|-----------|---|
| AAAA   | Addis-Ababa Action Plan                        | NGO       | Non-government organization                           |
| ABD    | Arellano-Bond Dynamic estimation               | NPM       | New Public Management                                 |
| ADF    | Augmented Dickey-Fuller test                   | NRDT      | Non-Resource Component of Direct Taxes                |
| APL    | Adaptable Programme Loan                       | NRI       | Non-Resource Component of Indirect Taxes              |
| AR(1)  | First-order Autoregression                     | Obs.      | Observations  |
| AR(2)  | Second-order Autoregression                    | ODA       | Official Development Assistance                       |
| CFA    | Central Finance Agency                         | OECD      | Organisation for Economic Cooperation and Development |
| CIS    | Commonwealth of Independent States             | OLS       | Ordinary Least Squares estimation                     |
| CIT    | Corporate Income Tax                           | OT        | Other Taxes   |
| COA    | Chamber of Accounts                            | PAM       | Public Administration and Management                  |
| Corr.  | Correlation                                    | PD        | Paris Declaration on Aid Effectiveness                |
| CPI    | Corruption Perception Index                    | PDIA      | Problem Driven Iterative Adaptation Theory            |
| CPIA   | Country Policy and Institutional Assessment    | PEA       | Political Economy Approach                            |
| DFID   | UK Department for International Development    | PEFA      | Public Expenditure and Financial Accountability       |
| DPL    | Development Policy Loan                        | PEMPAL    | Public Expenditure Management Peer Assisted Learning  |
| EC2SLS | Baltagi's Two-Stage Least Squares Estimation   | PER       | Public Expenditure Review                             |
| ECM    | Error component model                          | PFM       | Public Financial Management                           |
| EU     | European Union                                 | PFMMP     | Public Finance Management Modernization Project       |
| FEM    | Fixed-effects model                            | PFMRS     | Public Finance Management Reform Strategy             |
| FGLS   | Feasible Generalized Least Squares estimation  | PHRDF     | Japan Policy and Human Resources Development Fund     |
| FMIS   | Financial Management Information System        | PIP       | Public Investment Program                             |
| FSU    | Former Soviet Union                            | PIT       | Personal Income Tax                                   |
| FY     | Fiscal Year                                    | PIU       | Project Implementation Unit                           |
| GDP    | Gross Domestic Product                         | PPP       | Purchasing Power Parity                               |
| GFS    | Government Finance Statistics                  | PSR       | Public Sector Reform                                  |
| GFSY   | Government Finance Statistics Yearbook         | RDT       | Resource Component of Direct Taxes                    |
| GLS    | Generalized Least Squares estimation           | REM       | Random-effects model                                  |
| GMM    | Generalized Method of Moments                  | RIN       | Resource Component of Indirect Taxes                  |
| GNI    | Gross National Income                          | ROSC      | Report on the Observance of Standards and Codes       |
| GNP    | Gross National Product                         | SAI       | Supreme Audit Institution                             |
| GRD    | Government Revenue Database                    | SDC       | Swiss Cooperation Office                              |
| GST    | Taxes on Goods and Services                    | SECO      | State Secretariat for Economic Affairs                |
| HCI    | Human Capital Index                            | SGB.net   | Software/system for FMIS                              |
| HIC    | High-Income Countries                          | SLDC      | Solution and Leader Driven Change Theory              |
| IBP    | International Budget Partnership               | SOE       | State Owned Enterprise                                |
| ICT    | Information and Communication Technology       | SSC       | Social Security Contributions                         |
| ICTD   | International Centre for Tax and Development   | Std. Dev. | Standard Deviation                                    |
| IDA    | International Development Association          | TE        | Transition Economies                                  |
| IFI    | International Financial Institutions           | TFMIS     | Treasury Financial Management Information System      |
| IID    | Independent and Identically Distributed        | TR        | Tax Revenues  |
| IMF    | International Monetary Fund                    | TSA       | Treasury Single Account                               |
| INCT   | Taxes on Income, Profits and Capital Gains     | UCOA      | Unified Chart of Account                              |
| IO     | International Organization                     | UMIC      | Upper Middle-Income Countries                         |
| IPSAS  | Int'l Public Sector Accounting Standard        | UN        | United Nations  |
| ISPMS  | Indicators of Strength of Public Mngmt Systems | UNCTAD    | United Nations Conference on Trade and Development    |
| ITT    | Taxes on International Trade                   | UNDP      | United Nations Development Programme                  |
| IV     | Instrumental Variables                         | US        | United States   |
| LIC    | Low-Income Countries                           | US\$      | United States dollar                                  |
| LMIC   | Lower Middle-Income Countries                  | VAT       | Value Added Tax                                       |
| MIC    | Middle-Income Countries                        | WB        | World Bank  |
| MIMIC  | Multiple Indicator-Multiple Causes Model       | WDI       | World Development Indicators                          |
| MoF    | Ministry of Finance                            | WGI       | World Governance Indicators                           |
| MTEF   | Medium-Term Expenditure Framework              | WTO       | World Trade Organization                              |

## Country Abbreviations

|     |                        |
|-----|------------------------|
| ALB | Albania                |
| ARM | Armenia                |
| AZE | Azerbaijan             |
| BGR | Bulgaria               |
| BIH | Bosnia and Herzegovina |
| BLR | Belarus                |
| CZE | Czech Republic         |
| EST | Estonia                |
| GEO | Georgia                |
| HRV | Croatia                |
| HUN | Hungary                |
| KAZ | Kazakhstan             |
| KGZ | Kyrgyz Republic        |
| KHM | Cambodia               |
| KSV | Kosovo                 |
| LAO | Lao Republic           |
| LTU | Lithuania              |
| LVA | Latvia                 |
| MDA | Moldova                |
| MKD | Macedonia              |
| MNE | Montenegro             |
| MNG | Mongolia               |
| POL | Poland                 |
| ROU | Romania                |
| RUS | Russia                 |
| SRB | Serbia                 |
| SVK | Slovakia               |
| SVN | Slovenia               |
| TJK | Tajikistan             |
| TKM | Turkmenistan           |
| UKR | Ukraine                |
| UZB | Uzbekistan             |
| VNM | Vietnam                |

## **Abstract**

This dissertation explores three sets of relationships in the context of transitional states: (i) institutions and tax revenues, (ii) economic growth and tax structures, and (iii) the advice of international organizations and the implementation of PFM reform. It consists of three core chapters (after an introduction and overview of the project as a whole in Chapter 1).

Employing panel data, Chapter 2 addresses a central question: does the quality of institutions affect tax revenue in lower-middle income transition countries? It presents an analysis of the role of institutions, measured by shadow economy, corruption, regulatory quality, government effectiveness and rule of law in determining the level of tax revenue, as measured by the tax-to-GDP ratio. By tracing the origins of the tax systems in targeted countries since the fall of the Berlin Wall, Chapter 2 analyses the available data and relates the results to recent literature. It finds that the most likely causes of insufficient tax revenue stem from the low-quality institutions, specifically, the increased share of the shadow economy and level of corruption.

Chapter 3 employs panel data from a sample of transitional countries over the period 1991–2015. It finds that, in a particular transitional country, the higher the rate of economic growth, the higher the ratio of taxes to GDP. Moreover, economic growth, as measured by GDP per capita growth, among other pertinent variables, leads to changes in the tax structure. The findings also indicate that determining the causes of change in the composition of tax revenue during the course of economic development is helpful in creating a more effective tax revenue mix in transition economies.

Chapter 4 suggests that while international organizations facilitate the process of PFM reform in context of a specific transition country, and seem to be credible partners of local government in pursuing such reform, not all their advice has been implemented or implemented successfully. It finds that with the pace of implementing reform being slow, borrowed institutions based on international best practice are not always effective in improving the country's PFM systems. These findings are built upon the evidences from a review of policy documents, results of the PEFA framework assessment, and a survey among practitioners, public officials and donors.

## **Acknowledgments**

My thesis would have not been possible without the help of several people who have guided and supported me through my academic journey.

My principal advisor Dr. Leslie A. Pal deserves the utmost gratitude for his constant constructive and valuable advice and sensible suggestions throughout this journey. I am immensely grateful to my co-supervisors Professor Sohrab Abizadeh and Professor Crina Viju for their truly exceptional guidance, encouragement, helpful suggestions and insightful comments during the process of writing this dissertation. I would also like to thank Professor Saul Schwartz for his very practical suggestions.

I deeply appreciate extremely helpful comments and excellent constructive suggestions made by Professor Monica Cule and Professor Yiagadeesen Samy on different parts of this dissertation.

I am profoundly indebted to my mother, who inspired me with her great courage since beginning of my studies, who always believed in me. I would like to thank my father for his tremendous support, and patience.

I wish to acknowledge the excellent support and assistance of the University of Central Asia in early stages of writing this dissertation. I would like to express my appreciation to organizers and participants in the Workshop on Taxation and Revenue Mobilization organized by the United Nations University World Institute for Development Economics Research (UNU-WIDER) and the International Centre for Taxation and Development (ICTD) for their feedback on a portion of this dissertation.

## Chapter 1

### 1 Introduction

*“There is no surer art one government learns from another than the art of taking money from the pockets of people”.* Adam Smith

*“No public policy issue is more important than the structure and level of taxes”.* Joseph E. Stiglitz

*“Transitional states of society raise a particular category of problems which do not exist in societies that function according to a consistent system of principles”.* Joseph A. Schumpeter

How did the tax policy and public financial systems in transition economies<sup>1</sup> evolve: what happened, why and what are the policy implications of that evolution? This is the central research question, which is addressed here in three essays. The essays that make up this dissertation discuss public finance and public policy phenomena present in all transitional societies that try to find strategic fiscal policies associated with their development agendas. The dissertation explores the relevant research questions pertinent to the evolution of tax policy and reform advice on public financial management, and seeks to find optimal strategies to formulate development-oriented tax policy, a corruption-resistant tax structures, and more efficient public financial management approach for policy-makers in transition economies.

The topics of how taxation and public financial management in transition countries have evolved, and the resulting changes in tax revenue system and public financial architecture, have become increasingly important not only for governments in transition states, but also for development and international aid. Adequate revenue collection and efficient spending to finance key development expenditures and government needs has manifested itself as a fundamental challenge in almost all transition countries (Alm, Martinez-Vazquez and Schneider, 2004; Addison and Roe, 2004). If, under the centrally-planned economy, governments directly administered and allocated economic resources, enjoying the revenues often from the surpluses of state enterprises, then, during their transition to a market economy, they had to find different incentives to generate revenues from economic agents. This shift meant seeking new

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<sup>1</sup> The terms “transition” and “transitional” are used interchangeably to refer to countries with their economies in transition, or Transition Economies (TEs), or sometimes, post-communist countries, as used in the literature. This research focuses on the original notion of transition and covers former Soviet–bloc countries (including Central and East Europe, Baltic Sea States, South Caucasus and Central Asian countries, but excluding China, Cuba, North Korea - these countries are not analysed in this research). After the collapse of the Berlin Wall, these countries went through transition from centrally planned economies to more market–dominated systems.

While the original notion of transition (formulated for instance, by the European Bank for Reconstruction and Development - EBRD, 1997) included all countries, which emerged from communism and faced a similar set of challenges on their way to capitalism, since the evolution of transition process, a variety of brands of capitalism that need different sets of reforms emerged. As a result, the EBRD redefined and broadened its transition concept in 2016 from an emphasis mainly on the level of state control of an economy to a wider set of assessments. The new concept argues that a “well-functioning market economy should be more than just competitive; it should also be inclusive, well-governed, environmentally friendly, resilient and integrated” (EBRD, 2016: 08). The Czech Republic is the only country so far to have made that transition, according to new EBRD’s criteria for determining when a country had completed its transition to a market economy.

mechanisms of economic management, new legal and administrative leverage, establishing novel tax and spending systems consistent with the development, political and socio-economic needs of a society in transition.

In exploring how tax policy has evolved over time in transition economies, two points must be taken into account. First, neglecting tax reform during the transition to a market economy cost the Former Soviet Union (FSU) countries a hefty price – disruptive transition, volatile economic downturns, cyclical fiscal policies and inadequate tax institutions - causing government revenues to decline rapidly and drastically (Mokhtari and Ashtari, 2012). Second, not having proper institutions in place at the time, governments in the FSU faced considerable revenue loss during the transition to a market economy, with their citizens suffering hardships (Deaton, 2008). However, building stronger and proper institutions has not been simple. Although there is no blueprint for change, and no conventional theoretical framework or roadmap for a smooth shift from a socialist centrally-planned economic system to a market economy, we can learn from the experiences of transition countries in setting up the essential institutions to ensure apt tax revenue and appropriate public financial management systems.

Two different theories that predict only partial reform in the post-communist economies in transition can be found in the literature. One posits that early negative distributional consequences of transition may lead to backlash of some countries instead of the desired reform (Przeworski, 1991). The other argues that early gains from transition induce reformers holding a position of authority to put the economy only in partial reform equilibrium, because it is where their vested interests and rent-seeking behaviour is protected (Hellman, 1998).

In a market economy, the role of tax policy follows from the view of the role of government in organizing economic activities (Faria, 1995). One of the theoretical frameworks used to explain the development of tax policy and differences in tax policy evolution across countries is institutional theory (Eccleston, 2004; Hale, 2002; Peters, 1991; Mariott and Holmes, 2006; Steinmo, 2003). One of the strands in the institutional theory literature (Brewer, 1988; Finer, 1997; Johnson, Kaufman and Schleifer, 1997) favours non-interventionist government with lower taxes. However, some scholars (Shleifer and Vishny, 1993; Mauro, 1995; Treisman, 1997) favour greater intervention by the government resulting in either performing governments' tasks, well, by effectively collecting taxes or performing those functions with delays, corruption and distortions.

There is much space for examination of tax policy in transition countries using these theories, particularly using institutional development theory. Despite the obvious advancement of the above-mentioned authors in explaining differences in tax policy evolution across and within countries, first, institutional theory and institutional development theory have not been widely applied outside above-mentioned authors' works and second, the experience of transition countries has not been expansively investigated, in contrast to the OECD member-countries, which have received much emphasis. Thus, *the first task* for this dissertation is to investigate the evolution of tax policy in selected transition countries by using institutional development theory and utilizing a tax effort model to explain the different approaches adopted by those countries in their respective tax reforms.

Second, the structure and level of taxation, the pattern of tax bases, and the overall level of tax burden, tend to change over time and with economic development. While a myriad of studies has explored the relationship between government spending, taxation and economic growth, one obvious fact -- that the increase in the level of gross domestic product (GDP) in a given country could also affect the structure and level of taxation -- had been somewhat neglected. The theoretical link between the rate of economic growth and tax structure has not been clearly established in the standard neoclassical model literature in spite of the increased importance of tax reforms, which often leads to changing the tax structure (Tosun and Abizadeh, 2005).

Identification of key factors in the settings for tax policy in post-communist transition countries requires looking at how the level and structure of taxes changed over time and across countries. Tax burdens as a percentage of GDP differ considerably between industrialized, developing and transition countries. While in industrialized countries the average tax share (ratio of taxes to national income) increased from 30 to about 35% over the last 30-year period, in transition countries, the tax share decreased slightly over two decades, but shows a remarkable slowdown compared to 1980s (Bahl and Bird, 2008). Certainly, there is a considerable variation across both developing and transition countries. Analysis of the determinants of this variation in the tax ratio suggests that among other factors, those transitional and developing countries that imposed higher taxes did so largely in response to an increase in per capita GDP (Bahl, 2006). Hence, *the second task* for this dissertation is to analyse more current fiscal data on transition countries, examine their governments' latest revenue trends in order to unravel the relationship between economic growth and tax structure to find niches for public policy to streamline tax collection.

Finally, equally important to generating revenue, governments need control over generated public resources to fund national priorities and provide public services ranging from defence, education, health care, social programs, payment of salaries to public servants, to water and sanitation, building public infrastructure, environment protection and natural disaster management, etc. An efficient system of public finance management (PFM) is thus a vital component of any state. Post-conflict states and transitional countries present a particularly complex environment for building and strengthening public financial management systems. In post-conflict environments, the reform of public financial management became a principal area of not only local governments, but also international organizations. The World Bank, the International Monetary Fund and other donors are engaged in supporting PFM reforms in many post-conflict environments of transitional countries, including Tajikistan. Progress in PFM reforms is often considered as a key conditionality for a country to receive sustained and considerable aid flows, making it more susceptible to accepting what has been advised.

With the exception of some notable work dedicated to post-conflict countries (World Bank, 2012), the literature on PFM does not focus on post-conflict environment (Pretorius and Pretorius, 2009) or specifically, on transitional countries. The notable literature highlights a significant influence of donors in promoting PFM reforms through policy dialogue, provision of grants and other support operations, and emphasizes that:

“strong external influence on reform drivers, measures, and approaches has been achieved through various combinations of financing mechanisms (such as multi-donor trust funds) and policy conditions (linked to IMF staff monitored programs and poverty reduction growth facilities, donor budget support, HIPC conditions, and others) as well as by providing technical assistance” (WB, 2012: 21).

Consequently, accomplishing the first and the second tasks will be conducive to exploring the reform advice on public financial management reform drawing on experience of Tajikistan, a post-conflict transitional country, particularly a meta-analysis of the evolution of the PFM system in light of reform advice and implementation in Tajikistan, which is *the final task* for this dissertation.

*The structure of the dissertation.* The dissertation is composed of three essays. It consists of two quantitative essays that are based on econometric models utilizing the extended tax effort<sup>2</sup> model and tax revenue components model, aimed at exploring revenue collection challenges in transition economies. They are followed by a qualitative essay based on semi-structured interviews investigating the adoption of reform advice for the PFM system, drawing on the example of Tajikistan, a transitional country in Central Asia. Each essay consists of an abstract, introduction, literature review, methodological discussion, followed by the analysis and conclusion.

Chapter 2 analyzes the directions of tax reform that transitional countries have followed since the fall of communism to 2015, and considers whether they are justified in terms of institutional development theory and the practical socio-economic constraints of transitional countries. Chapter 3 empirically explores whether economic growth affects changes in the tax structures in transition countries. Chapter 4 utilizes of the Public Expenditure and Financial Accountability (PEFA) indicators and results of the survey among stakeholders in PFM reform, to investigate what PFM reform advice has been implemented successfully and what did work and what did not. A concluding section assembles briefly findings of all chapters of the dissertation and closes with reflections on the policy implications

The three essays are inextricably and directly linked. The three essays relate to each other by focusing on integrating theoretical analysis of taxing and spending activities of governments with development issues. They all touch strategic issues in public finance and development studies. Chapter 2 studies the impact of institutions, corruption and underground economy on ability of transitional countries to collect taxes. Chapter 3 investigates whether the economic growth influences changes in structures of tax revenues. Chapter 4 explores PFM reform advice and implementation, drawing on the specific case of a transitional country. Chapter 5 concludes with policy implications. A unifying theme in all the

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<sup>2</sup> This study uses the terms ‘tax revenue’ or ‘tax collection’ interchangeably to refer to actual tax-to-GDP ratio in transition countries, as opposed to ‘tax effort’ and ‘tax capacity’ concepts, that are not used in this study. In the literature, often tax capacity is defined as the maximum (and/or predicted) potential level of tax revenue that a country can collect, whereas tax effort refers to the ratio between actual revenue and tax (or predicted total taxable) capacity (Garg, Goyal, Pal 2017; Maurya, Singh, Khare, 2016; Piancastelli, 2001).

However, sometimes the term ‘tax effort’ is used in the literature more broadly to refer to tax revenue as a percentage of GDP in general (Bird, Martinez-Vazquez, Torgler, 2008). When discussing the concepts of the ‘tax effort model’ and the ‘extended tax effort model’ by Bird et al. (2008) in this study, the terms used in cited reference articles were not changed.

chapters is to get insights on the nature of public finance as an essential underpinning for a better understanding of many of the key public policy and development debates in transitional countries. A unifying objective of essays has been to analyse the ongoing public policy debates relating to public finance, especially the public money raised mostly from taxes by the states, and aid received from IOs to reform public sector in case of lower middle-income transition economies.

Together, the chapters reveal and address several gaps in the field. Collection of adequate level of revenues, change in tax structures as a result of economic development, along with analysis of influence of external actors in implementation of PFM reform is an essential, but often neglected, foundation for the study and practice of public policy, public management, public sector economics, development studies and other applied social sciences. Thus, *what was*, *what is* and *what should be* a normative framework for fiscal reform, based on positive analysis, is the other common thread linking all chapters thematically and intricately.

## Chapter 2

### 2 Impact of Institutions on Tax Revenue Collection in Transition Economies

#### 2.1 Introduction

Transition economies (TEs) or countries with their economies in transition faced and some still encounter the absence of a tradition of market-based institutions as an enormous challenge to overcome and withstand. In the case of transition countries, this can be traced to a common ‘socialist’ past. Institutional quality can act as a determinant of tax collection and tax potential, and the poor quality of institutions and governance in many transition countries is an instrumental factor behind the poor tax collection. In addition, a large informal or shadow economy is often a determinant of tax revenue, as it widens the gap between potential and real tax collection.

This chapter considers the tax policy context in thirty-three transition economies<sup>3</sup> and investigates if tax revenue collection is influenced by the quality of institutions. The primary goal of this chapter is to analyse available data to explore the impact of institutional quality on tax collection in case of

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<sup>3</sup> For the current 2017 Fiscal Year (FY) 33 transition economies covered by this study are classified into: a) lower-middle income, b) upper-middle income and c) high-income group based on their Gross National Income (GNI) per capita, using the *World Bank Atlas method* in 2015. Henceforth, lower-middle-income transition economies (those with a GNI per capita between \$1,026 and \$4,035) include 11 countries: Armenia, Cambodia, Kosovo, Kyrgyz Republic, Lao PDR, Moldova, Mongolia, Tajikistan, Ukraine, Uzbekistan and Vietnam. These countries still face the most significant transition challenges. Upper-middle-income transition economies (those with a GNI per capita between \$4,036 and \$12,475) include 13 countries: Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Macedonia FYR, Montenegro, Romania, Russian Federation, Serbia and Turkmenistan. High-income transition economies (those with a GNI per capita between \$12,476 or more) include 9 countries: Croatia, Czech Republic\*, Estonia\*, Hungary\*, Latvia, Lithuania, Poland\*, Slovak Republic\* and Slovenia\* (6 countries with asterisk are also OECD-member countries, while Latvia is in the process of becoming a member of the OECD).

transition economies<sup>4</sup> since the fall of communism. It empirically examines the relationship between institutional quality/informal institutions and tax collection to explain what would improving of institutional quality mean for tax administration in lower-middle income transitional countries. This chapter answers *the research question*: does quality of institutions indeed affect tax revenue in lower-middle income transition countries? As weak institutions undermine the government's ability to collect tax revenues, I *hypothesize* that the higher share of total tax revenues to GDP is associated with stronger and less corrupt political and socioeconomic institutions or forces.

This chapter examines the impact of institutional quality and the presence of informal institutions (including informal economy and corruption) on tax<sup>5</sup>-to-GDP ratio in various transition economies. This study utilizes panel data analysis and synthesizes the most current data for 33 transition economies. It extends the body of knowledge about the topic by analyzing the most current data from different sources with the focus on transition countries where only a scant literature bearing on the problem exists.

This study engages in the analysis of the quantitative and qualitative research on the tax effort model to show a connection between tax collection and institutional factors. It builds on previous studies on the tax effort model and the extended tax effort model, but is *distinctive* in two areas. Its regional focus is entirely on the post-communist transition countries. It contains more current and up-to-date data. Many developing and transition countries need more revenues to finance their spending on social programs, education, health care, defence, public infrastructure, environment protection, public investment programs and so on. In addition, sufficient revenues can finance a continuous flow of public services over time. The demand for public services can grow at the same rate or faster than the economy. If there is a growing demand for social security spending for example, revenues may need to grow even faster than the economy.

Furthermore, for developing and transition countries to reduce poverty, they must increase their capacity to collect a relatively larger fraction of tax revenue<sup>6</sup> as a percentage of GDP. Strengthening the tax policy capacity within the tax agency and making the system more taxpayer friendly is key to solid

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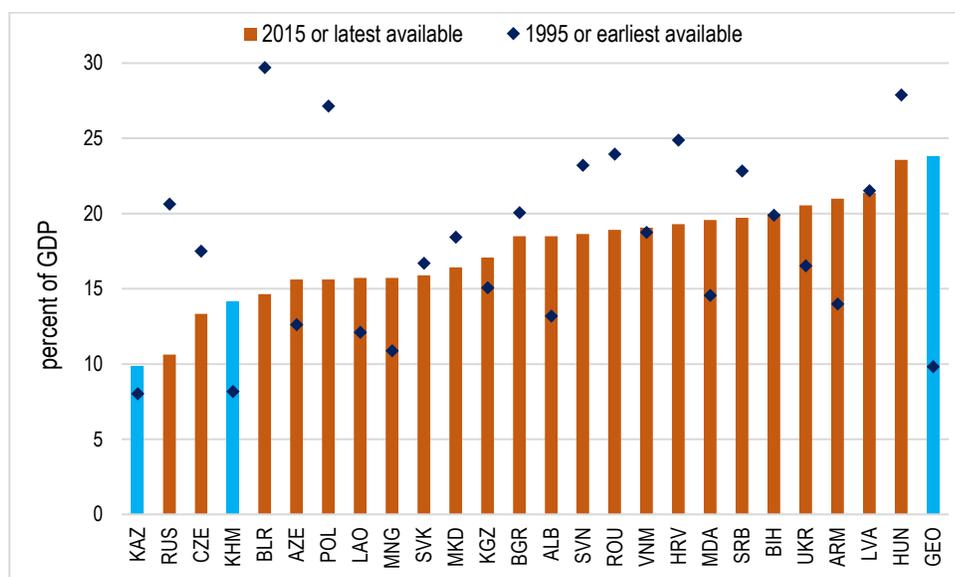
<sup>4</sup> The assumption of this study was that a transition country's income group stays the same and does not change if the income group classification of a country remained unchanged over the last 5 years in the sample period (i.e. 2012-2016). If the income group changed over the last five years, then the assumption was to which income group classification a country belonged or listed as, most of the time. For instance, if we look at the data, Albania was classified as low-income (LIC) in 1993-1995, as lower-middle income (LMIC) during 1991-92, 1998-2008, 2011, as upper-middle income (UMIC) in 2009-2010 and 2012-2016. So, for the sample period Albania was listed as LIC – 3 times, as LMIC – 14 times, and as UMIC – 7 times. Since Albania was listed as UMIC over the last five years, it was classified as UMIC in the estimations. Otherwise, it would have been classified as LMIC, since it was classified more as LMIC since 1991.

<sup>5</sup> Taxes are defined as compulsory payments to general government based on Prichard, Cobham, and Goodall (2014). The data on total tax revenue here refer to the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes.

<sup>6</sup> Tax revenue refers to compulsory transfers to the central government for public purposes. Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It is regarded as one measure of the degree to which the government controls the economy's resources.

progress in implementation of the current tax reform. There is still a need to raise tax revenue to its full potential to create room for higher spending in priority areas, particularly in social welfare, education and health care. The other significant challenges to successful implementation of the reform are the high tax rates burden and complicated filing procedures that discourage individual entrepreneurs and small firms from operating in the formal sector and, contribute to a shadow economy. The informal economy in almost all lower-middle income transition countries as a share of officially measured GDP is estimated to be very high (Elgin and Oztunali, 2012). Entrepreneurs who operate in the informal sector or hide part of their income are prone to unofficial solutions with government officials, and they deprive the state of tax revenue, at times enabling corruption to persist.

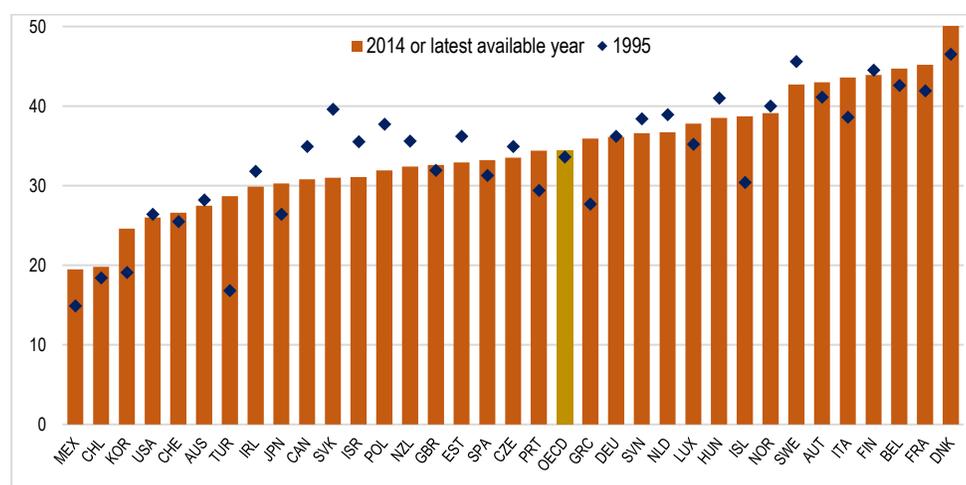
The tax to GDP ratio of most transition countries experienced some change over the past two decades (Figure 2.1). If we assess the aggregate tax revenue through inter-country comparisons between 1995 and 2015 (i.e. twenty years later), looking at what comparable countries collect, the outcome shows that tax revenue in almost all FSU countries rose, but only slightly, with Russian Federation and Belarus being the exception where revenue collection declined (Figure 2.1). In 2015, many countries of East Europe (Hungary, Serbia, Croatia, Romania, Slovenia, Bulgaria, Poland, Macedonia, Poland, Czech Republic and Slovakia) collected less tax revenues in general than in 1995 (WDI, 2016). With the move from a centrally planned economy to a market economy, nominal tax collection in FSU countries has grown. However, the cultural and institutional legacy of central planning had a lasting impact on tax reform in FSU countries as it had in other transition countries. The complicated tax laws, irrational and burdensome administrative practices, and a lack of voluntary compliance all provide disincentives to accrue capital and to operate within the formal economy. Building an efficient form of taxation in these countries depends not only on administrative and economic welfare, but also on strong institutions, removal of administrative barriers, macroeconomic management, economic incentives, and improvement in the business environment.



**Figure 2.1** Total Tax Revenue as a Percentage of GDP in Transition Economies (1995 and 2015).

Constructed using data from World Development Indicators (2016). *Note:* 1) The figure shows comparison of the tax to GDP ratio of transitional economies between 1995 FY and 2015 FY. 2) The data on tax performance from the GFSY (IMF, 2016) and the Government Revenue Dataset (ICTD, 2016) may to some extent, differ from data presented above.

Taxation provides necessary funds to allow the government to perform its functions, however high taxes may threaten government stability. The ‘critical limit’ or optimal level of total tax revenues receipts to national income has been studied extensively. Clark (1945) argued at the end of World War II that if the sum of all kinds of taxation passes the ‘critical limit’ of more than 25% of national income, detrimental pressure and distortion of the economy can have devastating effects on national debt as the value of the currency declines. Clark pointed out that a high tax burden or high tax ratio to national income depreciates the value of money, can wear down economic incentives and encourage tax evasion. However, as of 2014, almost all OECD member countries (with the exception of Mexico and Chile) passed this figure (Figure 2.2). The OECD countries experienced rapid growth of real incomes and relatively stable inflation over the last decade. As it currently stands, among the OECD countries, Denmark has the highest tax-to-GDP ratio (50.9% in 2014) followed by France (45.2%) and Belgium (44.7%) (Figure 2.2).



**Figure 2.2** Total Tax Revenues as a percentage of GDP in the OECD countries (1995 and 2014). Constructed using data from OECD (2016). *Note:* Denmark has the highest tax-to-GDP ratio among OECD countries (50.9% in 2014) followed by France (45.2%) and Belgium (44.7%).

Thus, the *central argument* of this chapter is that the adequate level of tax collection to finance national priorities, development, infrastructure and other spending needs in transition countries is a product of a complex interaction between strong institutions. The intricate interactions should involve corruption-resistant mechanisms, rule of law, higher level of income per capita, shadow economy management, human capacity, responsible government, strong revenue authorities and streamlined tax administration. This argument is built upon the extended tax effort model, which contains the institutions variable controlling for governance and corruption factors to extend the conventional tax effort model. In almost the same way, if taxpayers have low trust in authorities and confront widespread corruption, they tend to conceal their taxable incomes, evade taxes and not comply with their tax obligations.

The structure of this chapter is as follows. Section 2.2 presents the conceptual and theoretical framework to address the impact of institutions and shadow economy on tax revenue collection in transition countries. First, it provides definitions and discusses how the institutional variables can be measured for the purposes of this study. Then, it summarizes theories and theoretical studies in the

literature that addresses the role of informal institutions such as shadow economy and corruption in revenue collection. Next, it analyses the conceptual frameworks proposed in the literature and offers diagrammatic representation of institutional variables along with interpretation of institutional interactions. Section 2.3 lays out the research methodology. It explains the concept of extended tax effort model, the theoretical framework and analyses the advantages of the extended tax effort model. Section 2.4 summarizes the available data and describes data sources. Section 2.5 provides the model specification and describes the estimation procedure. Section 2.6 offers the baseline results of fixed-effects model and explains why institutions and shadow economy are important factors in tax revenue collection. Section 2.7 provides robustness checks and its findings, and Section 2.8 concludes and presents policy implications.

## **2.2 Conceptual and Theoretical Framework**

### **2.2.1 Institutions: Definitions and Measurement**

What are institutions? This study uses wide and loose definitions of the institutions. In its broadest definition, institutions “are simply rules” and “some [rules] are formal (as in constitutional rules), some are informal (as in cultural norms)” (Steinmo, 2015: 181). Douglas North offers more subtle loose definition of the institutions:

“Institutions are the rules of the game of a society or, more formally, are the humanly-devised constraints that structure human interaction. They are composed of formal rules (statute law, common law, regulations), informal constraints (conventions, norms of behaviour, and self-imposed codes of conduct), and the enforcement characteristics of both.” (North, 1995: 7).

Not only institutions structure political, economic and social interactions, but they also shape “the direction of economic change towards growth, stagnation, or decline” (North, 1991: 97), and as institutions evolve, they face both informal constraints (customs, traditions, taboos) and formal constraints (constitutions, laws, property rights). North highlights that “because institutions are made up of formal rules, informal norms and the enforcement characteristics of both, it is the combination of rules, norms, and enforcement characteristics that determines economic performance” (North, 1995: 15). Thus, institutions exist because of formal and informal rules, norms, and their enforcement mechanisms that govern the evolution of communities and societies and that impact the behaviour of social actors.

Institutions evolve and change over time. The concept of institutional matrix can explain the institutional change in this context. The institutional matrix is composed of a mutually interdependent set of political and socio-economic institutions (North, 1991: 109). It consists of a complex of co-dependent rules and informal constraints that predefines the degree of learning and economic change to such an extent that “if the institutional matrix rewards piracy (or more generally redistributive activities) more than productive activity, then learning will take the form of learning to be better pirates.” (North, 1995: 14). One of the fundamental characteristics of an institutional matrix is *informal*

*constraints*, which is a powerful and often widely used method of lowering transaction costs between social actors:

“*Informal constraints* can take the form of agreed upon lower cost forms of measurement (standardized weights and measures, for example) and make second- and third-party enforcement effective by specific sanctioning devices or information networks that acquaint third parties with exchange performance (credit ratings, better business bureaus, etc.).” (North, 1990: 41).

The underlying assumption is that quality of institutions has a strong connection and pertinence to collection of tax revenues in the context of transition economies. The assumption underpins that a low-quality judicial system, too much bureaucracy, lack of transparency in government, and fixed arrangements in providing credits to connected borrowers and firms intensify informal or shadow economic activities, which in turn, lead to tax evasion and discouragement to pay taxes. In other words, the more enhanced the enforcement capability or the rule of law, the higher the regulatory quality and effectiveness of government, the lower the share of shadow economy and corruption, the more taxes a government can collect.

Kaufmann (2010: 4) offers measuring the governance by six dimensions. To measure the quality of institutions, the following three World Bank’s *Worldwide Governance Indicators (WGI)* are used as key supplementary proxies in this study.

(a) *The capacity of the government to effectively formulate and implement sound policies:*

**Government Effectiveness (GE)** – capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies.

**Regulatory Quality (RQ)** – capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

(b) *The respect of citizens and the state for the institutions that govern economic and social interactions among them:*

**Rule of Law (RL)** – capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

*Why these indicators, but not the others?*

Three other indicators of the WGI – control of corruption, voice and accountability along with political stability and absence of violence are not included in this study. Corruption in our model is captured by the corruption perception index of Transparency International. The indicators of political stability, voice and accountability are not taken into account since they measure different angles of governance<sup>7</sup>, aspects that are more political. In this regard, the perceptions on political processes by which governments are selected, monitored, and replaced (the areas by which these indicators measured) can be challenged vigorously. For instance, the monumental challenge could be the practical outcomes of the political processes and selection, monitoring, and replacing governments in many transition countries remain largely unchanged, or inert and static over the last two decades. Examples can be found in political processes that countries of the former Soviet Union such as Belarus, Armenia, Azerbaijan, almost all Central Asian countries, and some countries of East Europe, such as Macedonia have been experiencing lately. Furthermore, institutional quality measured as the mean of not all six dimensions of governance, but only three or four indicators is used extensively in the literature (for instance, in the studies of Buehn, Lessmann and Markwardt, 2013; Abdih and Medina, 2013; Torgler and Schneider, 2009). Thus, despite the indicators of voice and accountability and political stability and absence of violence are parts of governance dimensions, they are not taken into consideration and not tested as possible independent variables in this study.

*Why the World Governance Indicators would be good proxies for the institutional variables?*

This study uses three sub-indexes of governance: *rule of law*, *regulatory quality* and *government effectiveness* independently by using the respective WGI indicators as proxies for institutional quality. They are reasonable proxies for quality of institutions for several reasons. First, *regulatory quality* and regulatory agencies are the part of the web of interconnected institutions (North, 1990: 67). Regulations and *regulatory quality* form part of the formal rules of the game of a society (North, 1995: 13). Regulations and *regulatory quality* can act as a good proxy for institutional quality also because they are important in regulating or governing shirking or dodging, various principal/agent problems, and even income inequalities. Second, *government effectiveness* and efficiency is a good proxy for institutions because government effectiveness is one of the vital functions of the property rights structure and enforcement (North, 1990: 63). The principle of equity in government efficiency in this regard is of great importance, as “efficient policies that are perceived to be inequitable will engender political reactions that can stall or reverse effective reforms” (North, 1995: 16). Third, *the rule of law*, being one of the basic institutional frameworks of formal rules, along with civil and political liberties,

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<sup>7</sup> As of yet, there is no strong consensus among policymakers and scholars around a single definition of governance or institutional quality. Various authors have come up with different definitions. Governance in its broader definition implies “rules, enforcement mechanisms, and organizations supporting market transactions” (WB, 2002: 4). Narrower definition is “the manner in which power is exercised in the management of a country’s economic and social resources for development” (WB, 1994: 13). For this analysis, governance is defined as “(a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them” (Kaufmann, 2011: 222).

foster and stimulate future economic growth. In this regard, long-term “economic growth entails the development of *the rule of law* and (probably) the protection of civil and political freedoms” (North, 1995: 15). The WGI indicators of the *rule of law* and *regulatory quality* is used as a form of rule-based trust or rule-based institution in the work of Muethel and Bond (2013), and Alon and Hageman (2017).

Finally, the WGI indicators can act as good proxies for institutions, due to the richness of the WGI dataset. It is compiled using several hundred variables gauging different perceptions on institutions and governance covering over 200 countries since 1996. Also, it is collected from 31 different data sources, assessing perceptions of businesses, NGOs, public sector organizations and other respondents on institutional and governance quality (Kaufmann et al., 2010). In addition, the WGI uses an Unobserved Components Model, a statistical methodology to build both aggregate and disaggregated indicators of institutional quality and governance as a weighted average (Kaufmann et al., 2010).

Also, to check the robustness of the statistical results for the institutional quality this study employs instrumental variables such as index of ethnic, language and religious fractionalization using data from the alternative source, from Alesina et al. (2003) and system of checks and balances in political system using data from Dahlberg et al. (2016). They are also good proxies for institutional quality as they also form part of institutional matrix.

However, as North notes (1990: 36): “yet formal rules, in even the most developed economy, make up small (although very important) part of the sum of constraints that shape choices; a moment’s reflection should suggest to us the pervasiveness of informal constraint”. Thus, informal rules and constraints are also vital component of institutional matrix and institutional framework.

### ***Shadow Economy and Corruption: definitions and why treat them as institutional variables?***

Commonly, interaction of formal and informal institutions results in confrontation and conflict of two, culminating in the form of the shadow economy, as: “when formal and informal institutions clash, non-compliant behaviour proliferate, forming various *underground economies*.” (Feige, 1997: 22). Once formal and informal institutions clash, it leads to more tax evasion, especially in the context of transition economy (Gerxhani, 2004b: 729). Tax evasion in general is the mostly cited source of informal economy in the literature analyzed by Gerxhani (2004a). As a result, when the share of shadow economy rise extensively, it can cause a substantial reduction in tax revenues, and poorer quality of public goods and services (Torgler, 2010: 309). Gerxhani (2004b) highlights that without thoroughly studying the informal institutions, it would be impossible to investigate the phenomena of shadow economy:

“The theoretical importance of the interaction between *formal and informal institutions* in determining tax evasion finds empirical support in the data. When the two types of institutions are studied separately, the results can be ambiguous. Hence, for the study of noncompliant activities, one should consider both types of institutions simultaneously for a further comprehension of these phenomena” (Gerxhani, 2004b: 742).

Not only the institutional structures sometimes lack the formal anatomy and shape that can support the market economy mechanisms, but also very often feature informal sectors, that are in effect shadow

economies (North, 1990: 67). Analysing vast array of literature on tax evasion, Gerxhani (2004a) highlights that investigators of shadow economy face two competing theories: optimal taxation and rational utility maximization from the public choice perspective:

“Most of the theoretical contributions to the study of tax evasion can be summarized in two main categories, depending on how they see the role of government. The first assumes a benevolent dictator that maximizes social welfare. This includes the optimal taxation literature. The second sees government agents as rational utility maximizers. This is mainly represented by the public choice literature.” (Gerxhani, 2004a: 284).

While numerous registered businesses in transition countries sell much of their products and/or crops, and recruit much of their workforce through unofficial channels, these sort of decisions are not made because of the weak capabilities of their formal institutions: the legal system to enforce contracts (Johnson et al. 2005). Therefore, informal institutions such as unofficial economy or corruption are worth of investigation on their own, as a separate from but still closely connected phenomenon to formal institutions as well.

Existing literature clearly defines the meaning and definition of the shadow economy. This study uses the narrower definition of the *shadow economy* that refers to it as “all market-based production of legal goods and services that are deliberately concealed from public authorities for the following reasons:

- to avoid payment of income, value added or other taxes
- to avoid payment of social security contributions;
- to avoid having to meet certain legal labour market standards, such as minimum wages, maximum working hours, safety standards, etc.; and
- to avoid complying with certain administrative obligation.” (Schneider and William, 2013: 25)

Pappa et al. (2015) view the shadow economy as a synonym for the tax evasion. Somewhat similar to Schneider and William (2013) definition of the term is provided by Buehn and Schneider. They contend that shadow or underground economy consists of “all market-based, lawful production or trade of goods and services deliberately concealed from public authorities in order to evade either payment of income, value added or other taxes, or social security contributions” (Buehn and Schneider, 2012: 175-76). Shadow economy in the form of tax evasion often coexist with corruption. The study by Buehn and Schneider (2012) points out that there is a positive correlation between the two. The term corruption in this study refers to grand, petty and political corruption as defined by the Transparency International:

“Grand corruption consists of acts committed at a high level of government that distort policies or the central functioning of the state, enabling leaders to benefit at the expense of the public good. Petty corruption refers to everyday abuse of entrusted power by low- and mid-level public officials in their interactions with ordinary citizens, who often are trying to access basic goods or services in places like hospitals, schools, police departments and other agencies. Political corruption is a manipulation of policies, institutions and rules of procedure in the allocation of resources and financing by political decision makers, who abuse their position to sustain their power, status and wealth.” (Transparency International: <https://www.transparency.org/what-is-corruption#define>)

A difficult question to answer in this context is however, why one can treat the shadow economy as an institutional variable? The short answer is that while formal institutions do not regulate shadow economy, the informal or underground economy is governed by the rules of informal institutions and as such, one can treat the shadow economy as an institutional variable, once a broader or looser definition of institution is used.

I believe that the shadow economy can adequately proxy for the informal institutional indicator in determining the level of efficiency of the tax administration and overall adequacy of revenue collection in the context of transition economies. The shadow economy should be treated as a broader informal institutional variable because underground economic activities are the indirect and unexpected by-products of the institutional environment and of interactions of institutions. The shadow economy can serve as a broad informal institutional variable as it is also the direct outcome of the continuous institutional evolution. Considering the direct effect of the shadow economy on tax revenue with institutions playing an important role on the prevalence of shadow economy and the various direct and indirect links between corruption and tax revenues, analyzed in the literature, the shadow economy is considered as a proxy for informal institution in this study.

The shadow economy is also intertwined with corruption. The shadow economy is the other representation of informal institutions. It is obvious that when the tax administration and overall institutions are corrupt, it can be easier to get away with tax evasion; even if a taxpayer is caught with delinquencies, he pays bribe to the tax collector (Johnson et al., 2005), thus contributing to higher share of the shadow economy. Corruption has been used extensively in the literature as a proxy for institutional quality variable (for instance, Alon and Hageman, 2017; Bird et al., 2008).

In the context of transition countries, informal business approaches along with social expectations and political considerations all can corrupt tax administration and taxpayers' culture by creating several externalities, resulting in various types of equilibria (Cule and Fulton, 2009: 813). First, in the so-called 'bad equilibria', direct or indirect interactions between tax inspectors and businesses lead to ramping up the tax audits and then, increased penalties. Second, businesses that are eager to reduce their transaction costs, attempt and often manage to evade taxes by using the widespread corruption mechanisms in their interest. As the corruption is rampant, this environment increases the cases of deceitful or shadow transactions. Finally, the other equilibria arise when the outcomes of underground economic activities suit the stakes of both businesses and tax inspectors by opening new avenue for bribe taking (Cule and Fulton, 2009: 813).

Not only has the shadow economy influenced tax revenue directly and indirectly according to existing literature, but also the shadow economy and revenue collection are considered as two parts of a 'vicious cycle'. On the one hand, the stagnation of economic activities causes fleeing from formal to more shadow transactions, leading to shrinking tax revenue, and as such, hiking the fiscal deficit. On the other hand, shrinking revenues and rising deficits are, in turn, compensated for by higher tax rates. The vicious cycle goes on with higher taxes pushing more businesses and employees into the shadow

economy, and out of the official economy (Krstic and Schneider, 2015). In addition, the burgeoning literature focusing on entrepreneurship theory specifies that *informal or shadow economy* functions outside of formal institutions, but within the borders of informal institutions (De Castro, Khavul, and Bruton, 2014; Webb, Ireland and Ketchen, 2014; Welter and Smallbone, 2011; Williams and Shahid, 2016; Williams and Vorley 2014).

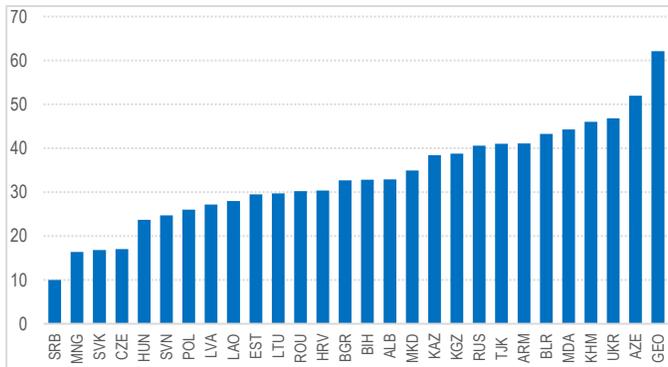
Tax avoidance and concealment are widespread worldwide. When compliance is complicated and difficult because of complexities of tax codes, tax evasion is exacerbated, as even taxpayers who are willing to pay taxes are unable to fulfil their obligations. To minimize tax evasion and maximize tax revenue, best practice governments in developing and transition countries strive for transparent, simplified systems of accounting and reporting to the tax authorities (Bird and Gendron, 2007). This is especially important for the main two segments of taxpayers in the lower-middle income transition economies – (a) large enterprises-taxpayers and (b) individual entrepreneurs, because most of the time they do not have the financial sophistication to cope with complex tax rules.

Historically, there was no need to have a compliance strategy to collect taxes in the communist states as the revenues generated included hidden taxes collected through the administrative structures of the command economy. The transition brought the tax burden out of the shadow and placed the obligation to directly pay taxes on the taxpayers. The tax base of socialist countries before transition consisted mainly of surpluses of state and municipal enterprises (Chand and Lorie, 1993; Bogetic and Hillman, 1995). Authorities with weak administrative capacities during the early days of transition had to develop a culture of public compliance with the new revenue claims (Easter, 2008). The transition from taxation mechanisms fit for a centralized planned economy to tax systems meeting the needs of the market-based economy was not a smooth process (Kuznetsov and Goncharenko, 2008) for many transition countries. In Russia for instance, despite persistent government efforts to improve taxation effectiveness, the shortcomings and problems of the tax system have been widely regarded by experts inside the country and abroad as main reasons for the poor performance of the Russian economy in the 1990s (Popova and Tekoniemi, 1998). The main motivation to evade taxes during the 1990s in Russia was the tax system itself as it provided incidences of extortionate taxation, lack of transparency, a very high level of decentralisation, and unequal and punitive measures for taxpayers (Yakovlev, 1999; Pogorletskiy and Soelner, 2002).

Low motivation of taxpayers to pay official taxes or low tax morale<sup>8</sup> reduces the tax revenue collection in a country. The level of tax revenue is associated with taxpayers' decisions to be fully or partially involved in the informal shadow economic activity and not paying official taxes. A larger shadow economy might cause lower tax revenue collection. Figure 2.3 shows that the size of the shadow economy measured as a percentage of official GDP exhibits considerable variation across transition economies. Poor regions tend to have a higher share of shadow economy than rich ones.

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<sup>8</sup> Tax morale is defined as the individuals' willingness to pay taxes and more broadly, moral obligation to contribute to society by paying taxes.



**Figure 2.3** Size of the shadow economy in percentage to GDP in transitional economies, 2007. Constructed using data from Schneider, Buehn and Montenegro (2010).

The average size of the shadow economy of transition countries increased from 35.8% of GDP in 1999 to 38.1% of GDP in 2006 (Schneider, Buehn and Montenegro, 2010). Unofficial or shadow economy in the context of the whole spectrum of economic operations carried out by the state is of the utmost importance in determining the tax revenue collection. It is because the shadow economy is crucial in the value-adding process or creating value through minimizing the information gap in decision-making – whether the legal ones (operate within the official economy), semi-legal (grey economy operations) and the entirely unlawful actions (shadow economy – entirely illegal) (Raczkowski and Schneider, 2013; Schneider, F., Raczkowski K. and Mroz, 2015).

Review of important studies about the impact of corruption on tax revenues also makes compelling reading for this analysis. Empirical assessment by Tanzi and Davoodi (2002) of the impact of corruption on the total (both tax and non-tax) revenues in a sample of up to 90 countries over the period of 1980-1997 suggested that corruption has a significant negative effect on governments' total tax revenue, but not on their non-tax revenue. Corruption had a larger negative impact on direct taxes than on indirect taxes.

A study by Abdih and Medina (2013) found that a burdensome tax system, along with other factors such as a low institutional quality as measured by the World Bank's *Worldwide Governance Indicators*, rigid labour market, and excessive regulation in financial and products market are all instrumental in explaining the size of informal economy. To estimate the size of the informal economy, the authors employed the Multiple Indicator-Multiple Causes (MIMIC) model, where their observable causes, such as tax burden, labour rigidity, institutional quality and burden in financial and product market, lead and induce an observable effect, informal economy. According to their study, a one standard deviation increase in the tax burden and a one standard deviation decline in institutional quality is associated with the rise of the size of the informal economy by 0.22 and 0.37 standard deviations respectively. As they point out in their study, institutional quality as measured by the World Bank's *Governance Indicators* contributes the most to the size of the underground economy in post-Soviet Central Asia. Regulatory and tax burdens are found to be important reasons as well for the growth of the underground economy (Table 2.1). The authors' calculations are zero-rated on institutional quality in Kyrgyz Republic and labour rigidities in Tajikistan, perhaps due to unavailability of data on these variables.

| Country         | Tax Burden | Labor Rigidities | Institutional Quality | Regulatory Burden in Financial and Product Markets |
|-----------------|------------|------------------|-----------------------|--|
| Armenia         | 10.6       | 15.0             | 28.8                  | 45.7   |
| Azerbaijan      | 9.1        | 13.4             | 43.0                  | 34.5   |
| Georgia         | 9.9        | 10.6             | 29.0                  | 50.6   |
| Kazakhstan      | 5.8        | 12.8             | 39.7                  | 41.7   |
| Kyrgyz Republic | 14.5       | 19.6             | 0.0                   | 65.9   |
| Tajikistan      | 11.7       | 0.0              | 47.6                  | 40.7   |
| Mean percentage | 10.3       | 11.9             | 31.3                  | 46.5   |

**Table 2.1** Relative Contribution of Cause Variables to the Size of the Informal Economy, 2008.  
Source: Abdih and Medina (2013).

To my knowledge, studies focusing on estimation of the size of shadow economy are of two types. One group of studies measures the size of shadow economies in transition countries using the total electricity consumption method (Kaufmann and Kaliberda, 1996; Johnson, Kaufmann, and Shleifer, 1997; Lacko, 2000). However, the electricity consumption method featured in those studies has been criticized as only a rough and inaccurate measure of overall economic activity by the second group of studies (Alexeev and Pyle, 2003; Belev, 2003; Friedman, Johnson, Kaufmann and Zoido-Lobaton, 2000). The second group of studies proposes a MIMIC model, a particular type of structural equations model to analyse and estimate the shadow economies considering multi-dimensional aspects and multiple effects of the shadow economy over time (Schneider, Buehn, Montenegro, 2010). In this latter study by Schneider, Buehn and Montenegro (2010)<sup>9</sup> MIMIC index is converted into ‘real world’ figures measured in percentage of official GDP using benchmarking or calibration. As a result, converted coefficients indicate the size and trend of the shadow economy in a particular country over time. The MIMIC coefficients posit that the estimated sizes of shadow economies are largely determined by institutional factors.

### 2.2.2 Role of Institutions in Tax Collection: Theories Proposed in the Literature

This study builds on the literature that examines the effect of institutions on government revenues (Easterly and Levine, 1997; DeLong and Shleifer, 1993; Mauro, 1995). Economic and political institutions along with macroeconomic structures and public attitudes towards taxation are all important in explaining tax policy and tax burden variations across countries (Steinmo and Tolbert, 1998). Different tax policies are the product of variations in institutional structures through which revenue-maximizing elites work (Bates, 1989; Hansen, 1983; North, 1990, Steinmo, 1993). These studies explain how various institutional structures set the rules of the tax policy game in various ways.

Low-quality or weak institutions are correlated with lower share of tax revenues to GDP (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1999; Friedman, Johnson, Kaufmann and Zoido-Lobaton, 2000). Two theories explain why taxpayers and businesses go ‘underground’. The first theory

<sup>9</sup> The empirical method used in this paper is based on the statistical theory of unobserved variables, which considers multiple causes and multiple indicators of the phenomenon to be measured, i.e. it explicitly considers multiple causes leading to the existence and growth of the shadow economy, as well as the multiple effects of the shadow economy over time.

recognizes that *high rates of taxation* cause taxpayers and businesses to operate within the shadow economy and encourage businesses to attempt to keep all their earnings for themselves (De Soto, 1989; Schneider and Enste, 1998). According to this strand of literature, cutting high rates of taxes can bring taxpayers into the official economy. The second theory contends that going ‘underground’ takes place because of *low-quality or weak institutions*: businesses are better-off if they hide their operations ‘underground’ to reduce the onerous burden of bureaucracy, corruption and weak property rights and thus not to officially pay taxes (Johnson et al, 1997; Kaufmann, 1997). The latter stream of literature contends that the underground economy is the fruit of inadequate institutional environment due to poor records on property rights, rule of law and regulatory quality. However, according to the second theory, taxpayers are willing to pay taxes at a fair and reasonable rate, but they resist acceptance of persistent excessive and arbitrary demands to pay taxes/bribes. Following both theories, tax revenues go down and the quality of public policy and administration declines due to insufficient and inadequate public spending, while firms are less likely to stay in the official economy.

Empirical studies have shown that people engage in shadow economic activities for a variety of reasons. Among the most important ones are government actions, most notably, taxation and tax regulations (Schneider, Buehn and Montenegro, 2010), quality of institutions and tax morale (Schneider, Krstic, Arsic, Randelovich, 2015). In addition, the main driving forces of the shadow economy are indirect taxes due to substantial scale of evasion of value added tax in internal trade, self-employment and unemployment (Schneider, Raczkowski and Mroz, 2015). Taxpayers in many cases adjust their evasion according to their satisfaction levels with public policy, the processes of collective decision-making, and the quality of their relationship with the authorities (Schnellenbach, 2006). The field of economic psychology and experimental economics acknowledges that the perception of fairness of the economic system plays an important role in tax evasive behaviour. Social stigma is also determined by how satisfied citizens are with public policy (Dell’Anno, 2009).

The scale and size of shadow activities has a strong positive correlation with the nominal tax rates and a negative correlation with the quality of the public sector (Schneider, Dreher and Meon, 2014). As argued by Enste and Schneider (2008), the high quality of public services is one of the pivotal factors in promoting strong tax morale. Therefore, good public services can lead to fostering tax compliance.

As the analysis in this chapter entails estimation of both static and dynamic panel models, it should be stated that to the best of my knowledge, the empirical literature on tax effort is not large: most of the existing studies employ cross-section empirical methods and ignore the variation over time. One of these cross-sectional studies identifies the factors that affect the tax effort mostly in Latin American countries (Bird, Martinez-Vazquez and Torgler, 2008). Their model assumes “a more legitimate and responsive state” is needed to ensure an adequate level of tax effort in developing Latin-American countries (Bird, Martinez-Vazquez and Torgler, 2008: 68). They argue that it is easier and faster to improve social institutions and accountability and reduce corruption than to change the structure of economy, level of tax revenue and tax rates. They empirically find that political (democracy, decentralization) and economic (free trade, protectionism, macroeconomic policy) institutions also significantly matter to the tax effort.

Four studies on revenue collection and the determinants of tax revenue potential are particularly notable for their panel data analysis. First, a regression analysis of a dynamic panel data model by Gupta (2008) found that certain structural factors, such as GDP per capita, ratio of agriculture to GDP, trade openness and foreign aid -- significantly affect tax revenues. Second, the study within a panel data framework by Davoodi and Grigorian (2007) illustrated that institutional improvements and policy undertakings aimed at reducing the size of informal economic activity, raised tax revenue performance in Armenia. Third, Baunsgaard and Keen (2010) in their panel data analysis of 117 low-, middle- and high-income countries detected that while there is a positive and significant relationship between trade and revenue in high and middle-income countries, this relationship is weaker in low-income countries. Finally, Pessino and Fenochietto (2010) observed that there is a positive and significant relationship between tax capacity and the level of development, trade and education, but tax capacity has a negative relationship with inflation, income distribution, the difficulty of tax collection and corruption.

Within the framework of the theories of institutions and institutional development, La Porta et al. (1999) found that the better performing governments are normally larger in size and usually collect higher tax revenues. As such, tax collection is one of the important aspects in the relationship between institutions and government performance. They separate the theories of institutions into three broad groups: economic, political, and cultural. Economic theories of institutions imply that institutions are created when the social benefits of building institutions exceed the transaction costs of doing so. For instance, a government protects private property when the returns to such protection exceed the cost of police. Political institutions are formed by those holding positions of authority to stay in power and to allocate resources to themselves. Cultural institutions are driven by beliefs in society that mould collective action and government. According to them, theories of institutional development entail measuring government performance. Government performance is typically measured by how relatively noninterventionist its actions are, how a government protects property rights, keeps regulations and taxes light. The efficiency of government, the quality of public goods provision, democracy and political rights are also dimensions to measure government performance.

La Porta et al. (1999) identified five determinants of government performance and the level of adequate tax collection across a sample of developing and transition countries. Those determinants were: (1) ethno-linguistic fractionalization, (2) religious affiliation, (3) origin of the commercial laws, (4) geographic location of countries and (5) other factors used as instruments to explain institutional development. La Porta et al. (1999) found that countries with higher rates of poverty, geographically closer to the equator, ethno-linguistically heterogeneous, governed by French or socialist laws, and with higher proportions of Catholics or Muslims had poorer government performance and lower tax collection.

There is also empirical evidence that adequate tax collection both in developed and developing countries can strengthen the quality of governance and public sector institutions as it makes governments more responsive and accountable to their citizens, and improves public policy particularly, when mechanisms of taxation are shaped directly by citizens (Altunbas and Thornton,

2011). In turn, taxes can improve the quality of governance. The authors found that higher fractions of tax revenues to GDP are associated with better quality of governance and institutions.

### **2.2.3 Conceptual Frameworks Proposed in the Literature**

There is a positive correlation between effective tax policy and tax administration and progress or prosperity in any country (Abizadeh, 1999). In the transitional economy context, a country's initial historic conditions, the legacy of transition, political restraints and distribution of power, macroeconomic stability and the level of GDP per capita, all contribute to tax revenue collection (Davoodi and Grigorian, 2007). The speed of transition depended heavily on the interaction between political and economic institutions and the state's ability to properly oversee the development of strong market institutions. As a result, countries with stronger institutions performed and still perform better in terms of tax collection in comparison to countries with weaker institutions (La Porta et al., 1999).

Furthermore, institutions such as property rights, regulatory quality and the rule of law can prove either advantageous or disadvantageous to taxpayers, also playing a pivotal role in tax collection. In this milieu, several studies emphasize the importance of both the quality and supremacy of institutions. The significance of institutions and institutional change in the development and performance of economies was posited by Douglass North (1990). The supremacy of institutions over geography or trade (Acemoglu, Johnson and Robinson, 2002; Rodrik, Subramanian and Trebbi, 2004) makes them the predominant determinant of economic growth and income level across countries (Acemoglu, Johnson, Robinson, and Thaicharoen, 2003).

A large shadow economy (as proportion of GDP) and corruption are both symptoms of the weakness of judicial, political, economic and administrative institutions and governance and can have a disastrous impact on economic development in general and tax revenues in particular. High-quality effective institutions are vital pre-conditions for development and for adequate tax collection in any particular state. To build up revenues requires establishing high quality and strong institutions. But what is the difference between the high-quality and low-quality institutions?

High-quality institutions are professionalized and separated from politics; low-quality institutions, by comparison, are poorly organized, unproductive, and work for the benefit of certain political actors (Ezrow and Frantz, 2013). High-quality institutions involve a set of well-trained officials who receive their job positions based on their merits, not loyalty to political leaders. In states with low quality institutions, interference of political agenda in the judicial, economic and administrative process is the norm. High-quality political, judicial, economic, administrative and security institutional structures are adept at fulfilling their sectoral responsibilities, performing the mandates of the states, and meeting the needs of citizens. Low-quality institutions by contrast lack these features.

To have sufficient revenues in national and domestic budgets that support development and infrastructure, the main features of high-quality institutions (Ezrow and Frantz, 2013) include:

- Autonomy and impartiality
- Rectitude and responsibility
- Competence, cost-effectiveness, productivity and transparency
- Equal access to institutions by any citizen irrespective of their earnings and geographic location
- Prudent macroeconomic and fiscal policy
- Ability to improve the standards of living of citizens

In addition, as Ezrow and Frantz (2013) suggest, professionalism, meritocratic recruitment, promotion, and salary competitiveness are defining features of high-quality institutions, including those responsible for tax administration.

Analysis of variation in the level of taxation in a sample of 89 developing countries of Africa, Asia, Latin America and Middle East over the period of 1980-1989 found that improvements in government effectiveness would raise the level of taxation by enhancing the capacity to tax (Fauvelle-Aymar, 1999). The model estimates that the level of tax revenue as a percentage of GDP depends on structural variables measuring the country's level of development, main features of its economic system, and, political variables such as the degree of legitimacy or popularity, efficiency and credibility of the government. The author finds that the level of tax revenue is negatively associated with the importance of agricultural sector and positively associated with the importance of foreign trade and mining. GDP per capita when estimated simultaneously with other economic indicators turns out to have an insignificant influence on tax revenue performance in this study. Fauvelle-Aymar (1999) points out that the level of tax revenue significantly depends on political variables such as the degree of government efficiency and credibility. The more the government is efficient and credible, the higher is its ability to ensure tax compliance.

With an unbalanced panel data set for 39 sub-Saharan African countries covering the period 1985-96, Ghura (1998) analyses whether tax revenue to GDP ratio is affected by the per capita income, level of corruption, and several variables to represent tax base, macroeconomic policies, and external environment. Ghura (1998) estimates tax base by share of agriculture in GDP ratio, trade and dummy variables for oil producing and non-oil mining countries. The macroeconomic policies variables are represented by inflation, percentage change in the real effective exchange rate, implementation of structural reforms and provision of public services, proxied by a human capital index (HCI). The external environment variables represented by external grants to GDP ratio, change in the stock of external debt to GDP ratio and percentage change in terms of trade. The study finds that corruption and inflation have the largest impact on tax revenue performance. His findings confirm that undertaking measures to reduce corruption can enhance tax revenue significantly, however he acknowledges that the battle against corruption can be costly and time-consuming.

Schaffer and Turley (2000) measure the effectiveness of tax administration in countries with transition economies by comparing average tax rates with effective tax yields. They compare the results with a benchmark of the mature market economies. They note that, as tax systems in transition countries are more politicized, their tax administrative capacities are weaker and thus tax arrears are experienced

more often than in the tax systems of mature market economies. By calculating an effective/statutory tax ratio, they found a positive correlation between an effective tax administration and progress in transition economies. According to them, the speed of transition depends on the interaction between politics and economic reforms and the ability of state to properly administer the development of the market institutions. The authors conclude that, on average 25 countries with economies in transition compared to the average EU countries are not effective in tax collection. They consider the informal economy, tax evasion, corruption, initial conditions of transition, political restraints and distribution of power, and level of GDP per capita as contributing factors to ineffective tax collection in transitional countries.

Grabowski (2005) examines the introduction of three imperative taxes for a market-oriented economy, namely, personal income tax, corporate income tax, and value-added tax in 27 post-socialist countries over the last 15 years. According to him, despite the fact that these countries apply various tax schemes and tax base with different rates, deductions, and allowances, one can observe a clear tendency to reduce the top income tax rates and broaden the above-mentioned tax base. He points out that, to achieve economic growth, a major challenge for many countries with economies in transition (Balkan countries and the majority of the former Soviet Union countries), is to abolish or limit those tax mechanisms that hinder neutrality on product markets.

Martinez-Vazquez and McNabb (2000) argue that the extent and speed of tax reform has been diverse, while some countries (Czech Republic, Estonia, Hungary, Latvia and Poland) adopted Western-oriented tax institutions quickly, others (Belarus and Turkmenistan) have experienced very little reform. The authors suggest that the range, pace, and stability of tax reforms can essentially affect the level of economic growth during transition. According to them, despite that tax systems in transition economies like tax systems in Western countries generated their receipts in the late 1990s from: (i) direct taxes, including personal income tax, corporate income tax, social security tax and (ii) indirect taxes, including VAT, excises, custom duty, a point of caution should be noted. While direct taxes are prevalent in tax revenues mainly in the Eastern European countries, it is not true for the FSU countries, and while prevalence of the indirect taxes in government receipts of the FSU countries is obvious, it is not true for the Eastern European countries. The authors note that property taxes are not a significant source of revenue in transition countries as they are in many Western countries.

The current analysis contributes to the latter strand of literature by incorporating a tax effort model into linkages between qualities of institutions, shadow economy, corruption, government effectiveness and revenue collection in transitional economies. The next section introduces the methodology in more details.

#### **2.2.4 Conceptual Framework: Diagrammatic Representation**

Formulation and execution of tax policy involve complex interactions between (a) *judicial and political institutions* around property rights, budgetary laws, accountability standards, decentralization, parliamentary decisions and economic institutions, as well as between (b) *economic forces*, including macroeconomic management, market structure, and trade policy (Figure 2.4). These institutional

interactions also permeate all levels of (c) *administrative and social dimensions*, such as the need for provision of goods and services, education, health care, mail delivery, garbage collection, and the development of infrastructure, among others. Interactions also involve *security functions*, including defence, border control and law enforcement.”

Design and implementation of tax policy also depends on formal institutions represented by (d) *governance structure*. The Worldwide Governance Indicators (WGI) report six indicators of governance and include relatively objective measures that are used in this study as *proxies or measures for the strength of institutions*, similar to numerous previous studies (for instance, Bird, Martinez-Vazquez, 2008; Lessmann and Markwardt, 2013; Nee and Opper, 2009) based on methodology by Kaufmann, Kraay and Mastruzzi (2003 and 2011). The six dimensions of governance are: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. Definitions of institutions, why governance indicators can be a good proxy for institutions in order to measure the quality and performance of institutions, was discussed briefly in section 2.2.1.

However, the problem is that the mentioned governance structures represent mostly formal institutions. Shadow economy, being a form of informal institution, still impacts revenue collection and should be taken into account for the analysis. In particular, the literature on shadow economy highlights the need to split or divide the economy (dual economy) into (i) an official one as first economy, and (ii) an unofficial sector as a second economy, where the informal economic activities are prevalent (Schneider and Enste, 2002: 7). Furthermore, different categories of taxpayers contribute to shadow economic activities by choosing to run their businesses using informal business practices:

“Conceptually, the informal economy within which such individuals [self-employed domestic workers, street-side vendors, and moonlighting tradesmen] operate includes all types of market economic activity that are potentially under-measured in the National Income Accounts, owing to the vendors’ informal business styles (e.g., sales in cash, lack of adequate records of sales and purchases).” (Alm and Erard, 2016: 23).

In Figure 2.4 the box “shadow economy or an unofficial economy” refers to fake or unregistered taxable transactions, theft, corruption, bribery, paid protection, manufacturing and sale of goods entirely prohibited, smuggling, provision of services and goods without authorization/permit/license, compatible with the definition of the term provided earlier. Taxes play a crucial role in the whole system of economic operations, especially in relation to the shadow economy. This study thus hypothesizes that the higher share of the shadow economy in transition countries is associated with lost tax revenues due to financial resources going underground or becoming hidden.

The rectangular four boxes located in the centre of the diagram labelled judicial/political institutions, economic institutions, administrative and security institutions and governance structure institutions refer to the interaction of various institutions, which affect revenue collection. The arrow pointing from these central four boxes above refers to the link of formal institutions with shadow economy. The arrow pointing from these central four boxes below point to the national budget, hinting to the close association of institutions with budget policy.

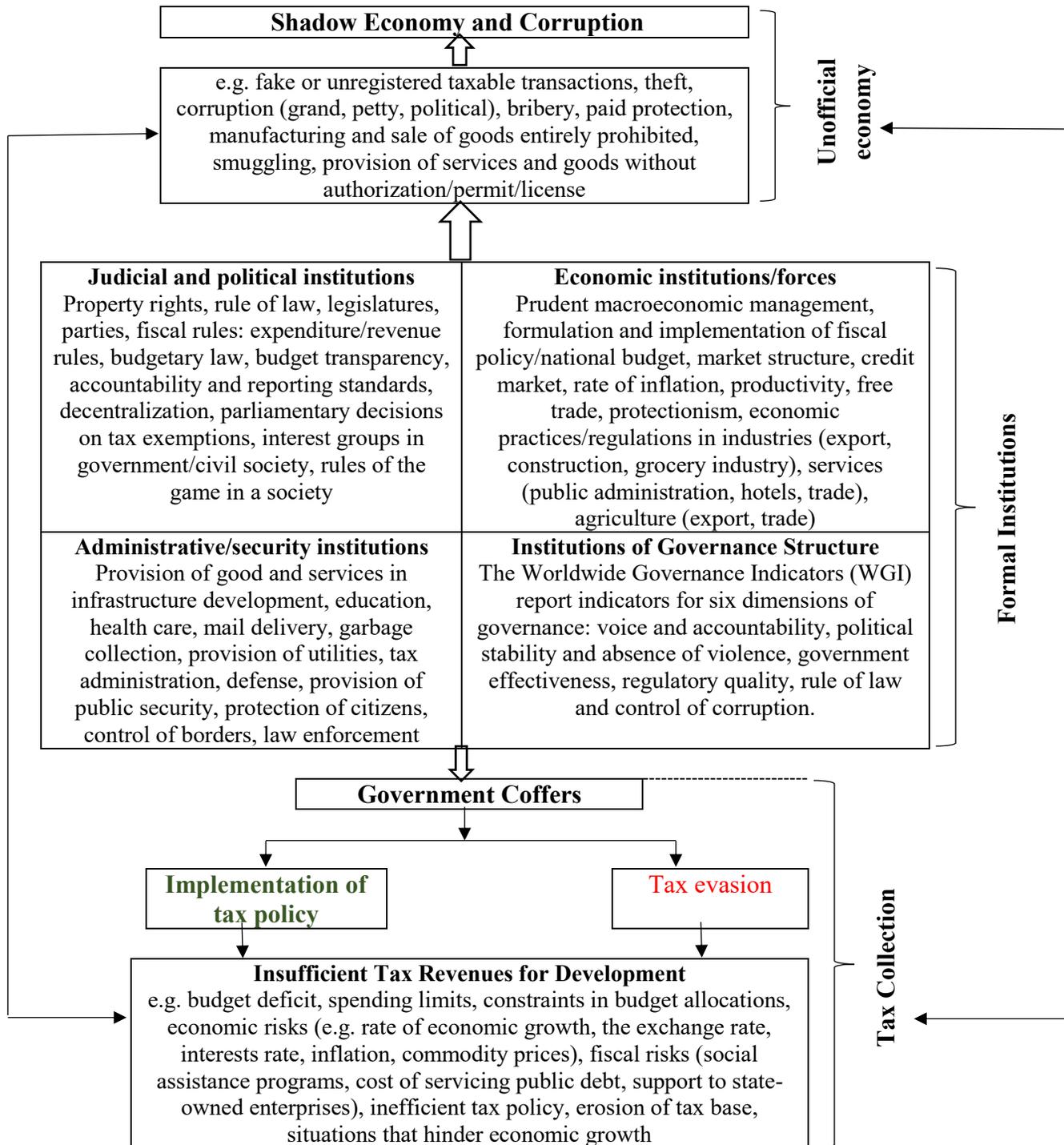
Below the box entitled “government coffers’ is two outcomes of tax policy execution. In other words, this refers to taxpayers who face two types of choices at the same time: payment of taxes or implementation of formulated tax policy or illicit tax evasion. The box “implementation of tax policy” in Figure 2.4 is equivalent to when a taxpayer pays taxes and operates within the official economy, which leads to tax optimization and official tax payment. Official payment of taxes enhances tax administration and foster to growth of revenues, i.e. to collection of adequate level of revenues that can be spent for local development. The opposite box in Figure 2.4 is the “tax evasion’ that occurs when a taxpayer fails to pay taxes, and then this tax evasion leads to economic activity within the shadow economy. The “tax evasion” box denotes illicit work, concealed and unreported income that results in evasion from direct and indirect taxes. If taxpayers notice that tax evasion is rampant, their tax morale substantially decreases, especially in the context of transition countries of the former Soviet Union and Eastern Europe (Cule and Fulton, 2009).

The arrow pointing down, below the box “tax evasion” points to insufficient tax revenues for local development. The existence of the shadow or unofficial economic activity in the form of tax evasion monumentally challenges conducting lawful business and diminishes capabilities of transition countries to generate an adequate level of revenues. In Figure 2.4 there is also a pointing arrow from atop – from the box” shadow economy” towards the bottom linking the shadow economy and insufficient tax revenue boxes. This arrow suggests that there is a close link between shadow economy and insufficient tax revenues. The box “insufficient tax revenues’ indicates that higher levels of tax evasion can lead to insufficient tax revenues for development and various forms of shortcomings. They in particular include, but not limited to, budget deficits, spending limits, constraints in budget allocations, economic risks (e.g. rate of economic growth, the exchange rate, interests rate, inflation, commodity prices) and fiscal risks (such as social assistance programs, cost of servicing public debt, support to state-owned enterprises). All these shortcomings in the medium- and long-run can lead to inefficient tax policy, erosion of tax base, and different unpredictable situations that hinder economic growth.

Many transition countries have encountered conflicting institutions, including external (e.g., formal rules, and protectionism along with rules/practices existing before) and internal (e.g., budgetary law/tax regulations and compliance procedures by taxpayers), economic, judicial, political and administrative. Subsequently, tax policies of many lower-middle income countries have changed substantially, but level of tax collection or structure of taxes have changed much less. One can see this tendency in the level of tax collection as a temporary equilibrium of institutions, until new shockwave(s) bring it to a new balance.

The interactions between all institutions indicating the sources and resultant outcomes in Figure 2.4 are dynamic. Thus, these interactions of institutions influence the level of tax collection, the structure of tax revenue, and tax rates. Consequently, these complex interactions affect the tax ratio with respect to the GDP. Figure 2.4 is thus diagrammatic representation when institution are of low quality, weak, inefficient and incompetent, coming out as resultant factors from the shadow economy and corruption. In its turn, the informal or shadow economy and corruption, weakens the formal institutions. Entrepreneurs and businesses confront burdensome tax regulations with weak enforcement and often opt to function within the shadow economy. By doing so, important revenues from businesses are not

collected. The shadow economy and corruption have generally negative effects on overall sufficient revenue collection. Inflation exacerbates this situation, as transaction costs are higher. As a result, economic growth and development are limited.



**Figure 2.4** Shadow economy in the context of political, economic, administrative and security institutions. Constructed by using different conceptual frameworks. The structure of table is from Raczkowski and Schneider (2013: 6).

## 2.3 Research Methodology

### 2.3.1 Extended Tax Effort Model

The standard model of tax effort (Alm, Martinez-Vazquez and Schneider, 2004; Bahl, 2003; Piancastelli, 2001; Tanzi, 1992; Teera and Hudson, 2004; Stotsky and WoldeMariam, 2002) takes no account of institutional facets in assessing and tracking comparative tax revenue collection. The conventional tax effort literature postulates the following model equation:

$$TR = f(Y, POP, XM, NAGR) \quad (2.3.1)$$

where,  $TR$  – tax effort (measured by tax/GDP ratio),  $Y$  – GDP per capita (measured in constant \$US),  $POP$  – rate of population growth,  $XM$  – ratio of exports plus imports to GDP,  $NAGR$  – non-agricultural share of GDP.

The extended tax effort model is more appealing because it includes an institutional component in explaining revenue performance. Thus, this chapter employs the concept of the extended tax effort model (Bird, Martinez-Vazquez, Torgler, 2008) as a basis, with further modifications involved. The extended tax effort model implies that various institutions competing and conflicting with each other – the main ones being - political (democracy/authoritarianism, centralization/decentralization, budgetary/non-budgetary), economic (free trade/protectionism, macroeconomic policy, market structure), administrative (provision of good and services, infrastructure development, education, health care) all interact with each other and contribute to the formulation and implementation of tax policy. The concept of the extended tax effort model is utilized with the focus on analysing the impact of institutions (shadow economy, government effectiveness, regulatory quality, rule of law, and corruption) on tax efforts:

$$TR = f(Y, POP, XM, NAGR, INST, SML, DMG) \quad (2.3.2)$$

$$INST = f(GOVQ, REGQ, CORR, ROL, SHADE) \quad (2.3.3)$$

where,  $INST$  is a vector of variables representing institutions that capture the following:

(a) government quality or government effectiveness -  $GOVQ_{it}$ , (b) regulatory quality -  $REGQ_{it}$ , (c) perception of corruption -  $CORR_{it}$ , (d) rule of law -  $ROL_{it}$ , and (e) shadow economy –  $SHADE_{it}$ . In the equation,  $SML$  denotes supplementary macroeconomic and labour market variables such as inflation, unemployment and gross capital formation. In addition,  $DMG$  denotes demographic characteristics such as ageing population, rate of urbanization and tourism.

To investigate if institutions stimulate greater tax revenues in transition countries, this study follows Bird, Martinez-Vazquez and Torgler (2008), but with some modifications. First, compared with the analysis by the cross-section data and focus on Latin America in Bird et al. (2008), this study uses panel (longitudinal) data for estimation and its regional focus is switched to transition economies. Second, in contrast to Bird et al. (2008), this study uses the natural logarithm of the GDP per capita growth ( $\log Y$ ) in the estimation. It is done for the best equation fit, and to remove skewed (thick tails) distribution of data for this variable of interest, manifested by the high magnitude of kurtosis. Furthermore, in comparison to the study by Bird et al. (2008), this study utilizes the supplementary data

on macroeconomic setting, labour market, additional demographic characteristics and leisure variables, added to the equation. Finally, instead of the regional dummy used in Bird et al. (2008), this study employs dummies for the level of income of transition economies. As such, the following equation is used to estimate the model:

$$TR_{it} = \alpha_i + \beta_1 \log_e(Y_{it}) + \beta_2 POP_{it} + \delta_1 XM_{it} + \delta_2 NAGR_{it} + \boldsymbol{\gamma} INST_{it} + \nu SML_{it} + \omega DMG_{it} + I_{it} + Z_{it}\eta + f_i + \varphi_t + \varepsilon_{it} \quad (2.3.4)$$

In this equation,  $TR_{it}$  denotes the country's level of tax revenue measured by the tax revenue as a ratio of GDP in transition country  $i$  at the time  $t$ .  $Y_{it}$  denotes GDP per capita growth.  $POP_{it}$  is the rate of population growth and  $XM_{it}$  is the ratio of exports plus imports to GDP PPP adjusted which represents real openness.  $NAGR_{it}$  is the non-agriculture share of GDP and  $SML_{it}$  denotes the supplementary macroeconomic environment and labour market (proxied by inflation as measured by the annual growth rate of the GDP implicit deflator capturing the rate of price change in the economy as a whole, rate of unemployment and gross capital formation).  $DMG_{it}$  denotes demographic characteristics and leisure variables capturing aging, rate of urbanization and tourism.  $I_{it}$  represents the dummy for level of income of transition countries: lower-middle, upper-middle and high-income (*LMIC*, *UMIC* and *HIC*).

In equation 2.3.4,  $f_i$  represents the unobservable country specific, time-invariant effects,  $\varphi_t$  denotes unobservable time specific effects,  $Z_{it}$  is a matrix that includes instrumental variables,  $\eta$  is a vector of coefficients, and  $\varepsilon_{it}$  denotes the error term. The coefficients  $\beta_1 - \beta_2$  control the effects of structural variables related to the transition country's level of development: per capita income and the rate of population growth that are employed in the conventional literature. The coefficients  $\delta$  control the influence of economic structure and openness in revenue performance. The coefficient  $\nu$  controls the impact of supplementary macroeconomic and labour market variables. The coefficient  $\omega$  captures the impact of demographic characteristics and tourism as a form of leisure in collection of taxes.

The main parameter of interest - coefficient  $\boldsymbol{\gamma}$  captures the effects of a vector of variables related to institutions, namely, influence of shadow economy, corruption, government effectiveness, regulatory quality and rule of law on tax revenue.  $INST_{it}$  denotes the main variable of interest – institutions proxied by the following governance variables: (a) government quality or government effectiveness -  $GOVQ_{it}$ , (b) regulatory quality -  $REGQ_{it}$ , (c) perception of corruption -  $CORR_{it}$ , (d) rule of law -  $ROL_{it}$ , and (e) shadow economy –  $SHADE_{it}$ :

$$INST = f(GOVQ, REGQ, CORR, ROL, SHADE) \quad (2.3.3)$$

*GDP per capita growth* - the explanatory variable used in the model is a proxy for the level of development. The higher level of development, the higher capacity to pay and collect taxes in any country. The expectation is that there is a positive relation between the level of income per capita and the level of tax revenue. A higher level of development is expected to raise the ratio of tax revenue on aggregate. The rate of *population growth*, other explanatory variable, is expected to be positively related to the level of tax revenue as tax systems of countries with faster pace of growing their populace

may have a higher capacity to collect taxes since more taxpayers could be registered for the taxation purposes.

The effect of economic structure and openness on ability to tax is captured by the *openness*, and *non-agricultural sector share to GDP*. The *openness* or the ratio of the sum of exports and imports to GDP and the share of non-agricultural sector in GDP are two aspects of a country's tax base<sup>10</sup> considered in this study. A country's *openness* is believed to influence tax revenue (Cameron, 1978, Mahdavi, 2008; Fauvelle-Aymar, 2009). Often, trade taxes being easier to administer are a major source of government revenues. The anticipation is that trade positively influences the level of tax revenue. The tax revenue collection is expected to be positively related to the degree of openness of the economy. *Non-agricultural share to GDP* – the other explanatory variable is believed to influence the ability or capacity to tax. The composition of the economy impacts tax revenue performance as certain sectors are easier to tax than others. For instance, it is easier to administer tax collection from large industrial companies rather than from the agricultural sector, particularly, if this sector has plenty of small farmers. For political reasons, many transition economies exempt from taxation a large share of agricultural activities. Also, the larger the relative importance of agricultural sector in a country's economy the lower the need to spend in governmental activities and services as many public sector activities are city-based (Tanzi, 1992). A higher non-agricultural sector's share to GDP is expected to be associated with a higher tax effort or higher tax to GDP ratio.

*Inflation* can act as one of the macroeconomic determinants of tax revenue. High inflation rates may generate higher level of tax revenue due to inflated rate of national currencies, especially revenue from taxes on income, profits and capital gains (Ghura, 1998; Mahdavi, 2008). Thus, it is expected that high inflation rates positively affect tax revenue. The other macroeconomic determinant *gross capital formation* is expected to positively affect tax revenue because increase in physical assets (investment minus disposals) of firms means payment of higher corporate income tax revenue. The higher rates of *unemployment* is expected to negatively affect or lower tax revenue, since more unemployed workers pay less taxes.

Institutions – the explanatory variable of main interest affects tax revenue collection. In this model, institutions capture the variables of *government effectiveness*, *regulatory quality*, *corruption*, *rule of law*, and *shadow economy*. Government effectiveness, regulatory quality, and rule of law are three out of six Worldwide Governance Indicators (WGI) (Kaufmann, Kraay and Mastruzzi, 2011). Three indicators of the WGI – control of corruption, voice and accountability along with political stability and absence of violence are not included in this study. Corruption in our model is captured by the corruption perception index of the Transparency International. The Transparency International's corruption perceptions index is used extensively in the literature (for instance, Becker et al., 2009;

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<sup>10</sup> In the literature this is better known as 'tax handles' and is defined as "tax bases that lend themselves to taxation" (Musgrave, 1986: 244).

Marquez et al. 2011). The indicators of political stability, voice and accountability are not taken into account since they measure different angles of governance<sup>11</sup>, aspects that are more political.

In this regard, the perceptions on political processes by which governments are selected, monitored, and replaced (the area by which these indicators measured) can be challenged vigorously in the context of transition countries. For instance, the monumental challenge could be the practical outcomes of the political processes and selection, monitoring, and replacing governments in many transition countries remain largely unchanged, or inert and static over the last two decades. Examples can be found in political processes that countries of the former Soviet Union such as Belarus, Armenia, Azerbaijan, almost all Central Asian countries, and some countries of East Europe, such as Macedonia have been experiencing lately. Furthermore, institutional quality measured as the mean of not all six dimensions of governance, but only three or four indicators is used extensively in the literature (for instance, in the studies of Buehn, Lessmann and Markwardt, 2013; Abdih and Medina, 2013; Torgler and Schneider, 2009). Thus, despite the indicators of voice and accountability and political stability and absence of violence are parts of governance dimensions, they are not taken into consideration and not tried as possible independent variables in this study.

The variable government quality or *government effectiveness* captures perceptions of the quality of the civil service and the extent of its autonomy from political pressures, the quality of public policy design and application (Kaufmann, Kraay and Mastruzzi, 2011). The variable *regulatory quality* indicates perceptions of the capability of the government to formulate and implement rigorous policies that allow and promote private sector development. The variable *rule of law* catches perceptions of the degree to which contracts are enforced or property rights protected through police and courts in a society.

The variable *corruption* measures perception of corruption defined as abuse of public power for private benefits or the exploitation by public officials of their power in delivering public goods for private payoffs (Coolidge and Rose-Ackerman, 1997; Heidenheimer, 2004; Klitgaard, 2016; Klitgaard, 1998; Klitgaard, 1988). I hypothesize that corruption being a symptom of weak socio-economic and political institutions has a negative impact on collection of tax revenues.

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<sup>11</sup> As of yet, there is no strong consensus among policymakers and scholars around a single definition of governance or institutional quality. Various authors have come up with different definitions. Governance in its broader definition implies “rules, enforcement mechanisms, and organizations supporting market transactions” (WB, 2002: 4). Narrower definition is “the manner in which power is exercised in the management of a country’s economic and social resources for development” (WB, 1994: 13). For this analysis, governance is defined as “(a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them” (Kaufmann, 2011: 222).

The variable *shadow economy* reflects the underground economy. Schneider, Buehn and Montenegro (2010) identified tax and social security contributions as the key determinants of shadow economy<sup>12</sup>. Thus, it is expected that there is an inverse or negative relationship between the shadow economy and tax revenues.

### 2.3.2 Institutional Theory and Extended Tax Effort Model

Applying institutional theory is useful in framing the extended tax effort model. Institutional theory provides insights into institutional quality's influence on tax policy formulation, to the point that institutional concepts fit the extended tax effort model in explaining how well institutional factors have contributed to revenue collection. Institutional theory has been utilized in the literature to study tax policy (e.g. Eccleston, 2006; Eccleston, 2004; Marriott and Holmes, 2006; Steinmo, 2003; Steinmo and Tolbert, 1998; Steinmo, 1993). This literature defines institutions as the rules of game in political and socioeconomic arena. This literature employs institutional theory to explain the dynamics of change in tax policy. The institutional theory suggests an emphasis on the effects of institutions on political and socio-economic outcomes, and policy formation. Institutional theorists contend that the institutional arrangements strongly affect the development of formal structures in an organization and in a state.

Immergut (1998) believes institutional theory provides a context that is conducive to comprehend why actors make the choices that they do. Hence, this study uses institutional theory with its concentration on the effects of institutions on outcomes of tax collection and its broader implications on tax policy to contextualize specific institutional settings, which can be instrumental in shaping policy-making. Such context for this research is the existence of informal institutional networks that are crucial in instituting and implementing tax policies. As such, in these contexts, informal institutions (such as corruption and shadow economy) influence tax collection from the policy-making undertaking, via the adherence to informal rules. In these contexts, the degree to which these patterns of behaviour (corruption and shadow economy) have become institutionalized and entrenched also influences tax collection.

The application of the extended tax effort model in this study is very valuable, too. This concept complements the conventional tax effort model, which harnesses mainly economic variables and considers only limited supply factors to seek to explain the tax revenue collection in transition countries. The extended tax effort model not only further extends the conventional tax effort literature empirically, but also takes into account the role of the institutions. In this regard, this is where additional important variable - institutions covering multi-faceted dimensions of societal institutions come in handy to explain comparative revenue performance and tax morale of the citizens of transition countries.

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<sup>12</sup> Determinants of the shadow economy by Schneider F., A. Buehn and C. Montenegro (2010) are the following:

(a) Tax and Social Security Contribution Burdens; (b) Intensity of Regulations in Labor Market; (c) Public Sector Services; (d) Official Economy as measured by (1) GDP per capita based on 2005 US\$ Purchasing Power Parity (PPP); (2) unemployment rate; (3) inflation rate: GDP deflator (annual rate in %); (4) openness or trade in percentage to GDP; (e) Monetary Indicators: (1) M0/M1 and (2) currency/M2; (f) Labour Market Indicators: (1) labour force participation rate and (2) growth rate of total labour force; (g) State of the Official Economy as measured by (1) GDP per capita; (2) growth rate of GDP per capita.

The extended tax effort model is a powerful and helpful concept to study empirically the impact of institutions on tax collection in transitional countries. Three reasons are explaining why the extended tax effort model is fully capable of empirically examining and shedding a light on the link between institutions, underground economy and corruption.

First, compared to the conventional models of an optimal tax policy, the extended tax effort model is better equipped to investigate the phenomenon of lower tax collection in transition countries as it emphasizes the prevalence of political and socio-economic institutions in securing sufficient revenues. To my knowledge, tax revenue performance in transition countries within the framework of the extended tax effort model has not been thoroughly and systematically studied yet. The extended tax effort model is particularly appealing as it shows that improving quality of institutions and reducing the size of the shadow economy and corruption will have a positive effect on tax collection in transition economies. Improvement of institutional quality is not necessarily easy and can be time consuming. Yet, it is a reasonable and viable alternative to changing tax mechanism leverage (for instance, imposing higher taxes on economic activities such as external trade and/or mining, that can be seen in many transition countries) and economic structure (such as changing the ratio of the non-agriculture sector in the economy or the share of imports and exports in GDP).

Second, while transitional countries are different from each other in setting and pursuing their socio-demographic and economic goals and each transitional country has a unique pattern of changes in its tax effort or the ratio of total tax revenues to GDP, nevertheless, the transition countries have many common characteristics and weaknesses. To name a few:

- A history of political and socio-economic integration under the slogan of building communism for over half a century;
- Widespread corruption. For instance, among 178 countries, to take an example of some transitional countries from the FSU and East Asia: Vietnam ranks 112, Russia and Azerbaijan 119, Kazakhstan and Kyrgyz Republic 123, Ukraine 130, Tajikistan 136, Lao 139, Cambodia 150, Uzbekistan 153 and Turkmenistan 154<sup>13</sup>;
- Large shadow economy, which is around 34–45% of their respective GDP (Krstic and Schneider, 2015; Dreher, Meon and Schneider, 2014, Elgin and Oztunali, 2012; Schneider, Buehn and Montenegro, 2010) or 2–3 times that of the OECD countries;
- While transition countries face diverse fiscal problems of tax reform, almost all lower-middle income economies rely heavily on indirect taxation, particularly value-added taxes;
- Large hard-to-tax agricultural and industrial sectors because of tax evasion mechanisms and tax loopholes in lower-middle income countries.

Due to the existence of many problems and questions in common, similar analytical methods can be used, carefully, in the analysis of tax structures for developed and less-developed countries (Burgess and Stern, 1993). While different tax efforts of countries can be studied by comparing customary and

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<sup>13</sup> Corruption Perception Index (2016), available at: <https://www.transparency.org/research/cpi/>

common factors found in other countries, country-specific distinctive features in tax policy and tax compliance enforcement is taken into consideration, too, as:

“Any country’s tax performance can be explained in part by factors common to many other countries. In addition, however, country-specific factors may contribute significantly to explaining revenue performance. One set of country-specific factors, for example, relates to the management of tax policy... A second set of country-specific factors has to do with the management of tax enforcement.” (Bird, Martinez-Vasquez and Torgler, 2006: 287).

Third, while political, judicial, economic and administrative institutions play an important role in shaping tax policy for transition countries, the steps taken to address the issue of corruption are still insufficient. In fact, while instituting a tax reform to stimulate demand, the majority of transitional countries set goals such as higher efficiency in tax collection, the reduction in tax evasion and fraud, but very few authorities and economists can harness the problem of corruption in tax authorities of transitional countries. Thus, establishing a corruption-resistant tax structure is the fundamental principle in the creation of a tax system (Stiglitz, 2010), so, corruption must be taken as the fundamental part of the process of creating an optimal or better tax system in developing or transitional countries.

Furthermore, the bigger picture of various tax efforts of transitional countries is characterized by fundamental concepts of two competing schools of thoughts. The first school advocates more taxation (by imposing higher taxes) as a necessary component of any lasting solution to underdevelopment. These thoughts are echoed in a series of empirical studies by the IMF, including Tanzi (1987), underlining that developing or transitional countries can indeed tax more, because their capacity to tax exceeds the effort they make to tax that capacity. Bird (2014), a representative of the second school of thought, accentuates the confines administrative capacity imposes in tax administration in developing countries (Bird, 2014). This research supports the second school of thought since trust or confidence in government and strong institutions are two driving factors that shape tax revenue collection in transitional countries in addition to conducting strict fiscal policy. During the transition process, governments and improving governing political and economic institutions play a crucial role. Institutions in particular can reduce uncertainties caused by transition through designing the structure for interaction, achieving greater certainty in the political and economic changes.

## **2.4 Data Description and Advantages of Panel Data Estimation**

### **2.4.1 Data Description and Data Sources**

The analysis utilizes annual data for the sample of 33 transitional economies and covers the period spanning from 1991 to 2015. Table 2.2 presents the definitions of all variables used in the analysis and sources of data.

| Variables   | Definition and description   | Sources   |
|---|--|---|
| Dep. Variable:<br><b>Tax Revenue (TR)</b>                   | Ratio of tax revenues as a % of GDP. Tax revenue refers to compulsory transfers to the central government for public purposes. Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It is regarded as one measure of the degree to which the government controls the economy's resources.   | World Development Indicators – WDI (2016), Government Finance Statistics Yearbook 2015 (IMF, 2016) and Prichard, W., Cobham, A., and Goodall, A. (2014) |
| <b>Quality of Institutions</b>                              |  |   |
| a) Corruption Perception Index (CPI)                        | CPI reflects perceptions of businesses and country experts of the level of corruption in the public sector or extent to which public power is exercised for private gain.  | Transparency International* (2016)  |
| b) Government Effectiveness (GOVQ)                          | GE captures perceptions of the quality of the civil service and the extent of its autonomy from political pressures, the quality of public policy design and application.  | WGI (1996-2014); Kaufman, Kraay, and Mastruzzi (2010); La Porta et al. (1999)   |
| c) Regulatory Quality (REGQ)                                | REGQ indicates perceptions of the capability of the government to formulate and implement rigorous policies that allow and promote private sector development.   | WGI (1996-2014); Kaufman, Kraay, and Mastruzzi (2010)   |
| d) Rule of Law (ROL)  | ROL catches perceptions of the degree to which contracts are enforced or property rights protected through police and courts in a society.   | WGI (1996-2014); Kaufman, Kraay, and Mastruzzi (2010)   |
| e) Shadow Economy   | The estimates of the share of the unofficial economy to GDP  | Schneider, Buehn and Montenegro (2010); Schneider, Raczkowski and Mroz (2015); Elgin. and Oztunali, (2012).   |
| <b>Instrumental Variables</b>                               |  |   |
| a) Fractionalization  | Index of ethnic, language and religious fractionalization  | Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003).   |
| b) Checks and Balances                                      | System of checks and balances in political system  | Dahlberg, Holmberg, Rothstein, Khomenko & Svensson. 2016. The Quality of Government Basic Dataset.  |
| <b>Development</b>  |  |   |
| a) GDP per Capita growth                                    | GDP per capita growth (annual %) - Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is GDP divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. | WDI (2016)  |
| b) Population Growth (POP)                                  | Population growth (annual %). Population growth (annual %) is the exponential rate of growth of midyear population from year $t-1$ to $t$ , expressed as a percentage. Derived from total population.  | WDI (2016)  |
| <b>Openness</b>   |  |   |
| a) Real Openness or Trade (XM) (Export +Import/GDP adj PPP) | Trade, % of GDP - Trade is the sum of exports and imports of goods and services measured as a share of GDP   | WDI (2016)  |
| <b>Econ. Structure</b>                                      |  |   |
| a) Agriculture/GDP (NAGR)                                   | Agriculture, value added (% of GDP). Agriculture includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production.  | WDI (2016)  |
| <b>Macro. Environment</b>                                   |  |   |
| a) Inflation (INFL)   | Inflation is measured by the annual growth rate of the GDP implicit deflator. It shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.  | WDI (2016)  |
| b) Gross Capital Formation                                  | Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets  | WDI (2016)  |

| Variables                              | Definition and description  | Sources  |
|--|---|--|
| c) Unemployment                        | include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.<br>Total (% of total labor force) - Unemployment refers to the share of the labor force that is without work but available for and seeking employment.                     | WDI (2016)   |
| <b>Demographics</b>                    |   |  |
| a) Age                                 | Population ages 65 and above as a percentage of the total population. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin.   | WDI (2016)   |
| b) Urbanization                        | Urban population refers to people living in urban areas as defined by national statistical offices.   | WDI (2016)   |
| c) Tourism                             | International tourism, receipts (% of total exports). International tourism receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country. They also may include receipts from same-day visitors, except when these are important enough to justify separate classification. | WDI (2016)   |
| <b>Income Level <sup>14</sup> (33)</b> |   |  |
| a) Lower-middle income countries (11): | Armenia, Cambodia, Kosovo, Kyrgyz Republic, Lao PDR, Moldova, Mongolia, Tajikistan, Ukraine, Uzbekistan and Vietnam.  | WDI (2016);<br>Transitional Economies (TEs) are divided into three income groupings: lower-middle, upper-middle, and high. |
| b) Upper-middle income countries (13): | Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Macedonia FYR, Montenegro, Romania, Russian Federation, Serbia and Turkmenistan.   | Income is measured using gross national income (GNI) per capita, in U.S. dollars.  |
| c) High-income countries (9):          | Croatia, Czech Republic*, Estonia*, Hungary*, Latvia, Lithuania, Poland*, Slovak Republic*, Slovenia*.<br>Countries with * are members of the OECD as well.   |  |

**Table 2.2** Description of variables: Impact of Institutions on Tax Revenue Collection in TEs.

This study uses data on corruption from Transparency International, as they are employed more frequently in the literature compared to other datasets (for instance, Aghion et al., 2016; Becker et al., 2009; Marquez et al., 2011).

## 2.4.2 Merits of Panel Data and Crucial Features of FEM and REM Estimations

Equation 2.3.4 is estimated by employing an unbalanced panel data consisting of annual observations from a relatively diverse -- in terms of level of income, public administration, geographic location, types of democracy -- sample of thirty-three transitional countries over the period 1991-2015. These countries were selected based on a) common legacy of building communism based on command-

<sup>14</sup> The income level classification of transition economies saw changes since 1991. These changes are mainly in an upward direction. Changes occurred largely thanks to increase or sometimes decrease by one increment only – i.e. from low income to lower middle, to upper middle to high income, or vice-versa, in the opposite direction, though in lesser extent. There were no drastic changes since 1991, i.e. there were no changes in an upward or downward direction by two increments.

The assumption of this study was that a transition country's income group stays the same and does not change if the income group classification of a country remained unchanged over the last 5 years in the sample period (i.e. 2012-2016). If the income group changed over the last five years, then the assumption was to which income group classification a country belonged or listed as, most of the time. For instance, if we look at the data for Albania, it was classified as low-income (LIC) in 1993-1995, as lower-middle income (LMIC) during 1991-92, 1998-2008, 2011, as upper-middle income (UMIC) in 2009-2010 and 2012-2016. So, for the sample period Albania was listed as LIC – 3 times, as LMIC – 14 times, and as UMIC – 7 times. Since Albania was listed as UMIC over the last five years, it was classified as UMIC in the estimations, Otherwise, it would have been classified as LMIC, since it was classified more as LMIC since 1991.

planned economy; b) availability of data on all variables for at least five periods; and c) the internal consistency of their tax revenue, data on institutions and size of shadow economy. Despite the fact that data are missing for a few years, this type of unbalanced or incomplete panels are rather the norm in typical economic empirical settings (Baltagi, 2008).

Panel (or longitudinal) data regression analysis captures both variation over countries and variation over time. Amongst other advantages of panel data is controlling for individual or countries heterogeneity, whereas cross-section and time series studies have a risk of obtaining biased results (Moulton, 1987). In addition, panel data suggest more variability and less collinearity between the variables (Baltagi, 2008). Moreover, panel data give more degrees of freedom, better ability to study dynamics of adjustment, better ability to identify and measure effects, better ability to create and test more complicated behavioural models than cross-section or time-series data (Baltagi, 2008; Hsiao, 2003; Moulton, 1987).

Fixed-effects and random-effects procedures are two approaches for estimating panel data each with their own merits and advantages. The fixed effects model (FEM) is very valuable to control for country-constant unobserved features or the problems created by country specific events. The random-effect model has the advantage that it is more economical in consuming the degrees of freedom than FEM during estimation. Mundlak points out that the difference between fixed-effects and random-effects estimation is “arbitrary and unnecessary” (Mundlak, 1978: 70). Mundlak (1978) argues that if the model is properly specified, the random-effect estimator is identical to the fixed-effect estimator.

The fixed-effects estimation controls for the omitted variable bias or unobserved heterogeneity. The fixed effects model is a good specification for our model as we have a set of  $N$  lower middle-income countries, a set of  $N$  upper middle-income countries and  $N$  high-income transition countries. The ‘fixed-effects’ imply that although the intercept may differ across countries, each entity’s intercept does not vary over time, that is, it is time-invariant. The fixed-effects model allows for regressors to be endogenous if they are correlated only with a time-invariant component of the error.

Considering that  $x_{it}$  is time varying annually between 1991-2015, even if the regressors have a limited or full form of endogeneity, one still can obtain a consistent estimator of the marginal effect of independent regressors. Our fixed-effects (FE) regression model with unbalanced one-way error component disturbances features that:

$$TR_{it} = \alpha_i + X'_{it}\beta + u_{it} \quad i=1,\dots,N; t=1,\dots,T_i \quad (2.4.1)$$

$$u_{it} = \mu_i + v_{it} \quad (2.4.2)$$

where  $\mu_i$  denotes the unobservable country-specific effect and  $v_{it}$  denotes the remainder disturbances.  $\mu_i$  is time-invariant and responsible for any country-specific effect that is not included in the regression. The remainder disturbance  $v_{it}$  differs with countries and time and is considered as the usual disturbance in the regression.  $\mu_i$  is assumed to be a fixed parameter to be estimated and the remainder disturbances  $v_{it}$  independent and identically distributed IID  $(0, \sigma_v^2)$  or, in other words, independently

and identically distributed with zero mean and constant variance. The  $X_{it}$  are assumed independent of the  $v_{it}$  for all  $i$  and  $t$ . The fixed effects model is an appropriate specification focusing on a set of transitional countries. Also,  $X_{it}$  is a  $(K - 1) * 1$  vector of explanatory variables,  $\mu_i \sim \text{IID}(0, \sigma_\mu^2)$  and independent of  $v_{it} \sim \text{IID}(0, \sigma_v^2)$ . If we put this equation in vector form, we have:

$$TR = \alpha_i + X\beta + u = Z\delta + u \quad (2.4.3)$$

$$u = Z_\mu\mu + v \quad (2.4.4)$$

However, fixed-effects tax effort model may have a *flip side or disadvantage* that it cannot be used to investigate time-invariant causes of the dependent variable. Besides, the unbalanced structure of the data set due to missing data for some periods ( $T_i \neq T$  for some  $i$ ) may preclude the estimation of a two-way fixed-effects model. In addition, because of estimator consistency one needs to ensure that the selection of sample does not result in errors being correlated with regressors. Other limitations of panel data involve design and data collection problems, distortions of measurement errors, attrition and cross-section dependence (Banerjee, Marcellino and Osbat, 2005; Ridder, 1992).

The random-effects estimation assumes that unobserved heterogeneity is not correlated with the variables in the model. The error term,  $u_i$  is a kind of random disturbance at the country level. The REM estimation can give the most comprehensive interpretation and conclusions from the data, as it estimates the effects of both time-constant and time-varying variables. Mundlak (1978) noted that the REM assumes exogeneity of all the regressors with the random individual effects. According to him, in contrast, the FEM allows for endogeneity of all the regressors with these individual effects.

First, I assume that the individual country-specific effects ( $\alpha_i$ ) is correlated with the variables of interest ( $X_{it}$ ), but uncorrelated with the error term ( $\varepsilon_i$ ) and run the FEM, allowing a limited form of endogeneity. Then, I estimate the REM, assuming that the purely random individual-specific term is not correlated with the regressors. In the REM, the other assumption is that  $\alpha_i$  in equation (2.3.4) is completely random, implying that  $\alpha_i$  is not correlated with the explanatory variables or regressors. A clear advantage of the REM is that it provides estimates of all coefficients and has marginal effects even of time-invariant regressors. However, one of the disadvantages of the REM is that if the FEM is appropriate, then the estimates derived from the RE model could be inconsistent.

## 2.5 Estimation Results

### 2.5.1 Descriptive Statistics

The primary dataset on the main variable of interest – institutional quality -- is derived from three sources. The first set of indicators (government effectiveness, regulatory quality and rule of law) are the WGI compiled by the World Bank. The second set is the corruption perceptions index by the Transparency International, a global anti-corruption coalition. The third one – size of the shadow economies is the one produced by Elgin and Oztunali (2012). The data on shadow economy compiled by Elgin and Oztunali are based on a simple deterministic dynamic general equilibrium model, having calibrated data estimated by Schneider, Buehn and Montenegro (2010). This dataset can be considered the most extensive and accurate dataset on shadow economy in the literature as it extends the previously used methodology<sup>15</sup>. This study also checks the robustness of results making the use of the other established estimates of shadow economies on smaller samples, specifically those presented by Alm and Embaye (2013) and Schneider, Buehn and Montenegro (2010).

Alm and Embaye (2013) estimate the size of the shadow economy for a panel of 11 countries over the time period 1984-2006. Their methodology is based on the currency demand method and the GMM dynamic panel model. Contrasting previous studies, the authors include a measure of tax administration enforcement strength as a key factor determining the extent of tax evasion. However, it should be noted that their approach lacks micro-foundations, as their model does not include a measure of individual workers' motivation to evade the formal economy.

Table 2.3 presents the summary statistics for all variables of the model for the sample of 33 transitional countries. The table details the descriptive statistics for all variables employed in the estimation of institutions' impact on tax revenue collection. For our sample of countries, on average, tax revenues including social security contributions (SSC) represent 24.1% of GDP annually. On average, the estimate of the share of the unofficial (shadow) economy is around 35.7% of GDP annually in all transitional countries. In addition, the population growth rate in the sample of transitional countries used is 16.8%.

Additional descriptive analysis of skewness and kurtosis is also valuable as a test of normality to distinguish the shape of the probability density function (PDF), particularly for the dependent tax variables (Table 2.3). The skewness (a measure of symmetry of residuals) statistic of *tax revenues*, *government effectiveness*, *corruption*, *regulatory quality* and *shadow economy* is closer to zero and that hints for more or less symmetrically distributed residuals on these variables. The skewness statistic of the variable *tourism* (2.296) indicates slightly right skewness. Table 2.3 shows that the kurtosis statistic of almost all variable (except dummies) has the value within the range of 1.7 and 13.5, hinting for normal distributed residuals of almost all variables. The only exception is the GDP per capita growth variable with the much higher value of 28.6, which points out that the tails are thicker than those of a normal distribution.

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<sup>15</sup> Bittencourt et al. (2014), Goel and Saunoris (2014), and Pappa et al. (2015) have all utilized these estimates in their empirical studies recently.

These results suggest that the distribution of the dependent variable – tax revenue is almost normally distributed. However, thick-tailed data on *GDP per capita growth* variable calls for transforming this variable by taking its natural logarithm. Taking the natural logarithm for data on *GDP per capita growth* in effect results in removing high magnitude of kurtosis. That is why the model uses the log form of the *GDP per capita growth* variable.

**Table 2.3** Summary Statistics for the Impact of Institutions on Tax Revenue Collection.

|                                    |                               | Obs. | Mean   | Std. Dev. | Min     | Max     | Skewness | Kurtosis |
|------------------------------------|-------------------------------|------|--------|-----------|---------|---------|----------|----------|
| <b>I. Total Tax Revenue</b>        |                               |      |        |           |         |         |          |          |
| Tax Revenues, inc.SSC              | % of GDP                      | 577  | .241   | .683      | .076    | .497    | .063     | 3.344    |
| <b>II. Quality of Institutions</b> |                               |      |        |           |         |         |          |          |
| <i>Shadow Economy</i>              | % of GDP                      | 538  | .357   | .134      | .130    | .816    | .816     | 3.969    |
| <i>Corruption (TI CPI)</i>         | Level of Perception           | 544  | 35.482 | 12.809    | 15      | 70      | .608     | 2.795    |
| <i>Gov't Effectiveness</i>         | Percentile Rank               | 625  | 44.596 | 23.193    | 1.46    | 84.95   | .088     | 1.763    |
| <i>Regulatory Quality</i>          | Percentile Rank               | 545  | 49.039 | 25.235    | 1.421   | 93.269  | -.181    | 2.154    |
| <i>Rule of Law</i>                 | Percentile Rank               | 551  | 40.973 | 23.228    | 2.39    | 86.6    | .216     | 1.919    |
| <b>III. Development:</b>           |                               |      |        |           |         |         |          |          |
| GDP per capita growth              | Annual %                      | 825  | 2.833  | 7.791     | -5.325  | 9.236   | .516     | 28.615   |
| Population growth                  | Annual %                      | 825  | .169   | 1.168     | -10.955 | 3.732   | -1.110   | 13.518   |
| <b>IV. Openness:</b>               |                               |      |        |           |         |         |          |          |
| Exp+Imp/GDP                        | Exp.\$+Imp.\$/<br>GDP PPP, \$ | 825  | 94.779 | 31.98     | 22.228  | 199.675 | .521     | 2.769    |
| <b>V. Economic Structure:</b>      |                               |      |        |           |         |         |          |          |
| Agriculture/GDP                    | % of GDP                      | 825  | 15.408 | 12.481    | 1.680   | 65.864  | 1.239    | 4.180    |
| <b>VI. Macroecon. Context</b>      |                               |      |        |           |         |         |          |          |
| Inflation                          | Annual % (GDP deflat.)        | 813  | 2.362  | 1.782     | -4.244  | 9.645   | .763     | 4.608    |
| Gross capital formation            | % of GDP                      | 825  | 24.942 | 7.512     | -.691   | 59.771  | .814     | 5.769    |
| Unemployment                       | % of total labor force        | 825  | 11.166 | 6.782     | .101    | 37.300  | 1.351    | 5.262    |
| <b>VII. Demographics</b>           |                               |      |        |           |         |         |          |          |
| Tourism(inbound visit)             | Receipts, % total exports     | 604  | 12.203 | 12.292    | .511    | 73.743  | 2.296    | 8.752    |
| Urbanization                       | Annual %                      | 825  | 54.249 | 14.991    | 15.782  | 76.667  | -.767    | 2.762    |
| Age 65 and above                   | % of total                    | 825  | 10.801 | 4.558     | 2.941   | 20.027  | -.236    | 1.852    |
| <i>Years after 1998</i>            | Dummy                         | 594  | 2.784  | 8.845     | 0       | 1       | .485     | 13.121   |
| <i>Upper-Middle Income</i>         | Dummy                         | 825  | .909   | .287      | 0       | 1       | 2.846    | 9.1      |
| <i>Lower-Middle Income</i>         | Dummy                         | 825  | .333   | .471      | 0       | 1       | .707     | 1.5      |

Figures 2.5 and 2.6 presents the scatterplot of panel data on *shadow economy* and *tax revenue* with overlaid linear prediction plot and classified by two main income groups, highlighting data for LMIC and UMIC. The inverse relationship between shadow economy and tax revenue in both figures can be explained by negative correlation between tax collection and shadow economy.

Figure 2.5 Inverse correlation between size of shadow economy and tax revenue.

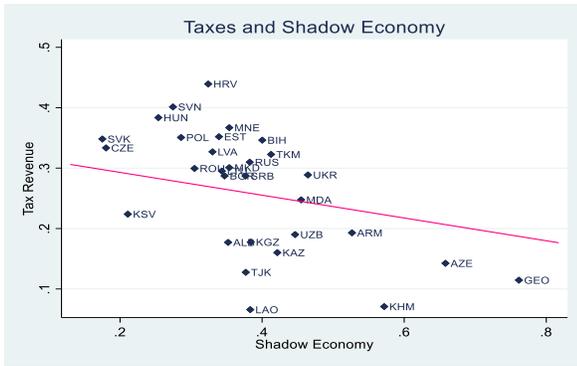
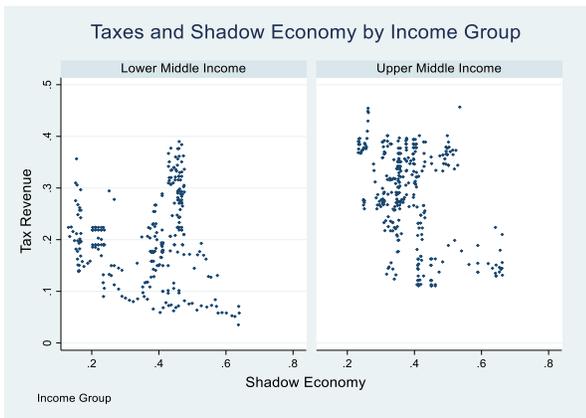


Figure 2.6 Size of shadow economy and tax revenue by income group.



## 2.5.2 Empirical Results

I use the Hausman test to decide whether FEM or REM is a better fit for the data. The Hausman test compares FEM and REM estimators. In performing the Hausman test, the assumption is that REM estimator is fully efficient under null hypothesis. The test compares the estimable coefficients of time-varying regressors to decide whether a FEM or a REM model fits the data and provides consistent estimation results.

The results of the Hausman test show that the overall statistic of chi-square distribution  $\chi^2(16)$  has  $p$ -value = 0.000. This prompts to strong rejection of the null hypothesis that REM provides consistent estimates. So, the Hausman test favors the use of the FEM.

I begin the empirical data exploration by presenting the correlation matrix of the institutional variables (Table 2.4). This correlation matrix is helpful to investigate pairwise correlations among the key regressors – institutional variables. Then, I run FEM on Equation 2.3.4, which allows me to control for the unobserved institutional effect heterogeneity. This type of analysis is as well valuable for having a consistent estimation and preventing or correcting biased results.

|                     | GDP p.c.<br>Growth | Shadow<br>Economy | Gov't<br>Effectiveness | Corruption | Regulatory<br>Quality | Rule of Law |
|---------------------|--------------------|-------------------|------------------------|------------|-----------------------|-------------|
| GDP p.c. Growth     | 1.0000             |                   |                        |            |                       |             |
| Shadow Economy      | 0.2940             | 1.0000            |                        |            |                       |             |
| Gov't Effectiveness | -0.1561            | -0.5242           | 1.0000                 |            |                       |             |
| Corruption          | -0.1968            | -0.4526           | 0.7750                 | 1.0000     |                       |             |
| Regulatory Quality  | -0.1580            | -0.3670           | 0.8721                 | 0.6259     | 1.0000                |             |
| Rule of Law         | -0.1735            | -0.5577           | 0.8944                 | 0.7998     | 0.8076                | 1.0000      |

**Table 2.4** Correlation matrix for institutional variables

The correlation matrix (Table 2.4) shows that the variable *shadow economy* is most highly correlated (negatively) with the other institutional variables: *rule of law*, *government effectiveness*, *corruption* and *regulatory quality* (-0.55, -0.52, -0.45 and -0.36, respectively). The variable *corruption* is highly correlated with the remaining institutional variables: *rule of law*, *government effectiveness*, and *regulatory quality* (0.79, 0.77, and 0.62, respectively). All the other institutional variables are correlated with each other as well. Thus, because of correlation among institutional variables, the analysis undertakes the following approach.

I run the regressions with only one institutional variable at a time, without a grand regression of all institutional variables combined together. In other words, as we cannot include all institutional variables in the same specification, the remaining sets of indexes are estimated in alternate models 2, 3, 4 and 5.

Table 2.5 presents the estimation results of equation (2.3.4) using the FEM with tax revenue as the dependent variables and institutional variables as main predictors<sup>16</sup>. Column 1 of Table 2.5 shows the coefficient estimates for *shadow economy*. Column 2 reports estimations for variable *corruption*.

<sup>16</sup> The estimates of the Ordinary Least Squares (OLS) method with heteroscedasticity-robust standard errors following Buehn et al. (2013) and the REM of the tax revenue model are presented in the Appendix A.1 and Appendix A.2 just for comparison reasons.

Column 3 displays estimation results for *government effectiveness*. Column 4 exhibits estimation results for *regulatory quality* variable. Column 5 details estimation results for *rule of law*.

All estimated parameters conform to our prior expectations, have the expected signs and confirm the previous findings, suggesting that all the institutional quality variables considered in the model are fairly suitable determinants of tax collection in the sample.

Column 1 for the FEM regressions shows that the estimated coefficient for the main explanatory variable of interest – *shadow economy* - is negative and statistically significant, as hypothesized. This suggests that a higher overall share of underground economy is significantly associated with a reduced level of tax revenues (including social security) in general. The higher the size of the shadow economy, the less tax is collected. These results provide evidence of a statistically significant relationship between tax collection and the size of the shadow economy.

The estimation results in *column 2* of Table 2.5 show that the variable *corruption* is negatively associated with collection of taxes. This negative relationship is statistically significant. This suggests that when the incidence of *corruption* is high, this reduces the collection of taxes, confirming the findings of Aghion et al. (2016), Gauthier and Goyette (2016). In other words, in general, when there is high level of corruption, less tax is collected on average. Therefore, the higher the extent of corruption, the lower the possible contribution of a tax dollar on the economy because government accumulates less of this tax revenue.

As for *columns 3, 4 and 5* of Table 2.5, all three remaining institutional variables: *government effectiveness*, *regulatory quality* and *rule of law* in the FEM estimations are positive and statistically significant, confirming previous expectations. This suggests that the more effective the government or the higher the quality of the civil service, the more positive impact it has on tax collection, as expected. Thus, variations in government efficiency affect the tax collection according to our FEM model.

The *regulatory quality* or the ability of government to formulate and implement sound policies towards the private sector has positive and significant influence on tax collection in Column 4 as well. This suggests that the more sound regulatory quality and regulations on private sector, the more taxes it may collect. The results of the FEM estimations show that the better the *rules of law* or the higher the public confidence in the rules of society and property rights, the higher tax revenue can be collected in that society.

The variable *GDP per capita growth* in the FEM estimation, as expected, has a positive sign and is statistically significant. This suggests that a faster overall rate of growth in GDP per capita is associated with a higher share of tax revenues in general. *Population growth* has a positive but statistically insignificant impact on total tax revenues with the FEM regression. More rapid population growth is associated with greater total tax revenues, as expected. This may imply that an increase in the rate of population growth on average leads to higher tax revenue overall, however, this impact is not significant always.

Moreover, the results of the model indicate that *trade* as measured by *real openness* is positively correlated with the share of tax revenues. A higher degree of *real openness* or *trade* on average leads to an increase in share of tax revenues. The *share of agriculture* has a negative sign, as hypothesized and statistically highly significant. This suggests that the higher the share of the agricultural sector, the lower the ratio of tax revenues to GDP.

Among the **macroeconomic and labour market variables**, the coefficient of *inflation* is positively and strongly correlated, as expected, with tax revenue in general. The positive effect of the inflation rate on tax revenues suggests that higher rates of inflation mean more tax collected which, however, is worth less on account of the declined value of money. The *rate of unemployment* is statistically significant in the model and negatively associated with tax revenue in general. It is consistent with our expectation that a higher rate of unemployment contracts tax collection in general. Furthermore, a higher rate of unemployment is connected with a decline in the collection of taxes in general, according to our estimation results. The *gross capital formation* variable's sign is positive, but not statistically significant in all cases. This suggests that capital taxation can facilitate tax revenue, but to a limited extent in our sample.

Among the **demographic variables**, one can observe that *age* and *tourism* variables strongly affect tax revenue in general. The variable *age 65 and above* in our estimation results suggests that, with population aging, on average the relative reliance of governments on tax revenue in general, is expected to diminish. An increase in the over 65 part of the population appears to be strongly linked to lower tax revenue in general. The estimated coefficient *tourism* has a positive sign and is statistically significant. It suggests that an increase in the number of tourists is associated in general with an increase in tax collection. The variable *urbanization* is positively and significantly associated with tax collection. This confirms the expectation that urbanized areas, where the majority of industries is located and which are densely populated areas where more taxpayers live, facilitate tax revenue collection overall and contribute to a higher share of revenue.

If we focus on the magnitude of influence of the variables, the estimation results in Table 2.5 suggest the following. If we compare the magnitude of coefficients of the variables *shadow economy* and *corruption*, the magnitude of the influence of *corruption* is more negative on tax revenues in our sample. The estimation results suggest that *corruption* has more far-reaching damaging and adverse effects on generating the adequate levels of revenues, than the shadow economy. Thus, from a policy-making perspective, reduction of corruption may have a priority over the shadow economy. Among the other institutional variables that positively influence revenue mobilization, the variable *rule of law* has the most salutary effect upon ramping up revenues in the sample, in contrast to *government effectiveness* and *regulatory quality*. Thus, adhering to rule of law should be the primary concern for enhancing governance for policy-makers considering the fact that many transition economies, particularly LMIC, still have challenges with the issues of improving property rights.

The growth of *trade* and importance of the *economic structure* is one of the main features of transitional societies in their transformation to modern societies in shaping the nature of their tax systems. The results of the FEM estimations in Table 2.5 confirm that the magnitude of influence of the variable “trade” or openness is higher in the model (1) estimation, for instance. This may suggest that in practice, governments in many transition countries can generate higher shares of taxes from trade, as a potential source of revenue and a method to tax the growing merchant groups. Tariffs, excises, business licensing, and taxes on commercial groups can become more important than other taxes in this regard. Also, the FEM estimation results in Table 2.5 reveal that higher the share of *agriculture*, the less tax is collected as a consequence of it. While the economic structure of many transition countries, particularly LMIC, is tied to land and agricultural output, one of the factors negatively impacting the collection of taxes from the agricultural sector could be traditionally hard-to-tax schemes in the agricultural sector due to poor bookkeeping (Mahdavi, 2008) and/or due to shadow or unofficial economy.

The effects of institutional quality on inadequate tax revenue collection are in general agreement with the literature (Bird et al., 2008 and Friedman et al. 2001). The results of this study -- that corruption, through tax evasion, affects revenue collection negatively and that is statistically significant -- confirms the findings by Alm, Martinez-Vazquez and McClellan, 2016 and Ghura, 2002. The findings of this study on the negative influence of the shadow economy on revenue collection are consistent with the results obtained by Friedman et al. (2001). The positive and statistically significant coefficients of *urbanization* and *trade* in this study are analogous to findings by Mahdavi (2008). Consistent with findings by Garg et al. (2017), the coefficients of the ‘*share of agriculture to GDP*’ are negative and statistically significant in this study.

The findings of this study are that higher quality of institutions, such as improved *government effectiveness*, enhanced *rules of law* and better *regulatory quality*, can improve revenue collection or increase the efficiency by which tax revenues are translated into infrastructure. The findings are consistent with the results obtained by Acemoglu and Johnson (2005). Although Acemoglu and Johnson did not use the same WGI indicators, as was the case in this study, they proxied property rights institutions by somewhat similar indicators, concluding that high-quality property rights institutions can increase growth. While the concepts of growth and increasing the level of revenue are not exactly the same, in general, their results are compatible with ours.

To sum up, the results in Table 2.5 indicate that the institutional variables are very much pertinent in explaining tax collection in transition countries of Central and East Europe, former Soviet Union and East Asia. The five variables proxied as institutional and governance variables: *shadow economy*, *government effectiveness*, *corruption*, *regulatory quality*, and *rule of law* are always statistically significant and have the expected signs. Thus, these empirical results suggest strongly that institutional variables play a significant role in the determination of the level of tax revenue of transition countries.

**Table 2.5** Estimation Results: Impact of Institutions on Tax Revenue--FEM.

| Dep.Variable: <b>TR</b>          | Fixed-Effects (within) regression |                     |                     |                     |                     |
|----------------------------------|-----------------------------------|---------------------|---------------------|---------------------|---------------------|
|                                  | (1)                               | (2)                 | (3)                 | (4)                 | (5)                 |
| <b>Institutions</b>              |                                   |                     |                     |                     |                     |
| Shadow Economy                   | -.577**<br>(-2.49)                |                     |                     |                     |                     |
| Corruption (TI CPI)              |                                   | -.967**<br>(-2.41)  |                     |                     |                     |
| Gov. Effectiveness               |                                   |                     | .284***<br>(3.41)   |                     |                     |
| Regulatory Quality               |                                   |                     |                     | .261***<br>(2.71)   |                     |
| Rule of Law                      |                                   |                     |                     |                     | .317***<br>(3.03)   |
| <b>Development</b>               |                                   |                     |                     |                     |                     |
| GDP per capita growth            | .945**<br>(2.17)                  | .139**<br>(2.02)    | .151**<br>(2.42)    | .126*<br>(1.87)     | .167**<br>(2.03)    |
| Population growth                | .302<br>(1.23)                    | .675<br>(1.51)      | .611<br>(1.47)      | .817**<br>(2.04)    | .341*<br>(1.74)     |
| <b>Openness</b>                  |                                   |                     |                     |                     |                     |
| Trade (Exp+Imp/GDP)              | .641**<br>(1.97)                  | .593**<br>(2.15)    | .412**<br>(2.10)    | .372*<br>(1.91)     | .672**<br>(2.48)    |
| <b>Economic Structure</b>        |                                   |                     |                     |                     |                     |
| Agriculture/GDP                  | -.142***<br>(-6.09)               | -.125***<br>(-5.89) | -.141***<br>(-6.27) | -.103***<br>(-4.88) | -.109***<br>(-5.80) |
| <b>Macroeconomic Environment</b> |                                   |                     |                     |                     |                     |
| Inflation                        | .198**<br>(2.17)                  | .219**<br>(2.38)    | .224**<br>(2.39)    | .129***<br>(3.01)   | .216***<br>(5.01)   |
| Gross capital formation          | .466*<br>(1.94)                   | .929<br>(1.10)      | .402**<br>(2.41)    | .745**<br>(1.97)    | .113<br>(1.07)      |
| Unemployment                     | -.151**<br>(-2.03)                | -.156*<br>(-1.86)   | -.189*<br>(-1.83)   | -.202**<br>(-2.10)  | -.182*<br>(-1.87)   |
| <b>Demographics</b>              |                                   |                     |                     |                     |                     |
| Age                              | -.349***<br>(-4.12)               | -.308***<br>(-4.07) | -.243***<br>(-3.24) | -.205**<br>(-2.47)  | -.255***<br>(-2.94) |
| Urbanization                     | .221***<br>(5.90)                 | .238***<br>(6.74)   | .219***<br>(5.97)   | .251***<br>(6.38)   | .256***<br>(6.55)   |
| Tourism                          | .383***<br>(2.86)                 | .426***<br>(3.48)   | .459***<br>(3.10)   | .467***<br>(3.34)   | .488***<br>(3.44)   |
| Constant                         | 1.82***<br>(3.14)                 | 2.31***<br>(7.87)   | 2.19*<br>(7.24)     | 2.52***<br>(7.73)   | 2.49***<br>(7.81)   |
| F-Test:                          | 20.14***                          | 26.63***            | 25.37***            | 20.03***            | 20.29***            |
| Observations                     | 318                               | 396                 | 396                 | 355                 | 355                 |
| Prob > F                         | 0.000                             | 0.000               | 0.000               | 0.000               | 0.000               |
| Adj. R-squared                   | 0.565                             | 0.574               | 0.582               | 0.564               | 0.545               |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics shown in parentheses.

### 2.5.3 Robustness Checks

The next section provides robustness checks of the baseline FEM estimation that address both endogeneity and reverse-causality issues. First, I examine the robustness of the baseline results with the alternative regression model. In this case, I study the other traditional panel data estimator: random effects models (REM) using the generalized-least square (GLS) estimator. The REM or the error component model is specified to control for country-specific heterogeneity.

While the Hausman test favoured using the FEM, the REM is used only as the auxiliary and alternative regression model for the purposes of comparison (Appendix A.2), as income level of transitional countries and regional affiliations may cause variations between cases and observations, and other variables may be fixed between cases but vary over time. I assume that the regressors are uncorrelated with the random (panel-specific) effects with zero mean and constant variance.

The results are presented in Appendix A.2 and are robust to the fixed effect estimation output. All estimated coefficients have the anticipated signs and support prior predictions. All the institutional quality variables estimated in the REM are statistically significant at 1% and 5% in the sample. Particularly, column 1 for the REM regressions shows that the estimated coefficient for the main explanatory variable of interest – *shadow economy* - is negative and statistically significant, as assumed. This suggests that a higher overall ratio of informal economy is significantly associated with a contracted level of tax revenues in general. These results corroborate FEM results' evidence of a statistically significant relationship between tax collection and the size of the shadow economy.

The estimation results in *column 2* of Appendix A.2 confirm that the variable *corruption* is negatively associated with taxes. This negative relationship is statistically significant. This substantiates the FEM results that when the occurrence of *corruption* is rampant, this decreases the collection of taxes. The *columns 3, 4 and 5* of the Appendix A.2 show that all three remaining institutional variables: *government effectiveness*, *regulatory quality* and *rule of law* in the REM estimations are positive and statistically significant, proving validity of the preceding FEM estimations. This suggests that the higher the regulatory quality, the government effectiveness, and the better the application of the rule of law in a society, the more positive effect institutions have in general on tax revenues, or the more taxes that society is able to collect for its development.

In the REM model (Appendix A.2) , I consider the time dummy after year 1998 that takes on the value one when tax mix of post-1998 are studied, and zero otherwise. The income level dummies -  $I_{it}$  from equation 2.3.4 are also taken into account to differentiate between the income of transition countries: lower-middle, upper-middle and high-income (*LMIC*, *UMIC* and *HIC*). The results of the REM GLS estimation (Appendix A.2) show that dummy coefficients of lower-

middle income transition economies (*LMIC*) in contrast to the high-income (*HIC* – the category excluded) are negative and statistically significant. It suggests that in contrast to the *HIC* that were able to generate more revenues in part due to stronger institutions, less tax revenues were collected in the *LMIC*, and institutions were one of the factors behind it. The coefficients on the time dummy variable are positive and statistically significant in the REM panel (Appendix A.2) – suggesting that tax reforms undertaken in many countries with their economies in transition contributed to increased tax collection after 1998, leaving behind the effect of the tumultuous initial seven years of transition<sup>1</sup>.

The correlation matrix below (Table 2.6) shows that the regressor *population growth* is most highly correlated (negatively) with the variable *urbanization* (-0.61).

|                   | Agriculture/GDP | Urbanization | Population Growth | Openness |
|-------------------|-----------------|--------------|-------------------|----------|
| Agriculture/GDP   | 1.0000          |              |                   |          |
| Urbanization      | -0.3752         | 1.0000       |                   |          |
| Population growth | 0.4112          | -0.6071      | 1.0000            |          |
| Openness          | -0.1574         | 0.0169       | -0.0136           | 1.0000   |

**Table 2.6** Correlation matrix of main regressors

To rectify for possible simultaneity bias that may result from the variables *population growth* and *urbanization* an instrumental variables (IV) technique is employed, assuming these variables - *POP* and *URB* - might not be independent of the error term. This technique deals with the possible problem of heteroscedasticity as well. In addition, for the best equation fit, and to remove skewed (thick tails) distribution, the natural logarithm of the GDP per capita growth ( $\log Y$ ), is utilized in the estimation. Thus, to check for possible endogeneity, Baltagi's EC2SLS Random-Effects (REM) instrumental variables (IV) regression, Arellano-Bond Dynamic (ABD) Panel-Data Estimation with a one-period lag used for instruments, and ABD one-step estimator with robust standard errors, is utilized, as following:

$$TR_{it-1} = \alpha_i + \beta_1 \log_e(Y_{it-1}) + \beta_2 POP_{it-1} + \delta_1 XM_{it-1} + \delta_2 NAGR_{it-1} + \gamma INST_{it-1} + \nu SML_{it-1} + \omega DMG_{it-1} + Y_{it-1} + Z_{it-1}\eta + f_i + \varphi_t + \varepsilon_{it-1} \quad (2.5.1)$$

<sup>1</sup> When the countries of Central and East Europe and the FSU embarked on tax reforms in 1991, they faced inconsistent macroeconomic performance, spiralling through series of financial instability events, which culminated in the Russian financial crisis of 1998. During the years leading to this crisis, "tax collection remained sporadic and arbitrary and most of the largest industrial-financial groups were able to avoid taxation" (Clifford and Poirot, 2001: 498). Due to the weak tax systems, all transition countries in early 1990s had inadequate revenues:

"All post-communist countries were gripped by revenue crisis in the early 1990s, as the institutions designed to finance the communist state proved ill-suited to a market economy. Post-communist officials were forced to rapidly create tax systems to extract revenues from private sectors" (Gehlbach, 2008: 50).

where,

$TR_{it}$  = the tax revenue as a ratio of GDP in transition country  $i$  at the time  $t$ ;

$POP_{it}$  = the rate of population growth;

$XM_{it}$  = the ratio of exports plus imports to GDP PPP adjusted;

$NAGR_{it}$  = the non-agriculture share of GDP;

$SML_{it}$  = the supplementary macroeconomic environment and labour market variables (proxied by inflation, rate of unemployment and gross capital formation);

$DMG_{it}$  = the demographic characteristics and leisure variables capturing aging and tourism;

$Y_{it}$  = GDP per capita growth;

$I_{it}$  = the dummy for level of income of transition countries:  $LMIC$ ,  $UMIC$  and  $HIC$ ;

$f_i$  = the unobservable country specific, time-invariant effects;

$\varphi_t$  = unobservable time specific effects;

$Z_{it}$  = matrix that includes instrumental variables: fractionalization index, checks and balances;

$\eta$  = vector of coefficients;

$\varepsilon_{it}$  = the error term;

$\beta_1, \beta_2$  = control the effects of structural variables related to the transition country's level of development: GDP p.c. and population growth that is used in the conventional literature;

$\delta$  = control the influence of economic structure and openness in revenue performance;

$\nu$  = controls the impact of supplementary macroeconomic and labour market variables;

$\omega$  = captures the impact of demographic characteristics and tourism as a form of leisure in collection of taxes.

A probable source of simultaneity may arise from the fact that different institutional variables (*shadow economy, corruption, rule of law, government effectiveness and regulatory quality*) may possibly react to a change in the level of tax revenues. It is essential to exclude the likelihood that changes in tax revenues are caused by changes in institutional quality, or the likelihood of simultaneity. However, taking into account the regression framework in equation 2.5.1, simultaneity bias does not seem to be an issue. It is because the dependent variable is the log form of tax revenue, ranging from  $t-1$  to  $t$ , and all the independent variables are measured at  $t-1$ . It is therefore not likely that changes in institutional quality in a future (or current) period could affect the revenue collection from taxes in the previous year.

Discussion of the selection of instruments for measuring the quality of institutions is quite thin in the literature. The impact of institutions and corruption on economic growth has become a vigorous area of different studies since the late 1990s (Hall and Jones, 1999; Knack and Keefer, 1995; Mauro, 1995). One study addresses endogeneity by utilizing exogenous factors in institutions from colonial origin and settler mortality (Acemoglu et al., 2001). The studies by La Porta et al. (1999) and Alesina et al. (2003) are of greater interest as they emphasize that the quality of institutions is influenced by such factor as fractionalization or polarization of a society as a whole adversely affecting also political stability, economic policy and economic

management of a country. The first study proposes that quality of institutions and governance can be assessed by consideration of ethno-linguistic fractionalization, religious affiliation, origin of commercial laws, geographic location and latitude of countries and other factors (La Porta et al, 1999).

Bird (2008) utilizes two instrumental variables to deal with endogeneity. First, he selects as an instrument an index that covers ethnic, language and religion fractionalization because these variables can lead to low quality of institutions, political uncertainty and badly organized and implemented economic policies. For this IV, he employs data from Alesina, Delveeschauer, Easterly, Kurlat and Wacziarg (2003). Second, Bird (2008) uses the legal origin of a country as instrument based on data by La Porta, Lopez-de-Silanes, Schleifer and Vishny (1999).

La Porta, Lopez-de-Silanes, Schleifer and Vishny (1999) identified five determinants of government performance and the level of adequate tax collection across a sample of developing and transition countries. Those determinants were: (1) ethno-linguistic fractionalization, (2) religious affiliation, (3) origin of commercial laws, (4) geographic location of countries, and (5) other factors used as instruments to explain institutional development. La Porta et al. (1999) found that countries with higher rates of poverty, geographically closer to the equator, ethno-linguistically heterogeneous, governed by French or socialist laws, and with higher proportions of Catholics or Muslims had poorer government performance and lower tax collection.

The studies by La Porta et al. (1999) and Alesina (2003) are of greater interest as they emphasize that the quality of institutions is influenced by such factors as origin of commercial laws and fractionalization or polarization of a society as a whole adversely affecting also political stability, economic policy and economic management of a country.

I use a two-stage least-squares random effects estimator - Baltagi's (2013) EC2SLS estimator as an instrumental variable (IV) for fitting panel-data model for some right-hand side variables endogeneity concerns.

The Baltagi's (2013) EC2SLS estimator treats the disturbance term as random variable that is IID in my panel. Again, I assume that the error term has zero mean and is not correlated with the regressors. This IV estimator is also used to control for measurement error. While taking the EC2SLS approach, I examine the robustness of the baseline results to additional covariates. I use two instrumental variables: a) mean value of the ethnic, language and religion fractionalization based on Alesina et al. (2003) dataset (following Bird, Martinez-Vazquez and Torgler, 2008), and b) separation of institutional powers or checks and balances in political systems of targeted countries based on the WB's database of political institutions. I rely on the assumption that both instruments are linked, through other already utilized institutional variables, to tax collection. The Baltagi's EC2SLS estimates are close to the FEM estimates, with coefficients for institutional variables becoming of slightly lesser magnitude, but not to the extent of losing their

statistical significance (Table 2.7). The first-step estimates are satisfactory, with both instruments being correlated with tax revenue and displaying the expected sign. The Sargan test for over-identification suggests that the instruments are valid<sup>2</sup>. Thus, the results reported in Table 2.7 show that these two instruments are effective in explaining the impact of institutions on tax collection. The estimation results in Table 2.7 show that the additional measures of institutional quality – fractionalization, and checks and balances, are statistically significant and confirm that these two indices are crucial determinants of the domestic revenue mobilization. All remaining institutional variables are statistically significant, confirming the robustness of the baseline results.

The estimation results in Table 2.7 show that lower-middle income countries have a statistically significant lower tax ratio than high-income transition countries. This finding provides an empirical support to the unproductive outcomes of tax reforms in general in lower-middle income countries. It also provides evidence that the lower-middle income countries show lower tax performance compared to high-income transition countries and have difficulties to improve their tax revenue collection. In contrast, the estimation results in Table 2.7 show that the upper-middle income countries have a statistically significant positive impact on tax revenue compared to high-income countries. This may suggest that the tax revenue collection in upper-middle income transition countries slightly improved. The improved tax revenue collection in the upper middle-income countries compared to high-income countries may have two explanations. First, by and large, high-income transition countries became stable politically and economically with not much effort put on boosting tax revenue collection. Second, many upper-middle income countries made all efforts to catch up with the tax systems of the high-income countries over the last two decades. Especially, those countries which have geographical proximity to the West Europe, succeeded most.

The results on inadequate tax revenue collection in the lower-middle income transition countries might be associated with tax evasion as well, due to weak or poor quality of institutions. These results are in accordance with the latest estimates of the scale of tax avoidance. The estimated annual tax revenue losses for developing countries in general ranges from \$100 billion (UNCTAD, 2015) to \$200 billion (Crivelli, Mooij and Keen, 2016). Crivelli et al. (2016) utilize data on corporate income tax revenue and estimate global revenue losses at around US\$650 billion annually, of which around one-third relate to developing countries. While their estimates

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<sup>2</sup> The Sargan test for validity of instruments is used to find out if the chosen instruments are valid. In particular, to compute Sargan statistics in our sample, instrumental variables (IV): fractionalization index, checks and balances index were employed to replace explanatory variables: *POP* and *URB*, which I assume, might not be independent of the error term. The selected instrumental variables are exogenous variables that are correlated with both *POP* and *URB*. Next, the original regression was estimated by IV or instruments chosen, to obtain the residuals. Then, the Sargan statistics was computed by regressing the residuals on all explanatory variables, constant and all instruments, but excluding *POP* and *URB*. Under the null hypothesis that the instruments are exogenous, the computed chi-square value is not statistically significant, as shown in Table 2.7. Therefore, we can accept the chosen instruments as valid.

have not been disaggregated to country-level to reveal the underlying pattern, the authors suggest that OECD countries may lose 2-3% of their *total* tax revenues, and lower-income countries much more, 6-13%. One can guesstimate that annual tax losses in lower-middle income transition countries is high, too. For example, the estimated annual tax revenue losses as a percent of total tax only in Lao Republic is 12.58%<sup>3</sup>. The pattern of greater relative intensity in lower-income countries (measured by losses/GDP or losses/tax revenue) is even stronger in the results of a study by Cobham and Yanski (2017) compared to the work by Crivelli et al. (2016).

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<sup>3</sup> Estimates of tax losses to profit shifting as a percentage of total tax revenue. Retrieved from the Tax Justice Network on April 1, 2017: <http://www.taxjustice.net/2017/03/22/estimating-tax-avoidance-questions/>

**Table 2.7** Estimation Results: Impact of Institutions on Tax Revenue – EC2SLS GLS.

| Dep.Variable $\Delta \ln TR$           | EC2SLS Random-Effects IV regression |                     |                     |                     |                     |
|--|-------------------------------------|---------------------|---------------------|---------------------|---------------------|
|  | (1)                                 | (2)                 | (3)                 | (4)                 | (5)                 |
| <b>Institutions</b>                    |                                     |                     |                     |                     |                     |
| Shadow Economy                         | -.248***<br>(-5.28)                 |                     |                     |                     |                     |
| Corruption (TI CPI)                    |                                     | -.342**<br>(-2.13)  |                     |                     |                     |
| Gov. Effectiveness                     |                                     |                     | .336***<br>(2.57)   |                     |                     |
| Regulatory Quality                     |                                     |                     |                     | .175**<br>(2.16)    |                     |
| Rule of Law                            |                                     |                     |                     |                     | .274***<br>(2.98)   |
| <b>Instruments:</b>                    |                                     |                     |                     |                     |                     |
| Fractionalization Index (al_fraction)  | -.682**<br>(-2.13)                  | -.596**<br>(-2.12)  | -.581**<br>(-2.09)  | -.634**<br>(-2.23)  | -.849**<br>(-2.43)  |
| Checks and Balances Index (dpi_checks) | .271**<br>(2.09)                    | .179**<br>(2.03)    | .299**<br>(2.07)    | .187**<br>(2.04)    | .193**<br>(2.08)    |
| <b>Development</b>                     |                                     |                     |                     |                     |                     |
| GDP per capita growth                  | .356**<br>(2.45)                    | .184**<br>(2.23)    | .147**<br>(2.41)    | .183*<br>(1.89)     | .194**<br>(2.24)    |
| <b>Economic Structure</b>              |                                     |                     |                     |                     |                     |
| Agriculture/GDP                        | -.431***<br>(-5.06)                 | -.463***<br>(-5.70) | -.428***<br>(-5.83) | -.346***<br>(-5.86) | -.378***<br>(-5.24) |
| <b>Macroeconomic Environment</b>       |                                     |                     |                     |                     |                     |
| Inflation                              | .394**<br>(1.98)                    | .217***<br>(3.11)   | .402**<br>(2.17)    | .423***<br>(3.51)   | .407***<br>(3.29)   |
| Gross capital formation                | .278**<br>(2.15)                    | .370**<br>(2.53)    | .298*<br>(1.93)     | .468***<br>(2.69)   | .451***<br>(2.66)   |
| Unemployment                           | -.131**<br>(-2.19)                  | -.184*<br>(-1.79)   | -.179*<br>(-1.75)   | -.203*<br>(-1.78)   | -.191*<br>(-1.69)   |
| Years after 1998                       | .448**<br>(2.47)                    | .567***<br>(2.89)   | .588***<br>(3.03)   | .406**<br>(2.21)    | .384*<br>(1.96)     |
| <b>Demographics</b>                    |                                     |                     |                     |                     |                     |
| Age                                    | -.176**<br>(-2.11)                  | -.251**<br>(-2.08)  | -.156**<br>(-2.03)  | -.179**<br>(-1.98)  | -.161**<br>(-2.44)  |
| Tourism                                | .208**<br>(2.11)                    | .139**<br>(2.28)    | .261**<br>(2.38)    | .207**<br>(2.22)    | .218**<br>(2.28)    |
| Upper-Middle Income                    | .114**<br>(2.28)                    | .171**<br>(2.41)    | .107**<br>(2.40)    | .235**<br>(2.23)    | .301**<br>(2.32)    |
| Lower-Middle Income                    | -.401**<br>(-1.97)                  | -.261<br>(-1.60)    | -.221**<br>(2.06)   | -.207*<br>(-1.63)   | -.232**<br>(-2.08)  |
| Constant                               | .501***<br>(4.37)                   | .376***<br>(3.09)   | .355***<br>(5.26)   | .314***<br>(5.53)   | .316***<br>(5.35)   |
| Wald chi2                              | 329.04***                           | 302.71***           | 354.31***           | 279.33***           | 269.54***           |
| Prob>chi2                              | 0.000                               | 0.000               | 0.000               | 0.000               | 0.000               |
| Sargan stat., chi2                     | 8.21                                | 13.45               | 11.02               | 14.45               | 7.3                 |
| Prob>chi2                              | 0.29                                | 0.38                | 0.44                | 0.29                | 0.37                |
| Observations                           | 297                                 | 296                 | 301                 | 264                 | 264                 |
| Adj. R-squared                         | 0.852                               | 0.881               | 0.887               | 0.861               | 0.859               |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of z-statistics shown in parentheses.

#### 2.5.4 Dealing with Statistical Issues and GMM estimation

Finally, in order to assess more deeply and dynamically the relationship between institutions and tax collection, a dynamic model is studied. To check the baseline results' robustness, I use the Arellano-Bond estimator, a generalized method of moments (GMM) estimator for linear dynamic panel-data models with lagged levels of endogenous variables as well as first differences of exogenous variables as instruments to deal with endogeneity concerns. The Arellano-Bond estimator is also helpful in removing the panel-specific heterogeneity by first differencing the regression equation.

To ensure the consistency of the GMM estimates and following the Arellano-Bond methodology, first, I test the null hypothesis of no second-order autocorrelation in the transformed error term -  $\Delta \varepsilon_{it}$  using the AR (1) and AR (2) Arellano-Bond tests for the first and second order autocorrelations. Second, I check for the overall validity of the instruments using the Sargan test of over-identifying restrictions.

To address endogeneity in this model as a preventive measure, two precautionary steps have been taken. First, the approach of Acosta-Ormaechea and Yoo (2012) was implemented to examine the relevance of endogeneity on a country-by-country basis. After the robustness check, I excluded those countries that seem to be causing the endogeneity problem from the sample. Second, the GMM regressions were run with the lagged independent variable to account for time persistence in the dynamics of tax revenue estimates. Under the assumption of independent and homoscedastic residuals, the one-step GMM estimation generates more consistent parameter estimates. In this one-step GMM model, the first differences of dependent variable  $TR$  is instrumented with its past level and the strictly exogenous variables are instrumented with themselves. Thus, the value for  $\Delta TR_{i(t-1)}$  is used as an instrument to avoid a reverse causality of regressors that are not strictly exogenous. The independent variable with a one-year lagged value of tax revenues:  $\Delta TR_{i(t-1)}$  was created and tested. This lagged independent variable is not correlated with the lagged error term  $\Delta \varepsilon_{it}$ .

Arellano-Bond dynamic (ABD) panel data regression was run to address the endogeneity concern of some regressors in this model and to check the robustness of results. Table 2.8 reports the estimated parameters of equation 2.5.1, employing the difference GMM model regression and utilizing a model with 1 lagged value of dependent variable: tax revenue. Table 2.8 presents the estimation results of the ABD generalized method of moments (GMM) with autoregressive lag (1) model, where the lagged values (1) of the regressand (tax revenues) act as an explanatory variable. This method utilizes lag (1) of the regressand as an explanatory variable, which remains orthogonal to the error, as suitable instrument in the estimation of Equation 2.5.1. More specifically in this model, the lagged dependent and predetermined tax variables are instrumented with their past levels and the strictly exogenous variables (*shadow economy* and *corruption*) are instrumented with themselves.

Table 2.9 presents the results of the Arellano-Bond (1991) one-step estimator with robust standard errors to check for the homoscedasticity. The magnitude and the level of statistical significance of coefficients for institutions and tax are almost similar to those reported in Table 2.8, with the standard errors being different from the results reported in Table 2.8, confirming the lack of homoscedasticity in the ABD model.

As can be seen in both Tables 2.8 and 2.9, the main results confirm the results of the FEM estimation. In both tables, in columns 1 through 5, the coefficients for institutional variables: *shadow economy* and *corruption* are negative and significant in relation to tax revenue. In addition, the other indices of institutional quality: *government effectiveness*, *regulatory quality* and *rule of law* are positive and statistically significant to explain variations in tax collection. This suggests, again, the existence of a positive association between institutional quality and expansion of the tax revenue level. These results suggest that stronger and higher quality institutions are associated with an increase in tax revenues.

The Arellano - Bond test for zero autocorrelation in first-differenced errors suggests that there is no autocorrelation of either the first order (AR1) or the second order (AR2). In addition, the instruments of this model are valid, as corroborated by the Sargan test of over-identifying restrictions.

The results remain robust with the rest of the explanatory variables in columns 1 through 5 after the exclusion from the sample of several countries that seem to be potentially creating an endogeneity issue. The coefficient of *population growth*, *openness*, *inflation*, *urbanization* and *tourism* variables are positive and significant. This suggests, again, that these variables positively influence tax revenue. The coefficient for *capital gross formation* remains insignificant, but positive. The coefficients of *agriculture*, *unemployment* and *age* variables are negative and significant. This implies that the last three variables affect tax revenue negatively and on average contribute to the contraction of the tax bases.

The variable '*share of agriculture to GDP*' is the most significant predictor and the principal determinant of tax revenues among the variables. Its negative sign and statistical significance suggests that the larger share of agriculture sector has adverse effect on tax-to-GDP ratio. This could be due to various exemptions schemes and lower incomes in the agricultural sector. While the economic structure of many transition countries, particularly LMIC, is tied to land and agricultural output, the other factors negatively impacting the collection of taxes from the agricultural sector could be traditionally hard-to-tax schemes in the agricultural sector due to poor bookkeeping (Mahdavi, 2008) and/or due to shadow or unofficial economy. The magnitude of coefficients for '*share of agriculture-to-GDP*' varies from -.434 to -.862 in both GMM ABD models, with lag (1) and by one-step estimation. Assuming all other factors remain constant, it indicates that on an average, one percentage point increase in the share of agriculture GDP leads to 0.4 – 0.8 percent decline in tax-to-GDP ratio.

The estimation results in Tables 2.8 and 2.9 show that the Arellano-Bond tests fail to reject the hypothesis of no autocorrelation in the first and the second orders. The Sargan test suggests that the instruments are not correlated with the residuals.

To sum-up, empirical results in Tables 2.8 and 2.9 confirm that the institutional quality indicators are the relevant contributing factors in revenue collection in the sample. Shadow economy and corruption have been found as important indicators, suggesting that a rise in the size of the *shadow economy* and perception of *corruption* in society have a negative impact on government's ability to collect tax revenues. The analysis finds a significant positive effect of *government effectiveness*, *regulatory quality*, and *rule of law* on tax revenue. An increase in indicators of *government effectiveness*, *regulatory quality* and *rule of law* is associated with the rise in tax revenue collection, which confirms the hypothesis.

**Table 2.8** Estimation Results: Impact of Institutions on Tax Revenue – GMM (ABD) with lag (1).

| Dep.Variable $\Delta \ln TR$  | GMM (ABD) with lag (1) |                     |                     |                    |                    |
|-------------------------------|------------------------|---------------------|---------------------|--------------------|--------------------|
|                               | (1)                    | (2)                 | (3)                 | (4)                | (5)                |
| <b>Institutions</b>           |                        |                     |                     |                    |                    |
| Shadow economy                | -.148***<br>(-2.71)    |                     |                     |                    |                    |
| Corruption (TI CPI)           |                        | -.975**<br>(-2.12)  |                     |                    |                    |
| Gov. Effectiveness            |                        |                     | .602*<br>(1.95)     |                    |                    |
| Regulatory Quality            |                        |                     |                     | .126**<br>(2.24)   |                    |
| Rule of Law                   |                        |                     |                     |                    | .636**<br>(2.08)   |
| <i>Lag1: TR<sub>t-1</sub></i> | .558<br>(0.31)         | .485<br>(0.34)      | .439<br>(0.18)      | .184<br>(0.21)     | .203<br>(0.29)     |
| <b>Development</b>            |                        |                     |                     |                    |                    |
| GDP per capita growth         | .143**<br>(2.04)       | .219***<br>(2.74)   | .223***<br>(2.81)   | .277***<br>(3.29)  | .291***<br>(3.40)  |
| Population growth             | .162*<br>(1.90)        | .438**<br>(2.44)    | .436**<br>(1.84)    | .147*<br>(1.67)    | .143*<br>(1.96)    |
| <b>Openness</b>               |                        |                     |                     |                    |                    |
| Trade (Exp+Imp/GDP)           | .219*<br>(1.66)        | .346**<br>(1.98)    | .331**<br>(1.99)    | .561**<br>(2.15)   | .665*<br>(1.67)    |
| <b>Economic Structure</b>     |                        |                     |                     |                    |                    |
| Agriculture/GDP               | -.862***<br>(-3.05)    | -.481***<br>(-2.59) | -.469***<br>(-2.57) | -.434**<br>(-2.04) | -.506**<br>(-2.51) |
| <b>Macr. Environment</b>      |                        |                     |                     |                    |                    |
| Inflation                     | .517**<br>(2.24)       | .361**<br>(2.44)    | .296**<br>(2.14)    | .127**<br>(2.43)   | .132***<br>(2.57)  |
| Gross capital formation       | .225<br>(1.14)         | .398<br>(1.23)      | .428<br>(1.56)      | .165**<br>(2.07)   | .149*<br>(1.86)    |
| Unemployment                  | -.172**<br>(-2.17)     | -.165**<br>(-2.04)  | -.169**<br>(-2.08)  | -.124*<br>(-1.64)  | -.187*<br>(-1.73)  |
| <b>Demographics</b>           |                        |                     |                     |                    |                    |
| Age                           | -.139**<br>(-1.97)     | -.527**<br>(-2.18)  | -.643**<br>(-1.99)  | -.709**<br>(-2.00) | -.751*<br>(-1.79)  |
| Urbanization                  | .107**<br>(2.24)       | .249**<br>(2.03)    | .331**<br>(2.11)    | .167**<br>(1.97)   | .368*<br>(1.90)    |
| Tourism                       | .321*<br>(1.92)        | .392**<br>(2.02)    | .365*<br>(1.91)     | .386**<br>(1.98)   | .295**<br>(2.25)   |
| Constant                      | .921<br>(1.13)         | .601**<br>(2.76)    | .634***<br>(3.01)   | .865***<br>(2.89)  | .829***<br>(3.45)  |
| Wald chi2                     | 401.78***              | 310.51***           | 309.03***           | 320.59***          | 307.98***          |
| Prob > chi2                   | 0.000                  | 0.000               | 0.000               | 0.000              | 0.000              |
| Sargan stat., chi2            | 31.69                  | 36.51               | 34.96               | 30.18              | 32.84              |
| Prob > chi2                   | 0.36                   | 0.31                | 0.39                | 0.28               | 0.49               |
| Observations                  | 249                    | 353                 | 353                 | 287                | 287                |
| AR(1), p-value                | 0.00                   | 0.00                | 0.00                | 0.00               | 0.00               |
| AR(2), p-value                | 0.05                   | 0.10                | 0.13                | 0.26               | 0.37               |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of z-statistics shown in parentheses.

**Table 2.9** Estimation Results: Impact of Institutions on Tax Revenue – GMM (ABD) one-step estimation .

| Dep.Variable $\Delta \ln TR$     | GMM (ABD one-step estimation) |                     |                     |                    |                     |
|----------------------------------|-------------------------------|---------------------|---------------------|--------------------|---------------------|
|                                  | (1)                           | (2)                 | (3)                 | (4)                | (5)                 |
| <b>Institutions</b>              |                               |                     |                     |                    |                     |
| Shadow economy                   | -.138***<br>(-2.67)           |                     |                     |                    |                     |
| Corruption                       |                               | -.877**<br>(-2.13)  |                     |                    |                     |
| Gov. Effectiveness               |                               |                     | .429**<br>(1.99)    |                    |                     |
| Regulatory Quality               |                               |                     |                     | .232**<br>(2.34)   |                     |
| Rule of Law                      |                               |                     |                     |                    | .522***<br>(2.58)   |
| <b>Development</b>               |                               |                     |                     |                    |                     |
| GDP per capita growth            | .468*<br>(1.71)               | .233***<br>(3.02)   | .255***<br>(3.05)   | .279***<br>(3.39)  | .211**<br>(2.41)    |
| Population growth                | .138**<br>(1.99)              | .439*<br>(1.89)     | .435*<br>(1.80)     | .152**<br>(2.28)   | .153*<br>(1.68)     |
| <b>Openness</b>                  |                               |                     |                     |                    |                     |
| Trade<br>(Exp+Imp/GDP)           | .352*<br>(1.64)               | .368**<br>(2.05)    | .337**<br>(1.98)    | .576*<br>(1.84)    | .461**<br>(2.22)    |
| <b>Economic Structure</b>        |                               |                     |                     |                    |                     |
| Agriculture/GDP                  | -.841***<br>(-3.07)           | -.456***<br>(-2.58) | -.519***<br>(-2.59) | -.445**<br>(-2.05) | -.526***<br>(-2.64) |
| <b>Macroeconomic Environment</b> |                               |                     |                     |                    |                     |
| Inflation                        | .587*<br>(1.83)               | .388**<br>(2.30)    | .363**<br>(2.10)    | .182**<br>(2.49)   | .206***<br>(2.66)   |
| Gross capital formation          | .101<br>(1.12)                | .263<br>(1.39)      | .458<br>(1.44)      | .159**<br>(2.04)   | .121*<br>(1.85)     |
| Unemployment                     | -.219*<br>(-1.85)             | -.194*<br>(-1.86)   | -.145*<br>(-1.96)   | -.192*<br>(-1.64)  | -.231**<br>(-2.14)  |
| <i>Years after 1998</i>          | .511**<br>(2.44)              | .547**<br>(2.10)    | .598**<br>(2.04)    | .483<br>(1.36)     | .193<br>(1.15)      |
| <b>Demographics</b>              |                               |                     |                     |                    |                     |
| Age                              | -.111*<br>(-1.77)             | -.157*<br>(-1.69)   | -.203**<br>(-1.98)  | -.191**<br>(-2.03) | -.232**<br>(-1.97)  |
| Urbanization                     | .206**<br>(2.09)              | .183**<br>(2.27)    | .286**<br>(1.99)    | .156**<br>(2.07)   | .192***<br>(3.16)   |
| Tourism                          | .294***<br>(2.83)             | .382**<br>(2.04)    | .288*<br>(1.95)     | .306**<br>(2.45)   | .247**<br>(2.16)    |
| Constant                         | .908*<br>(1.67)               | .671***<br>(2.86)   | .686*<br>(1.74)     | .991***<br>(3.08)  | .924**<br>(2.15)    |
| Wald chi2                        | 243.02***                     | 259.63***           | 257.70***           | 343.38***          | 326.60***           |
| Prob > chi2                      | 0.000                         | 0.000               | 0.000               | 0.000              | 0.000               |
| Sargan stat., chi2               | 15.37                         | 17.65               | 14.77               | 19.66              | 13.59               |
| Prob > chi2                      | 0.33                          | 0.37                | 0.46                | 0.65               | 0.47                |
| Observations                     | 240                           | 354                 | 354                 | 288                | 288                 |
| AR(1), p-value                   | 0.00                          | 0.00                | 0.00                | 0.00               | 0.00                |
| AR(2), p-value                   | 0.22                          | 0.31                | 0.33                | 0.19               | 0.15                |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of z-statistics shown in parentheses.

## 2.6 Summary and Conclusion

In this chapter, I have studied the effect of institutional quality on tax collection in transition countries. First, I have built a baseline model using the extended tax effort model, which was estimated with the FEM method to assess the effects of institutions on tax collection. Then, using the alternative regression model with instruments and Baltagi's EC 2SLS method, I have obtained evidence that is consistent with the theoretical expectation that institutions strongly influence tax collection. In course of running two-stage least squares estimations, I ran several robustness checks to show that my findings are robust to the baseline results and do not plague them. The addition of the instrumental variables: mean value of fractionalization, and check and balances of political system confirmed again the theoretical prediction. Finally, evidence from the GMM Arellano-Bond estimations also corroborated the baseline results, suggesting that this effect holds and operates through institutional quality channels, consistent with the models' expectation.

In this chapter, I have used data for 33 transition economies for the 1991-2015 period to investigate the relationship between institutional quality and tax revenue. The fundamental conclusion of this paper is that institutional quality strongly influences tax collection in transition countries, i.e. higher quality institutions are associated with increased level of tax revenues, irrespective of the level of income and regional affiliation of a transition country. The results of the econometric analysis confirm that higher quality institutions lead to higher tax revenues. Likewise, poor quality institutions can weaken tax collection and indirectly diminish a positive effect taxation may have on economic development.

The key empirical results of this chapter confirm the general assertion that there exists a positive and significant relationship between institutions and tax revenues. Results of the empirical analysis indicate that quality of institutions has a statistically significant effect on tax revenue in general. In particular, the results confirm that the size of the *shadow economy* and *corruption* have a strong negative influence on *tax revenues*. Thus, in the proposed model a higher size of the *shadow economy* and *corruption* is significantly associated with a lesser share of tax revenues in general.

In addition, the empirical results support the hypothesis that other institutional variables – *the rule of law*, *regulatory quality* and *government effectiveness* have positive influence on tax revenues. This influence is statistically significant in both baseline estimations and robustness checks. This suggests that overall the supremacy of the rule of law, enhanced regulatory quality and increased government effectiveness is significantly associated with a higher ratio of tax revenues.

The results of the random-effects IV regression and random-effects GLS regression suggest that *lower middle-income transition countries* in contrast to *upper middle-income* ones in general

generated lesser share of tax revenues. It may imply that tax reform and tax structure changes - shift from trade taxes to indirect forms of taxation or taxes on consumption - have had positive effects only for those transitional economies classified as upper middle-income transition countries. Compared to the upper middle-income transition countries, in general the *lower middle-income transition economies* collected less tax revenues.

However, I find that there are substantial differences in the impact of some explanatory variables on tax revenue. For instance, there is no significant response to tax revenue by *population growth* and *gross capital formation*. I further observe that there are some differences in the relation between the results for the initial seven years of transition and the rest of the years. This suggests that the tax collection in transition countries changes dynamically because of variations in quality of institutions between countries and during different years.

This chapter makes two key contributions to the field. First, to my knowledge, it is the first one to use the Government Revenue Dataset - GRD (ITCD, 2016) on taxes to study the impact of institutional quality on tax collection in transitional countries. By combining the GRD data with data from Elgin and Oztunali (2012) on shadow economy, from the Transparency International on corruption perception index, from the World Bank's WGI and WDI, the attempt was made to make use of the best available data to analyse the impact of institutions on tax collection in transition countries. Second, to my knowledge, this research is the first to examine empirically the relationship of institutions and the tax collection using panel data and a fixed effects framework.

Yet, this research is a first step in a broader research agenda on how to factor in institutional variables considerations in optimal tax design. At least two areas of research are still in need of further exploration. The first pertains to the measurement of shadow economy. The empirical analysis in this area is limited by the relatively imperfect, incomplete and at times low quality of shadow economy estimates. More elaborate ways of testing shadow economy covering a wider span of years, possibly utilizing some relevant microeconomic data, could result in drawing conclusions that are more definitive on the relationships I have investigated. The second area for further research would address questions that have not yet been adequately addressed in this chapter or the existing literature, for various reasons. For example, when size of the shadow economy is increasing, and tax collection is contracting, and the quality of institutions worsens, what is the link of all these phenomena to the spending side and the overall effectiveness on how public funds are spent? The answers to this kind and other similar questions would bring in pivotal insightful discussions, observations and platforms relevant to the relationship between institutional quality and tax collection.

*Overall conclusion*

Weak institutions along with a relatively large informal sector as share of GDP, and increased perception of corruption are some of the key reasons why some lower-middle income transition countries have lower tax yields in real terms. Furthermore, weak institutions, evasion from paying taxes and non-tax revenues due to high tax burden significantly contributed to the increase in shadow economy in lower-middle income transition countries over the recent years. Thus, it is vital to achieve a sustainable policy balance in formulation/implementation of tax policies and improving the quality of institutions. It is still tough for many lower-middle income transition countries to attain a sustainable tax policy balance considering the often discordant and changing institutions. In addition, poverty rate and cultural norms are the other factors, which should be studied separately, as they are beyond the scope of this research.

More than a quarter century after the fall of Berlin Wall, which coincided with the start of myriad research on institutions, the transition process of many post-communist countries is not yet over. There are still numerous reports on low quality institutions in post-communist countries, particularly in lower-middle income and upper-middle income transition countries, including, but not limited to, cases of increasing size of the shadow economy, increased incidence of corruption, ineffective decisions made by governments, lack of the rule of law. Higher-income transition countries are also not immune from the shortcomings and deterioration of the quality of institutions.

The transition from socialism to capitalism is a dynamic process that requires a coherent set of institutions as not only a starting point, but also developing and evolving them on a permanent basis. Institutions of successful capitalist economies cannot be rapidly and easily copied, as this would lead to unintended tax revenue effects. Some higher-income transition countries became members of the OECD and EU over the last several years and perhaps reached the end of transition, or may have reached a limit when they should not be considered “transitional” anymore. But the challenges of building higher-quality institutions and adequate tax collection, will continue to pose a set of probing questions to lower income transition countries.

## Chapter 3

### 3 Tax Revenues in Transition Economies: Underlying Trends and Structural Changes

#### 3.1 Introduction

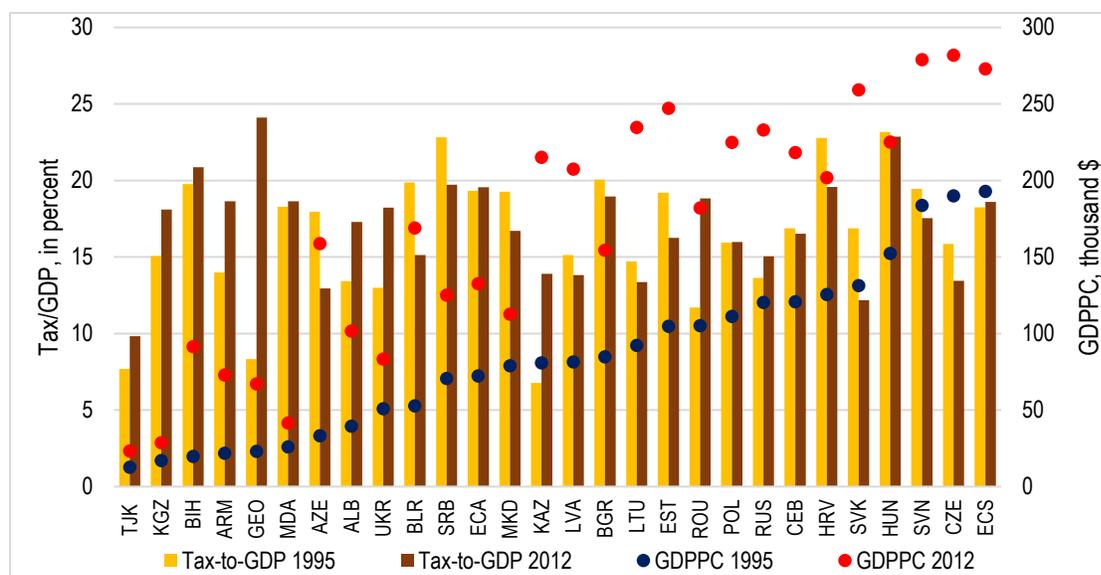
Economic theory postulates that different taxes or alternative tax policies have differential impacts on economic growth. The effect of taxes on economic growth has been studied extensively, often concluding that increased level of income taxes (both corporate and personal) can be detrimental to economic growth. However, the opposite relationship – how economic growth can influence the structure and composition of taxes, has not been comprehensively addressed in the literature. As such, a researcher commonly deals with two issues in the literature. First, the controversies regarding the effect of higher taxes on growth and second, the effect of economic growth on tax revenues in general and changes in tax structures in particular. To delve deeper into the exploration of the influence of growth on tax structures, it is useful to explain the underlying motivation behind this research and define the objective of this chapter.

*Underlying motivation for this research* – Detailed studies of taxation trend and changes in the tax structure of transition countries as related to economic development and growth is almost non-existent in the literature. Given that the primary emphasis of this analysis is to reveal the relation between growth and tax composition in countries with their economies in transition and close the existing gap in the literature, we begin by reviewing the tax revenue data in these countries.

Transitional countries<sup>1</sup> with various speeds and scales of economic growth have different tax burdens. Figures 3.1 and 3.2 show that, between the fiscal year 1995 and the fiscal year 2012, both GDP per capita (based on purchasing power parity, constant 2011 international USD) and GDP per capita growth rose much faster than overall tax collection in many of the targeted countries.

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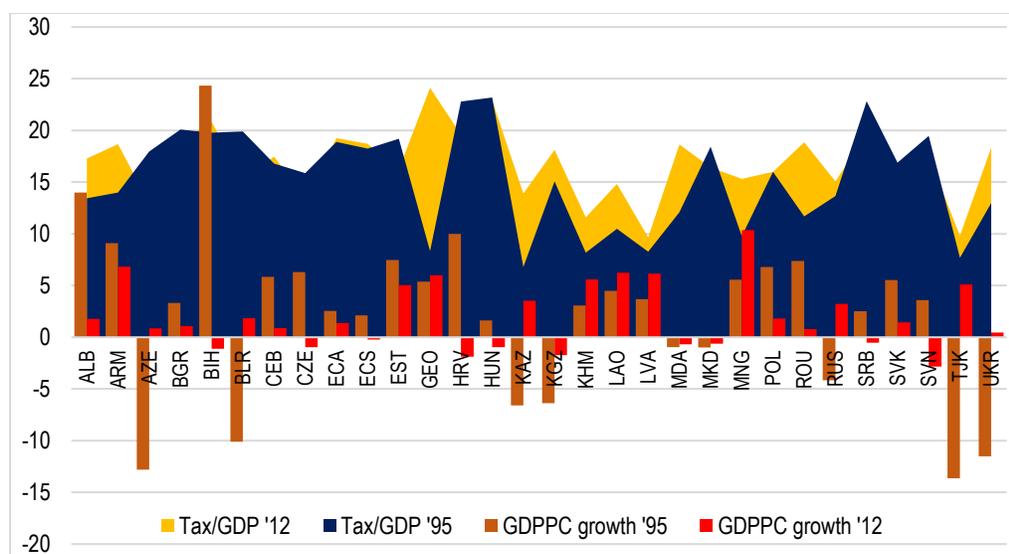
<sup>1</sup> The terms “transition” and “transitional” are used interchangeably to refer to the former Soviet–bloc countries (including countries in Central and Eastern Europe, the Baltic Sea states, South Caucasus and Central Asian countries, but excluding China, Cuba and North Korea, which are not analysed in this research). After the collapse of the Berlin Wall, these transition countries were seen as being in transition from centrally planned economies to more market–dominated systems.



**Figure 3.1.** Tax Revenue and GDP per capita, PPP, \$'000 in transition economies.

Constructed using data from IMF GFSY (2016). Note: The figure shows comparison of the tax to GDP per capita, PPP \$'000 in transition economies between 1995 FY and 2012 FY.

However, the tax to GDP ratio between 1995 and 2012 does not have a regular pattern. In some countries tax to GDP ratio has greatly increased (but by a lesser margin than GDP per capita growth), while in others it has only slightly increased, and in a third group of countries it has decreased. For example, in Azerbaijan, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Macedonia, Latvia, Lithuania, Serbia, Slovak Republic, and Slovenia the tax to GDP ratio was lower in 2012 than in 1995. However, tax to GDP in Georgia increased from 8.3 per cent in 1995 to 21 per cent in 2012, and in Kazakhstan, from 6.8 per cent in 1995 to 13.9 per cent in 2012.



**Figure 3.2.** Tax Revenue and GDP per capita growth in transition economies.

Constructed using data from IMF GFSY (2016). Note: The figure shows comparison of the tax to GDP ratio with the rate of GDP growth between 1995 FY and 2012 FY.

The scope of research covers a wide and diverse geographical area involving advanced economies of the European Union, Central and Eastern Europe, Commonwealth of Independent States (CIS), including Russia, rest of the Eastern Europe, South Caucasus and Central Asia, and developing transitional economies of the South East Asia<sup>2</sup>. Three most significant sub-categories of tax revenues in transitional countries are: taxes on income, taxes on goods and services and social security contributions, when clustered together in their respective regions show how the composition of major tax revenues changed between 1995 and 2013 for each region (Figure 3.3). Each tax component in Figure 3.3 is expressed as a percentage of GDP. The main observations of these changes over time and across regions are that there is an upward trend in taxes on goods and services in all regions: CIS, developing Asia, advanced economies of the EU<sup>3</sup>, except for Slovakia, Central and Eastern Europe, except for Macedonia. There is also an upward trend in collecting taxes on income across CIS countries, except for Azerbaijan and Kyrgyzstan and in advanced economies of the Euro area, except for Slovakia.

*Tax collection is getting low and is not efficient* - Raising adequate level of revenues could bring about two key positive changes. First, it can make particularly lower-middle income transitional countries less dependent on foreign aid. Second, it can help them in funding their national priorities, and delivery of a more acceptable level of public services.

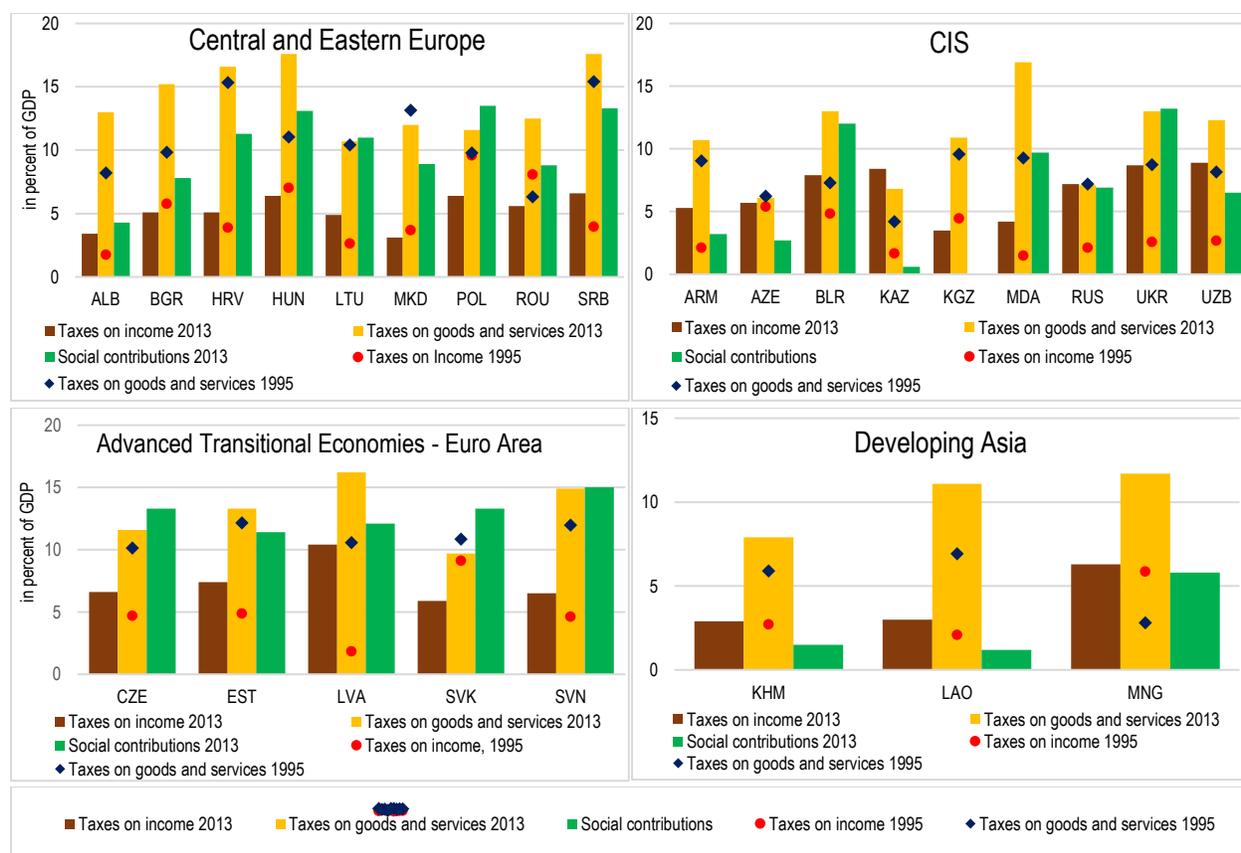
The *objective* of this chapter is to study the trends in tax revenues and changes in the tax structures/tax mix of transition economies over time to:

1. Provide an empirical justification and test the hypothesis that economic growth, as measured by GDP per capita growth, affects the composition of tax revenues, the fiscal structure and tax collection; and,
2. Analyse different determinants of tax shares in 33 transitional countries over the period of 1991-2015 by using a panel data regression **method**.

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<sup>2</sup> For the current 2017 Fiscal Year (FY) 33 transition economies covered by this study are classified into: a) lower-middle income, b) upper-middle income and c) high-income group based on their Gross National Income (GNI) per capita, using the *World Bank Atlas method* in 2015. Henceforth, lower-middle-income transition economies (those with a GNI per capita between \$1,026 and \$4,035) include 11 countries: Armenia, Cambodia, Kosovo, Kyrgyz Republic, Lao PDR, Moldova, Mongolia, Tajikistan, Ukraine, Uzbekistan and Vietnam. Upper-middle-income transition economies (those with a GNI per capita between \$4,036 and \$12,475) include 13 countries: Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Macedonia FYR, Montenegro, Romania, Russian Federation, Serbia and Turkmenistan. High-income transition economies (those with a GNI per capita between \$12,476 or more) include 9 countries: Croatia, Czech Republic\*, Estonia\*, Hungary\*, Latvia, Lithuania, Poland\*, Slovak Republic\* and Slovenia\* (6 countries with asterisk are also the OECD-member countries and Latvia is in the process of becoming a member of the OECD).

<sup>3</sup> The rationale for keeping the advanced economies separate was to have a disaggregated analysis based on transition countries' regional/geographic affiliation and level of income. In addition, every region and transition country is equally unique for investigation. Whether the transition economies are high or low income, all cases and/or regions deserve attention of a researcher to investigate. For instance, some advanced economies of the EU such as Czech Republic, Estonia and Hungary accelerated their structural reforms to meet the current requirements of the EU and consequently, achieved more progress in the reduction of the size of shadow economy in contrast to Romania or Bulgaria (as evidenced by Bayar and Ozturk, 2016).



**Figure 3.1** Major Revenue Categories in transitional countries (% of GDP), 1995 and 2013. Constructed using data from GFSY (IMF, 2016)

Economic growth results in changes to economic structure, government institutions, operation of businesses and consumer behaviour. These changes, in turn, open up opportunities for tax reform and diversification of revenue sources including the introduction of new taxes that are only possible when the economy has reached a certain level of development and growth. All these would eventually lead to significant changes in the tax mix and tax structure of countries experiencing economic growth. The results of these changes are increase in total tax revenues and a relatively more efficient and modern tax system. As such, there are two important *research questions*, followed by the relevant hypotheses, to be addressed under these circumstances, when dealing with the economies of transition countries that may have experienced economic growth since 1991:

1. *Has economic growth led to an increase in total tax revenues as a share of GDP in these countries since 1991?*
2. *Has that economic growth resulted in a significant change in the tax mix and tax structure of transition economies during the course of economic growth?*

Accordingly, it is *hypothesized* that:

1. *As the economies of transition countries grow overtime, governments' total tax revenues as a share of GDP continue to rise.*
2. *Economic growth leads to substantial changes in the tax structures and tax mix of transition economies, resulting in the collection of higher tax revenues.*

Testing and analysis of these hypotheses would enable us to determine how best these countries can implement proper fiscal policies to take advantage of the new opportunities made available to them during the process of economic growth, with the goal of promoting further economic growth and change.

*Central Argument* – Our theoretical and empirical model proposes that as economies of transition countries grow, their tax structure and tax mix changes significantly. The model is estimated by using an unbalanced panel data with annual observations from a relatively diverse sample of thirty-three transitional countries over the period of 1991-2015. This research finds that changes in the tax structure and category of taxes clearly matter when it comes to initiating tax policies. Using the recent data on economic growth, tax structures along with the associated socioeconomic and development variables, we find that economic growth leads to changes in the tax mix and tax composition of transition countries. Also, the higher the economic growth of a particular transitional country, the higher the degree of openness, the higher the extent of industrialization and the higher the level of urbanization and the employment rate, the higher the proportion of younger population, the higher the tax-to-GDP ratio would be. That is, economic growth leads to an increased tax revenue to GDP ratio in our sample of countries, and furthermore, leads to changes in the tax structures of these countries. These findings can be helpful in designing policies to better develop a more desirable tax revenue mix for transition economies.

This chapter aims at *contributing* to the empirical literature on taxation by drawing upon the existing theoretical and empirical models. It utilizes and expounds upon the modern empirical features of cross-country tax studies with a special focus on transitional countries. It is the first attempt at performing an extensive comparative analysis of trends in tax revenues and changes in the tax structures/mix of transition countries by employing more current data.

The *ultimate goal* of this study is to use the empirical findings to arrive at meaningful tax policy and tax reform recommendations that would benefit particularly lower and upper middle-income transition economies to develop a modern tax system resulting in higher revenues to assist them in implementing economic development. Pursuing the ultimate goal also entails determining causes of changes in the tax mix and relative importance of each tax as a component of the overall tax system.

*The larger policy implications* – An important policy implication of this research is to develop tax policies that enhance the chances for governments to improve their tax administration and implement meaningful tax reforms suitable for these countries. This involves a closer

examination of the potential benefits of reforms in tax policy and tax administration for transitional countries.

The structure or composition of tax revenues changes within a broad range, and changes overall during the process of economic growth. Such diversity in tax structure tends to increase as economic growth (measured by GDP per capita) reaches higher levels. At high-income levels, greater diversity in tax structure can be seen in terms of the choice between different categories of direct and indirect taxes, for instance. At lower income levels, the composition of tax revenues may depend on the nature of the economic structure and tax administration.

Different levels of economic growth may have different impacts on the various components of total tax revenue. At a given level of taxation, a change in tax revenue composition may have different effects on factors such as output growth, administrative and compliance costs, equity, efficiency, and stability as a source of revenue, depending on the tax mix. Grasping the significance of changes in tax structure or shifts in the composition of tax revenue can help in the formulation of policies affecting the choice of an appropriate tax revenue mix. Even if a certain level of taxation seems appropriate as a whole for a given country, the structure or composition of tax revenues may not be suitable due to over- or under-utilization of some types of taxes, the latter often leading to inefficiencies in tax collection related to the cost of administration, particularly in transitional countries.

*Structure of this Chapter.* Explanations of how economic growth affects the tax structure and tax mix are divided into eight main sections:

Section (1) provides a background with prominent structural features and trends that could support empirical generalizations based on a cross-country or regional view of tax structures in transitional countries. It also explains the concept of tax structure changes. Section (2) reviews the relevant empirical literature. Section (3) summarizes the theoretical framework and specifies the empirical model. Section (4) describes available data and presents data sources. Section (5) briefly talks about the advantages of panel data and estimation procedure and reports the results of summary statistics. Section (6) presents the baseline results and interprets the empirical findings for the first hypothesis proposed. Section (7) checks the robustness of the model and compares the results of robustness tests with the baseline results. Section (8) provides the results of tax bases elasticity estimates and analyzes the second hypothesis proposed. Finally, section (9) concludes with a summary of the main findings. Policy implications of changes in tax structure of transition economies are analyzed briefly in the concluding section of this thesis.

## **3.2 Review of Literature and the Hypotheses**

### **3.2.1 Development Context and Changes in Structure of Taxation in Transition Countries**

Empirical studies on changes in the composition of tax revenues and tax mix are scarce and scattered. Even rarer is research on changes in tax structure and composition in transition countries, which have experienced prominent shifts in their tax structures over the last two and a half decades. This chapter attempts to narrow the gap in this important area of research that has been neglected by researchers so far. This is a critical gap in the literature in terms of policy-making that attempts to improve tax policy, particularly in transition countries. This chapter utilizes more than a 25-year span of data on tax performance from the International Centre for Taxation and Development (ICTD)'s Government Revenue Dataset (GRD) and on the socioeconomic and demographic characteristics of transition countries since the fall of communism, in order to assess the effect of economic growth on tax structure—an effect that has not been systematically addressed in the literature so far.

Tax systems in general, and tax revenues in particular, are critical instruments in implementing economic development policies in transitional countries. If lower-middle income transitional countries are to reduce aid dependency and poverty more broadly, it is of vital importance that their revenue authorities collect adequate level of taxes effectively to match their increasing spending needs for development. Foreign aid volatility has considerably increased since the late 1990s. Since aid flows to developing countries are increasingly unpredictable and susceptible to political variables, reliance on a country's own domestic revenues to meet development objectives becomes essential in the long-run to maintain often diminishing aid-funded programmes or compensate for the reduction and even for ceasing of aid abruptly (Lensink and Morrissey, 2000; Pallage and Robe, 2001; Alesina and Dollar, 2000; Bulir and Hamman, 2007; Bulir and Hamann, 2006; Bulir and Hamman, 2003; Gupta and Tareq, 2008). Thus, enhancing the ability of developing and transitional countries to raise domestic resources through taxation would lead to less reliance on often-volatile external sources to support different social or public investment programs. In addition, ensuring that developing and transitional countries collect adequate levels of taxes might be what it takes to make citizens pay more attention to their system of government and governance overall.

The evolution of tax policy in developing and transition countries has been gaining more attention over the last three decades. A number of studies in this area have investigated the trends in taxation of various countries at different stages of their economic growth using the ratio of total tax revenues to GDP as a proxy for taxing power, indicating positive relationship between rate of economic growth and tax structure. In particular, the first testable hypothesis of this chapter -- that as economies grow, tax revenue relative to GDP continues to rise -- is echoed in the earlier works of scholars (Abizadeh and Yousefi, 1996; Abizadeh and Grey, 1985; Abizadeh, 1979; Abizadeh, 1988; Acosta-Ormaechea and Yoo, 2012; Bahl, 1971; Easterly and Rebello, 1993; Ram, 1987). As for the second hypothesis on why tax structures change systematically with economic growth (the change in income levels), a number of studies have relied upon

empirical models to elaborate on this subject (e.g. Adkisson and Mohammed, 2014; Arnold et al., 2011; Engen and Skinner, 1999; Hinrichs, 1966; Howard, 2003; Mamatzakis, 2005; Sobel and Holcombe, 1996; Tosun and Abizadeh, 2005; Widmalm, 2001). These include those studies that have tried to explain the effect of taxes on economic growth.

When analysing tax structures in developed and less-developed countries, similar analytical methods can be used for both group as both share many problems and questions that are common (Burgess and Stern, 1993). However, problems of taxation encountered by the developing and transitional countries are much more challenging than those faced by developed countries. Therefore, any analysis of taxation in developing countries should certainly take this into consideration. In addition, not only these differences in economic and political structure between developing and more developed countries matter, but also differences among the developing and transitional countries with different challenges and objectives for development are important factors to take into account (Stiglitz, 2010) when studying the issue in transitional economies.

Since the start of transition process, each post-communist country has reached different levels of development over the past half a century. For instance, the experience of Poland and Russia in the area of taxation reflects contrasting polarities of East Central European (ESE) and Former Soviet Union (FSU) countries during post-communist state-building (Easter, 2008). This implies that a tax structure which may be suitable for one country, may be undesirable for another. Meanwhile, Stiglitz points to two main differences between the tax structures of less-developed countries and those of the more developed countries. First, developing countries suffer from more widespread market failures. Second, asymmetry of information is far more spread in developing countries as compared to more developed countries. These differences suggest that more intense corrective measures, using taxation as a tool of fiscal policy, are required in developing countries as compared to more developed ones (Stiglitz, 2010).

The above-mentioned differences in the tax systems of transition countries are widely attributed to three main factors: the industrial structure inherited from communism, distance from the West, and differences in the level of economic development at the beginning of the post-communist transition (Gehlbach, 2008). First, after the dissolution of Soviet Union, those former Soviet Union countries, which inherited industrial plants or manufacturing enterprises in their territories, similar to the Soviet era, kept collecting the bulk of their government revenue from tax on profit of enterprises. Second, many countries of Eastern Europe, due to their vicinity, proximity or close neighbourhood to the industrialized countries of Western Europe, established tax systems, which were similar in their nature to the tax systems of countries in the European Union. The EU's accession processes and rules required that countries of East Europe (such as Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia before their accession in 2004) must harmonize their tax legislation with those in the EU (Martinez-

Vazquez and McNabb, 2000). As a result, transition from “old” (during the centrally planned economy) to “new” or “modern” sources of tax revenue meant these countries focus more on direct taxes of individuals, similar to their neighbours further west – the industrialized countries of the EU.

As a result, many Eastern European countries began collecting more revenue from direct taxation, - mainly in the form of personal income tax, but less revenue from indirect taxation as compared to their eastern neighbours. Finally, at the initial stages of transition, tax systems of post-communist countries with stronger and more prosperous economies focused on reform of direct taxes and thus generated more revenue from income taxes. The arguments articulated by Gehlbach (2008) are similar to the first hypothesis of this chapter that as economies expand, tax revenue increases, but not evenly.

### 3.2.2 Conceptual Framework: Changes in Structure of Tax Revenues

Theoretically and conceptually, one can argue that along with economic development, growth and progress, absolute level of tax revenues will increase. This holds true on the basis of the fact that taxes in general are a direct function of income that includes personal income and corporate profits and dividends paid out to the shareholders as a source of income ( $T = tY$ , where  $T$  is total tax revenue,  $t$  is the statutory tax rate and  $Y$  is national income). Given that consumption is a direct function of income ( $C = cY$ , where  $C$  is total consumption,  $c$  is marginal propensity to consume and  $Y$  is income), as income rises with economic growth consumption goes up leading to increased tax revenues collected in the form of sales or value added taxes, given the rates in effect. It follows that, theoretically, an increase in income as the result of economic growth, and given the statutory tax rates (be it income tax rate, corporate tax rate or sales tax rates), lead to higher absolute total tax revenues for governments. In addition, theoretically speaking, economic growth brings about many other fundamental changes to the social fabric, economic structure and other facets of the economy in general. These changes can support and facilitate imposition of new taxes and possibly allow for increased existing statutory tax rates as the tax system is modernized. These will result in higher relative tax revenues alongside economic growth. Such new initiatives become feasible as economic growth helps societies to improve their infrastructures, including education of the public, allowing them to understand and appreciate the value of public good in general and provision of public services in particular. Such awareness will ultimately translate into public's awareness and acceptance of paying their fair shares in the form of higher taxes to finance the provision of such public goods and services in general.

Overall, the concept of changes in size and structure of tax revenues in the process of socio-economic evolution can be traced as far back as to ‘the general theory of tax structure change during economic development’ by Hinrichs (1966). This theory provides enlightening

viewpoints for researchers of the topic as a first approximation in making international comparisons of developing and transitional countries' tax systems.

Discussing the size of government revenue shares, Hinrichs performs a regression analysis of sixty countries and separates countries in his sample of developing, transitional and developed ones, to explore the determinants of government revenue as a share of gross national product (GNP). He analyses the changes in tax structure as a function of three variables: "openness" or size of the foreign trade sector in a country, per capita income as an indicator of development, and cultural style featured in different regions of the world. In particular, his empirical findings suggest that:

- (1) A key determinant of government revenue shares of gross national product in developing countries with low per capita income is "openness" or ratio of imports as a share of GNP, not per-capita income. He believes that "openness" is a better indicator of government revenue shares for developing countries than the level of gross national product;
- (2) For transitional countries with medium-size per-capita income, he found a significant positive relationship between government revenue shares and per capita income;
- (3) For developed countries with high level of per capita income, according to Hinrichs, a high level of development is a sufficient but not a necessary condition for higher shares of government revenue.

Hinrichs provides three reasons why "openness" is an important determinant of tax ratios in developing countries. First, foreign trade sector makes the bulk of revenue (import duties and taxes on export) for more than two-thirds of the developing countries. Second, the greater the size of the foreign trade, the greater the degree of monetization of the economy, thus, the greater is the ability to collect taxes. Finally, colonialism brought to the developing world urban development, wider markets, large export companies, development of transport, etc., which makes tax collection not only on foreign trade, but on companies and their employees, easier. On the issue of structure of government revenue, Hinrichs investigates the structural differences within revenue shares (ratios of direct taxes, indirect taxes, foreign-trade sector taxes, etc.) of different countries, and analyses a cross-section profile of 26 countries at different periods.

Employing the social mobilization theory based on thresholds of 'significance' and 'criticality', Hinrichs' general theory of tax structure change during a socioeconomic evolution entailed a shift from traditional society to modernity. As stated in his theory, the share of direct to indirect taxes follows a U-shaped curve in the course of "development time" from (1) traditional society; to (2) transitional society consisting of "breakaway" from old and "adoption" of new; to (3)

modernity. On the issue of the tax structures, Hinrichs identifies different levels of development, advocating that in the course of development, processes of social mobilization and economic growth lead inevitably to the change in types, sizes, and rates of tax bases, in the same time entailing changes in the forms of taxation. Indeed, when comparing the ratio or level of the government revenue between developed and developing countries it is obvious that the ratio of total tax revenues to GDP increase with economic growth.

But is transition to modernity the same as transition to a market economy with a competitive polity? While precisely not the same, Hinrich's conceptual framework of transition to modernity has certain similarities with transition to market economy with competitive polity – i.e., either autocracies or democracies based on various institutional dimensions. As such, this concept is helpful to frame the investigation.

Under Hinrich's concept, transitional societies in early stages collect government revenue predominantly from 'traditional direct' taxes, such as taxes on agricultural crops, land, livestock, and so forth. In the transition to modernity, less revenues are generated from 'traditional direct' taxes, and more attention is paid to indirect taxes, and in particular taxes on external trade becomes more prominent. In the more advanced transitional stage, the ratio of direct to indirect taxes, can increase or decline subject to the 'openness' (ratio of export-import relative to GDP) of the economy to foreign trade. Hinrichs argues that initially in the transitional stage taxes on foreign trade increase fastest, followed by taxes on consumption and transactions (internal indirect taxes). Near the end of the transitional period, modern direct taxes increase faster than internal indirect taxes.

The concept of "transition to modernity" explains the remarkable similarity between the Hinrich's concept and the practical transition of post-communist countries to a market economy with competitive polity – either as autocracies or as democracies, based on various institutional dimensions. Transformation to modernity features the increased tax structure elasticity, flexibility, or fluctuation, one of the main topics of this exploration. However, before both the economy and polity arrive at such a modernity phase, variations or fluctuations in tax structure are insignificant or negligible and are mostly led by the economic structure.

When the economy and polity reach modernity, more frequent changes or oscillations in tax structures may manifest themselves in two forms. First, more flexibility in tax structures may lead to more progressive direct taxes, if government's priority is equity and redistribution. Alternatively, more fluctuations in tax structures may result in the return to an indirect taxation system, if the priority is economic growth and indirect taxes are seen as a driver of growth in such scenario.

Hinrichs asserts that evolution of tax structures undergoes three stages. First, conventional direct taxes prevail at the earliest stages of traditional society, such as, historically, in medieval Europe, the Middle East of past centuries, or even in the first half of twentieth century in Afghanistan,

Ethiopia, and Nepal. With time, as the process of gradual development takes place, indirect taxes take over, dominated initially by customs duties and later by internal indirect taxes. Finally, there is an ultimate stage of coming back to more direct forms of taxation, as countries become more developed.

Hinrichs' model attempts to quantitatively measure and predict changes from traditional society to modernity using social mobilization theory, which views a number of the benchmarks of transition. According to Hinrichs, "such benchmarks are rates, over time, of urbanization, industrialization, secularization, democratization, education, media penetration, and so on" (Hinrichs, 1966: 2). In the meantime, Hinrichs recognizes that social mobilization theory has a wide and broad structure to analyse tax structure changes over the 'development time'. Hinrichs perfectly understands and acknowledges that his model is by no means able to provide the same advice for tax reform in all countries together noting:

"There is no ideal tax system for all societies or for any one society at all times. Societies and tax systems and times change. To paraphrase Heraclitus, the same government does not pick the same taxpayer's pocket twice. Both change, including the size of the pickings and the size of the pocket" (Hinrichs, 1966: 4).

Continuing Hinrichs' legacy of general theory of tax structure, a stream of literature in this tradition appeared in the 1990s and 2000s. Several studies examined the evolution of tax revenue with the level of economic growth. Following Hinrichs' model, a general theory of optimal tax systems was introduced, in which tax rates and tax bases are selected simultaneously with the administrative and enforcement regimes (Slemrod and Yitzhaki, 2002). In addition, Hinrichs' model stipulated the basis of the concepts of conventional and extended tax effort models (Bird et al., 2008), which is the focus of Chapter 2. In Hinrichs' tradition of general tax structure, Gordon and Li (2009) have carried out an analysis of puzzles of many dimensions of tax policies in developing countries within the framework of optimal tax literature. Based on the theory of the state, theory of tax compliance and theory of fiscal contract, Timmons (2005) argues that states have incentives to match the distribution of tax burden with the distribution of public benefits using techniques somewhat similar to Hinrichs' model.

Following the tradition of Hinrichs' model, to explain the evolution of tax systems in developing countries, Mahdavi (2008) contends that tax reform in developing countries should take into account changes in the level of tax revenues and its composition. Mahdavi (2008) suggests that the tax to GDP ratio is higher in countries where the volume of external trade, % of urban population, literacy rate and per capita income are higher. Carrying out similar to Hinrichs' analysis and following his model, Tarschys (2003) finds that societies with high taxes provide more security, certainty and organizational discipline whereas countries with a low GDP per capita by and large do not. However, according to him, taxpayers of low-tax societies bear higher costs to finance provision of goods and services (health care, education, security, physical

infrastructure) compared to high-tax societies who enjoy provision of public goods and services based on the taxes paid.

Hinrichs' arguments and conclusions and ensuing literature that stemmed from his research, provide a solid foundation to test these theories as applied in the case of transition economies. Accordingly, it is hypothesized that economic growth leads to substantial changes in the tax structures and tax mix in transition economies.

### 3.2.3 Scholars' debate on the actual relationship between taxes and economic growth

According to the neoclassical economic theory (Ramsey, 1928; Solow, 1956; Cass, 1965 and Koopmans, 1965), rates of growth in per capita income are inversely related to the initial levels of per capita income. This theory posits that poorer regions should grow faster than richer ones due to advancement in and access to new technologies over time leading to increase in per capita income. This relates to the first hypothesis of this chapter that has been tested in myriad of studies employing what is now broadly referred to as a Barro model:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^m \sigma_i X_{i,t-1} + \varepsilon \quad (3.2.1)$$

where  $y$  denotes income per capita and  $X$  is a set of control variables, at times used to control for taxes,  $\varepsilon$  denotes error term and  $\varepsilon = u_i + v_{it}$ , where  $u_i$  and  $v_{it}$  are the country and time-specific effects (or measurement error) respectively.

The Solow (1956) model postulated that steady state growth is not influenced by tax policy, yet, it suggested that taxes affect the short-term growth or transition growth rate. As the interest in growth theory and policies leading to or impeding growth rose, a number of studies focused on effects of lower or higher taxes on the rate of economic growth. A study by Romer (1986) pioneered a new endogenous growth model demonstrating that tax policies and spending impacts permanent growth in the long-run as well. A conventional neoclassical model of economic growth (Barro and Sala-i-Martin, 1992; Nijkamp and Poot, 1998; Keely and Quah, 2000 and Durlauf, Johnson and Temple, 2005) suggested a number of models to test whether taxes affect economic growth.

Some studies suggest that impact of taxes on growth is quite weak (Gerson, 1998) or it is difficult to measure the effect of taxes on growth (Easterly and Rebello, 1993). However, several studies showed that fiscal policy has a negative and significant effect on growth rate in both the short and the long term. A study by Engen and Skinner (1999) proposed that while the impact of key tax reform (a 5% point cut in marginal tax rates) on long-term growth rates is modest, even such seemingly little effect could have increasingly great impact on living standards and suggested that:

“...suppose that an inefficient structure of taxation has, since 1960, retarded growth by 0.2 percent per annum. Accumulated over the past 36 years, the lower growth rate translates to a 7.5 percent lower level of GDP in 1996, or a net reduction in output of more than \$500 billion *annually*. So the potential effects of tax policy, although difficult to detect in the time-series data, can be potentially very large in the long term” (Engen and Skinner, 1999: 324).

Examination of the historical record from the US economy, evidences of taxation and growth in a large sample of countries, evidences of labour supply, investment demand, and productivity growth demonstrated that higher corporate taxes lead to lower growth rates of countries in the future (Engen and Skinner, 1999). According to Engen and Skinner (1999), taxes distort economic activities by slowing down investments, discouraging research and development expenditures, capital flee to lower tax jurisdictions with lower productivity and discouraging efficient use of human capital in employment. Other studies have investigated how tax policies impact a country’s growth rate, using cross-country data during 1970-1997. For example, Lee and Gordon (2005) found that increase in corporate tax rates leads to lower growth rates in the future and concluded that reducing corporate tax rate by 10 percentage points can boost the annual growth rate by one to two percentage point. Another study using the empirical growth theory investigated the relationship between tax and expenditure limitations and the economic growth in the context of the US during 1990-2010 (Amiel et al., 2012). It found that more restraining tax and expenditure limitations affect the rate of growth, but this relationship varies over the level of income and type of tax and expenditure limitations (Amiel et al., 2012).

In addition to taxes, the other variable of interest - trade also may influence economic growth. The impact of trade on growth has been discussed extensively in the literature. Some studies argue that trade or openness of economy can affect growth rate greatly, although these discussions are inconclusive. An example is that, although Rodrik and Rodriguez (1999) shed some doubt on the existing evidence of the effects of trade and openness on economic growth, yet trade and openness appear as an important factor affecting economic growth in several studies (Dollar and Kraay, 2003; Frankel and Romer, 1999). A study by Alcalá and Ciccone (2004) utilizes real openness (ratio of export-import to GDP relative to purchasing power parity in US\$) and concludes that the real openness is a better measure of trade in contrast to openness as openness reduces the relative price of non-tradable goods thus creating distortion in cross-country differences.

Most of these studies acknowledge the issue of endogeneity of fiscal policy as a concern in their analysis and as a main obstacle in establishing relationship between fiscal policy and economic growth. The endogenous factor of fiscal policy may be a reason for the reported contrary empirical relationship – possible reverse causation between tax collection and economic growth (Tosun and Abizadeh, 2005). The authors suggest that: “The empirical stalemate caused by endogenous nature of fiscal policy hints at the possibility of a reverse causation between fiscal policy and growth. It is very likely that income growth affect the fiscal structure.” (Tosun and

Abizadeh, 2005: 2256). So, the growth rate can impact tax collection and particularly, the structure of taxes. Yet, the opposite relationship – how changes in rate of economic growth lead to changes in the tax structure has not been studied comprehensively leaving a wide gap in the literature. Only one study attempted to fill this gap exploring this reverse relationship, i.e. the impact of economic growth on fiscal policy (Tosun and Abizadeh, 2005). The latter study became the origin of the second testable hypothesis that was developed for this chapter, i.e. economic growth leads to substantial changes in tax structures and tax mix.

An empirical study of the changes in the tax mix of the OECD countries in response to economic growth from 1980 to 1999 found that economic growth, measured by GDP per capita, has had a significant effect on the tax mix of the OECD countries (Tosun and Abizadeh, 2005). This study claims that while income taxes and property taxes are positively linked to economic growth, collection of indirect taxes tend to decline in response to the GDP per capita growth. The other empirical study investigated the relationship between tax structures and economic growth in 21 OECD countries using a panel regression method and suggested that income taxes are resulting in lower economic growth than taxes on consumption and property (Arnold, 2008). The study revealed the three most growth-friendly taxes: property taxes, consumption taxes and personal income taxes, whereas the corporate income taxes were named as having the most negative effect on GDP per capita (Arnold, 2008).

The results of these studies were robust using different specifications and controlling for other determinants of economic growth and instrumenting tax indicators. Overall, several studies focus on controlling for unobserved correlation between countries and across time, using fixed effects model (Abizadeh and Tosun, 2005; Arnold, 2008; Amiel, Deller and Stallmann, 2003; Engen and Skinner, 1999; Lee and Gordon, 2005). In these studies, the three most often used estimation methods are: pooled OLS, fixed effect and random effects each with their strengths and weaknesses, proponents and opponents (Abreu, de Groot and Florax, 2005). The model of interest – fixed effects model has been cited as having an advantage of considering individual effects that are time-invariant like regional environment or geography leading to minimization of bias by omitted variable, however, also as having a disadvantage of creating inconsistency because of endogeneity (Amiel, Deller and Stallmann, 2003).

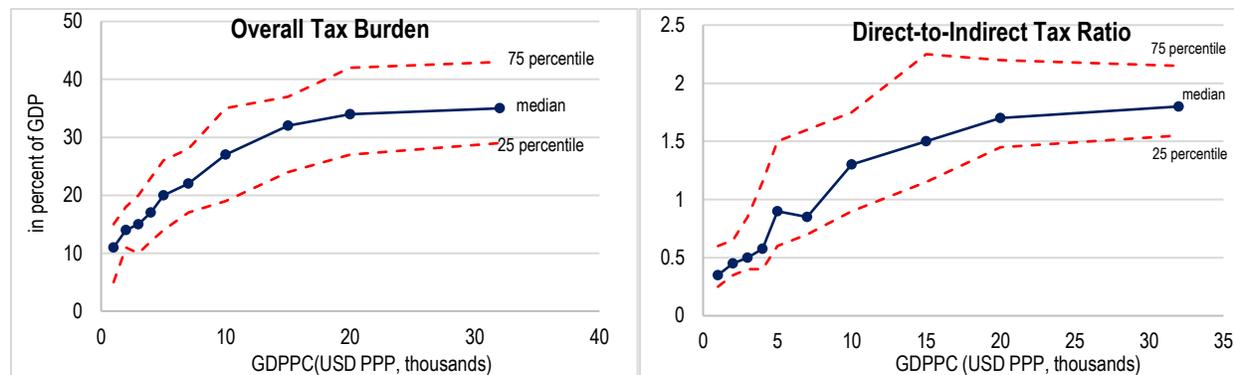
The review of growth literature reveals a problem of adequately addressing the issue of endogeneity in control variables. To address the endogeneity problem, different authors use different approaches. Some studies use a generalized method of moments (GMM) estimator (Arellano and Bond, 1991; Caselli, Esquivel and Lefort, 1996, Minoiu and Reddy, 2010). Others use 2SLS method with the additional instrumentation (Bird et al., 2008), or use the weighted average tax rates in other countries, weighting by the inverse of the distance between two countries (Lee and Gordon, 2005) to minimize endogeneity. As tax revenues increase during expansions and decline in recessions in short run, the other study removes the income tax

indicators from all possible correlations with the business cycle by “regressing them on the output gap in a first stage and using the residuals of these regressions instead of the actual tax variable in the growth regression” (Arnold, 2008: 17) in addition to different additional sets of robustness checks to deal with endogeneity.

### 3.2.4 Review of Trends in Tax Revenue and Changes in Tax Structure of Transition Economies

Arranging the available data according to the income level from all countries worldwide, one can analyse the changes in tax level as countries grow into more developed economies, measured by GDP per capita growth. Against this background, Figure 3.4 on the left depicts deciles according to the countries’ GDP per capita based on Purchasing Power Parity (PPP) prices on the horizontal axis, and the associated overall tax revenue-to-GDP ratio on the vertical axis. Points in Figure 3.4 denote the median values for each decile’s income level and the associated tax-to-GDP median values.

As Figure 3.4 displays, countries overall collected more tax revenues to GDP as they become more prosperous. Moreover, available data from all countries show that as countries develop (i.e. when their GDP per capita rises), the ratio of direct taxes becomes prevalent over indirect ones in their tax structure. This is shown in the right-hand side panel of Figure 3.4:

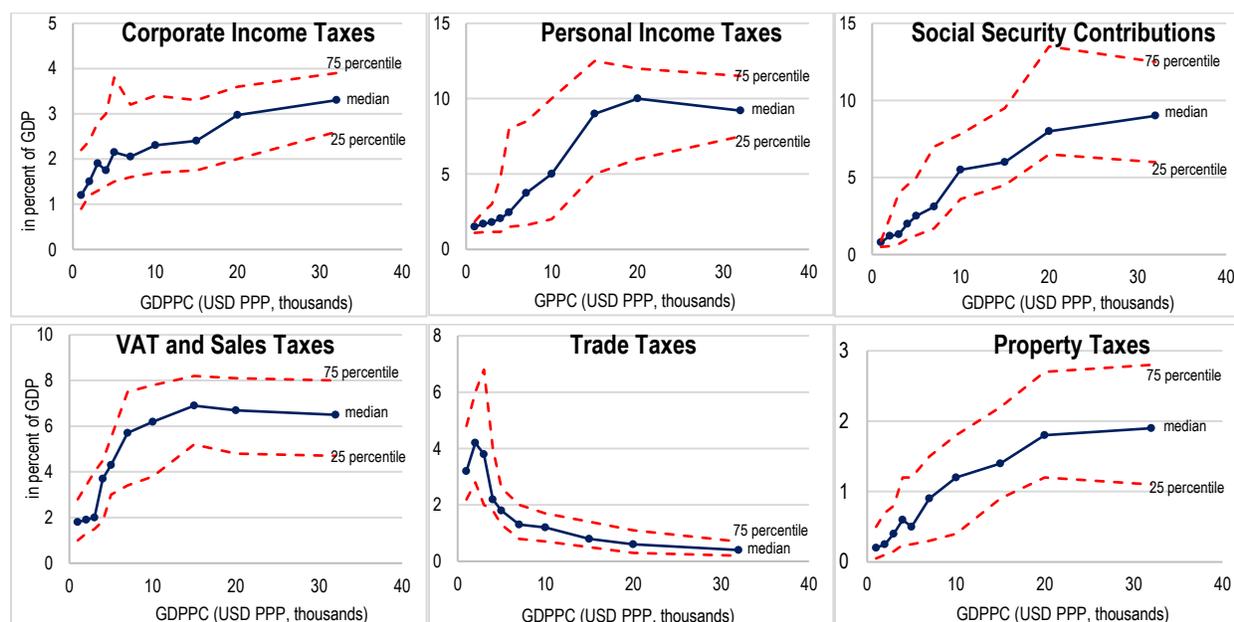


**Figure 3.2** Tax Revenue and Income Levels.

Note: Sample of all countries for which data are available. Median value for each income decile; bounds: 25 and 75 percentile. Constructed using data from IMF GFSY (2016), OECD (2016), UN (2016), Acosta-Ormaechea and Yoo (2012).

As shown in Figure 3.5, looking at the overall tax burden and countries’ income at a more disaggregated level at a point in time (2014), one can see that personal income taxes (PIT) and social security contribution (SSC) rise as countries’ GDP per capita increase. Acosta-Ormaechea and Yoo (2012) report that while collection of PIT and SSC makes up about 9.7 and 8.8% of GDP for countries with the income in the top three deciles, respectively, for the same taxes countries in the three lowest deciles collect only about 1.3 and 0.7% of GDP, respectively.

Value-added tax (VAT) and sales taxes rise with income too, but differences among income groups for these taxes are rather less substantial compared to the PIT and SSC. Collection of trade taxes drop with the level of development (Baunsgaard and Keen, 2010; Acosta-Ormaechea and Yoo, 2012). As for corporate income taxes (CIT) and property taxes, they increase with income, but not to the extent of the PIT and SSC growth with income level.

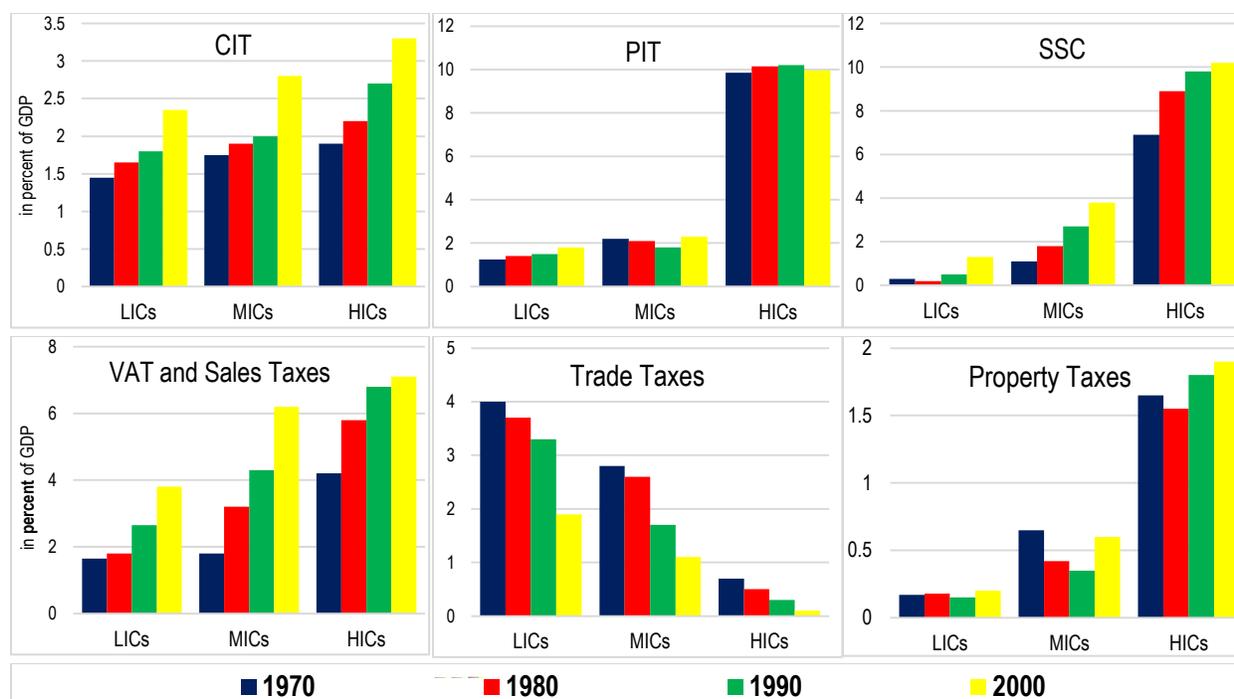


**Figure 3.3** Tax Revenue and Income Levels: Disaggregated Analysis at a point in time (2014).

Note: Median value for each income decile; bounds: 25 and 75 percentile

Constructed using data from IMF GFSY (2016), OECD (2016), UN (2016), Acosta-Ormaechea and Yoo (2012).

The substantial differences in the magnitude of tax burden and structure of taxes at different income levels - high-income countries (HICs), middle-income countries (MICs) and low-income countries (LICs) - highlight the great importance of analysing the relationship between the tax structure and economic growth. Figure 3.6 shows trends in changing the structure of tax revenue over time (1970s to 2000s) and across income groups at a more disaggregated level for our sample of countries. For direct taxes, all income groups - HICs, MICs and LICs, - display an ascending trend in CIT and SSC over time. As for the PIT, it shows only a slight upswing trend among these groups. For indirect taxes, a clear upward trend in VAT and sales tax in all income groups can be seen, but trade taxes demonstrate entirely the reverse pattern. The collection of property taxes in LICs and MICs is trivial, but in HICs is modest.

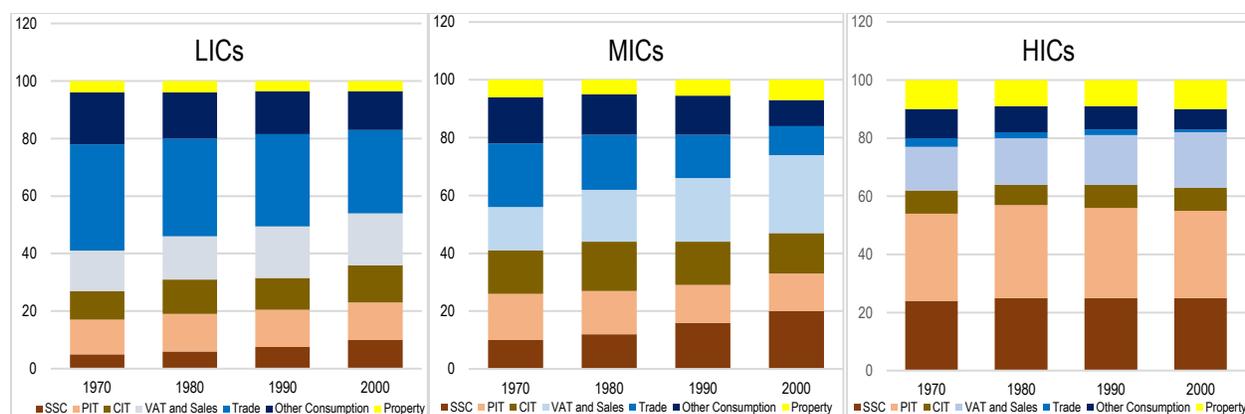


**Figure 3.4** Trends in Tax Revenue: Disaggregated Analysis.

Note: 10-year group median, 1970 refers to the median of 1970-79 and so forth

Constructed using data from IMF GFSY (2016), OECD (2016), UN (2016), Acosta-Ormaechea and Yoo (2012).

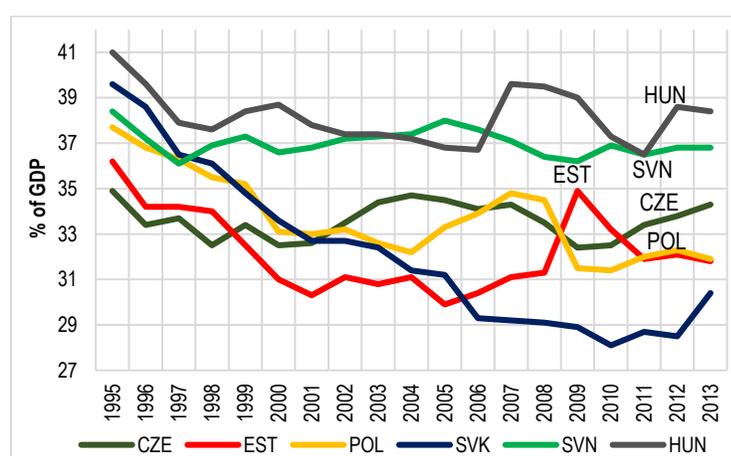
Figure 3.7 exhibits changes in composition of taxes or in tax structure of all three income groups - HICs, MICs and LICs over time. Each type of tax in this Figure represents its respective ratio to total tax revenue. The figure illustrates the notable differences in the composition of taxes between direct taxes (income taxes: PIT, CIT and SSC) and indirect taxes (consumption taxes: VAT and sales taxes, trade taxes) and property taxes. Particularly, the role of direct taxes in HICs is pivotal as direct taxes contribute to about two thirds of their total tax revenues. Direct taxes in MICs constitute around a half of their total tax revenues, but in LICs make up only about one-third of their total taxation:



**Figure 3.5** Trends in Tax Composition.

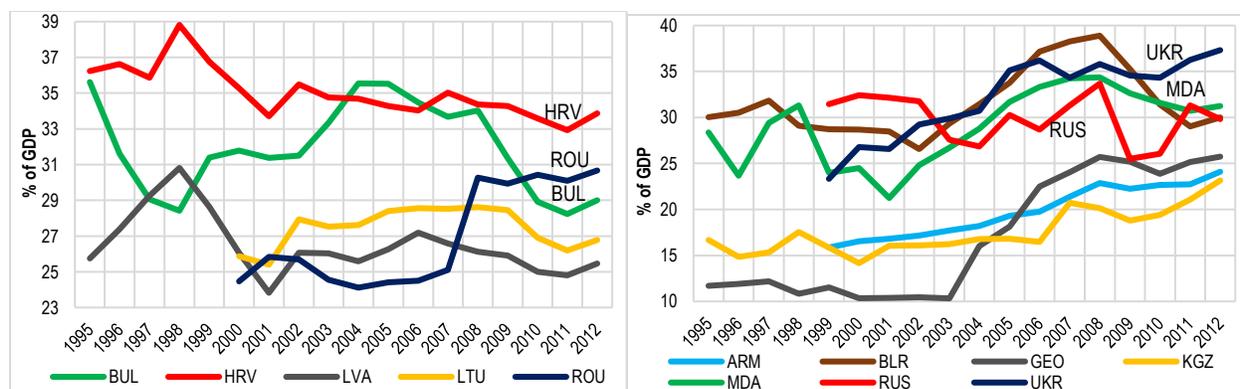
Note: 1970 refers to 1970-79 average and so forth. Constructed using data from IMF GFS (2016), OECD (2016), UN (2016), Acosta-Ormaechea and Yoo (2012)

In six transitional high-income countries that are now the OECD members, there is a downward trend in total tax burden since 1995 (Figure 3.8). Overall, the tax burden in Hungary, Slovenia, Estonia, Poland, and Slovak Republic and to a lesser extent in Czech Republic decreased in 2013 as compared to 1995.



**Figure 3.6** Tax revenue as % of GDP in transition countries, which are now OECD-members, 1995-2013. Constructed using data from OECD Revenue Statistics (2016).

As for rest of the East Europe, similar to many advanced economies of this region, Bulgaria and Croatia exhibited a slight downward trend for tax to GDP in 2012 as compared with 1995, while the level of tax burden in Latvia and Lithuania remained almost the same during the mentioned period with Romania showing the opposite pattern. In contrast, overall, total tax revenue in many former Soviet Union countries: Armenia, Moldova, Georgia, Kyrgyzstan and Ukraine increased, but in Russia and Belarus in 2012 remained almost at the same level as in 1995 (Figure 3.9).



**Figure 3.7** Tax revenues as % of GDP in Eastern European and FSU countries, 1995-2012. Constructed using data from World Development Indicators (WB, 2016)

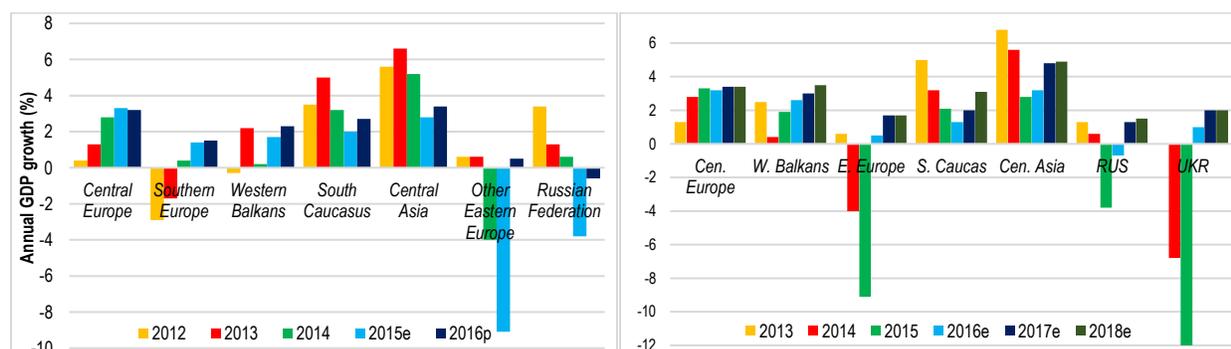
### 3.2.5 Economic Growth and Fiscal Issues in Transition Economies

Given the argument that economic growth plays a critical role in determining tax revenues and thus affecting tax structure a brief historical analysis of economic growth and budget issues in transition economies are discussed here. First, we switch our focus from the global economic growth indicators to recent and projected regional economic growth in countries with their economies currently in transition. The regional economic growth is characterized by uneven developments due to the volatile global environment and a downside risk after the global financial crisis of 2008. While Central Europe sustained its robust growth of around 3.3% in 2015 and 2016, Southern Europe and Western Balkans have an estimated modest acceleration from 1.3% in 2015 to 1.5% in 2016 and from 1.7% in 2015 to 2.3% in 2015, respectively. In contrast, the growth rates for 2015 in the South Caucasus and Central Asian countries are projected to be about half their growth indicators in 2014 with the other Eastern European countries (Belarus, Moldova and Ukraine) and Russia have suffered a steep recession in 2015. The growth in these regions has fallen as the drop in oil prices has hit their economies rather hard. Because of this downturn, both oil-exporting and neighbouring oil-importing countries of these regions experience lower trade and remittances flow<sup>4</sup>. Lower remittances<sup>5</sup> are contributing to lower growth. The IMF (2015) expected GDP to grow at 2.3% in 2015 for oil and gas importers in the region (Eastern Europe: Belarus, Moldova and Ukraine, South Caucasus and Central Asia) overall, down from 4.7% in 2014 and 5.7% in 2013. Purchasing power has

<sup>4</sup> Workers' remittances are a large source of income for several countries in Eastern Europe and Central Asia. In Albania, Armenia, Bosnia and Herzegovina, Georgia, Kosovo, the Kyrgyz Republic, Moldova, Montenegro, Tajikistan and Uzbekistan, remittances exceeded 10% of GDP in at least one of the last five years. Migrants from Ukraine sent home remittances amounting around US\$ 10 billion in 2013. Migrants from Tajikistan sent home remittances equivalent to 42% of GDP in 2014, proportionally more than any other country in the world received in the per capita terms.

<sup>5</sup> For instance, in dollar terms, money sent home from Russia by Tajik migrants was down by 44% in the first six months of 2015 compared with the same period in 2014, according to the Russian Central Bank; remittances from Russia to Uzbekistan fell by half, and those to Kyrgyzstan fell by a third.

dropped by more than 10% in 2015, according to the World Bank (2016), once the direct impacts of lower remittances and declining terms of trade are taken into account. However, as markets of these regions adjust to lower commodity and oil prices, the economies of South Caucasus, Central Asia and other Eastern Europe are estimated to have a moderate growth in 2016-18 with the Russian economy continuing to contract at a more modest pace as shown in Figure 3.10 and Table 3.1.



**Figure 3.8** Annual GDP growth in transition economies, 2012-16 (%) and 2013-2018 (%). Constructed using data from World Bank (2016), World Bank Group (2015).

Note: Other Eastern Europe refers to Belarus, Moldova and Ukraine.

The regional outlook during 2016-18 for Central Europe, Western Balkans, South Caucasus and Central Asia shows continuing growth at solid pace (IMF, 2015; WB, 2016). While overall, Eastern Europe (Belarus, Moldova and Ukraine), Russia and Ukraine have been hit by recession in 2014-15, it is expected that growth for these regions becomes positive by 2016-18, as their economies stabilize and start recovering (Table 3.1).

|                              | 2013 | 2014 | 2015  | 2016e | 2017e | 2018e |
|------------------------------|------|------|-------|-------|-------|-------|
| Central Europe <sup>a</sup>  | 1.3  | 2.8  | 3.3   | 3.2   | 3.4   | 3.4   |
| Western Balkans <sup>b</sup> | 2.5  | 0.4  | 1.9   | 2.6   | 3.0   | 3.5   |
| Eastern Europe <sup>c</sup>  | 0.6  | -4.0 | -9.1  | 0.5   | 1.7   | 1.7   |
| South Caucasus <sup>d</sup>  | 5.0  | 3.2  | 2.1   | 1.3   | 2.0   | 3.1   |
| Central Asia <sup>e</sup>    | 6.8  | 5.6  | 2.8   | 3.2   | 4.8   | 4.9   |
| Russian Federation           | 1.3  | 0.6  | -3.8  | -0.7  | 1.3   | 1.5   |
| Ukraine                      | 0.0  | -6.8 | -12.0 | 1.0   | 2.0   | 2.0   |

**Table 3.1** Annual GDP growth (%) in transition economies.

Source: IMF (2015), World Bank Group (2016). Notes:

a. Includes Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovak Republic, and Slovenia.

b. Includes Albania, Bosnia and Herzegovina, Kosovo, FYR Macedonia, Montenegro, and Serbia.

c. Includes Belarus, Moldova, and Ukraine

d. Includes Armenia, Azerbaijan, and Georgia

e. Includes Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan

Almost all countries with their economies in transition, including those recently transitioned to high-income countries, transitional countries in South and Eastern Europe (Belarus, Moldova, Ukraine), Western Balkans, South Caucasus, Central Asia, Eastern Asia and Pacific can experience higher growth by 2017-18 as estimated by higher real GDP growth figures at country

level (IMF, 2015; WB, 2016). Higher growth is driven by more robust domestic demand and supported by low oil prices (Tables 3.2, 3.3 and 3.4)

|                        | 2013 | 2014 | 2015  | 2016e | 2017e | 2018e |
|------------------------|------|------|-------|-------|-------|-------|
| Albania                | 1.4  | 2.0  | 2.7   | 3.4   | 3.5   | 3.5   |
| Armenia                | 3.3  | 3.5  | 2.5   | 2.2   | 2.8   | 3.0   |
| Azerbaijan             | 5.8  | 2.8  | 2.0   | 0.8   | 1.2   | 2.7   |
| Belarus                | 1.1  | 1.6  | -3.5  | -0.5  | 1.0   | 1.0   |
| Bosnia and Herzegovina | 2.5  | 0.8  | 1.9   | 2.3   | 3.1   | 3.5   |
| Bulgaria               | 1.3  | 1.5  | 2.9   | 2.2   | 2.7   | 2.7   |
| Georgia                | 3.3  | 4.8  | 2.5   | 3.0   | 4.5   | 5.0   |
| Kazakhstan             | 6.0  | 4.4  | 0.9   | 1.1   | 3.3   | 3.4   |
| Kosovo                 | 3.4  | 1.2  | 3.0   | 3.5   | 3.7   | 4.0   |
| Kyrgyz Republic        | 10.9 | 3.6  | 2.0   | 4.2   | 3.4   | 4.3   |
| Macedonia, FYR         | 2.7  | 3.5  | 3.2   | 3.4   | 3.7   | 3.7   |
| Moldova                | 9.4  | 4.6  | -2.0  | 0.5   | 4.0   | 4.0   |
| Montenegro             | 3.5  | 1.8  | 3.4   | 2.9   | 3.0   | 2.9   |
| Romania                | 3.5  | 2.8  | 3.6   | 3.9   | 4.1   | 4.0   |
| Serbia                 | 2.6  | -1.8 | 0.8   | 1.8   | 2.2   | 3.5   |
| Tajikistan             | 7.4  | 6.7  | 4.2   | 4.8   | 5.5   | 5.5   |
| Turkmenistan           | 10.2 | 10.3 | 8.5   | 8.9   | 8.9   | 8.9   |
| Ukraine                | 0.0  | -6.8 | -12.0 | 1.0   | 2.0   | 2.0   |
| Uzbekistan             | 8.0  | 8.1  | 7.0   | 7.5   | 7.7   | 7.7   |

**Table 3.2** Real GDP growth at market prices in % in transitional countries.  
Source: World Bank Group (2016)

|                    | 2013 | 2014 | 2015 | 2016e | 2017e | 2018e |
|--------------------|------|------|------|-------|-------|-------|
| Croatia            | -1.1 | -0.4 | 1.0  | 1.4   | 1.7   | 2.0   |
| Czech Republic     | -0.5 | 2.0  | 4.0  | 2.5   | 2.9   | 2.9   |
| Hungary            | 1.9  | 3.7  | 2.8  | 2.5   | 2.7   | 3.0   |
| Poland             | 1.7  | 3.4  | 3.5  | 3.7   | 3.9   | 3.9   |
| Russian Federation | 1.3  | 0.6  | -3.8 | -0.7  | 1.3   | 1.5   |
| Slovak Republic    | 1.4  | 2.5  | 3.1  | 3.3   | 3.5   | 3.5   |
| Slovenia           | -1.1 | 3.0  | 2.4  | 2.1   | 2.0   | 2.0   |

**Table 3.3** Real GDP growth at market prices in % in recently transitioned to high income countries.  
Source: World Bank Group (2016)

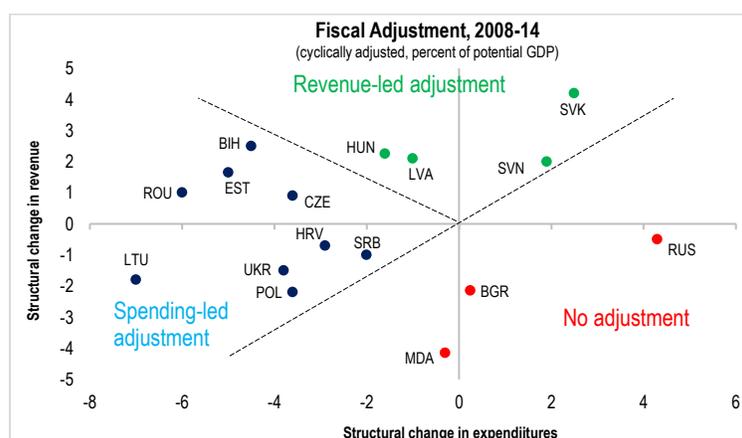
|          | 2013 | 2014 | 2015 | 2016e | 2017e | 2018e |
|----------|------|------|------|-------|-------|-------|
| Cambodia | 7.4  | 7.0  | 6.9  | 6.9   | 6.8   | 6.8   |
| Lao PDR  | 8.5  | 7.5  | 6.4  | 7.0   | 6.9   | 6.9   |
| Mongolia | 11.7 | 7.8  | 2.3  | 0.8   | 3.0   | 6.4   |
| Vietnam  | 5.4  | 6.0  | 6.5  | 6.6   | 6.3   | 6.0   |

**Table 3.4** Real GDP growth at market prices in % in selected Eastern Asia and Pacific countries.  
Source: World Bank Group (2016)

Second issue in transition countries relate to government budget. A key policy challenge for many transitional countries relates to restructuring their budgets to support long-term growth. Yet, two factors remain unfavorable for growth. First, many state budgets in transitional countries spend large share on transfers and public consumption. Second, revenues are collected from relatively high taxes on labor. Social security contributions that can generate employment is

an example. However, fiscal policies differed among various transitional countries. Countries negatively affected by dropping oil prices implemented expansionary fiscal policy to protect themselves from the unpleasant effects of recession. Less affected countries took the opportunity to build fiscal buffers<sup>6</sup> and benefit from cheaper price for fuel import.

The structural quality of budgets in some transitional countries improved since the global financial crisis of 2008 until 2014. For instance, Romania, Lithuania, Estonia, Czech Republic, Bosnia and Herzegovina, Croatia, Serbia, Poland and Ukraine achieved the larger part of their budget consolidation by reducing expenditures. Total cyclical fiscal adjustment surpassed 5% of potential GDP in several countries (Estonia, Lithuania and Romania) sometimes. However, Hungary, Latvia, Slovak Republic and Slovenia consolidated the larger parts of their budgets by increasing revenues while Russia, Bulgaria and Moldova opted for mostly no adjustment during 2008-2014 (Figure 3.11).



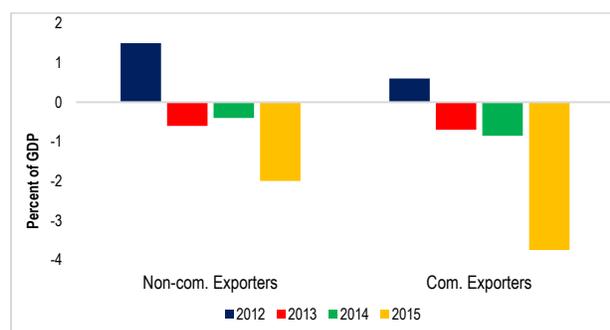
**Figure 3.9** Fiscal Adjustment in 2008-14: Consolidation has been mostly expenditure-led. Constructed using data from IMF (2015).

Several countries such as Albania, Bosnia and Herzegovina, Kosovo, Macedonia, and Serbia, which had budget deficits for much of the post-2008 period, could increase the speed of fiscal consolidation in order to strengthen their fiscal stance. The poor economic performance and tumbling oil prices have eroded fiscal revenue and deteriorated fiscal situation in many CIS countries. For instance, in Azerbaijan, expansionary fiscal policy has supported growth. In contrast, Belarus was forced to consolidate its public finances in the face of growing external constraints.

Governments in the main remittance-receiving transitional countries in Central Asia (Tajikistan and Kyrgyz Republic), South Caucasus (Armenia and Georgia) and Moldova, which are also non-commodities exporters, attempted to stimulate spending to support demand as consumers

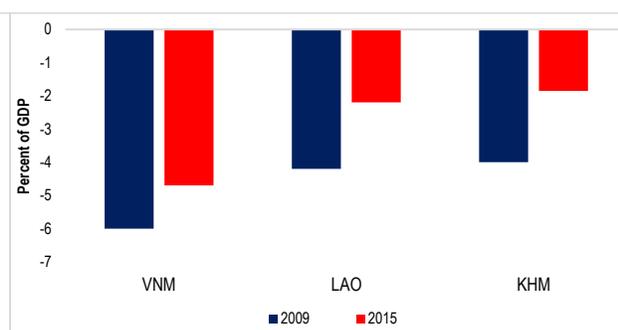
<sup>6</sup> For the purposes of this work, fiscal buffer refers to fiscal space created by saving budgetary resources and reducing public debt in good times.

spent less for their purchasing power declined by up to 10%. This led to a wider fiscal deficit by about two percentage points of GDP in 2015 (Figure 3.12). The falling price of regional exports such as aluminum, copper and cotton added to economic woes and put further strain on government finances. While fiscal deficits remained high in Mongolia and Vietnam, where fiscal reform is needed to stabilize government debt, improvement in fiscal balances of Vietnam, Lao and Cambodia in 2015 compared to 2009 is noticeable (Figure 3.13).



**Figure 3.10** Widening fiscal deficit (% of GDP) in fiscal balances.

Sample of countries in South Caucasus, Eastern Europe and Central Asia, 2012-2015. The data on sub-grouping is a simple average of all countries in each grouping. Constructed using data from IMF (2016).



**Figure 3.11** Improvements of Fiscal Balances (% of GDP) in Developing Eastern Asian countries.

Sample of Cambodia, Lao Republic and Vietnam in 2015 compared to 2009.

Constructed using data from World Bank Group (2016).

In addition to the main fiscal policy and economic growth challenges, high unemployment and inflation have persisted over the recent years in transition economies, too. Level of unemployment was very high in many countries. For instance, the unemployment rate in Bosnia and Herzegovina and the Former Yugoslav Republic of Macedonia was over 25% (UN, 2016). The unemployment may increase and put pressure on local labour market in Albania as well, because of the possible return of asylum seekers from the EU. The unemployment rate has marginally increased in Russian Federation, and Ukraine, where it increased sharply throughout 2014 and continued to climb higher. In many other CIS countries real wages fell, which in combination with inflation and worsened access to credit, led to depressed household consumption. Unemployment is estimated to further increase in the CIS countries in 2016-17. Inflation rose in all the CIS countries, particularly in 2015, driven by the sharp depreciation of national currencies. In almost all CIS countries inflation remained in double digits during 2015-2016.

### 3.2.6 Limited Role of Income Taxes in Financing Public Sector Activities

Most societies define equity in taxation as establishing tax liability largely based on ability to pay. While ability to pay can be measured by income, consumption, wealth, or some combination of all three, developing and lower-middle income transitional countries have relied heavily on two measures of ability to pay (income and consumption) in running their tax

systems. Thus, the focus for now is on only two taxes: personal income tax, which employs income as the indicator and value-added tax, which is an example of indirect assessment of tax on consumption.

Broad-based progressive income taxes were considered as the ideal and essential component of the good tax system in late 1970s and 1980s, achievement of which was the standard goal of tax policy design for developing countries (Auerbach, 2010; Bird, 2013). In parallel with this, consumption taxes like the value-added taxes (VAT) were not viewed as a useful and efficient instrument for progressive taxation in those countries because the VAT is an indirect tax. Nonetheless, many developing countries embarked on extensive reforms of their tax system and experienced a shift to indirect taxes, especially to value-added taxes by the 1990s and with the introduction of VAT, a new development tax model had emerged. Now, more than 150 countries worldwide, including many developing and transitional countries apply some form of a VAT, making this tax the mainstay of their revenue systems (Bird and Gendron, 2007; Grown, 2010).

Although progressive income taxes have long been viewed as an equitable and a feasible means of attaining wealth redistribution goals, income taxes, especially personal income taxes play only a limited role in financing public sector activities in developing and transitional countries. The main reason why income taxes play such an insignificant role in the tax structure of these countries is the fact that the ratio of total revenues from income taxes has changed minimally over the last 30 years (Table 3.5). Meanwhile, developing and transitional countries have experienced prominent shifts in their tax structures from income to indirect taxes over the recent decades (Table 3.5).

Revenues from personal income taxes are insignificant and stagnant in developing countries. They are collected almost fully (95%) from wage withholding on large enterprises in the formal sector and public sector employees (Bird and Zolt, 2005). Overall, since the early 1980s, the personal income taxes have raised only 1-3% of GDP in developing countries in contrast to 9-11% in developed countries (Peter, Buttrick and Duncan, 2010). More than that, the personal income tax constituted only 9% on average of total tax revenues collected in developing countries in contrast to around 25% in the developed countries (Bird and Zolt, 2005). Furthermore, on a regional basis, the ratio of personal income taxes to total tax revenues and to GDP is lowest in Latin America, Asia and Africa (Table 3.5).

| Regions       | Personal Income Tax/Total Taxes (%) | Personal Income Tax/GDP (%) |
|---------------|-------------------------------------|-----------------------------|
| North America | 45.2                                | 9.4                         |
| Latin America | 5.5                                 | 1.0                         |
| West Europe   | 21.0                                | 7.2                         |
| Asia          | 10.6                                | 1.8                         |
| Africa        | 13.6                                | 2.8                         |

**Table 3.5** Composition of personal income taxes by regions, 1999-2001.  
Source: Bird and Zolt (2005: 933)

Such a low percentage of personal income tax in the tax system of many developing and transitional countries can be explained by two principal reasons. First, relatively high personal income tax rates often lead to evasion by high-income individuals, and second, administering progressive personal income tax is difficult and incurs high cost of collection. As a result, one cannot expect that the relative importance of the personal income taxes in developing countries reach those of developed countries in the very near future.

To further elaborate on the first reason, it must be acknowledged that despite the cuts in income tax rates (Table 3.6), they are still in the 20-30% range in many developing countries (Bird and Zolt, 2005). It is one of the main reasons why rates of the personal income tax (both average and marginal rates) are frequently not kept to enforceable levels in many developing and transitional countries. The fear is that evasion of income taxes can become widespread. The more widespread the evasions, the less likely it is that taxpayers file honestly and voluntarily, therefore, the more difficult it is to administer the system.

| <b>Averages</b>               |      |
|-------------------------------|------|
| <b>Late 1990s:</b>            |      |
| Low-income countries          | 33.3 |
| Lower-middle-income countries | 33.3 |
| Upper-middle-income countries | 30.4 |
| <b>Early 1990s:</b>           |      |
| Low-income countries          | 41.3 |
| Lower-middle-income countries | 42.6 |
| Upper-middle-income countries | 35.9 |

**Table 3.6** Statutory Rates of Personal Income Tax in Developing Countries.

Source: University of Michigan, World Tax Database

In addition, the scope for substantial income redistribution through progressive income tax rates is very limited in developing, low-income and lower-middle income transitional countries because of the widespread tax evasion, weak tax enforcement, and deeply under-paid tax officials. This low pay often leads to bribery and corruption. Therefore, as the bulk of the population live below subsistence level, and the share of the shadow economy to national income is relatively high in most developing and lower-income transitional countries, great number of people and large shares of income either would not be taxed or would be assessed based on ad hoc rules developed by tax administrators.

Less tax evasion occurs in developed countries as taxpayers there can afford legal tax avoidance. To avoid income tax, taxpayers in developed countries are able within the framework of the laws to alter their economic behaviour in order to reduce their tax liabilities. For instance, by supplying fewer labour services, or shifting their capital to tax heavens abroad/low tax jurisdictions, or hiring lawyers to find loopholes in the tax laws, they can reduce their tax liabilities. Facing high personal income tax rates, taxpayers of the poorer countries often react by evading taxes by concealing their earned income, particularly capital income (such as dividends,

interest, rents, royalties, and profits from sole proprietorships and partnerships) or bribing tax assessors to accept their false income tax returns. These are due to the lack of systematic accounting practices, and reliable income and tax records. Because of all these, it is difficult to quantify precisely tax revenue foregone in developing countries. Best guess is that around \$50 billion worth of revenues is lost and not collected annually in developing countries due to the facts of hiding income, exploiting preferential treatment and not declaring income (Tax Justice Network, 2005).

A fundamental part of the problem with tax evasion is that very high income earners in many transition economies are able to evade taxes using various means, which may vary from country to country. While developed countries rely on income taxes from the middle-class, developing countries' middle-class is not large enough to produce a meaningful tax base. In other words, countries with a small middle-income group do not have enough sources to build an efficient and fair personal income tax system to improve income distribution.

The second reason mentioned – difficulties in administering tax and incurring cost of collection makes the personal income tax insignificant in developing and transitional countries. Typically, governments that generate revenues at low administrative cost have a better chance to develop compared to those countries with high cost of administering taxes (Lindert, 2004). In contrast to developed countries, which spend approximately 1% on average of their revenues to cover the cost of tax collection in their budgets (Bird and Zolt, 2005), the cost of administering taxes in developing countries in most cases are much higher – almost 3% of total revenues (Gallagher, 2005).

Moreover, not only does the personal income tax incur cost of its enforcement and collection, but it also imposes on taxpayers a cost of compliance with the tax law linked to obtaining information on regulations, acquiring and transmitting the necessary data and paying advisors (Bird and Zolt, 2005). It is estimated that tax compliance cost in developing countries is four to five times higher than these sorts of costs incurred by governments in developed countries (Evans, 2003). Therefore, improving tax compliance remains a central challenge particularly for both lower and upper middle-income transition countries.

The ease of administration of any tax is dependent on the numbers of taxpayers, the average payment relative to the cost of collection from each taxpayer, on voluntary and honest compliance of taxpayers with the laws. However, the most commonly seen problems, which hinder effective administration of the income tax in most of developing and transitional countries, can be identified. They include high degree of self-employment, shadow economy, the small size of businesses, weak taxpayer compliance and enforcement, large-scale evasion, inadequate record-keeping and accounting practices of both firms and authorities.

Overall, poorly designed and administered personal income tax systems of many developing and transitional countries make the administration of income tax much more difficult and result in a

relatively high administrative and compliance costs. Therefore, income taxes are likely to raise less revenue as a % of national income in low and upper middle-income transition countries compared to high-income countries. In addition, corruption, shadow economy and bad governance significantly constraints re-distributive policies of developing countries through the personal income taxes.

### 3.2.7 Tax Structure Changes and Economic Growth in Transition Countries

It is obvious that both transitional and developing countries have experienced prominent shifts in their tax structures over the recent decades (Table 3.7). Compared to most developed countries, transition countries income taxes, particularly, the personal income tax continued to play a very limited role, while indirect taxes made up the bulk of tax revenues. Bahl and Bird (2008) separated transitional countries out of developing countries in their study because, as they argue, trade taxes for transitional countries are only of minor importance. Yet, this fact is not corroborated robustly, as their data for 2000s are not complete and also do not cover more current data for they use the data available up to 2003 to assess the whole decade of 2000s. This chapter extends their study by analysing data that are more current and focus on transition countries. In addition, study of Bahl (2006) focuses mainly on increase of tax collection in developing countries, but not changes in tax structure of transition countries, an area that this chapter intends to permeate for analysis.

|                             | 1970        | 1980        | 1990        | 2000 <sup>a</sup> |
|-----------------------------|-------------|-------------|-------------|-------------------|
| <b>Income Taxes</b>         |             |             |             |                   |
| Industrialized              | 35.5        | 37.8        | 38.6        | 53.8              |
| Developing                  | 29.6        | 28.6        | 27.6        | 28.3              |
| Transition                  | 12.3        | 16.5        | 26.7        | 23.3              |
| <b>Total</b>                | <b>30.7</b> | <b>30.2</b> | <b>29.7</b> | <b>28.5</b>       |
| <b>Indirect Taxes</b>       |             |             |             |                   |
| Industrialized              | 27.2        | 29.4        | 30.5        | 19.8              |
| Developing                  | 25.2        | 29.3        | 34.9        | 40.1              |
| Transition                  | 10.5        | 21.8        | 37.9        | 42.1              |
| <b>Total</b>                | <b>25.3</b> | <b>28.9</b> | <b>34.2</b> | <b>39.0</b>       |
| <b>Taxes on Int'l Trade</b> |             |             |             |                   |
| Industrialized              | 4.6         | 2.8         | 1.0         | 1.0               |
| Developing                  | 32.4        | 30.7        | 25.6        | 19.0              |
| Transition                  | 7.7         | 5.2         | 7.6         | 5.4               |
| <b>Total</b>                | <b>25.2</b> | <b>23.8</b> | <b>18.2</b> | <b>14.1</b>       |

**Table 3.7** Tax Structures: Tax Categories as a % of Total Taxes.

Source: Bahl and Bird (2008).

Note: *a* – only limited data available.

Evidently, it is easier to collect revenues from economies that are high income, urban and non-agricultural, and where the real openness and the ratio of international trade to GDP are high. In general, nowadays governments of transition economies collect roughly between 15% and 40 %

of GDP in total revenue. Out of this, the ratio of tax revenue to GDP (excluding non-tax revenue) varies from an average 13% for lower-middle income transition countries to 35% for high-income OECD-member transition countries (Table 3.8, row c, all columns). The ratio of corporate to personal income tax revenues is 0.3 to 1 in the high-income OECD countries and 1.4 to 1 in the low-income countries (Table 3.8, row l, columns 2 and 6). While there is no need for lower middle-income economies to intend to have equal tax capacities as those of the OECD countries (33-48% of GDP), however, slightly increasing revenue of such countries to fund spending on social welfare initiatives and infrastructure projects would be a reasonable proposition. In addition, there is much room to improve revenue performance in every country.

| Country category:  | <i>Low-Income</i> | <i>Lower-Middle Income</i> | <i>Upper-Middle Income</i> | <i>High income non-OECD*</i> | <i>High income OECD</i> |
|--|-------------------|----------------------------|----------------------------|------------------------------|-------------------------|
| Number of countries:   | (37)              | (48)                       | (41)                       | (18)                         | (30)                    |
| a. Government revenue as a % of GDP                          | 18                | 26                         | 29                         | 34                           | 42                      |
| b. Government revenue, excluding grants, as a % of GDP       | 15                | 26                         | 28                         | 34                           | 41                      |
| c. Gov't taxes as a % of GDP (i.e. excludes non-tax revenue) | 13                | 18                         | 21                         | 16                           | 35                      |
| d. Taxes as a % of total government revenue                  | 71                | 67                         | 73                         | 46                           | 85                      |
| e. Income taxes as a % of GDP                                | 4                 | 5                          | 5                          | 6                            | 13                      |
| f. Corporate income taxes as a % of GDP                      | 2                 | 3                          | 3                          | 2                            | 3                       |
| g. Personal income taxes as a % of GDP                       | 2                 | 2                          | 2                          | 3                            | 10                      |
| h. International trade taxes as a % of GDP                   | 4                 | 5                          | 5                          | 3                            | 1                       |
| i. Taxes on goods and services, including VAT, as a % of GDP | 5                 | 6                          | 7                          | 5                            | 11                      |
| j. Corporate income taxes (CIT) as a % of government revenue | 12                | 11                         | 12                         | 7                            | 7                       |
| k. Personal income taxes (PIT) as a % of government revenue  | 9                 | 7                          | 8                          | 8                            | 23                      |
| l. Ratio of CIT to PIT revenue                               | 1.4               | 1.5                        | 1.5                        | 0.9                          | 0.3                     |

**Table 3.8** Summary Statistics (means) on sources of government revenue, by country category.

Source: IMF (2011). Note: The numbers show the means within each category and relate to recent years.

\*These are mainly countries with high levels of income from energy or mineral extraction.

To find out the explanatory factors for the variation in tax systems among the Central Eastern Europe and the Former Soviet Union countries, Gehlbach (2008) demonstrates that after the collapse of communism the Central Eastern European countries shifted to a 'Western' tax system with a broad tax base, and gave a prominent role to taxes on personal income. The former Soviet Union countries focused taxation on a few big, often monopolistic industrial enterprises and with that on corporate taxes and taxes on goods and services. Gehlbach (2008) summarizes that three facts reflect much of the differences in post-communist tax systems:

- “1. Tax collection overall has been lower in the CIS than in Eastern Europe and the Baltics.
2. Countries in the CIS have relied more on the “old” revenue sources of corporate taxation and taxes on goods and services, whereas those in Eastern Europe and the Baltics have relied more on the “new” revenue source of direct taxation of individuals.
3. Variation in tax structures over time has been greater in the CIS than in Eastern Europe and the Baltics, with partial replacement between 1994 and 2000 in the CIS of one “old” revenue source (corporate taxation) with another (taxes on goods and services)” (Gehlbach, 2008:23)

According to Gehlbach (2008), when the state budget relies heavily on tax revenue from a few key sectors, it may steer economic policy into a ‘revenue trap’. Gehlbach (2007, 2008) argues that, since the collapse of the Soviet Union, policymakers have been caught in just such a revenue trap, as they have favoured policies that generate tax revenue from the formerly state-owned enterprises and industries, the effect of which has been detrimental to the emergence of an entrepreneurial sector. Two facts are interesting to note in this regard. First, the providers of the bulk of this revenue—the formerly state-owned enterprises themselves—still rely heavily on constant government support. Second, proper re-allocation of labour and capital in the newly emerged private economy or sector has not materialized. Being incapable of escaping from their reliance on revenue from state-owned enterprises, the governments of former Soviet Union countries have themselves become part of the problem rather than providing a solution. In contrast, the countries of Eastern Europe have focused their tax schemes on the economic activities of the emerging private sector, with policymakers supporting such a move. Gehlbach’s (2008) data on the tax structures of transitional countries in the second half of the 1990s highlight the prominence of taxes on income, social security, and payroll in almost all Central Eastern European countries and the importance of taxes on goods and services in the former Soviet Union countries (Table 3.9).

|                       | Corporate Taxes | Taxes on Goods and Services | Income, Social Security, and Payroll Taxes | Other Taxes |
|-----------------------|-----------------|-----------------------------|--|-------------|
| <b>EE and Baltics</b> |                 |                             |  |             |
| Albania               | 0.08            | 0.41                        | 0.25                                       | 0.25        |
| Bulgaria              | 0.13            | 0.35                        | 0.43                                       | 0.09        |
| Croatia               | 0.03            | 0.45                        | 0.42                                       | 0.10        |
| Czech Republic        | 0.11            | 0.30                        | 0.53                                       | 0.06        |
| Estonia               | 0.06            | 0.35                        | 0.55                                       | 0.04        |
| Hungary               | 0.06            | 0.37                        | 0.48                                       | 0.10        |
| Latvia                | 0.07            | 0.35                        | 0.51                                       | 0.07        |
| Lithuania             | 0.06            | 0.37                        | 0.51                                       | 0.07        |
| Macedonia             | 0.03            | 0.34                        | 0.51                                       | 0.12        |
| Poland                | 0.08            | 0.33                        | 0.49                                       | 0.11        |
| Romania               | 0.12            | 0.28                        | 0.49                                       | 0.07        |
| Slovakia              | 0.12            | 0.31                        | 0.49                                       | 0.07        |
| Slovenia              | 0.03            | 0.35                        | 0.53                                       | 0.10        |
| <b>CIS</b>            |                 |                             |  |             |
| Armenia               | 0.20            | 0.40                        | 0.24                                       | 0.15        |
| Azerbaijan            | 0.22            | 0.31                        | 0.31                                       | 0.16        |
| Belarus               | 0.22            | 0.43                        | 0.26                                       | 0.09        |
| Georgia               | 0.12            | 0.42                        | 0.29                                       | 0.18        |
| Kyrgyzstan            | 0.09            | 0.47                        | 0.35                                       | 0.09        |
| Moldova               | 0.12            | 0.42                        | 0.36                                       | 0.10        |
| Russia                | 0.18            | 0.30                        | 0.37                                       | 0.15        |
| Tajikistan            | 0.13            | 0.48                        | 0.20                                       | 0.19        |
| Turkmenistan          | 0.21            | 0.46                        | 0.29                                       | 0.05        |
| Ukraine               | 0.20            | 0.31                        | 0.39                                       | 0.10        |
| Uzbekistan            | 0.23            | 0.52                        | 0.13                                       | 0.12        |

**Table 3.9** Mean Tax Structure in Transition Economies, 1994-2000.  
Source: Gehlbach (2008: 52)

Gehlbach (2008) argues that six conditions could have created the revenue trap in countries of the former Soviet Union. These conditions are:

- 1) a deep structural crisis in the economy, giving the state the leeway to influence the economic structure in the short term
- 2) an industrial structure dominated by big and often monopolistic enterprises, which are easy to tax
- 3) the absence of orientation towards EU membership, which would demand a Western-style tax reform
- 4) a low level of economic development, implying an inefficient (i.e. incompetent, under-financed, or corrupt) state bureaucracy and tax administration
- 5) few restrictions on formal economic policy-making, such that the dominant state actor can push related tax regulation through the legislative process without opposition from other political forces or business interests
- 6) policy choices based on tax revenue as a first-order political concern and favouring easy revenues from enterprises with high taxability.

Reviewing Gehlbach's (2008) explanation of the variation in tax systems among the post-communist countries during their initial stages, Pleines (2009) identifies Gehlbach's unsystematic elaboration of the conditions causing or promoting the revenue trap, yet finds his six conditions quite reasonable.

|                  | (% of GDP) |           |           |           |           |                    |
|------------------|------------|-----------|-----------|-----------|-----------|--------------------|
|                  | 1991       | 1992      | 1993      | 1994      | 1995      | Difference 1991-95 |
| Georgia          | 34         | 15        | 2         | 4         | 5         | -29                |
| Turkmenistan     | 38         | 42        | 19        | 10        | 9         | -29                |
| Tajikistan       | 33         | 36        | 36        | 54        | 14        | -19                |
| Azerbaijan       | 36         | 48        | 41        | 26        | 19        | -17                |
| Armenia          | 26         | 27        | 24        | 16        | 14        | -13                |
| Moldova*         | 32         | 20        | 17        | 17        | 20        | -12                |
| Russia           | 46         | 46        | 41        | 37        | 36        | -10                |
| Kyrgyz Republic* | 22         | 16        | 15        | 19        | 15        | -7                 |
| Kazakhstan*      | 21         | 23        | 22        | 17        | 16        | -5                 |
| Lithuania        | 41         | 34        | 28        | 25        | 24        | -18                |
| Latvia           | 37         | 28        | 36        | 36        | 36        | -1                 |
| Estonia          | 41         | 33        | 40        | 41        | 41        | 0                  |
| Belarus          | 48         | 46        | 52        | 48        | 44        | -4                 |
| Ukraine          | 38         | 44        | 44        | 46        | 41        | 3                  |
| Uzbekistan*      | 31         | 32        | 42        | 36        | 35        | 4                  |
| <b>Average</b>   | <b>35</b>  | <b>33</b> | <b>31</b> | <b>29</b> | <b>25</b> | <b>-10</b>         |

**Table 3.10** Revenue Decline in the FSU Countries, 1991-1995 (% of GDP).

Source: Cheasty A. (1996:33)

\* Does not include all payroll taxes.

As a result of these conditions, the first five years of transition (1991–1995) were characterized by economic disruption and turmoil, decreasing output, and a sharp decline in tax revenue-to-GDP ratio in many countries of the former Soviet Union (Table 3.10).

Two other factors should be mentioned here: the decentralization of foreign trade and changes in the former Soviet pension system, which led to a rise in payroll tax rates in most countries of the former Soviet Union from 9 per cent in 1989 to 36 per cent by 1995. These caused a sharp decline in corporate and personal income tax receipts (Cheasty 1996). The outcomes of these losses by type of revenue are presented in Table 3.11.

|                         | <b>Soviet Union 1989</b> | <b>Unweighted average 1994*</b> | <b>Change 1989-1994**</b> |
|-------------------------|--------------------------|---------------------------------|---------------------------|
|                         |                          | (% of GDP)                      |                           |
| <b>Total</b>            | <b>41.0</b>              | <b>28.7</b>                     | <b>-12.3</b>              |
| Taxes on wages          | 8.0                      | 8.2                             | 0.2                       |
| Personal income tax     | 4.4                      | 2.6                             | -1.8                      |
| Social insurance        | 3.5                      | 5.6                             | 2.0                       |
| Taxes on enterprises*** | 12.3                     | 7.1                             | -5.2                      |
| Taxes on consumption    | 12.0                     | 9.0                             | -2.9                      |
| Foreign activity        | 6.3                      | 1.7                             | -4.6                      |
| Non-tax revenue         | 2.5                      | 2.7                             | 0.2                       |
|                         |                          | (% of total)                    |                           |
| Taxes on wages          | 19.0                     | 28.0                            | -1.7                      |
| Personal income tax     | 11.0                     | 9.0                             | 14.9                      |
| Social insurance        | 9.0                      | 19.0                            | -16.6                     |
| Taxes on enterprises*** | 30.0                     | 25.0                            | 42.2                      |
| Taxes on consumption    | 29.0                     | 31.0                            | 23.7                      |
| Foreign activity        | 15.0                     | 6.0                             | 37.5                      |
| Non-tax revenue         | 6.0                      | 9.0                             | -1.7                      |

**Table 3.11** Revenue Decline in the FSU countries (% of GDP and % of total).

Source: Cheasty A. (1996: 34).

\*Countries of the former Soviet Union;

\*\*The calculation of decline is included for illustrative purposes only; the USSR figures and the average figures for the former Soviet Union are not strictly comparable because the 1994 average is unweighted;

\*\*\* Miscellaneous “other taxes” have been added to “taxes on enterprises”. In all countries where they could be identified, they were property taxes on natural resources.

### 3.3 Research Methodology: Theoretical Consideration and Empirical Analysis

#### 3.3.1 Theoretical considerations and model specification

*Hypothesis 1. Economic growth leads to changes in total tax ratio*

Taking into account our first hypothesis that as the economies of transition countries grow over time, governments' total tax revenue as a percentage of GDP continue to rise, we test the causative factors of economic growth affecting tax revenue and tax structures with our panel data by re-arranging equation 3.2.1 or the so-called Barro model as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^m \sigma_i X_{i,t-1} + \varepsilon \quad (3.2.1)$$

$$\Delta \tau_{it} = \beta_1 + \beta_2 y_{it-1} + \sum_{i,t=1}^k \eta_i Z_{i,t-1} + \varphi_t + \omega_i + \varepsilon_{it} \quad (3.3.1)$$

where  $\tau_{it}$  denotes tax revenues in country  $i$  at time  $t$ , coefficient  $y_{t-1}$  denotes economic growth as measured by GDP per capita growth with lagged value (1) to check for robustness. The coefficient  $\beta$  is an indicator of the response of the tax share to economic growth,  $Z_{it}$  is a matrix that includes all remaining control variables where  $\eta$  is a vector of coefficients,  $\omega_i$  represents the unobservable country specific, time-invariant effects,  $\varphi_t$  denotes unobservable time specific effects and  $\varepsilon$  denotes error term.

Testing this hypothesis uses the concept of tax mix change during economic development (Hinrichs 1966; Abizadeh 1979; Abizadeh and Yousefi 1996; Tarschys 2003) as the basis of the analysis.

*Hypothesis 2: Economic growth leads to changes in tax structures and tax mix*

Our second hypothesis that economic growth leads to substantial changes in the tax structure and tax mix in transition economies and that such changes have allowed governments to collect higher tax revenues in these countries is tested by analysing the 'extended' model of tax revenue (Sobel and Holcombe 1996)<sup>7</sup>. Several other studies (e.g. Aydin 2010; Mahdavi 2008; Poghosyan 2011; Tosun and Abizadeh 2005) have used models somewhat similar to Sobel and Holcombe (1996) to estimate the income elasticity and variability of tax revenue.

Empirical analysis of the extended model of tax revenue is derived from the standard model of tax revenue. The standard model dealing with the patterns of tax revenue changes is expressed by:

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<sup>7</sup> There is also a study by Girouard and Andre (1995), which offers a disaggregated approach to the cyclical adjustment of revenues in measuring the elasticity of individual tax categories with respect to their respective bases.

$$\ln(B_t) = \alpha + \beta \ln(Y_t) + \varepsilon \quad (3.3.2)$$

where  $B_t$  denotes the level of the tax base at time  $t$ ,  $Y_t$  represents the level of aggregate income during the period, and the coefficient  $\beta$  represents the income elasticity of revenue from this tax base and serves as a proxy for both the long-run growth and the short-run variability of the tax.

The ‘extended’ model of tax revenue proposed by Sobel and Holcombe (1996) compares the income elasticities of several taxes. The model separates the different taxes into those with long-run and those with short-run income elasticity and shows that there is greater variability in the short-run elasticity estimates. The authors highlight that the income elasticity of tax bases is a valuable tool for two reasons. First, it can be used as a proxy, as explained above, to measure periodic fluctuations of tax revenues in the short term. Second, it marks the tax revenue changes (rise or fall) in the long term. While the long-run income elasticity of a tax base indicates that revenue from that tax base will increase as income grows, short-run elasticity indicates that revenue from that base will fluctuate over the business cycle. Sobel and Holcombe (1996) provide an example of corporate taxable income and the retail sales tax base in the US, which have roughly the same income elasticity in the long run, while corporate income taxes have a much greater short-run elasticity than sales taxes. Although, the two tax bases demonstrate approximately the same rate of revenue growth as that of income over the long run, yet corporate income taxes fluctuate much more in response to short-run fluctuations in income.

Sobel and Holcombe (1996) estimate the annual growth rate of tax bases in their change form, denoted by a delta ( $\Delta$ ) before the variable. Their model shows more tax structure changes over the business cycle than does GDP:

$$\Delta \ln(B_t) = \alpha + \beta \Delta \ln(Y_t) + \varepsilon \quad (3.3.3)$$

Aside from the model proposed by Sobel and Holcombe (1996), economic growth and changes associated with socio-economic determinants can have various lasting impacts on the collection of taxes (Tosun and Abizadeh, 2005). Such changes can make one group of taxes either less or more appealing to collect as they become less or more valuable and/or costly to administer. As such, it can be argued that economic growth can lead to change in different taxes differently.

In order to determine the theoretical relationship between, on the one hand, the rate of economic growth and associated socio-economic and demographic variables (trade, share of agriculture to GDP, unemployment, inflation, population growth and density, urbanization, ageing) and, on the other, tax bases and tax structures, Tosun and Abizadeh (2005) assume a tax structure with only two taxes, tax  $A$  and tax  $B$ . Shares of these taxes in total tax revenues are defined as:

$$\tau^a = \frac{t^a A(Y)}{T} \quad (3.3.4)$$

$$\tau^b = \frac{t^b B(Y)}{T} \quad (3.3.5)$$

where:

$\tau^a$  = share of tax A in total tax revenue

$\tau^b$  = share of tax B in total tax revenue

$A$  = base for tax A

$t^a$  = average tax rate for tax A

$B$  = base for tax B

$t^b$  = average tax rate for tax B.

Both bases for taxes A and B are functions of the rate of growth  $Y$ .  $T$  is total tax revenue and is equal to:

$$T_{it} = t^a A(Y_{it}) + t^b B(Y_{it}) \quad (3.3.6)$$

As  $\tau^a + \tau^b = 1$ , shares of taxes A and B depend on the tax rates, tax bases, and growth rate, as follows:

$$\tau^{a,b} = f[t^a, t^b, A(Y_{it}), B(Y_{it})] \quad (3.3.7)$$

$\tau^{a,b}$  denotes share of tax A and tax B in total tax revenue. To track trends in individual taxes or trends in each tax category that takes place over the process of economic growth, the tax revenue structure  $\tau_{it}$  in our model is equal to the share of individual taxes or a particular source of tax revenue -  $T_{it}$  to GDP per capita annual growth rate -  $Y_{it}$  in transition economy  $i$  in year  $t$ :

$$\tau_{it} = \frac{T_{it}}{Y_{it}} \quad (3.3.8)$$

A change in the basic rate of tax and, particularly, a relative change in the tax bases results in tax structure variations and is therefore a powerful tool for policymakers to loosen or tighten fiscal policy and strategies. A change in tax base, including a broadening of the tax base (i.e. more people and enterprises paying tax), could raise more revenue to meet the cost of government or infrastructure spending. Accordingly, it is argued that economic growth leads to changes in the bases of different taxes and consequently to changes in the tax structure. To determine which tax base is affected most by economic growth and to what extent is pivotal in exploring the relationship between economic development (as measured by GDP per capita growth) and tax structures.

### 3.3.2 The empirical model of changes in tax structures

In order to test the second hypothesis of this paper—that economic growth, as measured by GDP per capita, changes the tax structure and thus tax policy in transitional economies—the following regression equation is utilized, which is derived from equations 3.3.2 – 3.3.8 above:

$$\Delta \ln \tau_{it} = \alpha + \beta_1 \Delta \ln Y_{it} + \beta_2 \Delta \ln Z_{it} \eta + f_i + \varphi_t + \varepsilon_{it} \quad (3.3.9)$$

where:

$\tau_{it}$  = tax revenues or specific source of tax revenue to GDP collected in country  $i$  in year  $t$

$Y_{it}$  = GDP per capita annual growth rate

$\beta_1$  = coefficient indicating the response of the tax share to economic growth

$\beta_2$  = coefficient indicating the response of the tax share to all remaining controls

$f_i$  = unobservable country-specific, time-invariant effects

$\varphi_t$  = unobservable time-specific effects

$Z_{it}$  = matrix that includes all remaining control variables, where  $\eta$  is a vector of coefficients

$\Delta$  = the change or first difference form of the variable.

The model is designed to capture the effect of economic growth that could lead to a change in the tax base and structure. The empirical model used here to analyze the impact of economic growth on tax structure or composition of taxes is built upon the model developed by Tosun and Abizadeh (2005) and Sobel and Holcombe (1996). Major differences are that the current chapter has a focus on transition countries and employs different methods of estimation (fixed-effect panel regression) and robustness check (Baltagi's EC2SLS and Arellano-Bond estimation) with a short-term business cycle orientation. Our specification has tax structure (ratio of tax revenue and a specific source of tax revenue to GDP) variable on the left-hand side, economic growth and other variables on the right side of the equation following Tosun and Abizade (2005) and Sobel and Holcombe (1996).

To explore, in more detail, the impact of the level of economic growth (GDP per capita growth) on tax bases/structures, the following empirical model is defined based on equation 3.3.9:

$$\Delta \ln Z_{it} = \Delta \ln (POP_{it}, XM_{it}, NAGR_{it}, INF_{it}, GRCF_{it}, UNEM_{it}, TRSM_{it}, URB_{it}, POPDEN_{it}, AGE_{it}) \quad (3.3.10)$$

where  $Z_{it}$  is a matrix that includes all remaining control variables. It covers series of socioeconomic indicators and demographic variables.  $POP_{it}$  denotes the rate of population growth. Population growth and GDP per capita growth have been used as proxies for the level of development of each transitional country. The prior expectation is that higher per capita GDP growth is associated positively with tax collection. A faster rate of population growth is also positively associated with tax collection and leads to a higher share of many types of tax. Countries with more rapid population growth may be able to collect more taxes from a larger tax base or generations of taxpayers. Thus, one can expect that the rate of population growth would be positively related to tax collection.

The same expectations hold with other demographics variables.  $URB_{it}$  refers to the percentage of total population living in urban areas. A higher proportion of urban population can lead to higher tax revenues, as urbanization in itself is the result of industrialization and economic progress.  $POPDEN_{it}$  denotes population density (people per square km of land area). It is expected that

densely populated urban areas increase tax collection overall and contribute to a higher share of certain types of tax in particular.

Trade taxes are often a major source of revenue in lower middle-income transitional countries, as they are easier and less costly to collect than taxes on income. Trade is measured by degree of real openness. The model does not employ the traditional openness variable, but, instead, utilizes *real openness* variable or ratio of export-import (constant international US\$) relative to GDP in purchasing power parity US\$. Alcalá and Ciccone (2004) argue that the *real openness* is a better measure of trade than the traditional definition, because the conventional openness variable can be an inaccurate measure by cross-country differences in the price of non-tradable relative to tradable goods (Alcalá and Ciccone, 2004: 638). The distortions emerge as openness can be shrinking in the relative price of non-tradable goods, and non-tradable goods are somewhat more expensive in industrialized countries where production is more efficient. Therefore, the *real openness* variable in the model,  $XM_{it}$ , quantifies the ratio of the export/import of goods and services to GDP<sup>8</sup> in purchasing power parity, US\$.

$NAGR_{it}$  is the non-agriculture share of GDP. It is expected that the bulk of public sector activities are based in urban areas (Tanzi 1992) and that revenue from the agricultural sector is in most cases infinitesimal. The lack of bookkeeping makes the agricultural sector hard to tax (Mahdavi 2008), which is why a higher share of the agricultural sector in transitional economies is correlated with lower tax revenue.

Three aspects of macroeconomic context—inflation, capital gross formation, and unemployment—can be associated closely with changes in the composition of taxes.  $INF_{it}$  is inflation (annual %) as measured by the annual growth rate of the GDP implicit deflator, showing the rate of price change in the economy as a whole. In the absence of proper indexation, higher inflation rates could lead to higher collection of some kinds of tax, while, at the same time, adversely influencing revenue from other types of tax.

The gross capital formation variable (in constant US\$),  $GRCF_{it}$ , has been used to control the effect of the specific tax base expansion from capital taxation. The unemployment rate,  $UNEM_{it}$ , can control for direct tax base changes in taxes on income, profit, and capital gains, and is measured by the total number of unemployed in the total labour force. We expect that higher unemployment rates contract the base of taxes in general and taxes on income, profits, and capital gains in particular.

Different kinds of tax and overall tax revenues are affected by other demographic factors. The old-age dependency ratio variable,  $AGE_{it}$ , is used to control for relatively heavy reliance on certain taxes (e.g. social security contributions and property taxes) due to a higher proportion of

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<sup>8</sup> To calculate real openness, the following formula, proposed by Alcalá and Ciccone (2004: 613) was utilized:

$$Real\ Openness_{AC} = \frac{Imports\ (\$) + Exports\ (\$)}{GDP\ PPP, \$}$$

elderly people in the population. It is expected that when people retire, they work less, may have enough savings to purchase property and as a result boost property tax collection, but reduce their share of personal income taxes.

$TRSM_{it}$  denotes international tourism receipts as a percentage of total exports to control for the tax-exporting behaviour of transitional countries. One can expect that attracting tourists will boost a country's collection of indirect taxes (Tosun and Abizadeh 2005).

### 3.4 Data Description and Data Sources

This research employs data on two major tax classification schemes compiled by the International Centre for Tax and Development (ICTD) for its Government Revenue Dataset (GRD). This dataset contains the most comprehensive and up-to-date data on revenue performance in disaggregated form across counties and over time (Prichard et al. 2014):

- 1) Basic revenue classification scheme for ICTD GRD, which includes data on: (a) taxes on income, profits, and capital gains; (b) taxes on property; (c) taxes on goods and services; (d) taxes on international trade and transactions; (e) other taxes.

According to the basic revenue classification scheme, total tax revenues ( $\tau$ ) is defined as:

$$\tau_{it} = INCT_{it} + PROPT_{it} + GST_{it} + ITT_{it} + OT_{it} \quad (3.4.1)$$

where  $INCT_{it}$  denotes taxes on incomes, profits and capital gains,  $PROPT_{it}$  denotes taxes on property,  $GST_{it}$  taxes on goods and services,  $ITT_{it}$  taxes on international trade and transactions,  $OT_{it}$  other taxes. And,

$$INCT = PIT + CIT + CG \quad (3.4.2)$$

where  $PIT$  denotes personal income taxes,  $CIT$  corporate income taxes and  $CG$  capital gains taxes.

- 2) Expanded revenue classification scheme for ICTD GRD, which contains data on: (a) resource direct taxes; (b) resource indirect taxes; (c) non-resource direct taxes; and (d) non-resource indirect taxes. According to the expanded revenue classification scheme, total taxes ( $TAX$ ) are defined as:

$$\tau_{it} = RDT + RINDT + NRDT + INDT \quad (3.4.3)$$

where  $RDT$  – resource direct taxes,  $RINDT$  – resource indirect taxes,  $NRDT$  is non-resource direct taxes,  $INDT$  – indirect taxes.

The inconsistency and incompleteness of data from other (non-GRD) sources on the structure of general government taxes in transitional countries, for instance for 1991–1997, has obliged me to omit this period of investigation initially despite its great historical importance in explaining changes in tax structure caused by growth, be it positive or negative. This is where the GRD dataset is particularly valuable: more complete and accurate, it contains general and central government revenue data, and both combined and merged revenue data.

Appendix B (Table B.1) presents the definitions and sources of all variables and data used in the empirical analysis.

### **3.5 Panel Data Estimation Procedure and Summary Statistics Results**

#### **3.5.1 Methodology, Advantages of Panel Data and Estimation Procedure**

In order to test the stated hypotheses empirically, panel data regression analysis is performed. Equation (3.3.9) is used as the empirical model in this regard. The model would allow us to analyse the impact of economic growth on changes in tax structure. The analysis employs an unbalanced panel dataset consisting of annual observations from a relatively diverse (in terms of level of income and development, public administration, size, geographic location, type of democracy) sample of 33 transitional countries over the period 1991–2015. The sample of countries was selected on the basis of (a) countries' common heritage of building communism and a command-planned economy in the past; and, (b) the existence of data on all variables for a minimum of five years. Although observations are not available for the entire sample period of 1991–2015 due to missing data for some periods ( $T_i \neq T$  for some  $i$ ), it is important to note that the use of this type of unbalanced panel dataset is common in case of such empirical analyses (e.g. Baltagi, 2008).

Panel (or longitudinal) data regression analysis in this study involves repeated measurement at different points in time on the same transitional country. This type of analysis is more appealing as it captures both variations over countries and variations over time. The fixed-effects model used in this analysis controls for all time-invariant differences between the countries, so the estimated coefficients of the fixed-effects model are not biased because of omitted time-invariant characteristics. This makes the fixed-effects model particularly attractive for usage in the extended tax revenue model. In addition, several other advantages for using panel data are listed in the literature. Amongst them are controlling for countries heterogeneity, more variability, less collinearity between the variables, more degrees of freedom, better ability to study dynamics of adjustment, better ability to identify and measure effects, better ability to create and test more complicated behavioural models than cross-section or time-series data (Baltagi, 2008; Hsiao, 2003; Moulton, 1987).

Using panel data has certain advantages in enriching empirical analysis as it involves the repeated observations of the same things at different points in time. First, panel data increase the

sample size considerably. Second, panel data can better spot and gauge effects that simply cannot be observed in pure cross-section or pure time series data. Third, by studying the repeated cross section of observations, panel data are better suited to study the dynamics of change (Baltagi, 2008). This study uses fixed effects model (FEM) to estimate the parameters of its empirical model. This estimation method and models used are supposed to deal with any problems related, say, to changing parameters over time or relevance of variable, should they arise. The fixed-effects model permits regressors to be endogenous if they are correlated only with a time-invariant component of the error term.

The analysis relies on the combination of empirical evidences with their interpretations, inferences and qualitative description. While using panel data, it is assumed that the causal relationship between independent and dependent variables is the same across countries. Cases of discrepancies in data from various sources or serious limitations in availability of data are analyzed cautiously.

The empirical strategy to test the first hypothesis that ‘as the economies of transition countries grow overtime, governments’ total tax revenues and certain categories of taxes continue to rise’, relies upon the fixed effects regression model to produce baseline or benchmark results. The dependent variables in the estimations are taxes, consisting of total tax revenue, direct taxes, indirect taxes, resource and non-resource revenue which are influenced by the GDP per capita growth in transitional country  $i$  at time  $t$ .

In pursuit of our empirical analysis, first, the appropriate method of estimation needs to be determined. That is, we need to decide which of the two statistical methods best suits our models: fixed effects (FEM) or random-effects model (REM), which is also called the error component model (ECM). To this end, the Hausman’s specification test was conducted to decide whether FEM or REM estimation method best fits our model. The result of Hausman test favors the employment of the FEM.

Then, I run the FEM regressions with the log dependent variable to account for time persistence in the dynamics of estimates of the GDP per capita growth’s impact on taxes. All specifications include time fixed effects. Next, a series of robustness tests, including the generalized least squares (GLS) regression, two-stage least square regression (Baltagi, 2013) and then, dynamic Arellano-Bond estimation using the general methods of moments (GMM) are conducted to compare these tests’ results with the benchmark results and to address the endogeneity issues.

Finally, to test the second hypothesis – economic growth leads to changes in the tax structures and tax mix in transition economies, I estimate tax base elasticity, testing the stationarity of tax variables. The results of tax base elasticity estimation should provide an evidence of responses of different types of taxes to the changes in economic growth as measured by the GDP per capita annual growth rate.

### 3.5.2 Some Background Statistics

Tables (3.12) and Table (3.13) show the summary statistics for tax variables and other independent variables, respectively for the sample of transitional countries. The tables report the descriptive statistics for the tax variables used in the estimation of GDP per capita growth's impact on composition of tax revenues. All variables have the expected range and sign.

For the sample of countries with their economies in transition, on average, tax revenues including social security made 26.8% of GDP annually; tax revenues excluding social security made 19.3% of GDP. So, the share of taxes (including SSC) in GDP is 26.8% in our sample of transitional countries. On average, annually around 6.4% of all tax revenues in the transitional countries are generated by taxes on income; 10.4% of tax revenues come from taxes on goods and services; 14.1% of revenues come from resource direct taxes; 14.7% of revenues are collected by non-resource taxes and non-resource component of indirect taxes made 12.6% of total tax revenues. Also, the population growth rate in the sample of transitional countries made 16.8%.

The unbalanced nature of the panel tends to have 'incomplete' data due to a number of missing observations, which is a normal practice (Baltagi, 2005). The unbalanced panel data on tax structure variables in our sample varies in size when different taxes are analyzed because the dataset (GRD, ITCD, 2016) has the following features. First, some categories of taxes are significantly larger in size than other categories. Second, some countries have relatively complete data, but others do not. For instance, three categories of taxes: taxes on property, 'other' taxes and taxes on income have lesser number of observations – 399, 491 and 546, respectively (Table 3.12). However, the other three categories: total tax revenues, including SSC; tax revenues, excluding SSC and non-resource indirect taxes have much greater number of observations – 621, 608 and 592, respectively (Table 3.12). Differences in number of observations can sometimes result in large differences across sample size for the analysis by types of taxes. Against this background, one-way error component regression models were estimated in order to minimize the impact of missing data and differences in revenue data across types of taxes and across countries.

Table 3.12 and Table 3.13 are helpful to investigate pairwise correlations between all dependent variables – various types of taxes with the key regressor – GDP per capita growth variable. Table 3.13 reveals that the mentioned regressors are only weakly correlated with each other. Particularly, all tax variables are weakly correlated with the main variable of interest – GDP per capita growth, with the value of this correlation lying within the range of 0.4 - 9.3% only.

Table 3.12 also shows that in contrast to GDP per capita growth, the GDP per capita variable is correlated by up to 56-59% with some tax variables, such as non-resource taxes, resource direct taxes, tax revenue, all including social security. Therefore, the variable GDP per capita growth is

used for estimations, while the variable GDP per capita is employed for the comparison purposes only.

Additional descriptive analysis of skewness<sup>9</sup> and kurtosis<sup>10</sup> is also valuable particularly for the dependent tax variables (Table 3.12). The skewness statistic value of taxes on property, taxes on international trade and transactions, other taxes and resource indirect taxes (1.01, 1.89, 2.16 and 5.94, respectively) indicates considerable right skewness. The skewness of the taxes on goods and services and resource direct taxes, excluding social security variables is close to zero (0.14 and 0.25, respectively) pointing to more or less symmetrically distributed data. The skewness statistic value of the resource direct taxes including SSC (-1.96) indicates left skewness.

Table 3.12 shows that the kurtosis statistic of almost all tax variable has the value within the range of 2.39 and 9.19, hinting for normal distributed data. The only exception is the resource indirect taxes with the much higher value of 41.41, which points out that the tails are much thicker than those of a normal distribution.

**Table 3.12** Summary Statistics of Tax Structure Variables.

| All variables in ( $\Delta$ ) ln form                |        | Obs. | Mean | S. Dev. | Min  | Max   | Corr./ GDP pc | Corr./ GDP pc growth | Skewn. | Kurtosis |
|--|--------|------|------|---------|------|-------|---------------|----------------------|--------|----------|
| <b>I. Total Tax Revenue (<math>\Delta</math> ln)</b> |        |      |      |         |      |       |               |                      |        |          |
| Tax Revenues, inc. SSC                               | % GDP  | 621  | .268 | .931    | .035 | .475  | .591          | .061                 | -.518  | 2.397    |
| Tax Revenues, exc. SSC                               | % GDP  | 608  | .193 | .341    | .031 | .364  | .430          | .027                 | -.439  | 5.493    |
| <b>II. Direct Taxes (<math>\Delta</math> ln)</b>     |        |      |      |         |      |       |               |                      |        |          |
| Taxes on income                                      | % Rev. | 546  | .064 | .027    | .023 | .197  | .389          | .032                 | .305   | 3.471    |
| Taxes on property                                    | % Rev. | 399  | .061 | .876    | .001 | .321  | .426          | .082                 | 1.011  | 5.382    |
| <b>III. Indirect Taxes (<math>\Delta</math> ln)</b>  |        |      |      |         |      |       |               |                      |        |          |
| Taxes on goods & services                            | % Rev. | 576  | .104 | .391    | .004 | 7.813 | .402          | .067                 | .145   | 2.871    |
| Taxes on int'l trade                                 | % Rev. | 520  | .016 | 1.681   | .002 | 2.287 | .383          | .041                 | 1.895  | 8.003    |
| Other taxes  | % Rev. | 491  | .007 | 1.733   | .864 | 2.836 | -.323         | .088                 | 2.163  | 9.191    |
| <b>IV. Total Resource Revenue</b>                    |        |      |      |         |      |       |               |                      |        |          |
| Resource direct taxes SSC                            | % Rev. | 582  | .141 | .676    | .012 | 2.908 | .582          | .093                 | -1.966 | 7.893    |
| Resource direct taxes                                | % Rev. | 578  | .067 | .311    | .012 | 1.982 | .429          | .029                 | .259   | 2.860    |
| Resource indirect taxes                              | % Rev. | 562  | .007 | .036    | .001 | .354  | .266          | .025                 | 5.949  | 41.411   |
| <b>V. Total Non-Resource Taxes</b>                   |        |      |      |         |      |       |               |                      |        |          |
| Non-Resource taxes SSC                               | % Rev. | 555  | .147 | .689    | .012 | 2.908 | .565          | .094                 | .335   | 2.084    |
| Non-Resource taxes                                   | % Rev. | 551  | .068 | .031    | .012 | 1.988 | .436          | .057                 | .270   | 2.801    |
| Non-Res. indirect taxes                              | % Rev. | 592  | .126 | .365    | .034 | 2.351 | .241          | .004                 | .601   | 2.751    |

Note: The table report the descriptive statistics for the tax variables used in the estimation of GDP per capita growth on composition of tax revenues.

<sup>9</sup> Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution, or a data set, is symmetric if it looks the same to the left and right of the center point.

<sup>10</sup> Kurtosis is a measure of whether data are heavy-tailed or light-tailed relative to normal distribution.

**Table 3.13** Summary Statistics of Control Variables.

| All variables in ( $\Delta$ ) ln form |                               | Obs. | Mean   | S. Dev. | Min    | Max    | Corr.<br>GDP pc | Corr./GDP pc<br>growth | Skewn. | Kurtosis |
|---------------------------------------|-------------------------------|------|--------|---------|--------|--------|-----------------|------------------------|--------|----------|
| <b>I. Development:</b>                |                               |      |        |         |        |        |                 |                        |        |          |
| GDP pc growth                         | Annual %                      | 825  | 2.833  | 7.791   | -3.981 | 9.236  |                 |                        | .516   | 28.615   |
| Population growth                     | Annual %                      | 825  | .168   | 1.167   | -5.604 | 3.732  | -.285           | .089                   | -1.107 | 13.517   |
| <b>II. Real Openness:</b>             |                               |      |        |         |        |        |                 |                        |        |          |
| Exp.+Imp./GDP                         | Exp.\$+Imp.\$/<br>GDP PPP, \$ | 825  | 23.081 | 2.207   | 18.216 | 29.911 | .158            | .017                   | .662   | 3.295    |
| <b>III. Econ. Structure:</b>          |                               |      |        |         |        |        |                 |                        |        |          |
| Agriculture/GDP                       | % of GDP                      | 825  | 15.408 | 12.481  | 1.680  | 65.864 | -.786           | -.148                  | 1.239  | 4.180    |
| <b>IV. Macroec.Context</b>            |                               |      |        |         |        |        |                 |                        |        |          |
| Inflation                             | Annual %                      | 813  | 2.362  | 1.782   | -4.244 | 9.645  | -.122           | .237                   | .763   | 4.608    |
| G. capital formation                  | % of GDP                      | 825  | 24.942 | 7.512   | -.691  | 59.771 | .176            | .194                   | .814   | 5.769    |
| Unemployment                          | % labor force                 | 825  | 11.166 | 6.782   | .101   | 37.300 | .241            | -.046                  | 1.351  | 5.262    |
| <b>V. Demographics</b>                |                               |      |        |         |        |        |                 |                        |        |          |
| Tourism (inbound)                     | % of exports                  | 604  | 12.203 | 12.292  | .511   | 73.743 | .183            | .002                   | 2.296  | 8.752    |
| Urbanization                          | Annual %                      | 825  | 54.249 | 14.991  | 15.782 | 76.667 | .616            | .033                   | -.767  | 2.762    |
| Pop density                           | People/sq. km                 | 825  | 74.871 | 51.553  | 1.427  | 295.75 | .061            | .017                   | 1.195  | 5.761    |
| Age 65 and above                      | % population                  | 825  | 10.801 | 4.558   | 2.941  | 20.027 | -.695           | -.091                  | -.236  | 1.852    |

### 3.6 Estimation Results

#### 3.6.1 Hausman's specification test and Visual Patterns of Data

Table 3.14 displays the STATA output from Hausman's specification test, assuming that random-effects (RE) estimator is fully efficient under null hypothesis. The test compares the estimable coefficients of time-varying regressors. Hausman test specifies that both FE and RE covariance matrices are based on the same estimated disturbance variance from the efficient estimator.

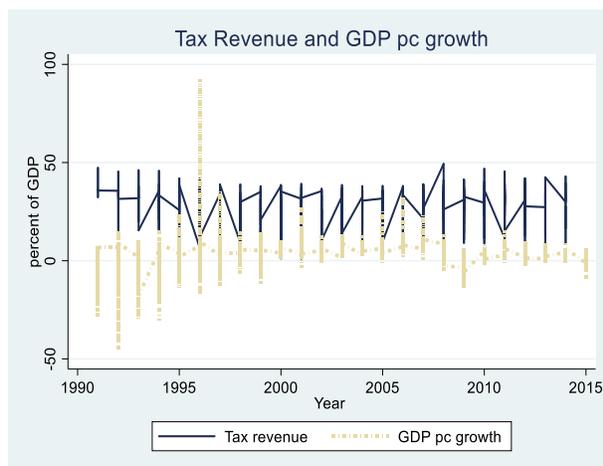
The main variable of interest is taken as an example for test. For the coefficient of the variable *GDP per capita growth*, a test of RE against FE gives  $t = 0.2053/0.0057 = 36.1$ , which is statistically highly significant. In addition, the overall statistic  $-\chi^2(11)$  has  $p$ -value = 0.000. This result leads to the rejection of the null hypothesis that REM provides consistent estimates. Accordingly, the Hausman test favors the use of the FEM.

**Table 3.14** Hausman's specification test results.

|                         | FE (b) | RE (B) | Difference (b - B) | St. Error |
|-------------------------|--------|--------|--------------------|-----------|
| GDP pc growth           | .3315  | .1261  | .2053              | .0057     |
| Population growth       | .2523  | .3196  | -.0672             | .0047     |
| Exp.+Imp./GDP           | .2733  | .0723  | .2009              | .0299     |
| Agriculture/GDP         | -.0211 | -.1559 | .1347              | .0426     |
| Inflation               | .2224  | .3299  | .1074              | .0039     |
| Gross capital formation | .0670  | .1266  | -.0596             | .0129     |
| Unemployment            | -.0632 | -.0123 | -.0509             | .0303     |
| Tourism                 | .2774  | .6902  | -.4127             | .0127     |
| Urbanization            | .8372  | .8482  | -.0109             | .0178     |
| Population density      | 1.044  | .0930  | .9518              | .0360     |
| Age 65 and above        | -.2740 | .0270  | -.3011             | .0132     |
| <i>Chi2</i>             | 61.84  |        |                    |           |
| Prob> <i>chi2</i>       | .0000  |        |                    |           |

Visual analysis of time-series data suggests that economic growth tends to positively affect and increase the tax revenues. Also, as argued above, economic growth can lead to significant changes in the tax mix and tax structure of countries experiencing economic growth. The data in our sample appear to support this effect of economic growth on tax revenues in general (Figure 3.14). Figure 3.14 illustrates the time-series relationship between GDP per capita growth and tax revenues in transitional countries that was used to test the first hypothesis that as the economies in our sample grow, total tax revenue continue to rise. It shows the variation in total tax revenues and GDP per capita growth over time.

**Figure 3.12** Time Series Relationship between GDP per capita growth and tax revenues.



### 3.6.2 Empirical Results

The results of testing the main hypothesis – as economies grow over time, total tax revenues continue to rise -- are presented in Table 3.15. Table 3.15 summarizes the estimation results of equation (3.3.9) using the Fixed-Effects Model (FEM) with tax mix of the countries with their economies in transition as the dependent variables and GDP per capita growth along with other control variables as predictors. Columns 1 and 2 of Table 3.15 present the coefficient estimates for total tax revenue, including and excluding social security contributions (SSC). Columns 3

and 4 reports estimations for direct taxes – income taxes and property taxes, respectively. Columns 5, 6 and 7 display estimation results for indirect taxes – taxes on goods and services, taxes on international trade and transactions and other taxes, in that order. Columns 8, 9 and 10 exhibit estimation results for resource revenues - resource direct taxes including social security, resource direct taxes excluding social security, and resource component of indirect taxes, respectively. Columns 11, 12 and 13 detail estimation results for non-resource taxes – non-resource tax including social security, non-resource tax excluding social security, and non-resource component of indirect tax, respectively.

The following features of our empirical approach are notable. All estimated parameters conform to our prior expectations. The results in columns 1 and 2 show that the estimated coefficients for the main explanatory variable of interest – change in *GDP per capita growth* - are positive and statistically significant for total tax revenue, both including and excluding SSC, as hypothesized. This suggests that an overall rate of growth in GDP per capita is significantly associated with a higher share of tax revenues (including or excluding SSC) in general.

Almost all the remaining estimated parameters in columns 1 and 2 conform to our expectations. *Population growth* has a positive and statistically significant impact on total tax revenues, whether SSC is included or not. More rapid population growth is associated with greater total tax revenues, as expected. This may imply that an increase in the rate of population growth on average leads to higher tax revenue overall.

Moreover, the results of the model in column 1 and 2 indicate that *trade* as measured by *real openness* is positively correlated with the share of tax revenues. A higher degree of *real openness* or *trade* on average leads to an increase in share of tax revenues. The *share of agriculture* has a negative sign, in line with our expectations and as hypothesized, but it is not statistically significant. This suggests that the higher the share of the agricultural sector, the lower the ratio of tax revenues to GDP, including or excluding SSC.

Among the **macroeconomic context variables**, the coefficient of *inflation* is positively and strongly correlated with tax revenue in general, including or excluding SSC, as expected. The positive effect of the inflation rate on tax revenues suggests that higher rates of inflation mean more tax collected which, however, is worth less on account of the declined value of money. The *rate of unemployment* is statistically significant and negatively associated with tax revenue in general. It is consistent with our expectation that a higher rate of unemployment contracts the tax base in general. Furthermore, a higher rate of *unemployment* is connected with a decline in the collection of taxes in general, according to our estimation results. The *gross capital formation* variable positively but not strongly influences the ratio of total tax revenues to GDP. This suggests that capital taxation can, to some extent, facilitate tax base expansion.

Among the **demographic variables**, one can observe that *urbanization* and *population density* variables positively and strongly affect tax revenue in general. This confirms the expectation that urbanized areas, where the majority of industries are located and which are densely populated areas where more taxpayers live, facilitate tax revenue collection overall and contribute to a higher share of revenue. In addition, higher ratio of urbanization points to economic progress. The variable *age 65 and above* in our estimation results suggests that, with population aging, on average, tax base for personal income tax, in particular, may diminish. That is, an increase in the ratio of seniors or those over 65 years old appears to be strongly linked to lower tax revenue in general and to a contraction of the tax base. The FEM estimation results show the negative association between aging and ramping up tax revenues in transition countries. The coefficients of “age 65 and above” have particularly higher magnitudes for a) *taxes on international trade and transactions*, and b) the category of ‘*other taxes*’, suggesting that aging influences tax structures and some taxes more profoundly than others. All else being equal, it can be explained by the following:

- a) *less taxes on international trade and transactions* are collected due to the elderly population creating an excess of savings as compared to investments; and,
- b) *less and less other taxes*, such as *employer payroll taxes and labour taxes* are collected because when population grows older they tend to work less, and in general, they tend to significantly reduce their earnings, their labour force participation, and productivity in the labour market.

The estimated coefficient for *tourism* has a positive sign, but is not statistically significant in our model. It suggests that an increase in the number of tourists is associated, in general, with expansion of the overall tax revenue base.

The results in columns 3 and 4 demonstrate that the estimated coefficients for the main explanatory variable of interest – change in *GDP per capita growth* are positive and statistically significant for *income taxes*, as hypothesized, and positive but insignificant for *property taxes*. This may suggest that a faster rate of growth in GDP per capita is significantly associated with a higher share of income taxes. This also indicates that economic growth is not significantly associated with a higher share of property taxes. It means that property taxes do not automatically increase in response to a faster economic growth, i.e. they are relatively inelastic, unless tax rates are changed. In fact, values of properties predominantly respond more slowly to changes in economic activities, in contrast to individuals or corporations’ level of income or businesses’ volume of sales that has faster reactions to changes in economic growth. Table 3.20 (p. 112), the section 3.8.2 and 3.8.3 (pages 111-114) of this study provides evidence and corroborates that property tax revenues are relatively inelastic in response to economic growth, in contrast to taxes on income, on goods and services, and taxes on international trade and transactions.

The results of the regression in column 3 and 4 show that *trade* as measured by *real openness* is positively and statistically significantly correlated with the share of property taxes. A higher degree of *real openness* or *trade* on average leads to an increase in share of property taxes. This suggests that as the economy grows and expands, trade, monetary policies, property markets, production, infrastructure and transport develop and evolve. Growing property markets bring different set of policies, ideas and different goods with novel rules of trade together. In terms of rates of growth, findings by Hinrichs (1966) indicate that in the transitional stage, taxes on foreign trade sector grow fastest initially. As a result, booming foreign and internal trade sector in transition countries is conducive and favourable to the collection of more property taxes according to our sample. So, the growth of trade tends to increase the importance of property taxes, which are in most cases paid by taxpayers directly, in periodic lump-sum payments. The *share of agriculture* has a negative sign, as hypothesized, but it is not statistically significant. This suggests that the higher the share of the agricultural sector, the lower the ratio of income taxes and property taxes, even though this relationship is not statistically significant.

Among the **macroeconomic context variables**, the coefficient of *inflation* is positively and strongly correlated with both income taxes and property taxes, as expected. The positive effect of the inflation rate on income and property taxes may suggest that higher rates of inflation mean more income taxes and property taxes collected due to inflated value of money. The *rate of unemployment* is statistically significant and negatively associated with both income taxes and property taxes. It is consistent with our expectation that a higher rate of unemployment contracts the base of income taxes and property taxes in general.

Among the **demographic variables**, the coefficients *urbanization* and *population density* positively and strongly affect property taxes. This is in line with the expectation that more urbanized areas, and densely populated areas with the greater number of taxpayers, and more tourists visiting the area, increase revenue collection from the property taxes. The variable *age 65 and above* in our estimation results suggests that, with population aging, on average the relative reliance of governments on income taxes from the retired, is expected to reduce. An increase in the over 65 part of the population appears to be strongly linked to lower income tax revenue in general and to a contraction of the base of income tax.

Columns from 5 through 13, the first rows show that the results across all the specifications show that the effect of the *GDP per capita growth* is positive and statistically significant on all categories of indirect taxes, all types of *resource tax revenue* and all categories of *non-resource tax revenue*. These results confirm that *GDP per capita growth* is strongly related to all taxes, except *property taxes*, which does not appear as statistically significant in explaining its importance.

Overall, empirical results in columns from 5 through 13 are in line with other related studies. I find that *GDP per capita growth*, *trade*, and *population density*, *unemployment* and *age* are particularly important in explaining expanding respective tax bases. Meantime, the findings indicate that *unemployment* and *age* are pivotal in explaining contracting respective tax bases. However, within the set of variables in my sample a relevant difference emerges across regression models. Some variables (e.g. *gross capital formation*, *tourism*) are not statistically significant.

In terms of magnitude of the explanatory variables, the coefficients of the *urbanization*, *trade* and *unemployment* rate are larger and statistically more significant for almost all categories of taxes in contrast to other variables. This suggests that higher rates of urbanization and employment, along with boosting both foreign and internal trade, are particularly conducive to ramping up generally revenue collection in terms of tax policies of transition economies.

The empirical results of this study are largely consistent with past studies. For instance, the coefficients of GDP per capita growth are positive and statistically significant for total taxes, including social security contributions, taxes on income, taxes on international trade and transactions and the category of 'other taxes' similar to results obtained by Tosun and Abizadeh (2005). However, unlike Tosun and Abizadeh (2005), the coefficients of economic growth are positive and significant for taxes on goods and services, positive and insignificant for taxes on property, analogous to findings by Slack and Bird (2014). While this study used somewhat different categories of taxes, the results of tax base elasticity estimates for taxes on income is still comparable with findings by Sobel and Holcombe (1996). Although the results of short-run elasticity estimates of taxes on income in this study are similar to findings by Sobel and Holcombe (1996), the results of long-run elasticity estimates of income taxes in the context of transition countries are different. The results of this study prove that income taxes are inelastic. This may be explained by the fact that direct taxes, including taxes on income in many lower-middle and even upper-middle income transition countries, still are not a big source of revenue, and it appears that this trend may last for some time.

**Table 3.15** Estimation results: Fixed-Effects Model.

| <i>Dependent Var.:</i>  | <i>A.(In) Tax structure</i> |                     | Basic Revenue Classification, ICTD GRD |                    |                                  |                    |                    | Expanded Revenue Classification, ICTD GRD |                     |                     |                      |                     |                    |
|-------------------------|-----------------------------|---------------------|--|--------------------|----------------------------------|--------------------|--------------------|---|---------------------|---------------------|----------------------|---------------------|--------------------|
|                         | <i>(I) Δ ln TR</i>          |                     | <i>(II) Δ ln Direct Taxes</i>          |                    | <i>(III) Δ ln Indirect Taxes</i> |                    |                    | <i>(IV) Δ ln RDT</i>                      |                     |                     | <i>(V) Δ ln NRDT</i> |                     |                    |
|                         | <i>(1) inc.SSC</i>          | <i>(2) exc.SS</i>   | <i>(3) INCT</i>                        | <i>(4) PRO</i>     | <i>(5) GST</i>                   | <i>(6) ITT</i>     | <i>(7) OT</i>      | <i>(8)incSS</i>                           | <i>(9)excSS</i>     | <i>(10) RIN</i>     | <i>(11)inc.SS</i>    | <i>(12)exSS</i>     | <i>(13)NRI</i>     |
| <b>Development:</b>     |                             |                     |  |                    |                                  |                    |                    |   |                     |                     |                      |                     |                    |
| GDP per capita          | .399***<br>(2.77)           | .546***<br>(3.68)   | .608**<br>(1.99)                       | .035<br>(0.74)     | .123*<br>(1.66)                  | .345**<br>(2.38)   | .434*<br>(1.82)    | .331**<br>(2.05)                          | .748**<br>(2.13)    | .425***<br>(2.17)   | .103**<br>(2.34)     | .471**<br>(2.44)    | .587***<br>(3.52)  |
| Population growth       | .239**<br>(2.12)            | .127**<br>(2.10)    | .279**<br>(1.99)                       | .741*<br>(1.68)    | .352**<br>(2.08)                 | .343**<br>(2.42)   | .865*<br>(1.84)    | .285*<br>(1.94)                           | .331*<br>(1.81)     | .107*<br>(1.71)     | .194*<br>(1.91)      | .298<br>(1.56)      | .579<br>(0.51)     |
| <b>Real Openness:</b>   |                             |                     |  |                    |                                  |                    |                    |   |                     |                     |                      |                     |                    |
| Exp+Imp/GDP             | .655**<br>(2.00)            | .674**<br>(1.99)    | .697*<br>(1.81)                        | .347***<br>(2.92)  | .156***<br>(3.06)                | .719**<br>(2.26)   | 3.93**<br>(2.15)   | .197**<br>(2.26)                          | .413*<br>(1.66)     | .143***<br>(3.07)   | .733**<br>(2.31)     | .401***<br>(2.58)   | .124**<br>(2.19)   |
| <b>Econ. Structure:</b> |                             |                     |  |                    |                                  |                    |                    |   |                     |                     |                      |                     |                    |
| Agriculture/GDP         | -.571*<br>(-1.87)           | -.861*<br>(-1.69)   | -.084<br>(-1.50)                       | -.068<br>(-0.49)   | -.095**<br>(-2.45)               | -.543*<br>(-1.85)  | -.753**<br>(-2.52) | -.053<br>(-0.46)                          | -.751**<br>(1.99)   | -.329<br>(-1.38)    | -.171***<br>(2.75)   | -.073<br>(-0.57)    | -.227**<br>(-2.01) |
| <b>Macroec. Context</b> |                             |                     |  |                    |                                  |                    |                    |   |                     |                     |                      |                     |                    |
| Inflation               | .253**<br>(2.16)            | .291**<br>(2.45)    | .794***<br>(2.67)                      | .055**<br>(1.99)   | .101*<br>(1.68)                  | .131**<br>(1.97)   | .372*<br>(1.79)    | .285**<br>(2.38)                          | .658***<br>(2.64)   | .186<br>(1.56)      | .085<br>(1.48)       | 2.19<br>(0.74)      | .746<br>(0.56)     |
| Gross capital formation | .045*<br>(1.67)             | .442<br>(1.06)      | .642<br>(1.57)                         | .863***<br>(3.34)  | .181*<br>(1.87)                  | .881<br>(1.48)     | .361**<br>(2.12)   | .146*<br>(1.68)                           | .056*<br>(1.63)     | .214<br>(1.42)      | .207*<br>(1.83)      | .043<br>(1.13)      | .475**<br>(2.42)   |
| Unemployment            | -.828**<br>(-2.20)          | -.105***<br>(-2.80) | -.197**<br>(-2.02)                     | -.038**<br>(-2.39) | -.119**<br>(-2.14)               | -.642*<br>(-1.92)  | -.224*<br>(-1.63)  | -.128**<br>(-2.24)                        | -.291***<br>(-3.21) | -.184***<br>(-3.38) | -.211***<br>(-2.61)  | -.368***<br>(-4.07) | -.114**<br>(-2.38) |
| <b>Recr./Demogr.</b>    |                             |                     |  |                    |                                  |                    |                    |   |                     |                     |                      |                     |                    |
| Tourism                 | .191<br>(1.33)              | .282*<br>(1.76)     | .279*<br>(1.88)                        | .327***<br>(2.79)  | .046*<br>(1.63)                  | .344<br>(0.53)     | 1.90*<br>(1.74)    | .421*<br>(1.67)                           | .208*<br>(1.86)     | .236*<br>(1.72)     | .561<br>(0.31)       | .469**<br>(1.97)    | .513*<br>(1.72)    |
| Urbanization            | .914***<br>(4.81)           | .767***<br>(4.01)   | .333*<br>(1.66)                        | 1.47**<br>(1.97)   | .959***<br>(3.14)                | 3.39*<br>(1.77)    | 4.05<br>(1.52)     | .479<br>(1.37)                            | .653*<br>(1.83)     | .785***<br>(3.80)   | 1.31**<br>(2.33)     | 1.03**<br>(2.16)    | .714***<br>(2.80)  |
| Pop density             | 1.49***<br>(3.36)           | 1.77***<br>(3.86)   | 1.79*<br>(1.68)                        | 2.85**<br>(2.11)   | 2.72***<br>(4.00)                | .307**<br>(2.01)   | 2.12**<br>(2.03)   | 2.77**<br>(2.28)                          | .913**<br>(2.20)    | 2.04***<br>(3.42)   | 4.108***<br>(4.65)   | 3.92***<br>(4.55)   | 1.04**<br>(2.42)   |
| Age 65 and above        | -2.74**<br>(-2.08)          | -.269**<br>(-2.06)  | -1.31**<br>(-2.24)                     | -.294<br>(-1.43)   | -.744**<br>(-2.11)               | -4.82**<br>(-2.10) | -7.57**<br>(-2.55) | -.051**<br>(-2.18)                        | -1.40**<br>(-2.49)  | -.939***<br>(-1.22) | -1.04***<br>(-3.07)  | -1.79*<br>(-1.84)   | -.244*<br>(-1.82)  |
| Constant                | 6.60***<br>(3.58)           | 6.79**<br>(2.51)    | 5.94***<br>(2.99)                      | 5.52*<br>(1.64)    | 3.88***<br>(3.00)                | 8.38*<br>(1.66)    | 9.22**<br>(2.49)   | 13.7***<br>(4.71)                         | 6.52**<br>(2.05)    | 9.59<br>(5.32)      | 10.1***<br>(3.77)    | 3.26**<br>(2.18)    | .111***<br>(4.22)  |
| F-test                  | 19.52***                    | 20.27***            | 8.69***                                | 8.13*              | 10.02***                         | 5.82***            | 5.92***            | 6.76***                                   | 8.63***             | 10.2***             | 12.6***              | 11.5***             | 15.8***            |
| Prob > F                | 0.000                       | 0.000               | 0.000                                  | 0.000              | 0.000                            | 0.000              | 0.000              | 0.000                                     | 0.000               | 0.000               | 0.000                | 0.000               | 0.000              |
| Observations            | 171                         | 169                 | 149                                    | 98                 | 157                              | 146                | 99                 | 154                                       | 157                 | 138                 | 137                  | 140                 | 157                |
| Adj. R-squared          | 0.684                       | 0.717               | 0.588                                  | 0.799              | 0.657                            | 0.567              | 0.533              | 0.598                                     | 0.639               | 0.588               | 0.696                | 0.575               | 0.695              |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics is shown in parentheses. All variables are in in change or difference form and expressed in natural logarithms. Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2

Source: Author's estimations.

### 3.7 Robustness Tests

#### 3.7.1 Robustness Check and addressing potential simultaneity concerns

To gauge robustness of the main conclusion of the study I perform the following series of checks: REM using GLS regression, Baltagi's (2013) EC2SLS and the dynamic Arellano-Bond (1991) estimation using GMM regression to check robustness and to address potential simultaneity and endogeneity concerns. In this section, I consider the alternative regression model and study the other traditional panel data estimator: random effects models (REM) running the generalized-least square (GLS) regression. The random-effect model or the error component model is specified to control for country-specific heterogeneity. Although the Hausman test favoured using the fixed-effects, REM is used as the alternative regression model as economic growth level of transitional countries and regional affiliations may cause variations between cases and observations, and other variables may be fixed between cases but vary over time. I assume that the regressors are uncorrelated with the random (panel-specific) effects with zero mean and constant variance.

Mundlak (1978) noted that the random effects (RE) model assumes exogeneity of all the regressors with the random individual effects. According to him, in contrast, the fixed effects (FE) model allows for endogeneity of all the regressors with these individual effects. Thus, a Mundlak version of the Random Effects model based on Mundlak's (1978) modification of the RE model for the general specification with the correlation of the country-specific effects ( $\alpha_i$ ) and the regressors considered in an auxiliary equation was used.

The results are presented in Table 3.16 and are similar to the fixed effect estimation output, reported above. In this model I consider the time dummy after year 1998 that takes on the value of one when tax mix of post-1998 are studied, and zero otherwise. The regional dummies and income level dummies are also taken into account. The coefficients on the income level dummy variables are positive and statistically significant across models, with the exception of the high-income OECD countries. A possible explanation for this may be the fact that high-income countries of the Eastern Europe have successfully finished years of transition entering in different stage of development – stage of building their more robust tax systems. The coefficients on the regional dummy variables are positive and statistically significant across all geographic scopes covered by this study. Overall, this indicates that the alternative estimations' results obtained by the REM are suitable for testing the first hypothesis as well.

**Table 3.16** Estimation results: Random-Effect Model (REM) GLS regression.

| <i>Dep.Variable:</i>    | <i>A. In. Tax Structure</i> |            | Basic Revenue Classification, ICTD GRD |         |                                   |          |         | Expanded Revenue Classification, ICTD GRD |           |          |                       |           |          |
|-------------------------|-----------------------------|------------|--|---------|-----------------------------------|----------|---------|---|-----------|----------|-----------------------|-----------|----------|
|                         | (I) $\Delta \ln TR$         |            | (II) $\Delta \ln$ Direct Taxes         |         | (III) $\Delta \ln$ Indirect Taxes |          |         | (IV) $\Delta \ln$ RDT                     |           |          | (V) $\Delta \ln$ NRDT |           |          |
|                         | (1) inc.SSC                 | (2) exc.SS | (3) INCT                               | (4) PRO | (5) GST                           | (6) ITT  | (7) OT  | (8) in.SS                                 | (9) ex.SS | (10) RIN | (11) inc.SS           | (12) exSS | (13) NRI |
| <b>Development:</b>     |                             |            |  |         |                                   |          |         |   |           |          |                       |           |          |
| GDP per capita          | .102*                       | .231*      | .021**                                 | .435**  | .558**                            | .152*    | .246    | .105**                                    | .295*     | .021*    | .492**                | .018*     | .018**   |
| growth                  | (1.65)                      | (1.77)     | (2.04)                                 | (2.47)  | (2.04)                            | (1.64)   | (1.26)  | (2.01)                                    | (1.79)    | (1.77)   | (2.27)                | (1.63)    | (2.50)   |
| Population growth       | .041                        | .046       | .662*                                  | .282*   | .423**                            | .423**   | .324    | .397**                                    | .453*     | .091     | .088                  | .031      | .011**   |
|                         | (1.29)                      | (1.33)     | (1.91)                                 | (1.66)  | (2.07)                            | (2.04)   | (1.20)  | (1.97)                                    | (1.67)    | (1.50)   | (1.30)                | (1.14)    | (2.44)   |
| <b>Real Openness:</b>   |                             |            |  |         |                                   |          |         |   |           |          |                       |           |          |
| Exp+Imp/GDP             | .497**                      | .380*      | .616                                   | .112*   | .328*                             | 1.86***  | 3.75*** | .164***                                   | .218**    | .101*    | .134***               | .309***   | .101**   |
|                         | (2.04)                      | (1.78)     | (1.54)                                 | (1.69)  | (1.94)                            | (3.11)   | (5.60)  | (4.04)                                    | (2.24)    | (1.68)   | (3.64)                | (4.06)    | (2.03)   |
| <b>Econ. Structure:</b> |                             |            |  |         |                                   |          |         |   |           |          |                       |           |          |
| Agriculture/GDP         | -.213***                    | -.247***   | -4.29**                                | -.381*  | -.185**                           | -.133*   | -.125   | -.194*                                    | -.241***  | -.133*   | -.548***              | -.273***  | -.074*** |
|                         | (-4.11)                     | (-4.64)    | (-2.14)                                | (-1.73) | (-1.99)                           | (-1.80)  | (-0.34) | (-1.88)                                   | (-2.86)   | (-1.95)  | (-4.15)               | (-2.89)   | (-4.35)  |
| <b>Macroec. Context</b> |                             |            |  |         |                                   |          |         |   |           |          |                       |           |          |
| Inflation               | .599***                     | .744***    | .142***                                | .172*** | .361*                             | .528***  | .376**  | 1.04***                                   | .141***   | .251     | 6.05                  | .857**    | .474**   |
|                         | (4.07)                      | (4.91)     | (3.28)                                 | (3.41)  | (1.68)                            | (2.67)   | (2.28)  | (2.82)                                    | (4.62)    | (1.32)   | (1.60)                | (2.34)    | (2.16)   |
| Gross capital formation | .153***                     | .139**     | .887*                                  | .309    | .333***                           | .341**   | .284*** | .656**                                    | .628***   | .303***  | .223                  | .518***   | .532***  |
|                         | (2.62)                      | (2.35)     | (1.65)                                 | (1.16)  | (3.72)                            | (2.48)   | (3.64)  | (2.01)                                    | (3.32)    | (3.85)   | (1.31)                | (3.12)    | (5.44)   |
| Unemployment            | -.044                       | -.254*     | -.222                                  | -.308   | -.727*                            | -.689*   | -.225   | -.627**                                   | -.149     | -.584**  | -6.00                 | -.261***  | -.738    |
|                         | (-1.27)                     | (-1.69)    | (-0.62)                                | (-1.50) | (-1.68)                           | (-1.64)  | (-0.52) | (-2.55)                                   | (-1.06)   | (-2.20)  | (-0.52)               | (-3.79)   | (-1.09)  |
| <b>Recr./Demogr.</b>    |                             |            |  |         |                                   |          |         |   |           |          |                       |           |          |
| Tourism                 | .199**                      | .298*      | .669                                   | .145*   | .108*                             | .445*    | .263    | .136                                      | .096*     | .040     | .652*                 | .566*     | .661*    |
|                         | (2.03)                      | (1.66)     | (1.45)                                 | (1.68)  | (1.86)                            | (1.92)   | (0.14)  | (1.36)                                    | (1.64)    | (1.39)   | (1.71)                | (1.74)    | (1.75)   |
| Urbanization            | .439***                     | .349***    | 2.07***                                | .723    | .149*                             | .756*    | 1.48    | 1.79***                                   | 1.40***   | .439*    | 1.05***               | .645***   | .557***  |
|                         | (4.80)                      | (2.86)     | (6.84)                                 | (1.20)  | (1.94)                            | (1.63)   | (1.38)  | (4.78)                                    | (4.75)    | (1.85)   | (4.97)                | (4.05)    | (2.96)   |
| Pop density             | .043**                      | .549**     | .375***                                | .388**  | .059                              | .353     | 1.13*** | 2.37**                                    | 2.62***   | .661**   | 1.88***               | .201***   | .152*    |
|                         | (2.03)                      | (2.24)     | (6.67)                                 | (2.47)  | (1.48)                            | (1.41)   | (2.03)  | (2.18)                                    | (3.62)    | (2.06)   | (2.82)                | (3.20)    | (1.77)   |
| Age 65 and above        | -.229***                    | -.255***   | -.298                                  | -.305*  | -.438**                           | -.241**  | -.862*  | -.372**                                   | -.702***  | -.132**  | -.099**               | -.281*    | -.027*   |
|                         | (2.81)                      | (-2.97)    | (-1.48)                                | (-1.67) | (-2.36)                           | (-2.23)  | (-1.91) | (-2.08)                                   | (-4.19)   | (-2.12)  | (-2.49)               | (-1.67)   | (-1.64)  |
| <i>High-Income</i>      | 2.47                        | 2.02       | 2.17**                                 | 1.43    | 1.74*                             | 1.06     | 1.49*   | 1.31                                      | 1.62      | 2.17     | 1.95                  | 1.87      | 1.43     |
| <i>OECD</i>             | (1.62)                      | (1.12)     | (2.09)                                 | (1.01)  | (1.69)                            | (1.45)   | (1.91)  | (1.53)                                    | (1.58)    | (1.61)   | (1.39)                | (1.20)    | (1.11)   |
| <i>Lower-Middle</i>     | 3.32***                     | 3.07***    | 2.02**                                 | 1.13**  | .842***                           | 2.34     | 2.17**  | .281                                      | .791*     | .885***  | .179*                 | .153      | .879***  |
| <i>Income</i>           | (3.11)                      | (2.98)     | (2.32)                                 | (2.25)  | (4.82)                            | (0.22)   | (2.33)  | (0.08)                                    | (1.89)    | (7.47)   | (1.63)                | (1.40)    | (7.41)   |
| <i>East Asia</i>        | 2.26                        | .346       | 3.06***                                | 1.86**  | 1.73***                           | .448     | 3.71**  | .029                                      | 1.34***   | .058     | 2.33**                | 1.17***   | 1.34     |
|                         | (1.16)                      | (1.32)     | (7.86)                                 | (2.50)  | (4.24)                            | (1.41)   | (2.53)  | (0.01)                                    | (2.78)    | (0.15)   | (2.22)                | (2.38)    | (0.60)   |
| <i>FSU Caucasus</i>     | 4.08***                     | 2.60**     | 1.03***                                | .279*** | .709***                           | .961     | .585    | .594                                      | .976***   | .254*    | .965                  | .226***   | .328***  |
|                         | (3.22)                      | (2.48)     | (4.14)                                 | (2.55)  | (4.51)                            | (1.50)   | (0.65)  | (1.48)                                    | (5.46)    | (1.85)   | (1.51)                | (2.77)    | (2.74)   |
| <i>FSU Central Asia</i> | .374                        | 2.39**     | 1.92***                                | .678*   | .731***                           | 1.52**   | 2.38**  | .957***                                   | 1.45***   | .062***  | 4.46**                | .172**    | .684**   |
|                         | (1.23)                      | (2.84)     | (3.21)                                 | (1.63)  | (2.65)                            | (1.97)   | (2.38)  | (3.17)                                    | (3.95)    | (3.23)   | (2.55)                | (2.07)    | (2.09)   |
| Wald chi2               | 902.14***                   | 547.8***   | 566.23                                 | 464***  | 711.3***                          | 231.9*** | 218***  | 283.54                                    | 836***    | 493***   | 178.02***             | 479***    | 56.9***  |
| BP LM,sd=sqrt           | .496                        | .341       | .642                                   | 1.008   | .437                              | 2.38     | 1.93    | .966                                      | .747      | .224     | 1.04                  | .771      | .367     |
| Hausman test chi2       | 169.84                      | 178.86     | 49.06                                  | 53.31   | 100.52                            | 41.56    | 7.94    | 31.43                                     | 52.68     | 121.9    | 86.51                 | 48.91     | 134.29   |
| Observations            | 169                         | 167        | 147                                    | 86      | 155                               | 144      | 109     | 152                                       | 155       | 141      | 135                   | 138       | 137      |
| Adj. R-squared          | 0.961                       | 0.914      | 0.842                                  | 0.968   | 0.893                             | 0.802    | 0.737   | 0.921                                     | 0.884     | 0.819    | 0.952                 | 0.941     | 0.827    |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics is shown in parentheses. All variables are in in change or difference form and expressed in natural logarithms. Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2. Source: Author's estimations.

*Simultaneity check*

Second, I apply a method of estimating consistent structural parameters by utilizing a two-stage least squares (2SLS) random effects estimator - Baltagi's (2013) EC2SLS estimator as an instrumental variable (IV) for fitting panel-data model for the right-hand side variables endogeneity concerns. This estimator treats the disturbance term as random variable that are independent and identically distributed (i.i.d.) in the panel data. Under the assumption that the error term has zero mean and is not correlated with the regressors, this IV estimator is also used to control for measurement error.

In the first stage, each endogenous variable is regressed on all the predetermined variables of the model. Using the structural equations of a simultaneous-equations model, then, rearranging and substituting, I obtain the reduced-form equations of the model:

$$\Delta \ln \tau_{it} = \alpha + \beta_1 \Delta \ln Y_{it} + \beta_2 \Delta \ln Z_{it} \eta + f_i + \varphi_t + u_{1t} \quad (3.7.1)$$

$$\Delta \ln Y_{it} = b + \gamma_1 \Delta \ln \tau_{it} + \gamma_2 \Delta \ln I_{it} + \gamma_3 \Delta \ln \omega_t + u_{2t}$$

$$\Delta \ln \tau_{it} = \alpha + \beta_1 (b + \gamma_1 \Delta \ln \tau_{it} + \gamma_2 \Delta \ln I_{it} + \gamma_3 \Delta \ln \omega_t + u_{2t}) + \beta_2 \Delta \ln Z_{it} \eta + f_i + \varphi_t + u_{1t} \quad (3.7.2)$$

$$\Delta \ln \tau_{it} = \alpha + \frac{\beta_1 b}{1 - \beta_1 \gamma_1} + \frac{\beta_1 \gamma_2}{1 - \beta_1 \gamma_1} \Delta \ln I_{it} + \frac{\beta_1 \gamma_3}{1 - \beta_1 \gamma_1} \Delta \ln \omega_t + \frac{u_{1t} + \beta_1 u_{2t}}{1 - \beta_1 \gamma_1} + \frac{\beta_2 \eta}{1 - \beta_1 \gamma_1} \Delta \ln Z_{it} + \frac{f_i + \varphi_t}{1 - \beta_1 \gamma_1} \quad (3.7.3)$$

$$\Delta \ln \tau_{it} = \pi_0 + \pi_1 \ln I_{it} + \pi_2 \Delta \ln \omega_t + \pi_3 \Delta \ln Z_{it} + \pi_4 \rho_i \sigma_t + v_{1t} \quad (3.7.4)$$

$$\Delta \ln Y_{it} = b + \gamma_1 (\alpha + \beta_1 \Delta \ln Y_{it} + \beta_2 \Delta \ln Z_{it} \eta + f_i + \varphi_t + u_{1t}) + \gamma_2 \Delta \ln I_{it} + \gamma_3 \Delta \ln \omega_t + u_{2t} \quad (3.7.5)$$

$$\Delta \ln Y_{it} = \frac{\alpha \gamma_1 + b}{1 - \beta_1 \gamma_1} + \frac{\beta_1}{1 - \beta_1 \gamma_1} + \frac{\beta_2 \eta}{1 - \beta_1 \gamma_1} \ln Z_{it} + \frac{\gamma_1 (f_i + \varphi_t)}{1 - \beta_1 \gamma_1} + \frac{\gamma_1 u_{1t} + u_{2t}}{1 - \beta_1 \gamma_1} + \frac{\gamma_2 \Delta \ln I_{it}}{1 - \beta_1 \gamma_1} + \frac{\gamma_3 \Delta \ln \omega_t + u_{2t}}{1 - \beta_1 \gamma_1} \quad (3.7.6)$$

$$\Delta \ln Y_{it} = \pi_2 + \pi_3 + \pi_4 \Delta \ln Z_{it} + \pi_5 \Delta \ln I_{it} + \pi_6 \Delta \ln \omega_t + \delta_i \mu_t + v_{2t} \quad (3.7.7)$$

Then, in the second stage, the predicted values of the endogenous variables are derived to estimate the structural equation of the model. The predicted values of the endogenous variables are estimated by substituting the observed values of the exogenous variables into the reduced form equations (3.7.4) and (3.7.7).

During the EC2SLS estimation following Baltagi (2013), I regress each endogeneous variables on all the exogenous variables of the system and then using the predicted values of the endogenous variables, estimate the structural equations. I add regional and income dummies to the estimation. While taking the EC2SLS approach, I examine the robustness of the baseline result to additional covariates.

The results of Baltagi's EC2SLS estimates are reported in Table 3.17 and are close to the FEM estimates, with coefficients for GDP per capita growth becoming of slightly greater magnitude, without

losing their statistical significance (Table 3.17). The predicted values of the endogenous variables are uncorrelated with the error terms. This confirms consistency of 2SLS structural parameter estimates. All remaining variables are statistically significant, confirming the robustness of the baseline results.

### 3.7.2 Addressing potential endogeneity concerns

As a final point, in this section, in order to assess more deeply and dynamically the relationship between economic growth and tax mix, a dynamic model is studied as well, in which preceding values of the dependent variable of disturbance term affect the current value of the dependent variable - taxes. I use the Arellano-Bond estimator, a generalized method of moments (GMM) estimator for linear dynamic panel-data models with lagged levels of the endogenous variables as well as first differences of the exogenous variables as instruments to deal with endogeneity concerns. The Arellano-Bond estimator is also helpful in removing the panel-specific heterogeneity by first differencing the regression equation.

The Arellano-Bond estimator and generalized methods of moments (GMM) in the context of this research should not be considered as two unconnected, unrelated, separate, isolated items or be treated as “variety of estimators” since Arellano-Bond estimation uses the generalized method of moments (GMM). Arellano and Bond (1991) developed consistent generalized methods of moments (GMM) estimator, or Arellano-Bond dynamic (ABD) estimator, which fits the parameters of our model due to the following. One-step GMM estimator and its corresponding robust VCE estimator employed in the model has:

- (i) more panels than periods ( $N=33$ ,  $T = 23$ );
- (ii) no autocorrelation in the idiosyncratic errors, as tested;
- (iii) unobserved panel-level effects that are correlated with the lags of the dependent variable.

Arellano-Bond estimator was used in addition to fixed-effects in order to check and gauge its robustness and to assess more deeply and dynamically the relationship between economic growth and tax mix. Hence, I use the Arellano-Bond estimator, a generalized method of moments (GMM) estimator for linear dynamic panel-data models with lagged levels of the endogenous variables as well as first differences of the exogenous variables as instruments to deal with endogeneity concerns.

**Table 3.17** Estimation results: Baltagi's EC2SLS REM IV regression

| Dep. Variable:             | <i>A. In Tax Structure</i> |                     | Basic Revenue Classification, ICTD GRD |                    |                                   |                    |                   | Expanded Revenue Classification, ICTD GRD |                     |                    |                       |                     |                    |
|----------------------------|----------------------------|---------------------|--|--------------------|-----------------------------------|--------------------|-------------------|---|---------------------|--------------------|-----------------------|---------------------|--------------------|
|                            | (I) $\Delta \ln TR$        |                     | (II) $\Delta \ln Direct Taxes$         |                    | (III) $\Delta \ln Indirect Taxes$ |                    |                   | (IV) $\Delta \ln RDT$                     |                     |                    | (V) $\Delta \ln NRDT$ |                     |                    |
|                            | (1) inc.SSC                | (2) exc.SS          | (3) INCT                               | (4) PRO            | (5) GST                           | (6) ITT            | (7) OT            | (8) in.SS                                 | (9) ex.SS           | (10) RIN           | (11) inc.SS           | (12) ex.SS          | (13) NRI           |
| <b>Development:</b>        |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| GDP per capita             | .141***<br>(2.59)          | .763**<br>(2.42)    | .194**<br>(2.30)                       | .123<br>(1.17)     | .151**<br>(1.99)                  | .569**<br>(1.97)   | 1.16**<br>(2.26)  | .171**<br>(1.99)                          | .125**<br>(2.23)    | .086<br>(1.17)     | .836***<br>(2.88)     | .308**<br>(2.52)    | .073**<br>(2.03)   |
| growth                     | .241**<br>(2.29)           | .164**<br>(2.33)    | .426*<br>(1.91)                        | .282*<br>(1.66)    | .423**<br>(2.04)                  | .324**<br>(2.20)   | .397**<br>(1.99)  | .453***<br>(2.67)                         | .191<br>(1.50)      | .188<br>(1.30)     | .231**<br>(2.14)      | .309**<br>(2.06)    | .211**<br>(2.44)   |
| Population growth          |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| <b>Real Openness:</b>      |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| Exp+Imp/GDP                | .238**<br>(2.34)           | .101**<br>(2.25)    | .686*<br>(1.84)                        | .829*<br>(1.69)    | .716*<br>(1.64)                   | 1.60***<br>(2.91)  | 3.35***<br>(4.15) | .488<br>(0.73)                            | .149*<br>(1.94)     | .119*<br>(1.68)    | 2.64*<br>(1.64)       | .282***<br>(2.66)   | .096*<br>(1.65)    |
| <b>Econ. Structure:</b>    |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| Agriculture/GDP            | -.111**<br>(-2.09)         | -.978**<br>(-1.97)  | -.301**<br>(-2.34)                     | -.274**<br>(-2.06) | -.286***<br>(-2.69)               | -.697*<br>(-1.80)  | -.741*<br>(-1.94) | -.236**<br>(-2.04)                        | -.296***<br>(-2.76) | -.016*<br>(-1.70)  | -.219**<br>(-2.05)    | -.994<br>(-1.09)    | -2.74**<br>(-2.35) |
| <b>Macroec. Context</b>    |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| Inflation                  | .768***<br>(3.81)          | .684***<br>(3.48)   | .174**<br>(1.98)                       | .578<br>(1.20)     | .391*<br>(1.64)                   | .789***<br>(3.17)  | .457**<br>(2.28)  | .114***<br>(2.82)                         | .141***<br>(3.62)   | .110<br>(1.12)     | .438<br>(1.60)        | .857**<br>(2.34)    | .474**<br>(2.16)   |
| Gross capital formation    | .259***<br>(3.12)          | .197**<br>(2.46)    | .157***<br>(3.03)                      | .529*<br>(1.76)    | .332***<br>(3.02)                 | 1.48**<br>(1.99)   | .284***<br>(3.64) | .168**<br>(2.01)                          | .148***<br>(3.32)   | .288***<br>(2.65)  | .231<br>(1.31)        | .518***<br>(3.12)   | .532**<br>(2.44)   |
| Unemployment               | -.796**<br>(-1.97)         | -.156**<br>(-2.35)  | -.754*<br>(-1.63)                      | -.279*<br>(-1.63)  | -.632<br>(-0.98)                  | -.082<br>(-0.88)   | -.225*<br>(-1.72) | -.627**<br>(-2.49)                        | -.108<br>(-1.06)    | -.172**<br>(-2.46) | -6.00<br>(-0.52)      | -1.16***<br>(-3.24) | -.738<br>(-1.39)   |
| <b>Recr./Demogr.</b>       |                            |                     |  |                    |                                   |                    |                   |   |                     |                    |                       |                     |                    |
| Tourism                    | .569**<br>(2.43)           | .444*<br>(1.66)     | .966*<br>(1.89)                        | .141*<br>(1.63)    | .436*<br>(1.86)                   | .511**<br>(2.47)   | .263<br>(0.14)    | .139<br>(1.36)                            | .283*<br>(1.64)     | .333**<br>(1.99)   | .248***<br>(3.41)     | .127**<br>(2.04)    | .661**<br>(2.05)   |
| Urbanization               | .611***<br>(4.67)          | .841***<br>(4.86)   | 1.53***<br>(3.54)                      | .151<br>(1.50)     | .925***<br>(3.94)                 | .603**<br>(2.34)   | 1.44<br>(1.18)    | 1.79***<br>(4.78)                         | 1.40***<br>(4.75)   | .439***<br>(2.85)  | 8.75**<br>(1.97)      | 6.47***<br>(3.00)   | 2.37***<br>(2.76)  |
| Pop density                | .103***<br>(3.53)          | .151***<br>(3.24)   | .236*<br>(1.67)                        | .121<br>(1.27)     | .177**<br>(2.48)                  | .348<br>(1.41)     | .761**<br>(2.03)  | .287***<br>(3.18)                         | .262***<br>(3.62)   | .119*<br>(1.82)    | 1.88<br>(0.96)        | 1.55**<br>(2.07)    | .178**<br>(2.22)   |
| Age 65 and above           | -.229***<br>(-2.81)        | -.255***<br>(-2.97) | -.298**<br>(-2.48)                     | -.305*<br>(-1.67)  | -.438**<br>(-2.36)                | -.241**<br>(-2.23) | -.862*<br>(-1.91) | -.372**<br>(-2.08)                        | -.402**<br>(-2.19)  | -.132**<br>(-2.12) | -.199**<br>(-2.49)    | -.281*<br>(-1.67)   | -.127*<br>(-1.64)  |
| <i>Lower-Middle Income</i> | .275**<br>(2.11)           | .418**<br>(2.08)    | .202<br>(1.32)                         | .221***<br>(2.87)  | .134***<br>(4.22)                 | 2.64***<br>(2.13)  | 2.11**<br>(2.13)  | .281*<br>(1.98)                           | .791<br>(0.32)      | .007<br>(0.47)     | .179<br>(0.29)        | .263<br>(1.40)      | 8.79***<br>(7.41)  |
| <i>East Asia</i>           | .672<br>(0.43)             | .611<br>(0.32)      | 1.46**<br>(1.97)                       | 2.33***<br>(4.50)  | 1.73**<br>(2.24)                  | 4.15**<br>(2.41)   | 3.71<br>(1.53)    | .029<br>(0.01)                            | 1.34***<br>(2.78)   | .058<br>(0.15)     | 2.33**<br>(2.22)      | 1.33***<br>(2.79)   | 1.34<br>(1.60)     |
| <i>FSU Caucasus</i>        | .323***<br>(2.72)          | .260**<br>(2.48)    | 1.54**<br>(2.54)                       | .776***<br>(2.65)  | .952**<br>(2.51)                  | 2.48**<br>(2.20)   | .585<br>(0.65)    | .594<br>(1.48)                            | .362<br>(1.46)      | .254*<br>(1.85)    | .965<br>(1.51)        | .502<br>(2.77)      | .661***<br>(2.74)  |
| <i>FSU Central Asia</i>    | .296**<br>(2.32)           | .593***<br>(3.54)   | 1.92**<br>(2.21)                       | .253<br>(2.34)     | .109***<br>(2.65)                 | .438***<br>(3.17)  | .238<br>(1.38)    | .597***<br>(3.17)                         | 1.45***<br>(3.55)   | .062<br>(0.23)     | .446<br>(0.55)        | .229<br>(0.07)      | .641***<br>(3.09)  |
| Wald chi2                  | 504.14***                  | 153.52              | 77.54                                  | 60.7***            | 91.1***                           | 174.1***           | 169***            | 171.34                                    | 128***              | 70.5***            | 58.02***              | 45.2***             | 410***             |
| BP LM,sd                   | .332                       | .279                | .476                                   | .978               | .347                              | .821               | .393              | .676                                      | .367                | .824               | .997                  | .341                | .447               |
| Hausman test chi2          | 39.84                      | 231.5               | 227.11                                 | 83.28              | 34.35                             | 13.20              | 70.13             | 17.56                                     | 67.78               | 76.33              | 10.05                 | 138.84              | 20.89              |
| Observations               | 169                        | 167                 | 147                                    | 86                 | 155                               | 144                | 109               | 152                                       | 155                 | 141                | 135                   | 138                 | 155                |
| Adj. R-squared             | 0.845                      | 0.741               | 0.804                                  | 0.918              | 0.863                             | 0.738              | 0.753             | 0.890                                     | 0.865               | 0.534              | 0.922                 | 0.931               | 0.732              |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics is shown in parentheses. All variables are in in change or difference form and expressed in natural logarithms. Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2

Source: Author's estimations.

In addition, the dynamic model with the Arellano-Bond estimator, a generalized method of moments (GMM) estimator is relevant and valuable to this study's panel-data model because:

- (a) it uses lagged levels of the endogenous variables as well as first differences of the exogenous variables as instruments, which is very helpful for the endogeneity check of the model;
- (b) it removes the panel-specific heterogeneity by first differencing the regression equation;
- (c) it reduces asymptotic imprecision and biases which may arise in such estimations and is more fit for the data collected with the number of periods (T=25) being less than the number of transitional countries (N=33) or  $T < N$ .

Some scholars contend that potential sources of endogeneity of fiscal variables are business cycle effects and Wagner's Law <sup>1</sup> (Abizadeh and Gray, 1985; Easterly and Rebelo, 1993; Hsieh and Lai, 1994; Acosta-Ormaechea and Yoo, 2012). Kneller, Bleaney and Gemmell (1999) are less concerned with Wagner's law as this law implies association between GDP growth and the growth rate of spending and taxation, rather than with levels of expenditure and taxation. They follow Folster and Henrekson (1999) in dealing with the endogeneity problem and utilize country intercepts, the lagged levels of all fiscal variables, level and first difference of labour force growth, and initial GDP as instruments. Acosta-Ormaechea and Yoo (2012) take first difference, i.e. using growth rates as a control for the country-specific, income-level factor that influences tax revenue. The variable of interest – GDP per capita growth rate - is stationary in its change form. Furthermore, in models utilizing growth rate of GDP per capita as a variable, like ours, endogeneity does not seem to be of much concern (Kneller, Bleaney and Gemmell, 1999; Acosta-Ormaechea and Yoo, 2012).

Nevertheless, to deal with endogeneity concerns in our model, two steps have been taken. First, the GMM regression is estimated, in which the first-differenced lagged dependent and predetermined variables are instrumented with their past level, and the strictly exogenous variables are instrumented with themselves. Second, controlling for the country-specific, income-level factor that influences tax structures, those countries, which appear to propel endogeneity problem, were eliminated from the sample. Hence, taking the first-difference or growth rates of all variables in Equation (3.3.9), constructing the lagged dependent variable  $Y_{i,t-1}$ , controlling for country fixed effects and excluding from the sample some countries, we estimate the following regression to check the robustness of the model:

$$\Delta \ln \tau_{i,j,t} = \alpha + \beta_1 \Delta \ln Y_{i,t-1} + \beta_2 \Delta \ln Z_{i,t-1} \eta + f_{i,t-1} + \varphi_t + \Delta \varepsilon_{i,j,t} \quad (3.7.1)$$

To address and to tackle the endogeneity issues, Arellano and Bond (1991) propose the generalized method of moments (GMM) approach, widely known as the difference GMM estimator. Our method utilizes this estimator along with lags of the regressors, which stay orthogonal to the error, as suitable instruments in the estimation of Equation (3.7.1). In line of this, the one-step GMM regressions were

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<sup>1</sup> The main principle of this law stipulates that governments spending and taxes are higher at higher levels of per capita GDP

run with the lagged independent variable to account for time persistence in the dynamics of tax revenue estimates. Under the assumption of independent and homoscedastic residuals, the one-step GMM estimation generates more consistent and unbiased parameter estimates. For the GMM estimation, as all dependent and independent variables, including the main variable of interest – GDP per capita growth are in change or difference form with lagged  $x_{t-1}$  tax structure variables, simultaneity bias does not seem to be of a large significance.

To verify the consistency of the GMM estimates, the null hypothesis of no second-order autocorrelation in the transformed error term,  $\Delta \varepsilon_{i,j,t}$  utilising the AR (1) and AR (2) Arellano-Bond tests for first and second order autocorrelation of the residuals (Arellano and Bond, 1991) was tested. Then, the overall validity of instruments using the Sargan test of over-identifying restrictions analyzed in Arellano and Bond (1991) was examined. The Arellano-Bond tests rejects the hypothesis that errors are correlated in the first order (AR1) and fails to reject the null hypothesis of no autocorrelation in the second order (AR2). The test for autocorrelation provides no evidence of model misspecification. The Sargan test suggests that the instruments are not correlated with the residuals.

The empirical approach of controlling for country fixed effects is less susceptible or vulnerable to endogeneity issues to such level that the pertinent unobservable components are country-specific and time-invariant. Profeta (2013) counters endogeneity concerns in his work through such reduced-form strategy and carries it out without estimating a structural model. Also, similar to the approach taken by Acosta-Ormaechea and Yoo (2012) to overcome endogeneity issues on a country-by-country basis, those countries that appear to be causing the endogeneity were excluded from the sample.

Following these two steps, no simultaneous relationship of taxes with either GDP per capita growth or population growth was detected in the sample. The independent variable with a one-year lagged value of tax revenues:  $\Delta \ln \tau_{i,t-1}$  was used as an instrument and tested to avoid a reverse causality of regressors that are not strictly exogenous. This test of weak exogeneity shows that the tax variables utilized in the model are at the lowest weakly exogenous to the remaining regressors or control variables. The lagged variable of tax revenue is not correlated with the lagged error term  $\Delta \ln \varepsilon_{i,t-1}$ , either. The two methods discussed above fundamentally reduce the chance of endogeneity in the model.

Table 3.18 reports the estimated parameters of equation 3.7.1 employing the difference GMM model regression results and utilizing the ‘extended’ model of tax revenue to estimate the tax structures in their change or difference form. ABD Panel Data regression has been run to address the endogeneity of some regressors in this model and to see if the estimates are different in practice. As can be seen in Table 3.18, the GMM estimation results continue to be similar to those with FEM estimation. In columns 1 and 2, the coefficient of GDP per capita growth is positive and significant in relation to tax revenue. It suggests, again, the existence of a positive association between increase in GDP per capita growth and expansion of the total tax revenue base. These results suggest that faster growth is associated with an increase in total tax revenues.

The results remain robust with the rest of the explanatory variables in columns 1 and 2 after the exclusion from the sample of several countries that seem to be potentially creating an endogeneity issue. It means lack of endogeneity. The coefficient of *population growth, openness, inflation, urbanization, and population density* are both positive and significant. This suggests, again, that these variables positively influence tax revenue and expand the base of most taxes. The coefficients *share of agriculture; unemployment and age* are both negative and significant. This may imply that the last three variables affect tax revenue negatively and on average contribute to the contraction of the tax bases. The coefficients *tourism and capital gross formation* remain insignificant, but positive.

The ABD GMM estimation results have particularly higher magnitudes of coefficients of the explanatory variables: a) *population growth and density*, and b) *gross capital formation for non-resource component of indirect taxes* (column 13). All else being equal, it can be explained by the following:

- a) more total non-resource indirect taxes are collected due to increasing different segments of taxpayers as a result of growing population and creation of more densely populated areas; and,
- b) more and more non-resource indirect taxes are collected because growing domestic investments to the infrastructure, such as plant, machinery, and equipment purchases, and the construction of new roads, railways, buildings, hospitals and offices. As a result, the fiscal space or base is expanded allowing for imposing and collecting more non-resource indirect taxes.

The Arellano - Bond test for zero autocorrelation in first-differenced errors suggests that there is no autocorrelation of either the first order (AR1) or the second order (AR2). In addition, the instruments of this model are valid, as corroborated by the Sargan test of over-identifying restrictions.

**Table 3.18** Estimation results: GMM (Arellano Bond Dynamic) regression.

| <i>Dep. Variable:</i>         | <i>A. In Tax Structure</i> |            | Basic Revenue Classification, ICTD GRD |         |                                   |         |          | Expanded Revenue Classification, ICTD GRD |          |         |                       |          |         |
|-------------------------------|----------------------------|------------|--|---------|-----------------------------------|---------|----------|---|----------|---------|-----------------------|----------|---------|
|                               | (I) $\Delta \ln TR$        |            | (II) $\Delta \ln$ Direct Taxes         |         | (III) $\Delta \ln$ Indirect Taxes |         |          | (IV) $\Delta \ln$ RDT                     |          |         | (V) $\Delta \ln$ NRDT |          |         |
|                               | (1) inc.SSC                | (2) exc.SS | (3) INCT                               | (4) PRO | (5) GST                           | (6) ITT | (7) OT   | (8)incSS                                  | (9)excSS | (10)RIN | (11)inc.SS            | (12)exSS | (13)NRI |
| <b>Development:</b>           |                            |            |  |         |                                   |         |          |   |          |         |                       |          |         |
| GDP per capita                | 2.52**                     | 3.42***    | .332**                                 | .071*** | 3.05**                            | 1.31*   | .188**   | .594                                      | 3.10**   | .001    | .594**                | 1.78**   | 2.61**  |
| growth                        | (2.03)                     | (2.81)     | (1.99)                                 | (2.60)  | (2.26)                            | (1.84)  | (2.13)   | (0.24)                                    | (2.15)   | (1.29)  | (2.24)                | (2.00)   | (1.97)  |
| Population growth             | .133**                     | .791*      | .182                                   | .019    | 4.38**                            | 2.11*   | .069     | .652                                      | .570**   | .002**  | .179*                 | 1.86**   | 2.25*** |
|                               | (2.15)                     | (1.78)     | (0.76)                                 | (1.28)  | (2.26)                            | (1.64)  | (1.01)   | (0.24)                                    | (2.26)   | (2.01)  | (1.70)                | (2.45)   | (3.61)  |
| <b>Real Openness:</b>         |                            |            |  |         |                                   |         |          |   |          |         |                       |          |         |
| Exp+Imp/GDP                   | .957*                      | 1.33**     | .681                                   | .205**  | 2.23**                            | 1.03**  | .571     | .533**                                    | 1.24*    | .207    | .159                  | 1.06**   | 1.67**  |
|                               | (1.73)                     | (2.21)     | (1.47)                                 | (2.03)  | (2.21)                            | (1.98)  | (1.14)   | (2.50)                                    | (1.93)   | (1.40)  | (0.23)                | (2.27)   | (2.11)  |
| <b>Econ. Structure:</b>       |                            |            |  |         |                                   |         |          |   |          |         |                       |          |         |
| Agriculture/GDP               | -.804*                     | -1.30***   | -4.91***                               | -.261*  | -8.87*                            | -2.32** | -.384    | -1.31                                     | -2.81**  | -.001   | -.413                 | -.533*   | -.546** |
|                               | (-1.77)                    | (-2.67)    | (-4.11)                                | (-1.80) | (-1.89)                           | (-2.44) | (-0.89)  | (-1.47)                                   | (-2.45)  | (-0.08) | (-1.56)               | (-1.69)  | (-1.97) |
| <b>Macroec. Context</b>       |                            |            |  |         |                                   |         |          |   |          |         |                       |          |         |
| Inflation                     | .189**                     | 2.25**     | 1.47*                                  | .237**  | .352**                            | 1.32    | .029     | 1.45                                      | .235*    | .001    | .518                  | .712     | .947    |
|                               | (2.27)                     | (2.40)     | (1.65)                                 | (2.48)  | (2.19)                            | (1.14)  | (0.46)   | (0.89)                                    | (1.69)   | (0.63)  | (0.47)                | (1.52)   | (0.73)  |
| Gross capital                 | .979**                     | .921       | 3.61                                   | .037**  | 5.62*                             | 1.38    | .773**   | .368                                      | .398     | .017    | .806                  | 4.78***  | 7.14*   |
| formation                     | (2.29)                     | (1.25)     | (1.37)                                 | (2.24)  | (1.71)                            | (0.32)  | (2.33)   | (0.51)                                    | (1.45)   | (0.99)  | (1.21)                | (2.62)   | (1.76)  |
| Unemployment                  | -.672**                    | -5.63*     | -.755*                                 | -.214** | -4.15*                            | -7.02** | -.129    | -1.05*                                    | -.776    | .002    | -1.37***              | -1.53*** | -1.20   |
|                               | (-2.27)                    | (-1.80)    | (-1.68)                                | (-2.03) | (-1.67)                           | (-2.11) | (-0.43)  | (-1.85)                                   | (-1.10)  | (0.25)  | (-3.48)               | (-3.41)  | (-1.57) |
| <b>Recr./Demogr.</b>          |                            |            |  |         |                                   |         |          |   |          |         |                       |          |         |
| Tourism                       | .832**                     | 1.11       | 2.56                                   | .032    | .469**                            | 1.71*   | .003     | 2.15                                      | .641     | .003    | .429                  | .101**   | 2.36*   |
|                               | (2.37)                     | (1.46)     | (1.47)                                 | (1.54)  | (2.01)                            | (1.63)  | (0.23)   | (0.49)                                    | (1.22)   | (1.43)  | (1.11)                | (2.24)   | (1.65)  |
| Urbanization                  | .669**                     | 1.92*      | .295                                   | .261    | .643**                            | .118    | .635***  | 3.05*                                     | 4.34*    | .008    | 1.11***               | 1.32***  | 1.14**  |
|                               | (2.33)                     | (1.84)     | (1.16)                                 | (1.42)  | (2.40)                            | (1.48)  | (2.63)   | (1.78)                                    | (1.81)   | (0.74)  | (3.77)                | (3.97)   | (2.12)  |
| Pop density                   | 1.14***                    | 1.31***    | 1.98**                                 | .052    | 1.67**                            | 3.48*   | 1.03**   | 1.51**                                    | 3.19*    | .037    | 1.99***               | 2.20***  | 4.44**  |
|                               | (3.52)                     | (3.75)     | (2.24)                                 | (1.06)  | (2.42)                            | (1.95)  | (2.15)   | (2.44)                                    | (1.64)   | (0.31)  | (4.23)                | (4.03)   | (2.09)  |
| Age 65 and above              | -.337**                    | -1.96*     | -6.00**                                | -1.13** | -1.18***                          | -6.21** | -9.35*** | -2.69                                     | -1.60**  | -.014   | -2.06*                | 6.33**   | -.019   |
|                               | (-2.18)                    | (-1.92)    | (-2.07)                                | (-1.98) | (-2.57)                           | (-2.53) | (-3.00)  | (-0.66)                                   | (-2.08)  | (-0.21) | (-1.75)               | (-1.97)  | (-0.30) |
| <i>Lag1: TR<sub>t-1</sub></i> | .786                       | .927       | .038                                   | .617    | 1.39                              | 1.07    | 1.51     | 4.84                                      | .599     | 2.59    | 4.41                  | .599     | .434    |
|                               | (1.09)                     | (1.22)     | (0.01)                                 | (0.37)  | (1.37)                            | (.051)  | (1.12)   | (0.69)                                    | (0.75)   | (1.57)  | (0.88)                | (0.75)   | (1.53)  |
| Wald chi2                     | 204.93***                  | 195.22***  | 191.70***                              | 44.9*** | 68.2***                           | 53.2*** | 31.9***  | 201.57                                    | 183.90   | 63.1*** | 227***                | 143***   | 68.2*** |
| Prob > chi2                   | 0.000                      | 0.000      | 0.000                                  | 0.000   | 0.000                             | 0.000   | 0.000    | 0.000                                     | 0.000    | 0.000   | 0.000                 | 0.000    | 0.000   |
| Sargan test, p-value          | 0.29                       | 0.43       | 0.35                                   | 0.24    | 0.86                              | 0.56    | 0.47     | 0.26                                      | 0.21     | 0.33    | 0.37                  | 0.28     | 0.42    |
| Observations                  | 122                        | 117        | 96                                     | 86      | 106                               | 92      | 81       | 104                                       | 106      | 91      | 89                    | 91       | 106     |
| AR(1), p-value                | 0.00                       | 0.02       | 0.09                                   | 0.04    | 0.00                              | 0.00    | 0.01     | 0.04                                      | 0.05     | 0.00    | 0.01                  | 0.06     | 0.03    |
| AR(2), p-value                | 0.32                       | 0.42       | 0.18                                   | 0.90    | 0.81                              | 0.06    | 0.83     | 0.15                                      | 0.19     | 0.71    | 0.10                  | 0.15     | 0.27    |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics is shown in parentheses. All variables are in in change or difference form and expressed in natural logarithms. Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2

Source: Author's estimations.

### Granger Causality Test

To explore the direction of influence in our empirical model: is it GDP per capita growth ( $Y$ ) that causes changes in tax structures, or the tax revenues ( $TR$ ) that affects GDP per capita growth, the Granger causality test is performed. The discussions in the next Section 3.8.1 (p. 119-120) confirm that the GDP per capita growth and tax variables are all stationary in their change or difference form.

Granger (1969) employed a methodology for investigating the causal relationship in time series. The Dumitrescu and Hurlin (2012) developed the test for Granger causality that is more relevant to our model since it deals with panel datasets, like in our model. I perform the Dumitrescu and Hurlin (2012) test following the implementation procedures as proposed by Lopez and Weber (2017). To test whether *GDP per capita growth* ( $Y$ ) causes *tax revenue* ( $TR$ ) increase, or vice-versa, I utilize the following two regressions for testing and assume that the disturbances  $u_{1t}$  and  $u_{2t}$  are not correlated with each other:

$$TR_{it} = \sum_{k=1}^m \delta_i TR_{t-i} + \sum_{j=1}^m \mu_j Y_{t-j} + u_{1t} \quad (3.7.2)$$

$$Y_{it} = \sum_{k=1}^m \alpha_i TR_{t-i} + \sum_{j=1}^m \beta_j Y_{t-j} + u_{2t} \quad (3.7.3)$$

Similar to Granger (1969), the method proposed specifically for using the test in the panel datasets by Dumitrescu and Hurlin (2012), and implemented by Lopez and Weber (2017) suggests testing for significant effects of past values of  $TR$  on the present value of *GDP p.c. growth* in order to decide on the existence of causality. The null hypothesis ( $H_0$ ) is that the variable of interest does not (Granger-) cause the other variable. If  $H_0$  is rejected in the first test (direction of causality from  $Y$  to  $TR$ ), one can conclude that causality from  $Y$  to  $TR$  exists, as hypothesized. Similarly, if  $H_0$  is not rejected in the second test, one can conclude that causality from  $TR$  to  $Y$  may not hold, as predicted.

The results of the test of direction of causality from  $Y$  to  $TR$  using equation (3.7.2) suggest that the direction of causality is indeed from *GDP per capita growth* ( $Y$ ) to *tax revenue* ( $TR$ ) since the estimated  $p$ -value of  $Z$ -bar statistic and the  $Z$ -bar tilde statistic are significant. In addition, the estimated average Wald statistic is also significant. Thus, the results of the test (Table 3.19) show that the outcome of the test is to reject the null hypothesis. So, *GDP p.c. growth* leads to increased *tax revenues* in our model.

The results of the test of direction of causality from  $TR$  to  $Y$  using equation (3.7.3) suggest that there is no reverse causation from *GDP per capita growth* ( $Y$ ) to *tax revenue* ( $TR$ ), since the  $p$ -values of the  $Z$ -bar statistic and the  $Z$ -bar tilde statistic are insignificant. In this case, the outcome of the test does not reject the null hypothesis. So, increase in *tax revenues* ( $TR$ ) do not lead to *GDP p.c. growth* ( $Y$ ) in our model.

But why the lag (1) was utilized in the test? The Dumitrescu and Hurlin (2012) Granger non-causality tested lags from 1 to 6 and identified that it is optimal to use the lag (1) in our model. That is the reason why the lag (1) of the main variables of interest was utilized throughout the Granger tests.

To sum-up, the results of the Dumitrescu and Hurlin (2012) Granger non-causality test, suggest that the direction of causality is from *GDP per capita growth* to *tax revenues*, as hypothesized, and no reverse causation from *tax revenues* to *GDP per capita growth*. This is summarized below (Table 3.19):

| Null hypothesis   | Test                | Statistics | Prob. ( <i>p</i> -value) |
|---|---------------------|------------|--------------------------|
| <i>GDP pc growth</i> does not homogeneously cause <i>TR</i> | $W^{HNC}$           | 5.242      | 0.000                    |
|   | $Z^{HNC}$           | 5.393      | 0.000                    |
|   | $Z\sim$ - bar tilde | 3.135      | 0.001                    |
| <i>TR</i> does not homogeneously cause <i>GDP pc growth</i> | $W^{HNC}$           | 2.381      | 0.178                    |
|   | $Z^{HNC}$           | 1.142      | 0.253                    |
|   | $Z\sim$ - bar tilde | 0.307      | 0.758                    |

**Table 3.19** Results of Dumitrescu and Hurlin (2012) causality test

### 3.8 Estimation of Tax Base Elasticity or Tax Base ‘Responsiveness’ to Economic Growth

#### 3.8.1 The Stationarity of Tax Variables and ADF-Unit Root Test Results

To test the second hypothesis of whether economic growth lead to changes in the tax structures and tax mix of transition countries, first, I check for the stationarity of tax variables, and then, estimate the tax base elasticity or ‘responsiveness’ of different categories of taxes to economic growth as measured by GDP per capita annual growth rate.

One of the essential features of any variables is stationarity. A stationary variable is one that has a tendency to yield mean and variance value, among other statistical properties, through time. However, if the variables continue to move upward through time, with no tendency to coming back downward, indicating a clear trend upward over time, then it is non-stationary.

In order to check for stationarity (or unit roots) of tax variables and GDP per capita growth in our panel dataset, the Fisher type panel-data unit-root tests are performed. Fisher-type unit-root tests for all tax and GDP variables are based on a) Augmented Dickey-Fuller (ADF) test and b) Phillips-Perron (PP) test. The null hypothesis of both the Fisher-ADF and the Fisher-PP unit root tests is that all panels contain a unit root or stationarity. The alternative hypothesis of the tests is that at least one panel is stationary. Panel-specific means (fixed effects) in the model are included, but time trend is excluded.

The unit-root tests check whether the variables are stationary in their change, or first difference form, denoted by a delta ( $\Delta$ ) before the variable. A statistically significant *p*-statistic would indicate that the variable is stationary in its level form, while an insignificant *p*-value would show that the variable is nonstationary. Lags (1) of the series are used in the Fisher-ADF and Fisher-PP regressions. The lags (1) are used to remove higher-order autoregressive components of the series. Thus, the assumption is that the data are generated by AR (1) process for Fisher tests:

$$\Delta \ln \tau_t = \Delta \ln TR_t - \Delta \ln TR_{t-1} \quad (3.8.1)$$

The results of this test for all of the tax variables and GDP per capita growth are given in Table 3.19. The first noticeable thing in Table 3.19 is that almost all the estimated coefficients are individually

highly significant, for the  $p$ -values are low. This gives us strong evidence against the null hypothesis in favour of the alternative (as  $p$ -values are mostly within the range of  $0.001 < p < 0.01$ ). These results confirm that the GDP per capita growth and tax variables are all stationary in their change or difference form<sup>1</sup>.

**Table 3.20** Tests for Difference Stationarity (Fisher-type unit-root test)

|   | $p$ -value of inverse chi-squared ( $p$ )<br>based on augmented Dickey-<br>Fuller tests, lags (1) | $p$ -value of inverse chi-squared ( $p$ )<br>based on Phillips-Perron tests,<br>lags (1) |
|---|---|--|
| $\Delta \ln$ GDP per capita growth                                  | 0.0000***   | 0.0000***  |
| GDP per capita growth   | 0.9997  | 0.9960   |
| <b>I. Total Tax Revenue (<math>\Delta \ln</math> TR)</b>            |   |  |
| Tax Revenues, inc. SSC  | 0.0012***   | 0.0000***  |
| Tax Revenues, exc. SSC  | 0.0402**  | 0.0000***  |
| <b>II. Direct Taxes (<math>\Delta \ln</math> Direct Taxes)</b>      |   |  |
| Taxes on income   | 0.0000***   | 0.0000***  |
| Taxes on property   | 0.0845*   | 0.0000***  |
| <b>III. Indirect Taxes (<math>\Delta \ln</math> Indirect Taxes)</b> |   |  |
| Taxes on goods and services   | 0.0000***   | 0.0000***  |
| Taxes on int'l trade and transactions                               | 0.0007***   | 0.0064***  |
| Other taxes   | 0.0000***   | 0.0000***  |
| <b>IV. Total Resource Revenue (<math>\Delta \ln</math> RDT)</b>     |   |  |
| Resource direct taxes, inc. SSC                                     | 0.0002***   | 0.0000***  |
| Resource direct taxes, excl. SSC                                    | 0.0158**  | 0.0000***  |
| Resource Component of Indirect Taxes                                | 0.0987*   | 0.0321**   |
| <b>V. Total Non-Resource Tax (<math>\Delta \ln</math> NRDT)</b>     |   |  |
| Non-Resource taxes, inc. social contributions                       | 0.0000***   | 0.0000***  |
| Non-Resource taxes, exc. social contributions                       | 0.0000***   | 0.0000***  |
| Non-Resource Component of Indirect Taxes                            | 0.0209**  | 0.0000***  |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of  $t$ -statistics is shown in parentheses.

Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2

Source: Author's estimations

Furthermore, the test results indicate that all our dependent and explanatory variables in panel are stationary. Almost all variables in first differences pass the stationarity test at 1% significance level. Following these results, and based on equation (3.3.3) and approach taken by Sobel and Holcombe (1996), I therefore estimate the transformed log model with OLS to capture the long-run elasticity of tax bases and with fixed-effects model to capture the short-run elasticity of tax bases. I first run OLS regressions without the logged dependent variables, but later include it for time persistence in the dynamics of tax responsiveness estimates using FEM.

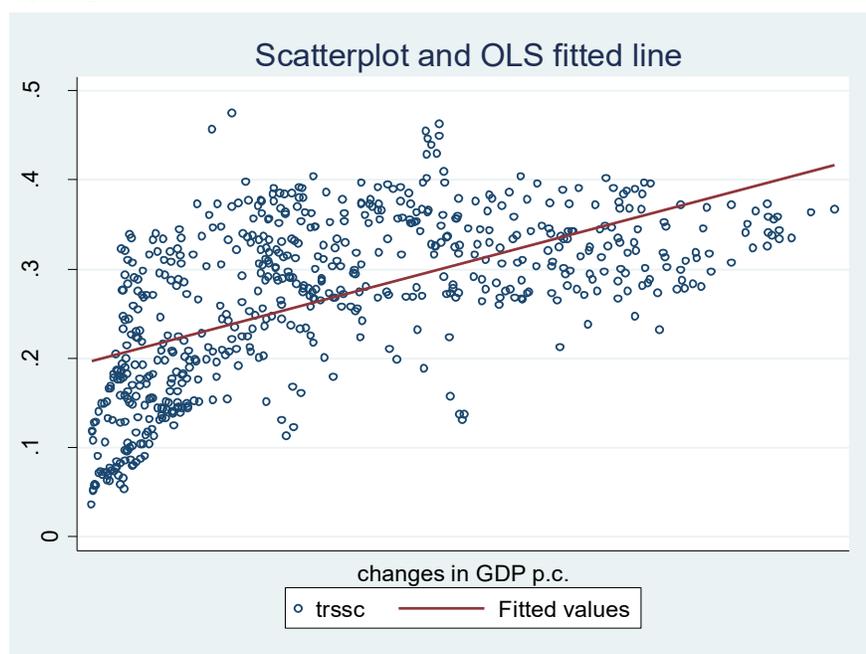
$$TR_i = \alpha + \beta(Y_i) + \varepsilon_i \quad (3.8.2)$$

$$\Delta \ln(TR_{it}) = \alpha + \beta \Delta \ln(Y_{it}) + \varepsilon_{it} \quad (3.8.3)$$

<sup>1</sup> Similar to the main variables of interest, all other explanatory variables also show that they are stationary in their change form.

Figure 3.15 exhibits a scatterplot of tax revenues and GDP per capita growth with OLS fitted line to test the alternative hypothesis that economic growth leads to substantial changes in tax structures and tax mix in transition economies. It shows that significant changes in tax mix is closely related to the GDP per capita growth. This is in line with previous findings that confirm a strong relationship between GDP per capita growth and changes in tax mix in the context of the OECD and developing countries, respectively (Tosun and Abizadeh, 2005; Chelliah, 1989).

The scatterplot of tax revenue and GDP per capita growth indicates that Ordinary-Least Squares model fits the data (Figure 3.15). However, this sort of linear relationship does not always hold, particularly for short-run elasticity estimations. Against this relationship, the log-log<sup>2</sup> model (equation 3.8.3) is used. Here the slope coefficient  $\beta$  measures the elasticity of taxes with respect to GDP per capita growth. This parameter is of considerable interest. The knowledge of constant elasticity model is helpful in determining which type of tax gains or loses importance with respect to changes in GDP per capita growth over short-term.



**Figure 3.13** Scatterplot of tax revenue (including social security) and GDP p.c. growth and OLS fitted line.

The model assumes that the elasticity coefficient between taxes and GDP per capita growth -  $\beta$ , remains constant throughout annual observations. That is, the change<sup>3</sup> in  $\ln$  GDP per capita growth

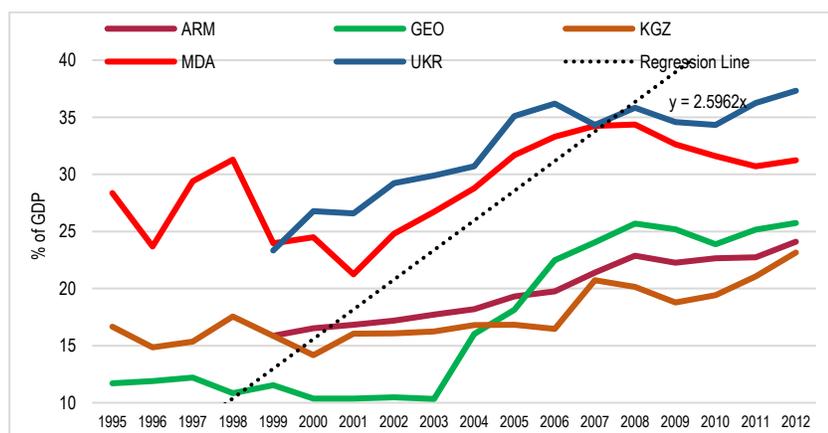
<sup>2</sup> The model uses the natural log:  $\ln$  = natural log (i.e., log to the base of  $e$ , and  $e = 2.718$ ).

<sup>3</sup> The word “change” for the purposes of this research denotes the annual percentage change, or annual (%) **growth rate**:  $[(Y_t - Y_{t-1})/Y_{t-1}]/100$ .  $Y_t$  and  $Y_{t-1}$  are, respectively, the current and previous values of the variable  $Y$ . The notion of annual growth rate is in contrast to the notions of absolute change:  $Y_t - Y_{t-1}$  and relative or proportional change:  $(Y_t - Y_{t-1})/Y_{t-1} = (\frac{Y_t}{Y_{t-1}} - 1)$ .

over changes in  $\ln$  taxes, or tax structures - the elasticity, remains the same no matter at which  $\ln$  GDP per capita growth rate the tax elasticity is measured. The elasticity coefficient is defined as:

$$\left(\frac{dY}{Y}\right) / \left(\frac{dX}{X}\right) = \left[\left(\frac{dY}{dX}\right) \left(\frac{X}{Y}\right)\right] \quad (3.8.4)$$

Figure 3.16 and Figure 3.17 show the regression plots of tax bases in selected CIS countries. The dashed lines show that the least-squares regression line and the error-correction OLS regression line are almost identical for the tax bases for the sample of the selected CIS countries. The slopes of these dashed lines are the mentioned elasticity estimates, which are obtained from equation 3.8.2.



**Figure 3.14** Least-Squares Regression Plot of GDP p.c. Growth and Tax Revenue

Equation 3.8.2 yields almost similar elasticity estimates for tax bases of the CIS countries. The elasticity estimates with the least squares (the slope of 2.5 – Figure 3.16) and error-correction model (the slope of 2.3 – Figure 3.17) for the CIS countries suggests that a 1 % increase in GDP per capita is associated with 2.5 and 2.3% growth in certain tax revenues in the sample used over the long term. The estimated elasticities are constant to changes in how much the tax base varies around per capita GDP growth. The estimated elasticities from equation 3.8.2 quantify only the long-run relationship between the GDP per capita growth and the specific tax base as they trend upward at the same long-run rate of per capita GDP growth. In order to get the estimate of the short-run variability of the tax base, all variables are transformed into stationary form using equation 3.8.3.

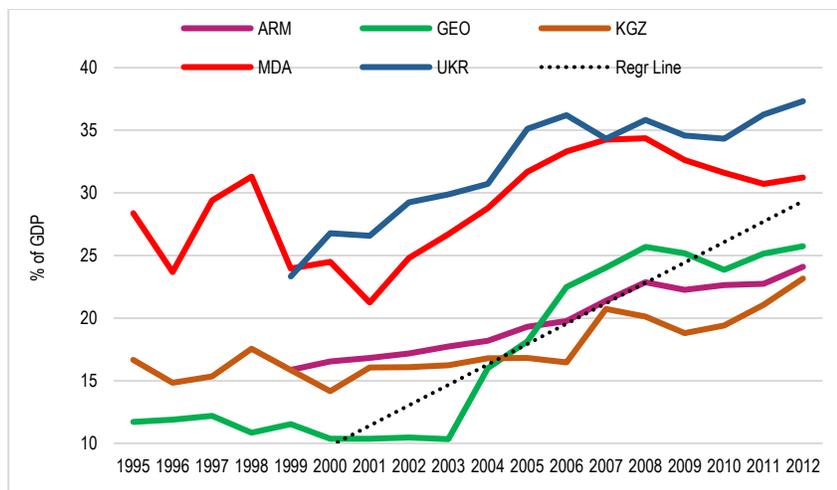


Figure 3.15 Error-Correction Least Squares Regression Plot of GDP p.c. Growth and Tax Revenue

### 3.8.2 Estimates of Tax Base Elasticity

To find out the response of the taxes to changes in the GDP growth, the elasticity of different types of taxes (i.e., responsiveness of taxes) to the changes in GDP per capita growth are estimated. In other words, the annual percentage change in taxes in response to a change in the GDP per capita growth are estimated. Such information is useful in determining the “optimum” tax mix for transitional countries.

Equation 3.8.3 implies that when the log of per capita GDP growth is regressed against the log of a tax base, the  $\beta$  coefficient (tax-elasticity coefficient) shows how rapidly a tax base changes compared to per capita GDP in the long term. In this case, a  $\beta$  coefficient (tax-elasticity coefficient) greater than one would suggest a tax base that grows faster than per capita GDP growth in the short-run, but lesser than one would imply otherwise.

Meanwhile, equation 3.8.3 utilizes the change (difference) in the logs of the variables instead of simply using the variables themselves. In this log-log model, the  $\beta$  coefficient (tax-elasticity coefficient) in equation 3.8.3 directly gauges the cyclical component of different tax base variability for it shows the annual percent change in the tax base that happens because of a one % change in per capita GDP growth. Thus the  $\beta$  coefficient greater than one would suggest that the tax base fluctuates more than the growth rate of per capita GDP over the business cycle in the short-run. The  $\beta$  coefficient less than one would indicate that a tax base fluctuates less than the growth rate of per capita income over the business cycle. The greater advantage of the specification in equation 3.8.3 is that the variables are stationary, as reported in the previous section through performing tests for difference stationarity based on Augmented Dickey-Fuller (ADF) test and Phillips-Perron unit-root test (Table 3.19 above). Therefore, the specification in equation 3.8.3 is not prone to the statistical problems associated with the standard or ordinary levels regression. Furthermore, equation 3.8.3 gauges the short run relationship between the per capita GDP growth and the tax base, a topic of greater importance while analysing policy implications on how taxes fluctuate over the business cycle.

Table 3.20 presents the elasticity estimates from both the long-run models and short-run models of equation 3.8.2 and 3.8.3. The average marginal effects estimated by the OLS estimates are given in the first column, and the next column provides R-squared estimates. Figure 3.18 gives a visual graph of this elasticity through the average marginal effects of per capita GDP growth on taxes.

The third column of Table 3.20 estimates the change form of the model, as specified in equation 3.8.3, and the fourth column shows the estimates of R-squared for this model. A comparison of those columns shows that there are some differences between the estimates of long-run and short-run. The big difference is between the first and third columns, which report the change specifications of the model.

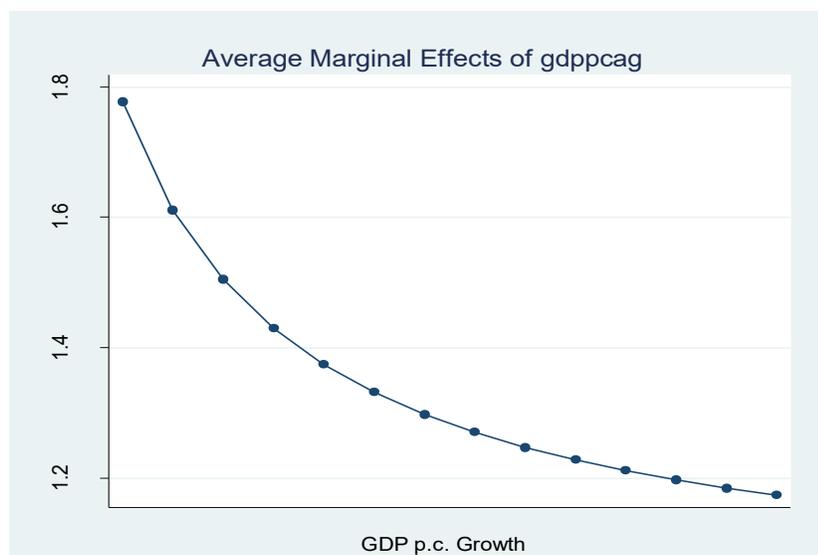
**Table 3.21** Tax Base Elasticity Estimates

| Variables                                   | Estimates of Long-Run Elasticity                       |                 | Estimates of Short-Run Elasticity                                      |                 |
|---|--|-----------------|--|-----------------|
|   | OLS , average marginal effects<br>1) $\beta$ , $ey/ex$ | R-squared<br>2) | Change Model (log-linear model) - $\Delta \ln$<br>3) $\beta$ , $ey/ex$ | R-squared<br>4) |
| <b>I. Total Tax Revenue</b>                 |  |                 |  |                 |
| Tax Revenues, inc. SSC                      | 1.161<br>(0.976)                                       | 0.841           | 1.774<br>(1.410)   | 0.849           |
| Tax Revenues, exc. SSC                      | .773<br>(0.280)  | 0.599           | .981<br>(0.102)  | 0.663           |
| <b>II. Direct Taxes</b>                     |  |                 |  |                 |
| Taxes on income                             | .939<br>(0.342)  | 0.638           | 1.433<br>(0.889)   | 0.668           |
| Taxes on property                           | .986<br>(0.397)  | 0.453           | .980<br>(0.587)  | 0.578           |
| <b>III. Indirect Taxes</b>                  |  |                 |  |                 |
| Taxes on goods and services                 | 1.179<br>(0.205)                                       | 0.649           | 1.332<br>(0.618)   | 0.696           |
| Taxes on int'l trade and transactions       | .985<br>(0.889)  | 0.601           | 1.014<br>(0.918)   | 0.679           |
| Other taxes                                 | 1.059<br>(0.619)                                       | 0.647           | -.674<br>(2.207)   | 0.528           |
| <b>IV. Total Resource Revenue</b>           |  |                 |  |                 |
| Resource direct taxes, inc. SSC             | .972<br>(0.305)  | 0.811           | 1.526<br>(0.934)   | 0.838           |
| Resource direct taxes, excl. SSC            | .957<br>(0.166)  | 0.672           | 1.201<br>(1.145)   | 0.724           |
| Resource Component of Indirect Taxes        | .541<br>(0.044)  | 0.416           | .894<br>(0.109)  | 0.479           |
| <b>V. Total Non-Resource Tax</b>            |  |                 |  |                 |
| Non-Resource tax, inc. social contributions | .963<br>(0.526)  | 0.809           | 1.583<br>(2.504)   | 0.862           |
| Non-Resource tax, exc. social contributions | .949<br>(0.255)  | 0.719           | 1.089<br>(0.279)   | 0.778           |
| Non-Resource Component of Indirect Taxes    | .873<br>(0.118)  | 0.593           | 1.688<br>(3.149)   | 0.687           |

**Note:** Standard errors of elasticity estimates are given in parentheses.

Notes: \*, \*\*, \*\*\* indicate significance at 1%, 5% and 10% respectively. Absolute value of  $t$ -statistics is shown in parentheses. All variables are in in change or difference form and expressed in natural logarithms. Full definitions and sources of data on tax mix or tax categories are given in Appendix B – Table B.1 and the meanings of all abbreviation used as columns' headings are given in Appendix B – Table B.2

Source: Author's estimations



**Figure 3.16** Average marginal effects of per capita GDP growth on tax revenue.

### 3.8.3 Results of Tax Base Elasticity Estimations

The estimates of long-run elasticity demonstrate how a tax base grows over time as GDP per capita growth rate increases, while the estimates of short-run elasticity express how a tax base fluctuates over a business cycle as economic growth fluctuates. The long run elasticity estimates from OLS regression with average marginal effects should be invariant to the cyclical variability of a tax base. As for the short-run elasticity estimates derived from the log-linear regression model, they are invariant to differences in long-run growth.

Table 3.20 presents the estimates of the short-run (the first-difference elasticity or the log change in variables) and the long-run income elasticity for different types of taxes. The big noticeable difference is between the first and third columns, which report the change specifications of the model. The estimates of the short-run elasticity from Column 3 of Table 3.20 indicates the following in particular:

1) Taxes on income, taxes on international trade, resource direct taxes (in both forms: with or without social security), non-resource taxes (including or excluding social security) and non-resource component of indirect taxes have the short-run elasticity coefficient -  $\beta$  greater than one in contrast to their identical estimates of long-run elasticity (Column 3 and Column 1). It shows that the above-mentioned tax bases grow faster than GDP per capita growth in the short-run. In other words, the mentioned tax bases fluctuate more than economic growth over the business cycle.

2) The short-run elasticity coefficient -  $\beta$  of tax revenues (excluding social security), taxes on property, and resource component of indirect taxes is either less than one or does not change its magnitude so much compared to the  $\beta$  coefficients of long-run elasticity. It indicates that tax bases of the mentioned taxes grow slower than economic growth in the short-run. The mentioned tax bases fluctuate less than

economic growth over the business cycle. In line with studies on tax base elasticity (for instance, Groves and Kahn, 1952 and Sobel, 1996), it suggests that tax revenues (excluding social security), taxes on property, and resource component of indirect taxes have all the identical long-run growth potential and the same short-run cyclical variability.

3) Tax revenues (including social security), taxes on income, resource direct taxes (including or excluding social security), resource component of indirect taxes, non-resource tax (including social security) and non-resource component of indirect taxes are much more variable over the business cycle than are taxes on property, taxes on good and services, taxes on international trade. In other words, over the business cycle, the former types of taxes vary significantly more than the latter group of taxes.

4) The values of the short-run elasticity coefficients for taxes on property and other taxes are less than their similar long-run elasticity estimates, suggesting that the tax bases of these taxes grow slower than GDP per capita growth rate in the short-run.

5) The short-run elasticities estimates for all types of taxes (except other taxes) have higher R-squared values, suggesting that the log change (log-linear) regression model better explain variation in tax bases in our sample.

The results in Table 3.20 demonstrate that tax bases with a higher elasticity estimates in the short run - tax revenues (including social security), taxes on income, resource direct taxes (including social security), non-resource taxes (including social security) and non-resource component of indirect taxes fluctuate more over the business cycle. It suggests that based upon the log-linear model estimates of the short run elasticities, the most cyclically variable of the tax bases is tax revenues (including social security), followed by non-resource component of indirect taxes.

The least cyclic of the tax bases is the category of 'other taxes', which has a negative estimated coefficient in the short run, suggesting it moves counter cyclically. So, a negative elasticity estimates of the category 'other taxes' points out that the base of 'other taxes' may move opposite to the business cycle, for instance, expanding or growing during the stagnations and contracting or dropping during booms.

The main policy implications of differences between the estimated short-run and long-run elasticities would be policy-makers' choice between boosting economic growth and fluctuation of tax bases. The estimates of tax base elasticity can act as a policy tool for governments in transitional countries to lessen tax revenue fluctuation or variability to balance it with objectives for long-run growth. For instance, as per the estimations, taxes on goods and services have a higher long-run growth rate and a lower cyclical variability than taxes on income.

### 3.9 Summary and Conclusion

In this chapter, I have used data for 33 transitional countries for the 1991-2015 period to investigate the relationship between per capita GDP growth and tax revenue. The fundamental conclusion of this chapter is that per capita GDP growth leads to changes in the composition of taxes and the tax structure in transitional countries. These changes are mostly due to changes in the shares of different categories of tax in total tax revenue or the tax mix.

The results of the baseline estimations corroborated by robustness tests, alternative estimations and tax elasticity estimations confirm the hypotheses proposed and answer the research questions. The results suggest that, first, economic growth in our sample of transition countries in general is associated with an increase in total tax revenue-to-GDP ratio, irrespective when social security is taken into account or not. This supports the first hypothesis and conforms to prior expectations. Second, economic growth triggers significant changes in the tax structures of transition countries during the course of economic growth. This finding supports the second hypothesis. That is, in the short-run, some tax bases fluctuate more than economic growth. In particular, taxes on goods and services, on international trade, on income, resource direct taxes and non-resource component of indirect taxes change faster than annual rate of GDP per capita growth in the short-term. In the long-run however, tax revenues in general and taxes on goods and services are more elastic or changeable with higher rates of fluctuation in response to GDP per capita growth. Tax bases of property taxes change slower than GDP per capita growth both in the short- and long-run.

The empirical results of this paper are in line with economic theory and previous studies. The results confirm the general assertion that there exists a positive and significant relationship between GDP per capita growth and tax revenues. The results of our empirical analysis indicate that per capita GDP growth has a statistically significant positive effect on tax revenue in general. In particular, the results confirm that GDP per capita growth also has a strong positive influence on the disaggregated variables: share of taxes on incomes, profits and capital gains, and taxes on international trade, plus resource direct taxes, including or excluding SSC and the share of non-resource indirect taxes. Thus, in the proposed model a higher growth rate of GDP per capita is significantly associated with a higher share of tax revenues in general, as well as with taxes on income and on international trade, resource direct taxes, resource indirect taxes and non-resource indirect taxes. The results of the model suggest that the change in the relative importance of different taxes over time, along with economic growth, opens avenues for governments to introduce new tax initiatives, leading to changes in the tax mix and tax structure.

However, I found that there are substantial differences in the impact of GDP per capita growth on different categories of tax. I have not found statistical significance in all tax categories. For instance, I have not found significant response to GDP per capita growth by property taxes and non-resource direct taxes. GDP per capita growth seems to affect positively the composition of 'other' taxes, which is not statistically significant. This suggests that the composition of taxes changes dynamically because of variations in GDP per capita growth.

When foreign aid becomes volatile and less predictable than domestic tax revenue by a wide margin, tax revenue collected - especially by lower-middle income transitional countries - can spur government spending on its priorities, including social programmes, education, health care, public investment programmes, infrastructure and general development.

## Chapter 4

### 4 PFM Architecture in Tajikistan: International Reform Advice and Domestic Reform Practice

#### 4.1 Introduction: Public Financial Management (PFM)

International organizations (IOs) like the World Bank (WB) and the International Monetary Fund (IMF) have recommended “best practices” in Public Financial Management (PFM) architecture over the years. Has this advice been adopted in actual reform efforts in Central Asian governments? If so, to what extent? If not, why not? This study explores what has been advised and what is being done, with reference to a specific country case study, Tajikistan.

The recent world economic downturn has emphasized the significance of states developing robust systems for managing their finances. With that, what may represent “best practice” or “good practice” in the design of such systems has changed, too. Thus, knowledge of public financial management (PFM)<sup>4</sup> and how fiscal institutions work gains special importance in well designed and effective implementation of fiscal policies.

The scale of foreign aid to Tajikistan reached US\$ 420.29 million in 2015 (OECD/UNDP, 2016: 150). Over the past ten years IOs, including the World Bank and the IMF, in collaboration with the government of Tajikistan, has invested in undertaking a wide selection of Public Financial Management (PFM) reform projects. The IOs have, and continue to make, a large impact on PFM reforms in Tajikistan.

The World Bank Group has been a major player in implementing activities, designed by the PFM Strategy and the respective Action Plans. It has ran 85 lending and grant-funded projects in Tajikistan so far, amounting almost US\$ 843 million since 1996 (World Bank, 2016), which is one of the largest in the context of transition countries. Its active portfolio in Tajikistan as of 2016 consists of 23 projects with net commitments of US\$ 236 million, 13 % of which are related to public sector reform and public financial management (World Bank, 2016). This is one reason why the focus of this study is on Tajikistan. Another is connected to the scarcity of empirical research on PFM in general, and aid effectiveness in Tajikistan in particular, compared to other transition countries. Also, Tajikistan experienced a five-year civil conflict in 1992-97, which affected its transition phase to more market dominated systems negatively in comparison to other transition countries. Lastly, as one of the poorest

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<sup>4</sup> For the purposes of this research, two definitions of PFM are employed. First, the notion of PFM is utilized in the broader sense as “concerned with the laws, organizations, systems and procedures available to governments wanting to secure and use resources effectively, efficiently and transparently. While PFM encompasses taxes and other government revenue, borrowing and debt management, its main focus is expenditure management, especially in the context of public budgeting” (Allen et al., 2013). Second, PFM in the narrower sense is “concerned with how governments manage the budget in its established phases— formulation, approval, and execution. It deals with the set of processes and procedures that cover all aspects of expenditure management in government” (Cangiano et al., 2013).

countries of the former Soviet Union, Tajikistan is reasonably representative of the other lower-middle income transition economies in general.

PFM has become an instrumental and overarching concept in governance, public administration reforms, and development studies. International Financial Institutions' (IFIs) portfolio of support for enhancing capacity in PFM reform has grown substantially, too, particularly since the late 1990s. Thus, much of the impetus for this research comes from the question of why, despite a constant flow of financial resources allocated to the PFM projects, the outcomes of implementation do not appear to live up to expectations. When policies to strengthen PFM are adopted, they are expected to have results, but not all of them implemented. Sometimes, they simply do not work or are undermined, quickly going off track in the face of strong antagonism or disagreement, or are implemented with negative consequences. In addition, financial resources and human capacity can limit the impact of reforms. Thus, a motivation for this research is to learn what practical development approaches can work better in the context of PFM reforms in developing countries.

Achieving the 2030 Sustainable Development Goals will put significant demands on public budgets in many developing countries. In addition to public funds, resource commitments and net aid flows of international organizations and multilateral institutions channelled through official development assistance (ODA) are also pivotal. Resource commitments of multilateral institutions and international agencies increased by two and a half time between 2005 and 2014. In the Addis Ababa Action Agenda (AAAA), ODA providers came up with a new agenda for financing sustainable development that brings together all financial flows and international and local policies with socio-economic and environmental policies. In particular, the ODA providers reiterated their ODA commitments to offer 0.7% of their gross national income (GNI) in ODA to developing countries (UN, 2016). The World Bank Group and the International Monetary Fund (IMF) are two international financial institutions (IFIs) staying at the top in the list of the aid providers and the budget reforms promoters across developing countries. Overall, the World Bank Group's net flows of financial aid channeled through the Official Development Assistance (ODA) quadrupled between 2005 and 2014 (UN, 2016: 197).

PFM is a vital and an indispensable part of the development process. Solid and well-built PFM supports oversight, accountability and effectiveness in the management of public finances and delivery of services. Moreover, well-founded PFM systems are cardinal to the proper mobilization, utilization and effectiveness of donors' aid.

In this context, the World Bank assists many countries in enhancing their public financial management in the areas of budget preparation, budget execution and treasury management, fiscal reporting, internal and external audit, debt management, and other budgetary processes. A brief history of the international aid agencies' engagement in budget and PFM reforms in developing countries, and analysis of their recent support for PFM projects will be helpful for better understanding of the rational of donors.

## *History*

While budget reforms in developed countries trace their history back to over a century or more ago, discussions about budgeting in developing countries originated from the 1950s onwards (De Renzio, 2013). As for the history of the World Bank's involvement in PFM issues in developing countries, it goes back to the 1990s. The World Bank supported PFM systems back then through "Analytical and Advisory Activities (AAA) (e.g. public expenditure reviews [PERs]), technical assistance, and investment and program lending, often in cooperation with partners such as IMF and DFID" (Wescott, 2008: 20). PERs (formerly Public Investment Reviews) used to evaluate both investment and current expenditures. Wescott (2008) found 18 issues of PERs in the 1990s with focus on topics of fiscal policy, budget preparations (policy priorities) and some degree of budget execution (operational management) analysis in different developing countries. The first AAA on Cambodia in the early and mid-90s addressed various fiscal policy issues such as reducing deficits, reprioritizing expenditure, and increasing tax revenues, and contained only a short discussion of financial management issues such as expenditure control systems (World Bank, 1994). As time went by, the quantity of PERs rose from 68 (17 per year) from 1992-2002 to 93 (over 23 annually) in 2003-2005 (Wescott, 2008).

An important new milestone was 2001. It was the year when the World Bank, in partnership with the European Commission, International Monetary Fund, and the governments of France, Norway, Switzerland, and the United Kingdom, started the Public Expenditure and Financial Accountability (PEFA) Program as a main tool to assess and reform PFM across countries. The donors supported PEFA through four phases of implementation. From the time of the initial assessments in 2005, PEFA has been used more than 500 times in 150 countries. It has transformed into the benchmark and accepted standard for PFM assessments with a pool of data containing over 40,000 different performance scores.

PEFA launched a benchmark methodology and reference tool for PFM analytical assessments. It was tried out between 2001 and 2005 to align the needs of government and their development partners for a common analytical tool. The initial openly accessible version of PEFA was set up in 2005. The same year PEFA reports covering Afghanistan and Zambia were prepared. PEFA metrics to evaluate the performance of PFM system are viewed positively by some scholars (Fukuyama, 2015; Boulding, Mackie, Ronsholt and Sharples, 2012). The PEFA framework is considered as one of the best-known evaluation mechanisms (Andrews et al., 2014). With its extensive coverage of PFM processes, the PEFA indicators are concise and well structured: "[PEFA] metrics typically divide the budget process into several components, such as: (1) a country's ability to understand its fiscal challenges; (2) its capacity to develop a plan for fiscal consolidation and (3) its actual implementation of these plans." (Fukuyama, 2015: 5).

However, indicators of PEFA have limitations as well. For instance, critics of PEFA believe that its indicators are far from being dynamic, they are completely static, and cover simply rudimentary stages

of PFM development (Andrews, 2008). The fundamental flaw and underlying weakness in PEFA indicators is seen in their narrow concentration on the technical dimensions of PFM reform, generally disregarding the particular local environment and institutional dynamics of budget systems (Ajam and Fourie, 2016). Not only PEFA assessments are donor-driven, but also, they are perceived as a form of subtle integration of a value system, which is founded on the principles used in industrialized countries, plus, PEFA indicators are ineffective and malformed diagnostic tools suitable merely for writing PFM action plans (Allen, 2009).

### *PFM Projects*

Since 2010, international agencies mobilized and provided nearly US\$ 16 billion to support strengthening and streamlining of public financial management in the 81 participating countries (OECD/UNDP, 2016: 64). Many developing countries utilized this support to analyse their PFM systems and implement PFM action plans to strengthen PFM processes. Some countries, like Zimbabwe, improved their PFM quality independently (OECD/UNDP, 2016). The World Bank Group has managed 1,245 projects on the theme of public expenditure, financial management and procurement, 170 of which are active now<sup>5</sup>. The World Bank's commitment to public expenditure, financial management and procurement increased almost two-fold: from US\$ 4 billion in 2005 to US\$ 7 billion in 2016.

### *Assessment*

However, researchers on PFM effectiveness point out that even though international agencies' support of PFM reforms has been positively and significantly associated with better country systems, the effectiveness of international agencies' aid in the PFM area is ambivalent (De Renzio, Andrews and Mills, 2011). The other analysis on PFM effectiveness, which is based on the World Bank's Country Policy and Institutional Assessment (CPIA) database, contends that the "recent data from the World Bank show virtually no improvement in the performance of PFM systems in the last ten years" (Vani, 2012: PFM Blog). Some scholars argue that implementation of PFM reform by development partners followed a rather sluggish pace, did not live up to expectations, and provided little solutions in structurally fixing faulty and distorted budgetary processes in the long run:

"Technical assistance provided by the World Bank and the IMF was much more effective in providing short-term solutions that dealt with immediate issues (such as setting up a basic financial reporting system or a procedure to mitigate expenditure arrears) than with deeply embedded structural problems (such as a fundamentally flawed budget process). The subsequent attempts to transfer and implant industrial country systems to developing economies, whether by the Bretton Woods institutions or others, were generally much slower to work and less successful than expected" (Allen, Hemming and Potter, 2013: 6).

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<sup>5</sup> [http://projects.worldbank.org/search?lang=en&searchTerm=&mjsectorcode\\_exact=BX](http://projects.worldbank.org/search?lang=en&searchTerm=&mjsectorcode_exact=BX)

Furthermore, an IMF paper acknowledges that improvements in PFM modernization were lopsided and inconsistent:

“despite sustained efforts in any countries [...] to undertake PFM reforms, progress has been uneven. [...] Reforms of PFM systems have been affected by corruption, extended civil conflict and the evasion of formal rules, and external scrutiny has stagnated” (IMF, 2007: 8).

The limited outcomes and achievements of PFM reforms is a topic reflected in the works of researchers. Particularly, they note that after the 2008 global financial crisis, fiscal strains reduced the quality of budgetary and public financial management in many developing countries, leading in the end to a more centralized decision making and top-down budgeting method (Alesina, Ardagna and Trebbi, 2006; Randma-Liiv and Bouckaert, 2016). Some scholars point to the fact that typically, development partners drive PFM reforms and this does not result in amelioration or enhancement of PFM systems:

“Many developing countries [...] are forced to comply with process requirements in PEFA and other assessments because of pressure from donors (even if such compliance does not yield improved PFM because reform do not ‘fit’ local contexts)” (Andrews et al., 2014: 12).

The World Bank’s CPIA has an indicator that is based on the scores for the quality of budgetary and financial management. Scores stretch from 1.0 to 6.0, in half-point (0.5) increments – the higher the score, the more reliable the country’s budget and financial management system is held to be. The World Bank’s CPIA evaluates the country against the following three criteria:

- A comprehensive and credible budget, linked to policy priorities
- Effective financial management systems to ensure that the budget is implemented as intended in a controlled and predictable way
- Timely and accurate accounting and fiscal reporting, including audited public account and effective arrangements for follow-up.

Overall, little progress has been achieved in improving the quality of budgetary and public financial management since 2010, with some notable exceptions (Table 4.1). “The quality of budgetary and public financial management for most assessed countries (87%) continues to fall within the “moderate” category” (OECD/UNDP, 2016: 61). The results in Table 4.1 demonstrate that many countries still have to enhance the above-mentioned criteria: namely, making their budgets more comprehensive and credible, linking their budgets effectively to policy priorities; executing expenditure in a controlled and predictable way; and subjecting budgets to timely and accurate accounting, fiscal reporting and public auditing.

|                                  | Score | 2010                |    | 2015                |    |
|----------------------------------|-------|---------------------|----|---------------------|----|
|                                  |       | Number of countries | %  | Number of countries | %  |
| <b>Strong</b>                    | 4.5   | 2                   | 4  | 0                   | 0  |
|                                  | 4.0   | 7                   | 12 | 7                   | 12 |
| <b>Moderate</b>                  | 3.5   | 23                  | 40 | 21                  | 35 |
|                                  | 3.0   | 13                  | 23 | 21                  | 35 |
|                                  | 2.5   | 8                   | 14 | 10                  | 17 |
|                                  | 2.0   | 4                   | 7  | 0                   | 0  |
| <b>Weak</b>                      | 1.5   | 0                   | 0  | 1                   | 2  |
| <b>Total countries assessed:</b> |       | 57                  |    | 60                  |    |

**Table 4.1** Quality of budgetary and public financial management (CPIA 13).

*Source:* OECD/UNDP (2016). *Note:* The OECD/UNDP (2016) assessment is based on data from the World Bank (2016). CPIA 13 is the assessment that focuses on the quality of budgetary and financial management only with the lowest score equal to 1 and highest score to 6 (i.e. 1=low to 6=high).

The results of CPIA assessment show that between the baseline year - 2010 and 2015, eleven countries (18%) made progress in strengthening their budgetary and PFM systems. However, there was little overall change in 35 countries (58%). Also, 14 countries (23%) faced a deterioration in the quality of public financial management.

But what is the quality of budgetary and public financial management reform if we focus on a more disaggregated level and narrower geographic scope? Tajikistan, a mountainous Central Asian country with its economy in transition, presents a particularly complex environment for building and strengthening the public financial management systems. In such an environment, reform of public financial management became a principal area of not only local government, but also international organizations' engagement. The World Bank, the International Monetary Fund, UK Department for International Development, Delegation of European Union and other donors are engaged in supporting PFM reforms in Tajikistan.

The *key objectives* of this research essay are: 1) to describe the content of the advice coming from international organizations on PFM in Tajikistan; 2) to compare the implementation of PFM initiatives; and 3) to assess differences in capacity. The *ultimate goal* is to document PFM reform in order to contribute to building accountable states, increasing capacity of public officials, and empowering citizens to promote sustainable PFM system and economic growth in Central Asia, drawing on the experience of Tajikistan.

As PFM is interdisciplinary, drawing from such fields as economics, public budgeting, public policy and administration, political science, accounting and auditing, etc., there is no single theory that covers all aspects that PFM entails. Therefore, various theoretical frameworks and concepts of the above-mentioned fields of study help explain different PFM phenomena. To analyze the role of the IFIs in policy shaping, the core of theoretical justifications are drawn from the conceptual frameworks of public policy, public administration and management (PAM), applied political economy analysis

(PEA), economics of public sector and the New Public Management (NPM). In addition, this is an observational study relying on data obtained on real-world political and socio-economic behaviour, and policy documents.

To analyse what has been advised and what has been implemented in PFM reforms in Tajikistan, this chapter consists of the following sections. Section 4.2 reviews the related literature. First, it analyses the fundamental streams of literature on public sector reform in developing countries, and then, explains the role of international organizations in PFM reform. Section 4.3 summarizes the scope of Tajikistan's transition after the collapse of the Soviet Union and describes the salient features of sluggish PFM reform in Tajikistan. It outlines the budget process and budget practice in Tajikistan, and then presents the recent trends of its national budget and advice by international organizations.

Section 4.4 discusses the methodology utilized in this research, namely, case study, survey, semi-structured interviews and individual assessment of PFM processes by PEFA methodology. Section 4.5 analyses implementation of recent PFM reform. It presents the results of a survey, data for which were collected through semi-structured interviews, and then explains and interprets the findings of PEFA assessment. Section 4.6 provides a summary and concluding remarks.

## **4.2 Literature Review**

This study is the first assessment of PFM reform advice by external actors and international organizations, implementation and effectiveness of PFM reform in the context of a lower-medium income transition country – Tajikistan from the public policy and public administration and management (PAM) perspectives. In addition, the study is the first one which uses the PEFA diagnostic tool in analysis of PFM reform advice by international organizations. While evaluating what has been accomplished in PFM reform, the research identifies issues and challenges that reform encountered, along with flawed design and weak implementation of some PFM initiatives. The research is the first study and the first microanalysis of the PFM reform in Tajikistan, which allows comparison of a country's experiences in reform with expectations. It provides a better understanding of the issues associated with PFM reform implementation in Tajikistan and informs public policy analysis.

### **4.2.1 Literature on Reform of Public Sector Management**

Brinkerhoff and Brinkerhoff (2015) argue that approach of international actors to reform of public sector management in developing countries “have focused largely on a combination of technical efficiency enhancing reforms based on neoliberal market models and New Public Management (NPM) principles and tools” (p. 222). The authors observe four wide streams of the contemporary literature for

effective public sector reforms in developing countries, highlighting: 1) political economy, institutions, and incentives; 2) public management function, not form; 3) iterative and adaptive reform processes; and 4) individual and collective agency. They note that these four strands reflect post-NPM public sector reform efforts in the developing world.

Political economy, institutions, and incentives are reflected in the notion that politics and institutions are pivotal in public sector reforms (North et al, 2009; Acemoglu and Robinson, 2012; and Fukuyama, 2011). The ‘public management function, not form’ stream of literature focuses not only on the studies of duplicating the public sector reform processes in industrialized countries, but rather more profoundly on “good governance” and achievable solutions in developing countries (Andrews, 2013; Grindle, 2007) or as the authors phrase it “institutional isomorphism” to emphasize the main roles of public management.

Several authors in this stream point out that under the influence of external actors, public service reform in developing countries at times can lead to inefficiency, creating the impression and appearance of reforms but in reality producing contradictory outcomes. External pressures can prompt decision-makers in developing countries to adopt the visible symbols of reforms under the veneer of restructuring civil service, computerized budgeting, and competitive procurement procedure, without actually implementing them (Krause, 2013). Furthermore, aid agencies can be a cause of program incoherence, leading sometimes to a less coordinated and even contradictory decentralization reform in the same country (Smoke, 2015). Often the World Bank reports its evaluation findings about the operational success in public sector reform, but these reports are not necessarily in parallel with overall progress in actual public sector performance (Cummings, 2015). In addition, aid agencies hardly ever admit the constant strain between the issues of reform ownership and political will of authorities, or tension between problem identification and best practice solution of reform actors (Brinkerhoff and Brinkerhoff, 2015).

The third stream of literature, reflected mainly by the World Bank publications, explores iterative and adaptive reform processes or quests for more achievable and successful public sector reform design and implementation (Blum et al., 2012; Bunse and Fritz, 2012; World Bank, 2012). This strand of literature seeks solutions to the issues of best design, smooth, effective and prosperous implementation of public sector reform by international organizations. The search of this stream is further refined by attempts to find answers to questions like how to clarify in advance reform’s objectives and strategies of implementation, who can clarify them, how to specify the success, and what would be the indicators of successful implementation. Usually, such clarifications and specifications of public sector reforms involve aid agencies and country actors going through series of consultations and an iterative process of problem identification and testing of solutions, often supported by external facilitators. This iterative process is, in other words, called the “problem driven iterative adaptation (PDIA)”, a phrase coined by Andrews (2013). In fact, the World Bank has broadly endorsed the problem-solving approach or PDIA as the central strategy for its public sector reform programs in developing countries and, utilizes this approach in its projects design and implementation.

Finally, the last strand of literature focuses on individual and collective agency and centers on the people, actors and experts engaged in supporting, implementing, and benefitting from reforms (Chabbot, 2014). This stream also deals with ownership of reform, commitment, reform champions, and collective action.

Public financial management is situated in this last stream. The recent epoch of fiscal crisis and scarcity of financial resources essential to public administration and effective public service has bolstered the position of public financial management in comparison to other public management functions (Randma-Liiv and Bouckaert, 2016). Enhancing the awareness and responsiveness of political and administrative leaders to public financial management issues, and making these issues more transparent, can in turn improve government accountability. Research on public financial management provides profound and illuminating insights on management of public organizations, adapting them to changing environment and role of administrative expertise in democratic institutions (Kioko et al., 2011).

The notion and anticipation that reform in the PFM domain in developing and transition countries should bring in an improved application and distribution of public finances similar to ‘success stories’ that industrialized countries have derived from such reforms, often results in growing pressure by external actors in PFM reform of less developed countries:

“Developing and transition economy countries are under increasing pressure to adopt advanced financial management practices that have been applied in developed economies. Examples are to switch from input to output budgeting, from line item to programme budgeting, from cash to accrual accounting using the International Public Sector Accounting Standards (IPSAS) or some derivate of them. That pressure comes from multilateral and bilateral aid organizations, from consultants, from the accountancy profession and sometimes from internally-generated initiatives.” (Hepworth, 2015: 251).

Hepworth (2015) also quotes the often deteriorating or unchanged World Bank’s CPIA rankings as a basis for his arguments that PFM systems in developing countries barely improved over the last ten years and PEFA scores by and large suggest disappointing results. According to him, the most prominent instances of a failed PFM approach can be found in the African countries. The failed approach often raises grave doubts over external pressure making PFM reform successful:

“The uncomfortable truth...is that the old consensus on budget reform (stemming from the 1990s), based broadly on the idea that developing countries should follow the approach to reform followed in advanced countries has proved largely unsuccessful” (Hepworth, 2015: 251).

#### **4.2.2 Role of International Organizations in Strengthening PFM Systems**

Despite the critical and increasing importance of financial resources and PFM in the workings of any state these days, academic research on this subject is thin (Kioko et al. 2011). Apart from some notable work (Hou, 2006; Hou and Moynihan, 2008; Krause and Douglas, 2005; Thompson and Gates, 2007), research on PFM's traditional subjects are found only rarely in the fields of public policy or public administration and management (PAM). PAM can be essentially enriched by studies in PFM field as "PFM offers analytical tools, measurement strategies, observable management practices, conceptual frameworks, and other tools of substantial value to future Public Administration and Management research" (Kioko et al. 2001: 120). In addition, traditional PFM topics can benefit from the concepts and theoretical framework of public administration and management, namely administrative expertise in democratic institutions, management of public organizations to accomplish the best results and adaptation of public organizations to their changing environment (Kioko et al., 2011). This chapter fills the gap in the academic literature, to a certain extent, by utilizing PFM analytical tools and conceptual frameworks, including PFM standardized and non-standardized analytical assessment to inform public policy, public administration and management's classic and contemporary issues.

International organizations provide a significant value, input and financial resources to improving governance, and social welfare and contributing to stronger growth in many developing and transitional countries. Overall, through the involvement and participation of donors in the ODA channels (not including private aid) US\$ 103.6 billion was invested to developing countries in 2006 and the amount of foreign aid to developing world reached more than US\$ 2.3 trillion (calculated by 2006 dollars) over the past 50 years (Easterly and Pfutze, 2008). Some portion of aid by international organizations to developing countries comes in the form of loans at both market rates and under preferential conditions. Technical assistance is offered too. As a rule, loans and technical assistance of international organizations are assigned for specific projects, funding of which cannot be secured through private sector and implementing of which do not seem possible without technical assistance from external actors (Gilbert and Vines, 2000; Metzger, 2002). International organizations make impressive contributions to development, but whether that contribution brings much needed progress in the field of PFM is a question to be explored.

The controversies over the aid effectiveness in the past and in the future are extensive (Sachs, 2005; Easterly, 2007). While design and implementation of programs and projects run by international organizations is by and large well-developed, the operational activities of international organizations are "by no means devoid of deficiencies in effectiveness and bureaucratic pathologies" (Rittberger et al., 2012: 221). Reforms in many developing and transitional countries in the field of PFM are often driven by international financial institutions (IFIs) such as the World Bank (WB) and the International Monetary Fund (IMF) or regional development banks such as the Asian Development Bank or African Development Bank. While some authors argue that external agents and IFIs bring in powerful neoliberal influence over development agendas (Rodrik, 2007), others suggest that overall,

international organizations have stimulated more modern managerial solutions and have been important leaders (Kenny, 2008).

Sceptics however, contend that policies and practices of international organizations are largely influenced by rich countries (Birdsall, 2008) and IFIs are normally biased towards dominating and exerting influence over reform design and implementation (Grindle, 2004; Andrews, 2010; Andrews, 2013a). This sort of bias and influence: “comes, for example, through external identification of what the right rules are, and through financing, facilitation, and sometimes even implementation of interventions intended to introduce these rules” (Andrews, 2013a: 4). In addition, there are arguments that “institutional reform promoted by multilateral organizations such as the World Bank, the International Monetary Fund, or the World Trade Organization (WTO) is heavily biased toward a best-practice model. It presumes it is possible to determine a unique set of appropriate institutional arrangements *ex ante*, and views convergence toward those arrangements as inherently desirable” (Rodrik, 2008: 100). Most of the time, agencies in developing countries have been bound by their needs to accept such influence for many years (Andrews, Pritchett and Woolcock, 2013). It is also contended that a strong organizational culture and internal bureaucratic struggle of international organizations over the material resources has lasting detrimental effects on international organizations’ programs development, effectiveness of implementation and ability to efficiently engage in reform (Weaver, 2008).

International organizations face key issues: the imposition of one-sided models of development, assessing success or failure, and trust in local authorities. On one hand, Andrews (2013b) found that international organizations exert a growing influence on government structures in developing countries, but impose a common model on these countries, which is supported by sets of indicators determining ‘right’ or ‘not acceptable’ rules of the game in governments in developing countries. On the other hand, reviewing a progress toward the goals of 2005 Paris Declaration on Aid Effectiveness, Knack (2013) discovered that recipient country systems can be employed by donors and international organizations only under the following three factors or frameworks. First, confidence by donors that they will gain adequate benefits from the amount of aid invested in developing countries. Second, the reliability and quality of the recipient country systems, measured by country corruption indicators; Finally, donors’ trust in effectiveness of aid and donors’ risk tolerance, measured by public support for aid provision in donor countries. Most likely one of the strategies to increase trust and confidence of international organizations and recipient countries in the delivery of aid would be making the rules of the game multilateral, involve all relevant stakeholders from the international organizations’ side and reduce corruption to make recipient country systems less opaque.

The agenda of public sector reforms (PSR) in developing countries has been pivotal in development. PSR investment lending has increased over the years. For instance, 11% of all World Bank loans provided for developing countries between 1990 and 2006 and 14.5% of them provided after 1999 involved a major public sector reform component (WB, 2008: 21). In this public sector reform agenda, PFM has a predominant role. PFM has been a major component in 81% (or 379 projects) of PSR

projects run by the World Bank in the developing countries (WB, 2008: 28). Meantime, the World Bank's overall ratio of development policy loans (DPLs) in total commitments nearly doubled in FY 2009 to 40% compared with around 25% in previous years (WB, 2009). In addition, ODA channelled through country PFM systems increased from 40% in 2005 when the Paris Declaration on Aid Effectiveness was signed, to 48% in 2010, short of the 55% target (OECD, 2011). So, in light of rising the ODA through country PFM systems, it is likely to anticipate that development aid and involvement of international organizations in reforming public sector, primarily through investing to reforming PFM will grow.

For countries dependant on aid, the topics of effective aid management and improving the PFM are closely intertwined. While creating a well-defined program for building robust country PFM systems is the necessary foundation for improving aid effectiveness, some authors point out that effectiveness of donors' aid in improving the PFM systems in developing countries is negligible and reforms in financial management, which is an important component of the public sector reform, have only limited positive effects (De Renzio et al., 2011).

Andrews (2013b) also argues that the positive effects of donors' aid lasts only for a short period or are insignificant. In addition, often, international actors supporting PFM reform take a lead role in developing action plans and strategies to strengthen budget institutions within a very optimistic time framework to implement it (Allen, 2013). Consequently, the need to improve aid management and making it more effective should be considered as a vital component of enhancing PFM system in developing countries.

Financial resources attracted through aid programs make considerable contribution to completeness or entirety of public finances in many developing countries and accountability for aid funds is crucial for PFM reform. Allan (2013) argues that prioritizing external accountability makes the recipient governments less publicly accountable to their own citizens or the communities they serve. He asserts that "donors, however, have universally taken the view that use of their resources for recipient country programs must be held to account, first by their government and public and only secondarily by the recipient country's constituency" (Allan W., 2013: 540). Echoing almost the same idea, it is reported that international organizations can undermine government capacity by delivering aid using their own reporting, procurement and other procedures (Brautigam and Knack, 2004). There are arguments that advice coming from international organizations can inadvertently weaken governance in developing countries, as the aid considered by their governments as a source of revenue, decreasing their dependence on domestic taxpayers for collecting revenues (Collier, 2006; Knack, 2009; Moore, 1998). Lack of coordination amongst donor agencies themselves and between donor agencies and recipient governments, mainly because of the donors' application of the national or their own administrative procedures and requirements, also makes aid less effective (Allan, 2013).

The 2005 Paris Declaration (PD) on Aid Effectiveness<sup>6</sup> advocates the widespread use of PFM systems and PFM diagnostic tools to evaluate effectiveness of recipient country systems and improve aid effectiveness. In contrast to this, there is also an argument that recipient country systems are full of deficiencies, and the country systems are to blame for ineffective aid delivery, not donors' practice, and thus, strengthening PFM systems cannot enhance aid effectiveness (Knack, Rogers and Eubank, 2011). Also, considering that only 1 out of 13 quantitative targets towards achieving main objectives of the PD has been fully met in 2010 (OECD, 2011), a question may arise whether PFM systems and PFM diagnostic tools are efficient tools to improve aid effectiveness. But the development aid and PFM literature underlines the fact that occurrence of successful reform of PFM systems requires longer time periods and entails strong political will, overcoming technical challenges and resistance of top officials who otherwise benefit from maintaining opaque systems and procedures in recipient countries (Allen, 2009; OECD, 2011; WB, 2008). Therefore, use of PFM systems and PFM diagnostic instruments is still a powerful tool to improve aid effectiveness, although efforts should be made to strengthen PFM systems and overcome some PFM reform challenges, which takes time.

Marshall (2008) frames all principal critiques of the World Bank and categorizes them into five main concerns. First, the author notes overall function and structure of the World Bank, including its US domination in decision-making, undemocratic governance and its size, scope and geography of its activities. Second, she adds the World Bank's economic ideology and conformity to narrow economic models in its activities. Third, she identifies the effect of the WB policies on environment, health services, water and energy supply, displacement of local population and mismanagement of macroeconomic policy bringing in developing world undesired economic results and debt burdens. Forth, the author discusses apprehension about the World Bank's ethics, integrity of its staff, and effectiveness of its activities against corruption and lack of activities supporting human rights. Finally, Marshall (2008) expresses the conundrum of the World Bank itself, as it seems as an institution beyond understanding and its operations are hard to fathom.

This section presented a background to some basic debates in the literature about the importance of the IOs in development, the effectiveness of aid by IOs and determined in general context the relative position of PFM in the overall development agenda. First, the IOs are important and valuable contributors to development aid. Second, assessment of aid effectiveness in the literature largely proves inconclusive; while some scholars contend that aid of IOs brings progress and other benefits to recipient countries, others claim that with aid provision, IOs exert relative influence over the recipient governments in reforming either public sector or PFM reform. Finally, the literature offers a critique that IOs' aid to public sector reform and PFM reform in developing countries has only limited, negligible, or ephemeral effectiveness.

A small note that this chapter does not aim to review and gauge the wide range of pros and cons of the IOs activities. Rather, it explores the pros and cons noted above with connection to PFM and public

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<sup>6</sup> The Paris Declaration (PD) on Aid Effectiveness was initiated in 2005 to harmonize and coordinate aid delivery among donors and between donors and recipient countries

sector reforms in Tajikistan, to analyse the advice by the international financial institutions and their implementation in a country case study example.

### **4.3 Tajikistan: Economy and Budgeting Process**

#### **4.3.1 Tajikistan' Transition and PFM reform**

Tajikistan's transition trajectory has been uneven, with sharp setbacks. Tajikistan is a landlocked mountainous country in Central Asia, which gained independence in 1991. In its early transition to a market-oriented economy, the country suffered dramatic economic losses as it was trapped in a civil conflict during 1992-1997. Since signing the National Accord in 1997, Tajikistan has undertaken market reforms that brought recovery and some economic growth to the country. Aluminium smelting, cotton production and remittances from migrants remain the main sources of economic growth.

Tajikistan is resource-poor and its natural endowment is among the lowest in Eurasia. The country is very dependent on commodity imports and remittances. Labour migrants make up Tajikistan's economic lifeline with migrants contributing the equivalent of 48% of Tajikistan's GDP in 2012, according to the World Bank, which then made the impoverished country the most remittance-dependent in the world. Tajikistan is still one of the poorest post-communist state that scores low on governance, property rights and corruption in the public sector, according to the World Bank's Country Policy and Institutional Assessment (CPIA) rating<sup>7</sup>.

A simple comparison of PFM-relevant CPIA variables between 2011 and 2015 (the latest year when data are available) suggests that the selected seven CPIA dimensions did not improve at all. For example, the performance in two selected CPIA variables, fiscal policy and macroeconomic management, worsened. As for the other selected five -- property rights and rule-based governance, public sector management and institutions cluster, quality of budgetary and financial management, public administration, transparency, accountability, and corruption in the public sector -- remained in the same level as in 2011 (Table 4.2). In particular, the World Bank's CPIA rating of quality of budgetary and financial management<sup>8</sup> between 2011 and 2015 stayed unchanged at a score of 3.5 (Table 4.2).

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<sup>7</sup> CPIA rating has been designed by the World Bank. It rates a country's performance against 16 criteria representing different policy and institutional dimensions of a country's poverty and growth strategy, including the quality of economic and budgetary management.

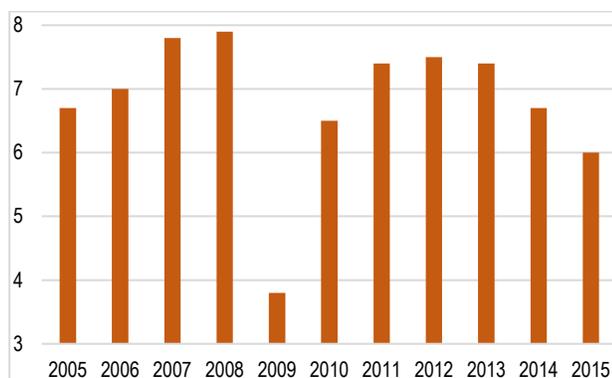
<sup>8</sup> Quality of budgetary and financial management assesses the extent to which there is a comprehensive and credible budget linked to policy priorities, effective financial management systems, and timely and accurate accounting and fiscal reporting, including timely and audited public accounts.

|   | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|------|------|------|------|------|
| Fiscal policy rating  | 4    | 4    | 4    | 3.5  | 3.5  |
| Macroeconomic management rating                                   | 4    | 4    | 4    | 3    | 3    |
| Property rights and rule-based governance rating                  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Public sector management and institutions cluster average         | 2.9  | 3    | 3    | 3    | 2.9  |
| Quality of budgetary and financial management rating              | 3.5  | 3.5  | 3.5  | 3.5  | 3.5  |
| Quality of public administration rating                           | 3    | 3    | 3    | 3    | 3    |
| Transparency, accountability, and corruption in the public sector | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |

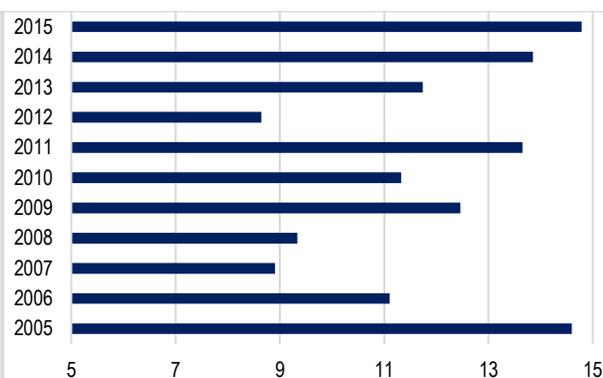
**Table 4.2** PFM Relevant variables of CPIA for Tajikistan, 2011-15.

Source: World Bank's Database on Country Policy and Institutional Assessment (CPIA), last updated 07/12/2016. *Note:* 1=low and 6=high.

The economy of Tajikistan gradually recovered from the global financial crisis of 2008, with real GDP growth rate rising from 3.8% in 2009 to 7.5% in 2012, but since then, again, slowing down to 6% in 2015 (Figure 4.1). The public spending to GDP ratio in Tajikistan has been steadily rising since 2007, as reported by the authorities in Tajikistan. The general government final consumption expenditure, including all government current expenditures for purchases of goods and services, compensation of employees, most expenditures on national defense and security, have risen tendency from 8.6% of GDP in 2012 to 14.7% in 2015 to the level of 2005 performance (Figure 4.2). However, the main risk to the Tajikistan's economy since 2014 remains its large exposure to external factors: declining world prices for aluminium and cotton, uncertain growth rates in its main economic partner countries, such as Russia and Turkey, as well as dependence on remittances and imported fuel.



**Figure 4.1** GDP growth (annual %) in Tajikistan. Constructed using data from World Development Indicators (2017).



**Figure 4.2** Tajikistan's general government final consumption expenditure (% of GDP). Constructed using data from World Development Indicators (2017).

There are several development agencies in Tajikistan, each with their own administrative and reporting procedures and agenda. The focal international organizations that have been active in supporting PFM reform in Tajikistan since late 1990s are the World Bank, IMF, DFID, Delegation of the European Union, Swiss Development Agency, and Government of Japan. The IMF provides technical assistance to build capacity in public financial management in Tajikistan through various missions by experts from its Fiscal Affairs Department (FAD) and a regional PFM advisor.

Major PFM reforms in Tajikistan started in the late 1990s, with more significant bilateral and multilateral donor involvement since 2005 (WB, 2012). International agencies like the World Bank, UK Department for International Development (DFID), Delegation of the European Union, Swiss Cooperation Office (SDC), Asian Development Bank and the International Monetary Fund, are the major donors investing in Tajikistan's PFM reform, which have recommended "best practices" in PFM architecture over the years. By and large, financial support of donors had beneficial impacts on PFM processes while government prioritized only specific control and management functions rather than driving a broader agenda for PFM reforms. Since its inception, the PFM reform brought the following changes to the PFM processes:

- Law on Treasury adopted (2001)
- Law on Public Finances adopted (2002)
- Customized treasury software package became operational (2002)
- Complementary budget information system introduced and installed (2004)
- A Programmatic Public Expenditure Review completed (2007)
- Two PEFA assessments (2007 and 2012) carried out
- PFM Strategy along with Three-year Action Plan was adopted by the government (2009)
- Treasury software system upgraded for rollout to sub-national-level governments (2009)
- PFM Coordination Council at the Ministry of Finance established (2010)
- Per capita financing in the education sector launched (2010)
- Budget Classification and Unified Chart of Accounts introduced (2011)
- Internal Audit Units established in central and local government (2011)
- Amended Law on State Finances adopted (2011)
- The administrative classification on local level has been adopted (2011)
- The PFM Council has approved the 5-year Treasury Development Plan that foresees the full introduction of TSA<sup>9</sup> (2012)
- The TSA republican level introduced in all finance departments (2012)
- The Central Treasury reorganized with establishing commitment control and cash management departments (2013)
- The budget of national level is formulated on the basis of the new administrative classification (2013)
- Dozens of finance departments (out of 73) adopted TSA at republican level (2013)

Overall, PFM reform in Tajikistan has been sluggish. The main reasons of the slow pace of advancement towards the PFM agenda goals in many developing and other transitional countries are "the lack of sufficiently strong institutions and the existence of powerful elites that use the budget process to extract economic rent... [and] low capacity of the finance ministry and related fiscal

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<sup>9</sup> A standard TSA is a bank account or a set of linked bank accounts through which the government (and its entities and spending units) transacts all receipts and payments and consolidates its cash balances.

institutions” (Allen, 2008). The other reason is historical. Substantial direct budget transfers from Moscow were limited for all Central Asian countries even in the Soviet era: for instance, Kyrgyzstan received 7.8%, Tajikistan 8.2% and Turkmenistan 9% of their respective GDP in union budget transfers (Orlowski, 1995). The legacy of chronic lack of budget funds transfer from centre to peripheries, followed by the elimination of such transfers with the dissolution of the former USSR, plus the effects of the civil war, damaged economic welfare and provision of public services in Tajikistan, global economic downturn, all delayed undertaking major PFM reforms until 2000s.

### **4.3.2 Budget Process and Budget Practice in Tajikistan**

Design and implementation of well-founded policies for the management of public funds is a pivotal building block of PFM. This section briefly reviews the literature on budget process, describes two phases of the budget process, summarizes the assessment of current budget practice in Tajikistan, and recent trends in budget balance of Tajikistan.

Debrun (2009) acknowledges that the design and implementation of fiscal policy in both industrial and developing economies has common difficulties such as deficit bias and pro-cyclicality,<sup>10</sup> due to inappropriate use of discretion in fiscal policy-making. According to him, the formulation and implementation of well-crafted fiscal policies depends heavily on effective institutions, a societal consensus and a government’s commitment to the mandate assigned to it.

Von Hagen and Harden (1995) found the empirical evidence that institutional rules governing the budget process have influence on fiscal performance. The author points out that policy makers can employ the budget process as a commitment tool for fiscal discipline. Von Hagen and Harden highlight that selection of the suitable budget process is often determined by the political atmosphere and by the sources of uncertainty in the budget process. According to him, modelling the budget process can act as a tool to settle both political conflict and uncertainty and help in better designing the budget process to improve fiscal performance.

Alesina and Perotti (1996) argue that budget process has an important effect on the determination of the budget balance and budget composition. The authors suggest that reform of budgetary institutions should start from two pivotal areas: more transparency of institutions, and strengthening of the roles of the executive branch vis-a-vis the legislature. Alesina and Perotti (1996) define budgetary institutions as a complex of the rules and regulations through which budgets are prepared, approved, and executed. They distinguish three types of rules and regulations in this respect: “(i) numerical targets on the budget, such as a balanced-budget law; (ii) procedural rules (such as voting rules) which regulate the preparation and legislative approval of the budget; and (iii) rules regarding the transparency of the budget” (Alesina and Perotti, 1996: 401). The authors recommend that the budgets should be as

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<sup>10</sup> A 'pro-cyclical fiscal policy' is when government decides to rise public spending and reduce taxes during an economic boom, but reduce spending and increase taxes during a recession. Pro-cyclicality could make the influence of economic or financial fluctuations bigger or stronger.

transparent as possible. According to them, the budgets are more transparent when they are presented by executive branch as a single document with all the pertinent policies included, when they cover the spending of general government, but not the central government only, and when financial forecasts are checked and corroborated by independent and non-public agencies.

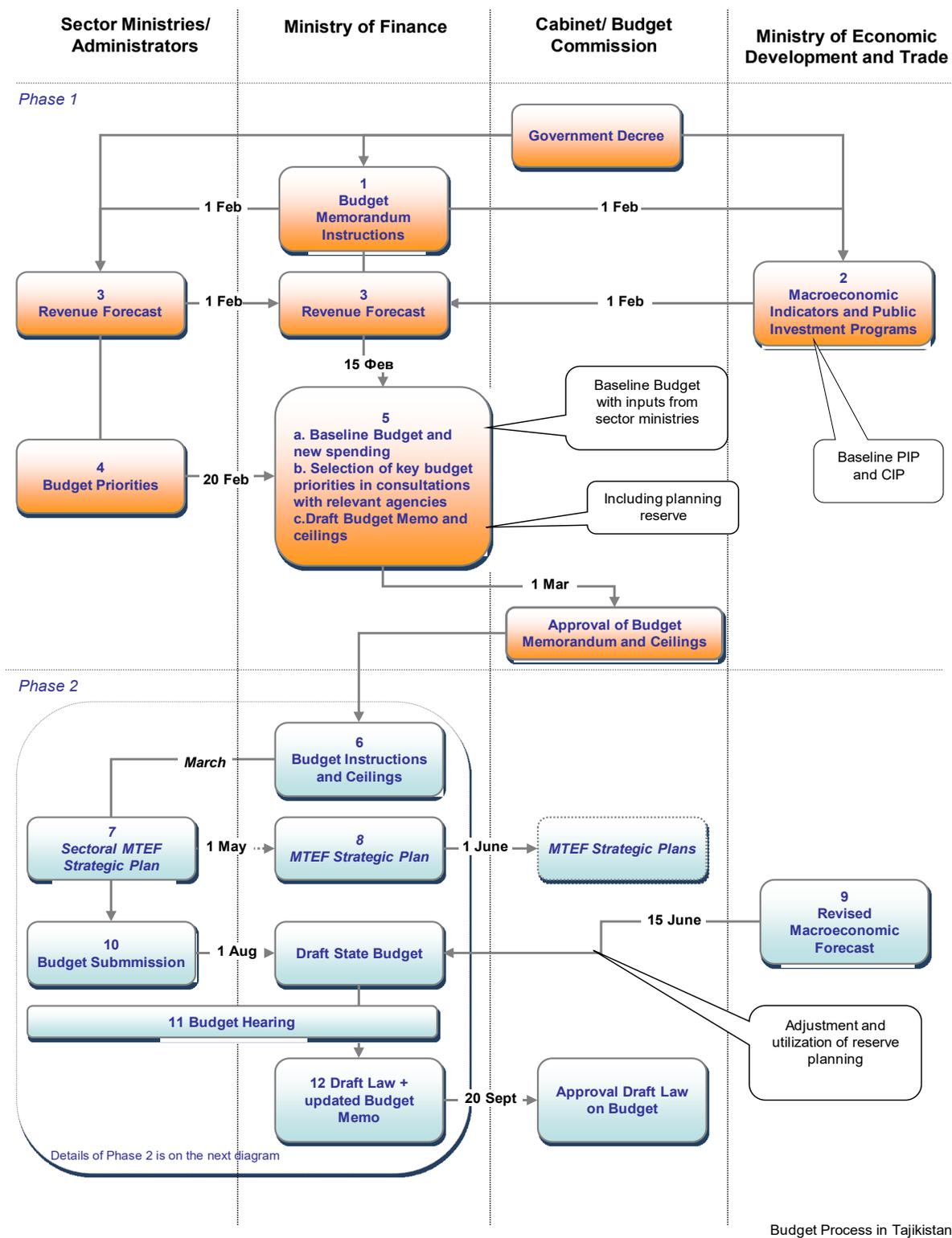
However, as Krause (2012) points out, neither the transition to more democratic budget process nor to intricate inter-sectoral ministerial public expenditure frameworks is a necessary ground to prompt reform of the traditional budget system.

The budget process in Tajikistan works from the bottom up. According to the Ministry of Finance, the process of tabling the state budget in Tajikistan entails two key stages of planning. During the first phase, the spending limits or ‘expenditure ceilings’ are identified. The second phase culminates in drafting the annual Budget Law and its subsequent approval by the national parliament.

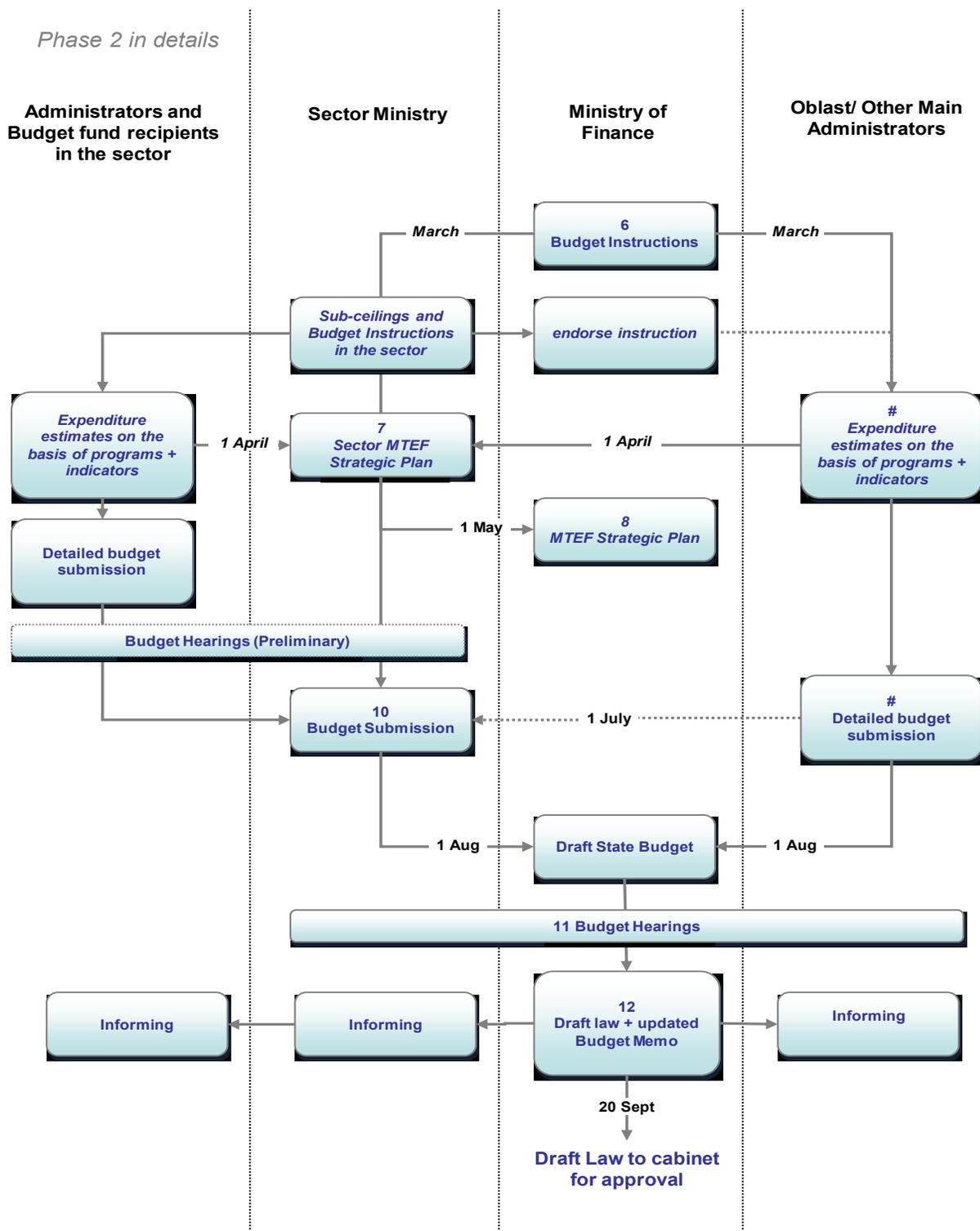
The Ministry of Finance is the key player that drafts the Budget Memorandum Instructions or the Explanatory Note to the Draft Budget Law during the first phase. It adjusts the forecasts of macroeconomic indicators and tax revenues (prepared by the Ministry of Economic Development and sector ministries) taking into account the national priorities and spending limits for budget items (Figure 4.3). The Ministry of Finance seeks the approval of the Budget Memorandum Instructions from the governmental Budget Board (Figure 4.3). The approved Budget Memorandum would be a baseline budget for the main administrators of budgetary funds and sectoral agencies.

When the second phase starts, the draft of the state budget goes through the consolidation of all national level budgets with the local levels. At some points at this stage, budget hearings are held with all stakeholders, representative of sectoral ministries and local governments to discuss budget proposals (Figure 4.3). The Ministry of Finance finally presents the revised draft of the Budget Law along with the updated Budget Memorandum Instructions to the government for review and to the parliament for approval (Figure 4.3).

The local budgets are not involved in the first phase of the planning (Figure 4.3). They begin to feature in the second phase (Figure 4.4). Once the draft of the Budget Law is submitted to the Parliament by the second half of September, the Ministry of Finance provides all local districts and provincial finance departments with estimates of the local budget level for next year. These estimates of the budget level subsequently get approval, and if new circumstances arise, the parliament updates or amends them accordingly.



**Figure 4.3** Budget Process in Tajikistan (Phase 1 and 2). Constructed using data from Ministry of Finance of Tajikistan (2015). Note: MTEF – Medium-Term Expenditure Framework, PIP – Public Investment Program.

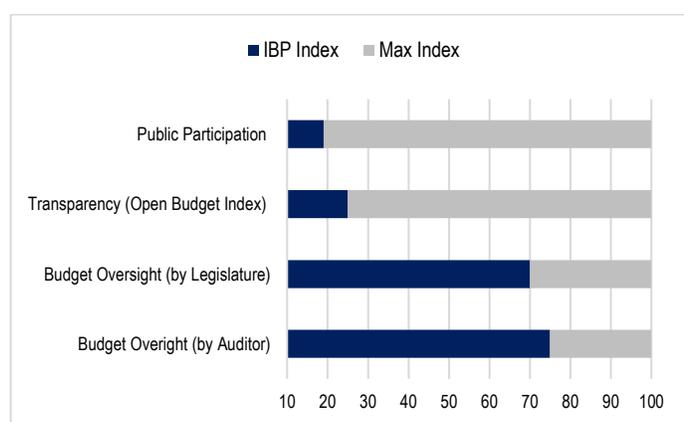


Budget Process. Phase 2

**Figure 4.4** Phase 2 of the Budget Process in Tajikistan.  
 Constructed using data from Ministry of Finance of Tajikistan (2015).  
 Note: MTEF – Medium-Term Expenditure Framework, PIP – Public Investment Program

The openness of budget processes along with public availability of budget information, clarity of roles and responsibilities in the government, assurances of integrity and data quality, are central to the assessment of the transparency of public finances. The Fiscal Transparency Report on the Observance of Standards and Codes (ROSCs) in Tajikistan based on a Code of Good Practices (IMF, 2007), found that many budget and fiscal reports are not available to the public or only a limited summary information is publicly available. Specifically, the report on Tajikistan (IMF, 2007) indicated that central government contingent liabilities, tax expenditures, macroeconomic assumptions, analysis of fiscal risks, financial assets and sustainability analysis are not available to the public at all. Meanwhile, the public had only limited access to actual revenues and capital spending of central government budget, general government budget estimates and consolidated general government final accounts (IMF, 2007).

The International Budget Partnership (IBP) conducts surveys on budget transparency across the countries based on the OECD's Best Practices for Budget Transparency (OECD, 2002) and the IMF Code cited above. Countries are ranked on a scale from 0 to 100 on the basis of a detailed questionnaire. The IBP survey (2016) ranks the government of Tajikistan low (19/100) in providing the public with prospects to take part in the budget process. The government scores low on transparency or Open Budget Index (25/100) as it provides the public only with minimal budget information. Nonetheless, the survey found that the budget oversight by the legislature and by the supreme audit institution in Tajikistan is adequate (Figure 4.5).



**Figure 4.5** Results of Open Budget Survey on Tajikistan.  
Constructed using data from International Budget Partnership (2016)  
Note: IBP – International Budget Partnership, Max – maximum.

According to the IBP survey (2016), the government of Tajikistan makes six of the eight key budget documents available to the public in a timeframe consistent with international standards (Table 4.3). In contrast, the government of Kyrgyz Republic makes all key budget documents available to the public (Table 4.4). To improve budget transparency, the IBP recommends that government should publish the Audit Report, and produce and publish the Mid-Year Review (Table 4.3).

|            | Pre-Budget Statement | Executive's Budget Proposal | Enacted Budget | Citizens Budget | In-Year Reports | Mid-Year Review | Year-end Report | Audit Report |
|------------|----------------------|-----------------------------|----------------|-----------------|-----------------|-----------------|-----------------|--------------|
| Kazakhstan | ●                    | ●                           | ●              | ●               | ●               | ●               | ●               | ●            |
| Kyrgyz R.  | ●                    | ●                           | ●              | ●               | ●               | ●               | ●               | ●            |
| Tajikistan | ●                    | ●                           | ●              | ●               | ●               | ●               | ●               | ●            |

**Table 4.3** Open Budget Survey on Budget Practice in Kazakhstan, Kyrgyz Republic and Tajikistan.

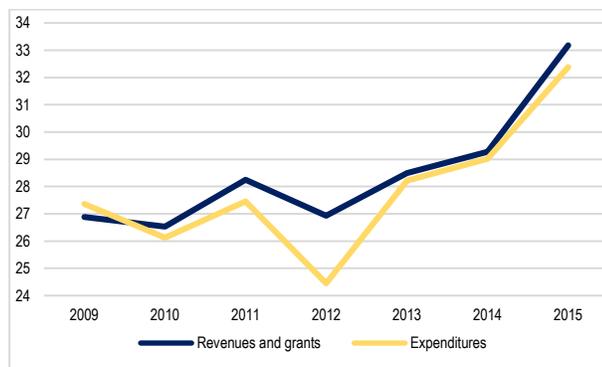
Constructed using data from International Budget Partnership (Apr 2016 Update)

Key: ● = Available to the Public; ● = Available for Internal Use; ● = Not produced.

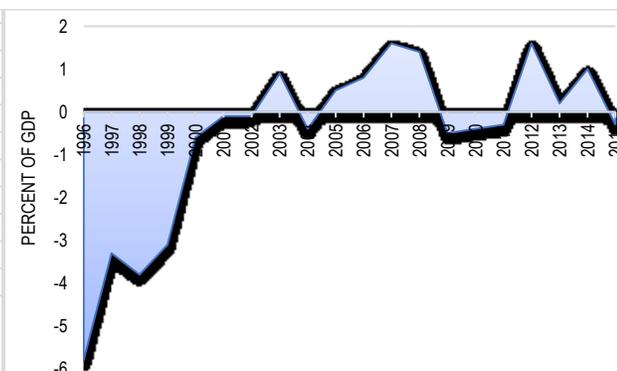
To improve budget participation, IBP recommends creating effective mechanisms such as public hearings, legislative hearings on the budget of specific agencies where the testimony from the public is heard, surveys and focus groups for capturing different budget issues. In addition, to strengthen budget oversight, the IBP suggests establishing a budget research office for the legislature and creating a system of quality control for supreme audit institutions.

### 4.3.3 Recent Trends with Balance of Budget in Tajikistan

According to official data from authorities, Tajikistan mostly kept a positive state budget balance with revenues and grants exceeding expenditures by small margins since 2010 (Figure 4.6). If we refer to data from the IMF, however, leaving aside externally financed Public Investment Programs, the state budget experienced single digit fiscal deficits in 1996-2001, 2004, 2009-2011 and 2015, and a modest surplus in 2002-2004, 2005-2008 and 2012-2014 (Figure 4.7).



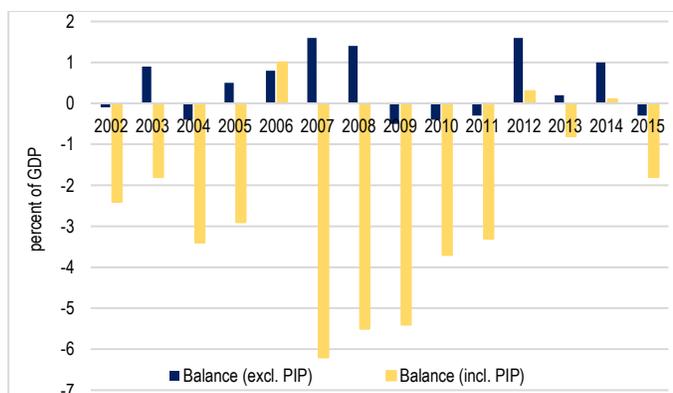
**Figure 4.6** Revenues/Grants and Expenditures of the State Budget in Tajikistan (% of GDP).  
Constructed using data from State Statistics Committee (2016)



**Figure 4.7** Balance of Budget in Tajikistan, % of GDP.  
Note: Public Investment Program excluded.

Constructed using data from IMF Article IV Consultations with the Tajikistan (2016)

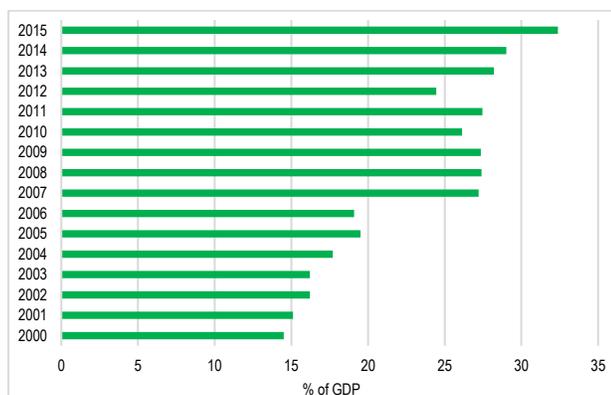
To fund the cost of different infrastructure projects during 2002-2015, the government borrowed from donors, mainly from China and IFIs. If externally financed Public Investment Programs are included and taken into account, then, the state budget had frequent deficits since 2002, ranging from 1% to 6% of GDP and only occasionally (in 2006, 2012 and 2014) had slight budget surpluses (Figure 4.8).



**Figure 4.8** Budget Balance (excl. and incl. PIP) in % of GDP (2002-2015).

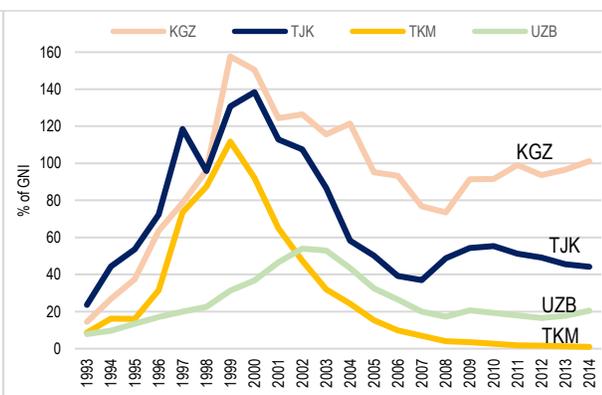
Constructed using data from IMF Article IV Consultations with the Republic of Tajikistan (2016). *Note:* PIP – Public Investment Program

The state budget expenditures' share of GDP reached 32% in 2015 (29% in 2014) (Figure 4.9). The external debt stocks in Tajikistan, including both public and private debt, grew during 2007 – 2010 and were 44% of the GNI by 2014 (Figure 4.10).



**Figure 4.9** Ratio of Public Spending to GDP.

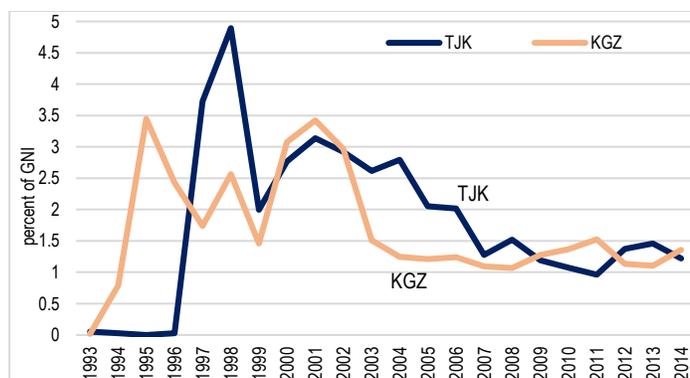
Constructed using data from State Statistics Committee of Tajikistan (2016)



**Figure 4.10** External Debt Stocks % of GNI.

Constructed using data from World Development Indicators (WB, 2016).

However, in the pile of external debt stocks, only a trivial part – less than 2% of GNI -- has been public debt and publicly guaranteed debt service since 2005 (Figure 4.11).



**Figure 4.11** Public Debt and Publicly Guaranteed Debt Service % of GNI, (1993-2014). Constructed using data from World Development Indicators (WB, 2016).

#### 4.4 International Organizations: Advice

##### 4.4.1 World Bank and PFM reform in Tajikistan

Overall, direct disbursements of development partners for the public sector of Tajikistan, a *factor-driven* country<sup>11</sup> in its current state of development, reached US\$ 420.29 million. The bulk of disbursements was on budget execution (28.9%) and financial reporting (22.9%). However, in contrast to 2010, the direct disbursement declined by half in 2015, from 30.7% to 14 %, respectively (Table 4.4).

| Direct disbursements for the public sector, US\$ million | Budget execution, % | Financial Reporting, % | Auditing, % | Procurement, % | 2015, % | 2010, % |
|--|---------------------|------------------------|-------------|----------------|---------|---------|
| 420.29   | 28.9                | 22.9                   | 3.5         | 0.6            | 14.0    | 30.7    |

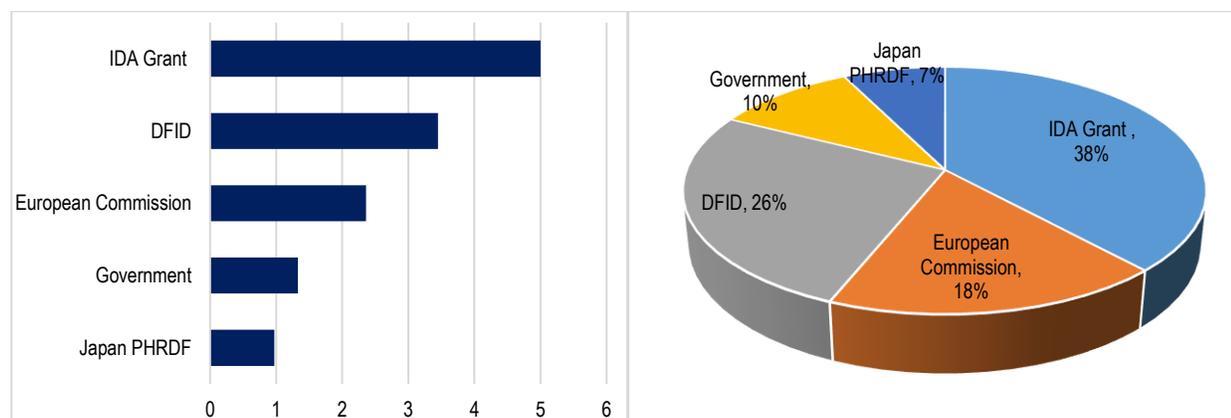
**Table 4.4** Donors' Use of Government Budgetary and PFM Systems in Tajikistan, 2010-2015. Source: OECD/UNDP (2016: 150).

The World Bank Group managed 85 lending and grant-funded projects in Tajikistan utilizing the International Development Association (IDA) funds and trust funds, amounting almost US\$ 843 million since 1996. The active portfolio of the World Bank in Tajikistan as of 2016 consists of 23 projects with net commitments of US\$ 236 million, funded mainly by IDA grants and credits (World Bank, 2016). The following sectors have the largest share of the portfolio: agriculture and rural development (40%), water and sanitation (15%), human development (14%), energy (13%), the public sector (13%) and the private sector (6%). The closed portfolio of the Bank currently includes 69 projects. PFM reform remains one of the most important priorities of the Bank in Tajikistan.

Using adaptable program loan (APL), the World Bank launched the Public Financial Management Modernization Project (PFMMP) in 2009. The World Bank approved the project at the Board Presentation on May 14, 2009 and the first phase of the project ended on March 31, 2015. The total

<sup>11</sup> According to the WEF's Global Competitiveness report (2009), in the first stage of development, the economy is *factor-driven* and countries compete based on their factor endowments, predominantly unskilled labour and natural resources. Businesses in the *factor-driven* stage of economy compete based on price and/or trade of basic goods or commodities, with their low productivity mirrored in low wages. Upholding competitiveness at this stage of development is subject to well-functioning public and private institutions.

project cost was US\$ 13.11 million and the Bank's commitment amount was US\$ 5 million (out of which, US\$ 4.96 million was disbursed) with the following project financing scheme by donors (Figure 4.12 and Figure 4.13):



**Figure 4.12** PFMMP Funding, APL-1 (US\$ millions).

**Figure 4.13** Share of the PFMMP funding by donors (%).

Constructed using data from: World Bank (2015).

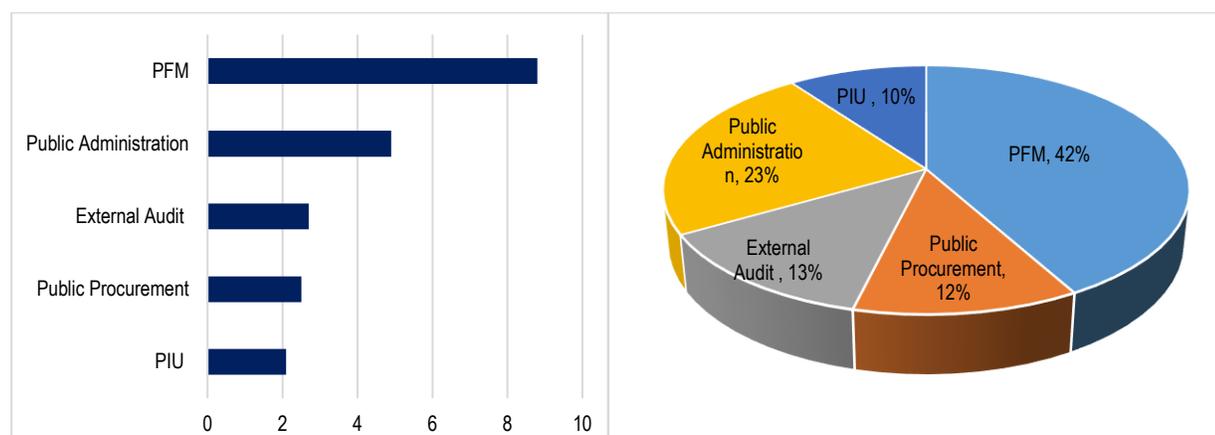
Note: PHRDF stands for Japan Policy and Human Resources Development Fund.

The aims of the Public Financial Management Modernization Project were to create basic processes for efficient and transparent management of public expenditures. The project had the following components:

- (1) Building institutional capacity of the Ministry of Finance's (MoF) structures and budget organizations, as well as implementation of the PFM Strategy;
- (2) Improvement of budget planning and budget execution, implementation of the integrated chart of accounts and enhanced budget classification system;
- (3) Preparation for automation of core PFM operations component, including establishment and capacity building of the MoF's ICT Center; modernization of MoF Information and Communication Technologies (ICT) infrastructure, and preparation of the financial management information system technical requirements and procurement.

Utilizing the investment project-financing scheme as a lending instrument, the World Bank started the second phase of the Public Finance Management Modernization Project (PFMMP-2) in Tajikistan after its approval at the board meeting on June 1, 2015 with the projected closing date of June 30, 2021. The total cost of the second phase of the project is US\$ 21 million, with the Bank's commitment of US\$10 million (47.62% of total cost) and DFID's commitment of US\$11 million (52.38% of total cost). In addition, other development partners provide advisory services to the PFM reform in Tajikistan. For the second phase of the project, particularly, the IMF provides advisory services on technical dimensions of PFM reforms, the EU provides parallel financing of activities in areas of sector budgeting and planning, monitoring of state owned enterprises and DFID funds strengthening parliamentary oversight

of PFM processes (World Bank, 2015). Figures 4.14 and 4.15 show the cost and percentage share for each component of the project.



**Figure 4.14** Cost of each components of the PFMMP-2, US\$ million.  
Constructed using data from World Bank (2015).

**Figure 4.15** Cost of each components of the PFMMP-2, US\$ million.  
Constructed using data from World Bank (2015).

The aims of the PFMMP-2 are to improve the efficacy, control, and accountability of public expenditures in Tajikistan. The second phase of the project has five components:

- 1) Public finance management modernization to continue implementation of the public finance management reform strategy (PFMRS), strengthening the budget planning, budget execution, and treasury;
- 2) Strengthening public procurement to support the regulatory and institutional framework for public procurement and support implementation of an e-procurement system;
- 3) Strengthening external audit to assist the Chamber of Accounts (COA) in implementing the strategy and action plan for developing external audit body;
- 4) Managing public administration reforms to develop the institutional capacity of the Executive Office of the President (EOP) and its subordinate entities responsible for functions critical to the effective development of the PFM system;
- 5) Project management or a project implementation unit (PIU) to coordinate project activities, and ensure timely and efficient implementation of each activity.

#### 4.4.2 Overview: What Has Been Advised

Three basic objectives of budgetary institutions have been identified as: aggregate fiscal discipline; strategic prioritisation of expenditure, and technical efficiency (Campos and Pradhan, 1996). Three strategies to achieve these objectives are therefore (Schick, 2013):

1. Maintaining a sustainable fiscal position, meaning that governments should keep a strict balance between revenues and expenditures, including other fiscal aggregates to achieve economic stability;
2. Effective allocation of resources to sectors, ministries and programs or distribution of public funding on the basis of verification of public program effectiveness and according to priorities set by government;
3. Efficient provision of public services, meaning that in delivering public services or public goods, government should pay special attention to the quality and accessibility of services, because the services are crucial points of contact between citizens and government.

The PFM reform agenda has been given a prominent place to achieve the above-mentioned objectives, and in the main policy documents in Tajikistan: National Development Strategy up to 2015, Public Administration Reform Strategy for 2005-2015, and the Poverty Reduction Strategy Paper for 2007-2009, 2010-2012, and the Living Standards Improvement Strategy for 2013-2015. Particularly, the key PFM objectives were set out in the Public Administration Reform Strategy of Tajikistan and included the following:

- Closer coordination between the budget and economic policy;
- Greater coherence in responsibilities for PFM, integrating investment planning and the budget process and providing the Ministry of Finance (MoF) with the overall responsibility for linking strategies and programs with the budget process;
- Better procedures for financial decision-making in ministries;
- Reformed internal control and audit systems;
- Greater effectiveness of public procurement; and
- Optimized revenue allocation mechanism among levels of government.

The main principles of strengthening the PFM architecture in Tajikistan have been set by the country PFM Strategy for 2009-2018, which was developed with the assistance of international advisors on PFM reform and in close consultations with aid donors and international organizations. The adoption of the PFM Reform Strategy (President's Decree #639 on Approval of PFM Strategy, 2009) for 2009-2018 on March 20, 2009 marked a significant milestone in the reform of public finances in Tajikistan. The Strategy prioritized several activities for PFM reform based on ideas of creating the basic elements of PFM system in place, focus on capacity building, and approving new initiatives only if results achieved and logical sequence of reforms. Consequently, prioritized tasks included a sequence of reforms for 2009-2018, summarized in Table 4.5:

*Short-term priorities:*

Priority 1: Reinforce stability, credibility, comprehensiveness and transparency of the budget

*Medium term priorities:*

Priority 2: Set clear roles and responsibilities at central level

Priority 3: Build national PFM capacity

Priority 4: Improve checks and balances

Priority 5: Introduce policy based budgeting

*Long-term priorities:*

Priority 6: Automate the PFM system

Priority 7: Develop fiscal decentralisation

|  | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|------|------|------|------|------|------|
| 1. Budget stability, credibility, transparency and comprehensiveness |      |      |      |      |      |      |      |      |      |      |
| 2. Roles and responsibilities  |      |      |      |      |      |      |      |      |      |      |
| 3. National PFM capacity   |      |      |      |      |      |      |      |      |      |      |
| 4. Checks and balances   |      |      |      |      |      |      |      |      |      |      |
| 5. Policy based budgeting  |      |      |      |      |      |      |      |      |      |      |
| 6. Automation of PFM system, properly functioning TSA                |      |      |      |      |      |      |      |      |      |      |
| 7. Development of fiscal decentralization                            |      |      |      |      |      |      |      |      |      |      |

**Table 4.5** Prioritized activities for PFM reform in Tajikistan for 2009-2018.

Constructed using data from PFM Strategy of Tajikistan for 2009-2018. *Note:* the dark grey areas indicate intensive reform activities and the different shades of light grey areas indicate less intensive preparatory and/or follow up activities.

The reform strategy in Tajikistan stretches over a period of 10 years (a sequence of reforms for 2009-2018), and comprises these platforms or prioritized tasks, summarized in Table 4.5. The detailed tasks for reform of PFM system for 2010-12 are shown in Appendix C.1.

The PFM Strategy Three-Year Action Plan for 2012-2014 developed by the PFM Council of the Ministry of Finance in consultation with donors and international organizations covers the key aspects of the PFM system and specifies each PFM activity advised for reform in detail. The Action Plan includes all basic steps of budget cycle: (1) Strategic Planning, (2) Budget preparation, (3) Budget Execution, (4) Accounting and Reporting, (5) External Audit, and, (6) Policy Review.

The Ministry of Finance (MoF) is responsible for strategic planning, budget preparation, budget execution, internal audit, accounting and reporting. The MoF interacts directly with a large number of Budget Organizations (BO) and with the 17 main sub-national governments. The role of sectoral ministries, particularly the Ministry of Education, Ministry of Health and Ministry of Labour and Social Protection in the budgeting of sectors has been relatively limited. In this chain of reform

management, external factors - the international organizations and their PFM advisors -- also contribute.

The overall picture of PFM reform in Tajikistan during 2010-15 was that Tajikistan, with the assistance of international organizations, including the World Bank, adopted a more comprehensive strategy for sequencing PFM reform in developing countries, the so-called ‘platform approach’ (Brooke, 2003) which was implemented elsewhere, for instance, in Kenya<sup>12</sup>. What emerges now is a complex picture of successive gradual progressions of some PFM reforms, or little progress in other PFM dimensions, as a result.

Overall, the support of donors and aid agencies, including the World Bank, to improving the PFM system in Tajikistan has been impressive. IOs’ involvement and support in PFM reform resulted in enhancement and amelioration of some processes of PFM. In particular, out of different dimensions of PFM reform, four processes of PFM have undergone improvements during 2010-2015. Namely, improvements in: a) some budget planning procedures and formats, b) implementation of the medium-term expenditure framework (MTEF), c) internal audit processes and, d) some components of the financial and treasury management information system (FMIS and TFMIS) are easily noticeable. Specifically, the following donors’ advice has been implemented in principle:

- *Budget planning*: Integrated budget classifications and a separate Tajikistan’s unified chart of accounts (UCOA) is in place, in line with international standards. The customization of the International Public Sector Accounting Standards (IPSAS) to the needs of Tajikistan has already started with application of several standards;
- *Implementation of the MTEF*: Budget preparation cycle incorporates Medium Term Expenditure Framework (MTEF) parameters;
- *Internal Audit*: The internal audit practices have been significantly improved, they are widely accessible, and many international standards of internal audit has been implemented. In addition, the Law on Internal Audit in the Public Sector of Tajikistan has been adopted. This piece of legislation is recommended as a model law for other CIS countries by the Inter-Parliamentary Assembly of the CIS countries;
- *FMIS and TFMIS*: The introduced information systems are capable of capturing almost all financial transactions, even though they have limited flexibility and their utilization at the local government level requires much more effort.

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<sup>12</sup> Rather than the traditional focus on individual components of the budget process, Brooke (2003) proposes that PFM reforms be packaged together into groups of activities or measures (platforms) that form a logical sequence.

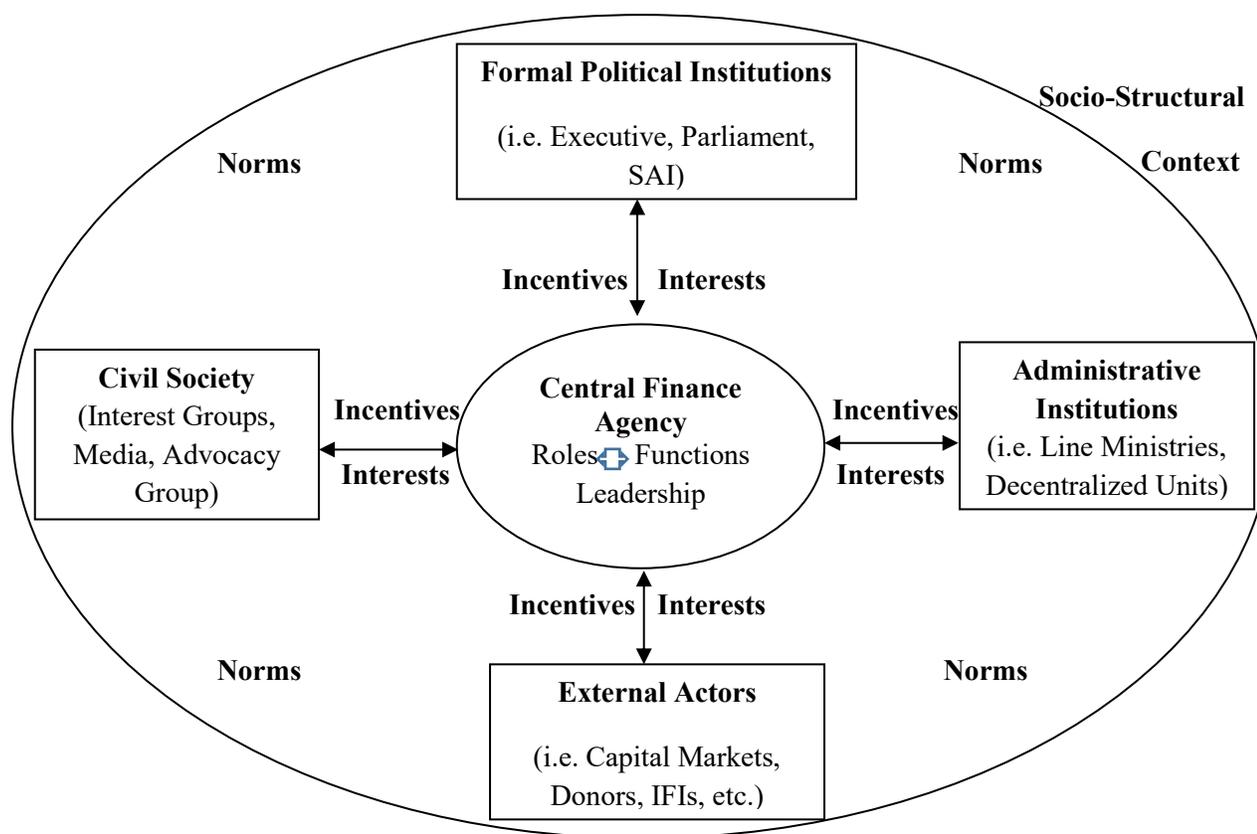
## 4.5 Research Methodology

This section provides the general and broad results of field observation and then briefly explains the Dressel-Brumby theoretical framework as the main theoretical tool to study the impact of IOs in driving the PFM reform agenda in Tajikistan. The following sections present the methodology utilized in this study, policy documentation review, and semi-structured interviews. Finally, the next section assesses activities of the IOs in strengthening Tajikistan's PFM reform by analysing the results of two PEFA assessments and the semi-structured interviews with PFM stakeholders in Tajikistan.

### 4.5.1 Theoretical Framework

The direct field observations and the results of the semi-structured interviews in Tajikistan, analysed in more detail in the next section, suggest that implementation of the PFM reform by the PFMMP, the World Bank's Project Implementation Unit, the key body responsible for reforms, faced considerable delays in delivering the PFM reform agenda. Many projects run by other donors, for instance EU projects in the domain of the PFM are plagued by very slow administration. The response of the DFID's technical assistance in strengthening Parliamentary oversight of PFM processes was at first somewhat sluggish, until it was launched in the second half of 2015. In fact, this exact sluggishness in the pace of implementation and quality of PFM reforms made one of the active donors in PFM reform in Tajikistan – the Swiss Cooperation Office (SDC) -- to opt for a complete exit strategy from running any project in the PFM domain since the end of 2015. The same rationale of sluggishness in implementation – could possibly make the EU Delegation reduce its financing of PFM reform in Tajikistan in the next few years. The IMF provides only limited PFM advisory services in adopting a unified chart of accounts (UCOA), treasury single account (TSA), cash commitment control, and assessing fiscal risks by the state-owned enterprises (SOE). The slow pace of implementation and stagnation lead not only to a loss of momentum in reforming PFM systems, but also to a loss of pivotal momentum to reform public sector and governance overall in Tajikistan.

The literature that focuses on PFM reform in less developed countries strongly suggests that well-functioning central finance agencies (CFAs) are crucial to the public financial management process. Yet, how the capability of CFA can be efficiently enhanced is a conundrum. It is suggested that this intricate issue should be seen through the prism of the wider political economy context of a country (Dressel and Brumby, 2009). The Dressel-Brumby framework highlights that countries should focus not only on building capacity, but also on strengthening the capability of central finance agencies to drive PFM reform. Particularly, the Dressel-Brumby framework identifies crucial institutions that affect decision making in budget process. They include formal political institutions (executive branch, parliament, supreme audit institution), administrative institutions (line ministries or decentralized units), the role of civil society (interest groups, media, advocacy groups) and external actors (capital markets, donors, IFIs, etc.) plus internal incentives and interests within officials involved in decision-making in budgeting (Figure 4.16).



**Figure 4.16** The Political Economy Environment of Budgetary Institutions.

Source: Dressel and Brumby (2009). Note: IFI = international financial institution; SAI = supreme audit institution.

While all factors shown in Figure 4.16 interact in the budgetary institutions environment, the focus of this part of the chapter is to explore the influence of external actors. This is because many developing countries in the course of their PFM reform receive significant funding from donors and IFIs, or use the service of foreign advisors with experience in budgeting (as discussed above). Donors and international advisors exert a strong influence on PFM reform, which may cause a dependence on donors and advisors that restrain development of local capacity, and results in the possible passivity of states (Allen, 2008; Allen, 2013). This practice contradicts the principles set by the PEFA for developing countries, which assumes the leading role of local governments in prioritizing sequence of reforms in collaboration with donors. Therefore, there are arguments that “continued care is needed to ensure that the prescriptions of donors are actually relevant and appropriate to the needs of each particular country” (Allen, 2013: 11).

PFM is an integral part of the public sector reform (PSR). The evolution of PFM is closely intertwined to broader thinking on public sector reform. In practice, it can be seen that the amount of aid related to PFM reform and the number of aid agencies involved in PFM reform increased significantly.

Committed funds by the international organizations for projects related to public sector financial management increased ten-folds from 1995 to 2007 – from US\$85.1 million in 1995 to US\$930.6

million in 2007 (OECD International Development Statistics database). During the same period of time (between 1995 and 2007), the number of aid agencies that provide technical assistance in the PFM field increased to more than 25 (De Renzio, 2013).

For theoretical analysis of advancement in public sector reforms, Andrews (2015) suggests to assess the outcomes of PSR by the ‘positive deviance’ framework. Unlike much of the literature which focuses only on limited successes and failures in running projects in the domain of PSR, his theories is based on the successes in public sector reforms that brought beneficial solutions and results.

This theoretical framework is directly relevant to the analysis of the results and fruits of PFM reform. However, applying the ‘positive deviance’ framework cannot per se mean that only favorable and beneficial outcomes was achieved in public sector reforms, but rather outcomes portrayed in reports by aid agencies as mostly ‘positive’ at times could be undesirable from the local players’ perspectives. The reliance on the ‘positive deviance’ approach is rather a helpful framework tool to comprehend, grasp and making sense of the processes of change in the PFM systems. Also, employment of the ‘positive deviance’ methodology is rather an instrument to explain policies related to ‘oddly successful’ intervention and involvement of the IOs by looking at the events through the prism of ‘positive changes’, which may not be necessarily always only positive or some outcomes of reforms may be more or less successful than others.

The framework includes two theories: solution and leader driven change (SLDC) and problem driven iterative adaptation (PDIA) and several related hypotheses (Table 4.6). The hypotheses are centered on the simple questions, such as what motivates a reform, how it is implemented, who leads it and what the updated governance structure represent? (Table 4.6). SLDC theory suggests that unusual positive outcomes of reforms are the products of solutions that as focus of change are identified at the beginning of the process – during the launch of reform at the starting phase. Then, the positive deviance entails implementation of reforms according to initial plans, a leader drives the process, and finally best practice solution is achieved for making that society better-off. The competing hypotheses associated with the SLDC theory offer the understandings on what makes the reform successful and valuable in the process of development.

PDIA theory proposes that the successful outcomes of reforms are achieved through an iterative process – when a problem is identified, but a solution is not yet offered, a solution appears when reforms go through an experiment, through process of trial and error performed by different actors each playing their own driving role in pushing the reform. PDIA suggests that at the end, reforms result in mixed ‘hybrid’ product of both best practice solution and ideas and concepts on the local level, which suits the particular environment. The four hypotheses associated with the PDIA theory suggest the notions on what leads reform to successful operationalization.

| Key question   | Solution and leader driven change (SLDC)   | Problem driven iterative adaptation (PDIA)   |
|--|--|--|
| A. What motivates reform?  | H1. Successful reform is motivated by the promise of a solution<br><i>One expects reform solutions to be fully identified at the reform's start and that reform will focus on implementing solutions</i>   | H5. Successful reform is motivated by problem (performance deficiency)<br><i>One expects that a problem will be clearly identified at the start of reform, promoting an appetite for change and a process of change</i>  |
| B. How do reforms get implemented?                               | H2. Successful reform is implemented according to a specified plan of action<br><i>One expects to find that reform content is fully planned out at the start of the change process, and is implemented as planned</i>                            | H6. Successful reform emerges through a process of experimentation as agents find and fit content to context<br><i>One expects to find reform content emerging through a process of experimentation and trial and error</i>  |
| C. Who leads the reform process?                                 | H3. Successful reform is led by a champion; some high-level individual with authority<br><i>One expects to find a single individual in a high-level position identified consistently as "leader" of the reform</i>                               | H7. Successful reform is led by a group of agents who provide various functions required to make reform work<br><i>One expects to find multiple individuals identified as playing key functional roles in the reform process</i>   |
| D. What do the "new" government/governance structures look like? | H4. Successful reforms produce the "right" best practice solutions commonly argued as necessary to foster good governance<br><i>One expects final reform products to resemble pure-form best practice solutions identified at reform's start</i> | H8. Successful reforms produce hybrid solutions that blend ideas from inside and outside the context; all fitted to the context<br><i>One expects to find that final reform products are mixed-form products of many influences; including best practices and internal ideas</i> |

**Table 4.6** Hypotheses and theories explaining positive deviance in PSR. Constructed by using data from Andrews (2015: 200).

#### 4.5.2 Comparative Research Methodology: Case Study

While the comparative research technique (Collier, 1993) containing descriptive country case studies methodology (Yin, 2012) is employed, the study contributes to building relevant substantiation on PFM reform utilizing the following sources of evidence: policy documentation review, PEFA assessment, survey and semi-structured interviews.

#### 4.5.3 Policy Documentation Review and PEFA Assessments Analysis

The review and scrutiny of policy documents, namely: country PFM Strategy, PFM Strategies Action Plans, PFM Implementation Progress Reports makes part of the methodology. Methodologically, the analysis of the PEFA Assessment Reports provides insights whether the changes to PFM reform driven by the IOs were robust or not.

#### 4.5.4 The PFM Questionnaire and Semi-Structured Interviews

As a part of a survey on progress with the PFM system in Tajikistan, a questionnaire was designed to study the experience and direct involvement of the main PFM stakeholders and practitioners in the reform (Appendix C.2). Four categories of respondents or interviewees were identified during the research design. Thus, the semi-structured interviews involved a series of formal and informal meetings with:

- a) Academics – on technical aspects of PEFA, interviewee suggestions on PEFA reforms in the context of development.
- b) Stakeholders from the IOs – on technical aspects of the PFM reforms, coordination between donors, their involvement in the process, their reform advice, their suggestions on how one can accelerate the pace of reform and make it more effective.
- c) Public officials at the Ministry of Finance – on reform implementation and its effectiveness, cooperation with donors and citizens of the country.
- d) Practitioners, experts, representatives of the international NGOs – on their insider’s views on technical issues related to PFM reform as a whole.

#### 4.5.5 Methods of data collection

A survey and interviews were employed as the main methods in the evaluation. The survey aimed to obtain data from a sample of leading international organizations involved in PFM reform in Tajikistan. Data were collected through semi-structured, one-to-one interviews conducted with government officials, representatives of donors and other stakeholders working for different PFM projects.

Observations, guided by the research questions, reflect the experience of the stakeholders who participated in the evaluation. Conclusions, the reasoned assessment of each evaluation question through a survey, were drawn largely from the observations made by the stakeholders. In addition, the following methods were used to collect data, opinions, and evidence related to the PFM efforts by the international organizations:

- Cross-checking data (triangulation) – When contradictory data were obtained, these points were further checked with other sources and follow-up interviews were requested and conducted. During the triangulation, the focus was to grasp the same thing from different perspectives to be able to confirm or challenge the findings of previous methods. Great care was taken to critically examine obtained data to evaluate to what extent it is likely to be reliable and valid.
- Quotations – The principal investigator was able to capture some of significant quotes from the interviewees, which are not attributed to particular interviewees in order to keep anonymity. These quotes are utilized in the analysis of the results.

#### 4.5.6 Metrics and Logistics

Fifteen interviews were conducted with stakeholders in Tajikistan. This number of interviews was deemed sufficient for the purposes of this research because of the following reasoning and factors. First, a limited number of donors (World Bank, DFID, EU) were involved in PFM reform in Tajikistan during the time of interviews. Second, awareness on the essence of changes in PFM processes and progress of PFM reform over the last few years is considerably higher amongst a handful number of decision-makers, mostly top- and medium-rank government officials from the Ministry of Finance. This fact was corroborated by almost 80% of interviewees.

Third, there is a discussion in the literature about two criteria for the adequate number of interviews: sufficiency and saturation of information (Seidman, 2006: 70). The criterion of sufficiency was reflected in the range of PFM stakeholders: the study involved enough participants to reflect categories such as gender, rank, age and experience. Some scholars believe that at certain point of a study, the interviewer starts to hear the same information already reported (Rubin and Rubin, 1995; Weiss, 1994) and is no longer learning anything new, which is the criterion of saturation of information. To a large extent, this criterion was reached after interviewing the fifteenth participant of the study.

Finally, practical requirements of time, money, and other resources, presence of donors, availability of respondents and necessary years of working experience of participants had a role in this study. For instance, amongst all possible participants of the study only those were selected who have at least three-year working experience in the field of PFM reform in Tajikistan, which, in its turn, reduced the range of respondents. Thus, the study aimed at obtaining as representative a range of responses as possible – totaling fifteen participants to fulfil the objectives of the study in order to provide answers to key questions.

As for logistics of this study, all respondents were asked the same questions in their offices and places of work. The interviewer gathered data by sending letters about the survey enclosed with the questionnaire (Appendix C.2) first, and then taking notes in a series of semi-structured interviews. The survey contained questions on different dimensions of PFM reform. Different types of questions were employed in the questionnaire, ranging from open and list questions to rank order and scale of PFM reform. The questionnaire consisted of three parts: background, experience of participants in PFM reform and their observations on changes in PFM processes. The main emphasis of the survey was on fact-finding. One-third of participants were selected through the snowballing approach, in which one participant leads to another. The informants spoke in a narrative form during the interviews about their experience, which is believed to be a valuable source of data for the purposes of this research. Due to sensitivity of many issues in PFM, interviewees asked not to be taped.

#### **4.5.7 Limitations of the Interview-Based Approach**

Interview-based approach has advantage of conducting a targeted interview, concentrating on the topic of the interest (PFM), which can provide lots of insights on causal inferences explaining the obscurity whether the intended changes to strengthen PFM reform brought the desired results or not. However, this approach has its limitations too, which should not be neglected. Interview-based technique may be sometimes subjective and biased, yet this approach can produce wealth of materials and facts for analysis.

Among the other common problem of this approach the literature often reminds about researchers' bias because of poorly designed questions, respondents' biased responses, inaccuracies due to poor recall, and reflexivity – often interviewees give what interviewer wants to hear (Yin, 2012). In addition, researchers typically tend to overweight their findings or pay no attention to or overlook data not going in the direction of their analysis (Nisbet and Watt, 1980).

Therefore, reasonable efforts are made to substantiate interview data with information from other sources. This triangulation was done to crosscheck findings. The other methods of data collection include policy documentation review, the PEFA framework assessment and the applied political economy analysis.

### **4.6 Assessment of activities by IOs in strengthening Tajikistan's PFM reform**

#### **4.6.1 Public Expenditure and Financial Accountability (PEFA) Assessment**

To explore the balance between what has been advised and what is being done, diagnostic tools for standardized assessment of PFM effectiveness are employed. For the purposes of this comparative study, standardized assessments of PFM systems such as Public Expenditure and Financial Accountability (PEFA)<sup>13</sup> indicators<sup>14</sup> are used. The PEFA framework comprises of 28 indicators that

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<sup>13</sup> PEFA is a multi-donor partnership that assesses the condition of country public expenditure, procurement and financial accountability systems, and develops a practical sequence for reform and capacity-building actions.

<sup>14</sup> Development of PEFA indicators is collaborative effort of seven development partners to oversee the development of a universally accepted tool to assess a country's PFM system against 31 indicators in three areas of budget credibility,

assess institutional arrangements at all stages of the budget cycle, together with crosscutting dimensions, indicators of budget credibility and three additional indicators on donor practices.

The PEFA assessment is designed by international organizations to produce standardized or institutionalized and consistent benchmarks for comparison and have a strong quantitative element. Specifically, PEFA indicators are considered as diagnostic economic and sector work (ESW) products developed by the World Bank, the IMF, and partner organizations, and may have been “associated with aspects of fiduciary interests or creditworthiness” (Dressel and Brumby, 2009), or bearing uncertain applicability of a standard “good practice” model of public financial management (Andrews, 2010). Yet, the PEFA Performance Measurement Framework for PFM is the most comprehensive attempt thus far to construct a framework to assess the quality of PFM institutions.

The PEFA assessment methodology is internationally-acknowledged as “the best available tool” (Allen, 2013) and one of the good PFM practices which entails scoring of indicators on a four-point ordinal scale, based on unbiased, clear criteria and evidences. This methodology is aimed at assessing PFM system performance and does not assess fiscal policy - rather this methodology is considered as an integrated basis to verify whether a government possesses the necessary tools to execute its budget. Using this methodology, aid agencies can also evaluate whether aid delivery through certain schemes, say, direct budgetary support, is effective or not.

PEFA assessments have been a good tool for governments to identify their needs and priorities for strengthening their PFM system, for aid agencies to decide whether to use recipient country systems in aid delivery or not, and for researchers at universities and think-tanks to evaluate effectiveness of aid and PFM reform (Andrews, 2010; De Renzio et al., 2011). Design and implementation of the PEFA framework has been successful, too, because “well thought-out indicators provide a robust and stable set of high-level performance standards covering the whole of the PFM system” (Boulding et. al, 2012: 42). The PEFA framework was introduced in 2005, and is a joint product of several international development agencies. It addresses weaknesses, fragmentations and inconsistencies in earlier PFM assessment tools (Allen, 2013; Allen et al., 2004). The PEFA framework “can still be seen as a rather technocratic tool addressing details of the PFM system” (Boulding et. al, 2012: 43). The PEFA framework covers all aspects of budgeting: credibility of the budget; comprehensiveness and transparency; policy-based budgeting; predictability and control in budget execution; accounting, recording and reporting; external scrutiny and audit. Yet, some limitations of PEFA assessments include the following:

- Lack of comprehensive datasets
- Inconsistencies in coverage and use of data: especially for indicators PI-1 to PI-4 data

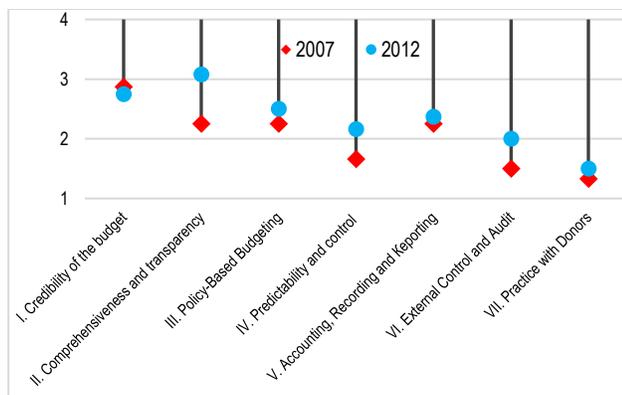
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comprehensiveness, transparency, and the stages of the budget process (i.e., planning, execution, reporting and audit). Development partners are the World Bank, the European Commission, the UK’s Department for International Development (DFID), the Swiss State Secretariat for Economic Affairs (SECO), the French Ministry of Foreign Affairs, the Royal Norwegian Ministry of Foreign Affairs, and the International Monetary Fund (IMF).

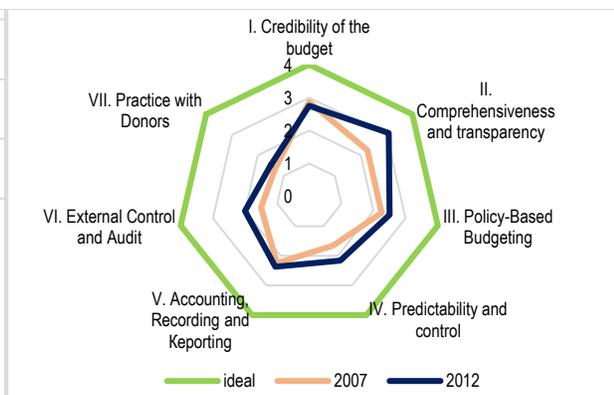
- Data for indicators PI-1 to PI-4 can be amended only when an annual report for state budget execution is ready (usually in June or July of fiscal year). Thus, unavailability and inconsistency of budget data forces restrains the analysis to annual observations and delay in period of investigation.

So far, two assessment reports for Tajikistan were completed in 2007 and 2012. For the purposes of this study, a comparison is drawn between two official PEFA assessments in Tajikistan commissioned by the PEFA Secretariat in 2007 and 2012, and an assessment study undertaken by the author in 2014 using the methodology of PFM Performance Measurement Framework (WB, 2016). Data for the individual assessment are obtained from the annual reports on state budget performance, which is published by the Ministry of Finance and approved by the Parliament of Tajikistan.

Figures 4.17 and 4.18 show the progress in 2012 PEFA assessment since 2007 report. The second PEFA assessment findings indicate that on average, in contrast to the 2007 baseline PEFA report, the indicators of the budget credibility (set of PIs 1-4) improved insignificantly, with an infinitesimal change (Figure 4.18). While performance on indicator PI-1 improved, performance on indicator PI-4 is unchanged, the rest of indicators (PI-2 and PI-3) were found not directly comparable due to a slight change in methodology of assessment. Performance on comprehensiveness and transparency of budget (set of PIs 5-10) was found improved significantly. Policy-based budgeting (indicators PI 11-15) and predictability and control of budget (set of PIs 16-21) slightly improved in the second assessment of 2012. Performance on Accounting, Recording and Reporting (PIs 22-25), on the average, did not change, because, while two indicators slightly improved, one indicator remained the same, and performance on indicator PI-23 (availability of information on resources received by service delivery units) actually deteriorated. Performance on External Scrutiny and Audit (PIs 26-28) improved again with an infinitesimal change (slight improvement in one indicator and two indicators remained at the same level as in 2007). While performance on Donor Practices (indicators D 1-3) were found slightly improved, in fact, it is hard to make such a judgement, because indicators D-1 and D-3 did not change at all, but indicator D-2 shows only slightly better performance (Figure 4.18).



**Figure 4.17** Level of Progress in PFM reform by the PEFA Assessment Reports (2007 and 2012)



**Figure 4.18** Comparison of the PEFA Assessment Reports (2007 and 2012).

*Note:* In order to present these visual graphs, letters were converted to numbers. The lowest possible letter score in the PEFA Assessment (D) was substituted to the score number of 1 and the highest possible letter score (A) to the score number of 4. The letter scores and the number scores have the equal weights: A=4 (the highest score), B=3, C=2 and D=1 (the lowest score).

Along with two PEFA assessments, the IMF's Report on the Observance of Standards and Codes—Fiscal Transparency Module (ROSC), the World Bank's Second Programmatic Public Expenditure Review and the Public Sector Accounting System Review by the Swiss State Secretariat for Economic Affairs (SECO), revealed the most important challenges in PFM reform. Fragmentation of the budget process, significant deviations between the planned and executed budgets, both in amount and composition, lack of an administrative segment in the budget classification, and lack of the unified Chart of Accounts to be integrated with the budget classification were cited by these strategic documents as the then main challenges in PFM reform.

### *Self-Assessment Study*

PEFA (2016: 12) identifies three types of assessment models. First, a self-assessment undertaken and funded by a government with arrangement for independent validation. Second, a joint assessment, conducted for instance by a government in partnership with a domestically based academic or civil society organization that is funded by donors. Finally, an external assessment led by a non-government stakeholders with technical support and funding provided by a government that possesses enough resources and capacity.

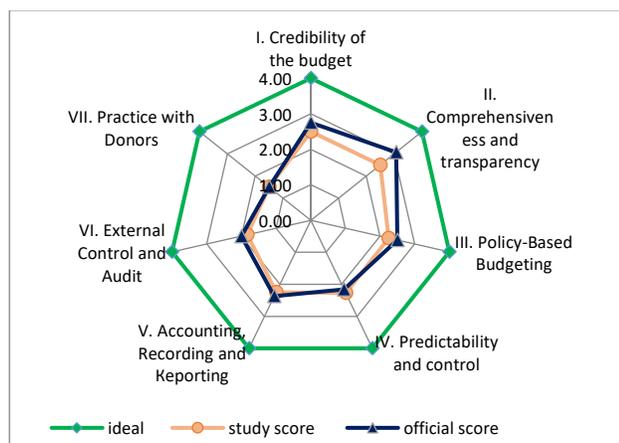
The first type, a self-assessment utilizing the PEFA methodology, can be replicated for the purposes of this chapter. Thus, it entailed comparing the indicators of the PEFA Assessment in 2007 and 2012 with an assessment conducted by the author in 2014. Even though the full and detailed assessment takes much more time, capacity and resources, the author has unofficially conducted a self-assessment of the PFM dimensions using the PEFA methodology. It is not commissioned officially by the PEFA Secretariat, and not validated independently, as the PEFA requires. However, this method of self-assessment is not different from the 'official' PEFA assessment, with the exception that it is conducted independently and may reveal or contain deviations from the official assessment. It is done only to assess the state of affairs in the domain of PFM reform in 2014, two years after the follow-up PEFA

assessment. It simply compares the PEFA indicators from the follow-up 2012 PEFA assessment with where the PFM reform stood by the end of 2014.

The results of author's self-assessment in 2014 using the PEFA methodology suggest that:

- Half of the PEFA indicators (15 out of 31) have not changed at all (48.4%)
- 9 indicators reveal moderate progress (29%)
- 5 indicators show considerable progress (16%)
- 1 indicator demonstrates moderate decline
- 1 indicator was hard to assess because of the lack of data

Although the PEFA's follow-up assessment in 2012 indicates that performance of around 58% of all indicators improved since 2007, the self-assessment by the PEFA methodology shows results that are more modest and less improvement (Figure 4.19). Comparison of the PEFA's follow-up assessment in 2012 with the self-assessment results in 2014 reveals the following. While 15 (51%) indicators have the same scores, 10 indicators (32.2%) show more modest performance results and limited improvements, 3 indicators (9.6%) indicate better scores than the PEFA's follow-up assessment in 2012, 3 indicators (9.6%) are not directly comparable (Appendix 3).



**Figure 4.19** Official PEFA assessment (2012) and self-assessment study (2014)

On the positive side, the study reveals that only 15% of all indicators show significant progress in performance of the PFM systems (whereas official assessment records it at 35.5%) and around 29% of indicators show moderate progress in contrast to 2007 assessment (official assessment indicates 20%). On the negative side, this study shows that almost half of the PEFA indicators - 48.4% are in the same level as in 2007 (whereas the official assessment assesses it at 35.5%). Only one indicator (different ones) in both this study and the official assessment shows deterioration as compared to 2007 assessment.

So, while reliability of the PEFA indicators is not an issue or the focus here, when the assessment of progress in PFM agenda is more transparent and discussed openly involving not only donors,

international organizations and governments at the national level, but more stakeholders they can play a progressive role in strengthening PFM systems in Tajikistan.

#### **4.6.2 Survey of practitioners and public officials involved in PFM reform**

For the purposes of assessment of the PFM system modernization in Tajikistan, a series of semi-structured interviews were conducted with key stakeholders: PFM practitioners, projects donors and officials of the Ministry of Finance in Tajikistan during March – April 2016 and then, follow-up interviews over the phone and email for further clarifications during June – August 2016.

The principal investigator approached interviewees with the questionnaire (Appendix C.2) through a series of enquiries that focus on the PFM achievements by various PFM projects. The evaluation aimed at seeking answers to the following questions:

- What motivates PFM reform?
- How does PFM reform gets implemented?
- Who leads the PFM reform process?
- What do the new PFM structures look like?

The main purpose of this micro-study was the evaluation of the PFM reform in Tajikistan. The assessment of activities by the International Organizations in PFM reform in Tajikistan is generally positive and sustainable, but there are avenues to increasing the overall efficiency and effectiveness of PFM processes.

#### **4.6.3 Interviews Results**

In addition to the key criterion of selection of survey's participants set on at least three years' work experience in PFM field, the proportion of men to women was also carefully selected based on the principles of equality. Among all participants of this study, 53.33% of respondents were men and 46.66% of them were women. 40% of respondents were government officials, 40% were PFM practitioners, experts and consultants, 20% were representatives of donors (Figure 4.20), and the majority of participants (60%) had between 5 and 10 years of working experience in PFM reform in Tajikistan (Figure 4.21). These two characteristics: gender of the total population engaged in PFM reform and participants' working experience (number of years worked in the area of PFM in Tajikistan) makes the sample reasonably representative and consisting of a group with a rigorous experience in the field.

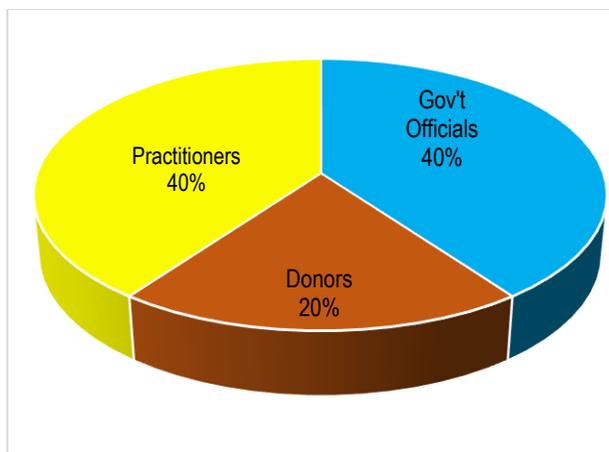


Figure 4.20 Categories of respondents.

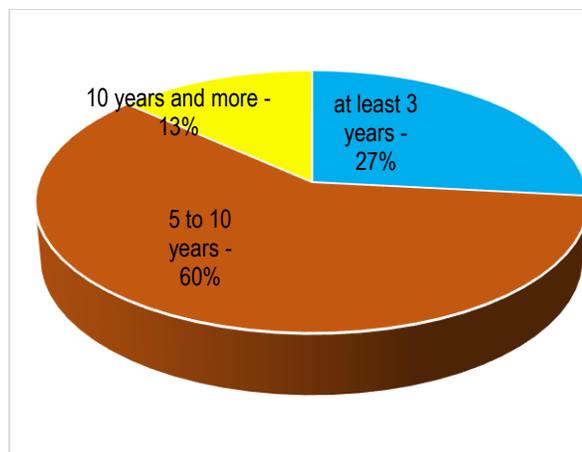


Figure 4.21 Experience of respondents in PFM.

### a) What motivates PFM reform?

Andrews (2015) utilizes competing hypotheses and two theories of ‘solution and leader driven change’ (SLDC) and ‘problem driven iterative adaptation’ (PDIA) to explain successes or ‘positive deviance’ of public sector reforms. His competing hypotheses are useful for the analysis and interpretation of the survey results.

One of the opening key enquiries of the survey thus was an idea to have a better understanding about what are most important motivations and concerns for the PFM system. According to the SLDC theory (Andrews, 2015), most effective reforms are driven by the promise of providing a solution. It is when reform solutions are fully identified at the launch of the reform and afterwards the reform revolve around executing solutions. Next, within the framework of the PDIA theory, Andrews (2015) proposes a competing hypothesis, according to which most effective reforms are driven by a problem or ‘performance deficiency’. It is when an underlying problem is defined at the launch of the reform that creates a desire or enthusiasm for change.

The results of the survey suggest that both hypotheses offered by Andrews (2015) are likely plausible when it comes to PFM reform in Tajikistan. Indeed, at the beginning or at the launch of PFMMP-1 in 2010, the PFM reform was more driven by the promise of solution and concentration on implementing solutions, as reflected by principles set out in the PFM Strategy for 2009-18, PFM Action Plans for 2010-2012 and 2013-15, and by financial support of donors to the first phase of the reform. In contrast to that, the launch of the second phase of the PFM reform (PFMMP – 2 was launched in 2016 and will be implemented until 2021) established a basis to take lessons from myriads of problems encountered while implementing the phase 1 of the PFM reform (PFMMP – 1), which in its turn, stimulated more appetite for change. Desire for change in phase 2 is reflected by adding the coverage of more specific PFM domains to the agenda of reform since 2016. For instance, as Figure 4.14. and 4.15 in page 147 shows, donors supported the second phase of the reform (PFMMP -2) by allocating funds to the

specific PFM domains, such as public administration (23% of funds committed), external audit (13% of funds) and public procurement (12% of funds committed).

When asked about what motivates PFM reform in Tajikistan, 60% of the survey participants responded that building local capacity in better public budgeting, improving the methodological documentation for budget preparation/execution and computerization of different PFM processes are three *most important drivers*. The rest of participants offered broader answers. Two other important motivations behind PFM reform according to the survey participants were more effective public service (27%) and relevance of a strong and solid PFM system to broader society goals (13% of respondents).

In the meantime, two thirds (around 67%) of respondents' *most important concern* for PFM reform was support and coordination of different PFM initiatives by various donors and IOs. According to these respondents, donor fragmentation and lack of compromise among the IOs caused to delays in implementation of several projects. Donor fragmentation, lack of collaboration between IOs even led the SDC, one of the large donors of PFM reform in Tajikistan, to pull out all its support of PFM reform in 2015 and to prioritise support of private sector instead. One of the respondents found the 'best practice' advice in PFM reform as an interesting learning exercise, but in the meantime admitted difficulties faced and explicitly linked the most important concern for the PFM reform with different challenges in implementing the 'best practice' approach in practice:

“Working for PFM reform is much more interesting in terms of learning best practices, but implementing those practices within the real environments is often associated with challenges of various types.”  
(Interview C 02)

Asked about what are strong motivations to provide funding to strengthen PFM reform in Tajikistan, several reasons were given. Among them was overall country development, improving position of the country to receive more development aid, transparency in public money management, accomplishing the work of PFM reform until its logical end and not stopping or pausing in doing what has already been accomplished so far. Some respondents praised the prominence of PFM reform in driving broader public sector reform agenda and a need to keep reforming PFM until its common-sense finale:

“Funding to strengthening PFM reform is important because this is practically the only vehicle for any PFM reforms to succeed and bear fruits in high-return public sector reform in developing countries.”  
(Interview C – 01)

“Since we have some indicators of success, notwithstanding challenges, we have to implement PFM reform until the logical end, it has not reached its logical coherence and culmination as of yet” (Interview A - 03)

The High Level Forum on Aid Effectiveness in Busan, 2011, emphasized that the donors' cooperation and aid effectiveness occupy a crucial role in development (OECD/UNDP, 2016). In addition, the lack of coherence and fragmentation in activities of donors and IOs produces negative outcomes not only

for overall aid effectiveness (Djankov, Montalvo and Reynal-Querol, 2009), but also for government institutions in recipient countries (Morss, 1984; Knack and Rahman, 2007).

Lack of efficient and effective coordination seemed to respondents of the survey as the major concern that reduces motivations for further reform and to some extent, blocks the faster progress of PFM reform. The results of the survey suggest that in PFM reform at times there was inefficient and unproductive cooperation on one hand between donors and IOs, on the other hand between development partners and public officials of mid- and lower ranks. In the meantime, examples of officials' incompetency were given, too.

Respondents were asked if government officials realize the importance of donors' support and a need for all stakeholders and actors to cooperate with each other and pool resources in effectively implementing different avenues of PFM reform in the country. The answers represented three different camps.

The first group, consisting of a small number of participants (13%), acknowledged that not all, but many or an increasing number of government officials realize this importance, but many understand it their own ways, or in their particular area of practice or expertise.

The second group of answers – 40% of respondents -- echoed the reality that majority of high- and medium-ranking officials are aware and fully realize the importance of donors' support and collaboration between all stakeholders. However, the respondents noted the realization of importance is not sufficient prerequisite for effective cooperation between donors and officials from the Ministry of Finance in running PFM programs. Here is an example of the answer from this camp:

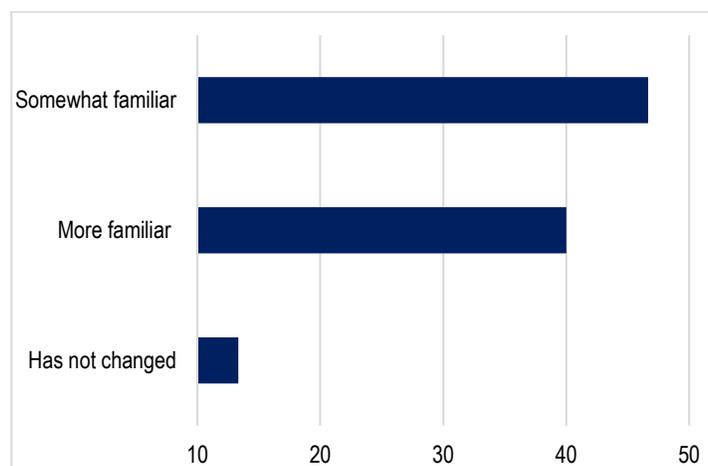
“While most of government officials and civil servants do realize the importance of donors' support and cooperation of stakeholders in implementing PFM reform agenda, sometimes this understanding is not enough for the expected efficient cooperation from their parts. This mostly applies to the medium level managers, whereas the high ranked officials are more responsive with rare exceptions, of course.”  
(Interview C 03)

The majority number of participants comprised the third group of respondents: 47% of respondents answered that only a small number of government officials recognize donors' support in PFM reform and need to cooperate. Here is an answer of one of the respondents from this group:

“From my personal experience, I estimate that only approximately 20% of public servants understand the essence of the PFM reform in Tajikistan, the rest are still not aware of the importance of PFM reform and need to cooperate in this area at all.” (Interview B 01)

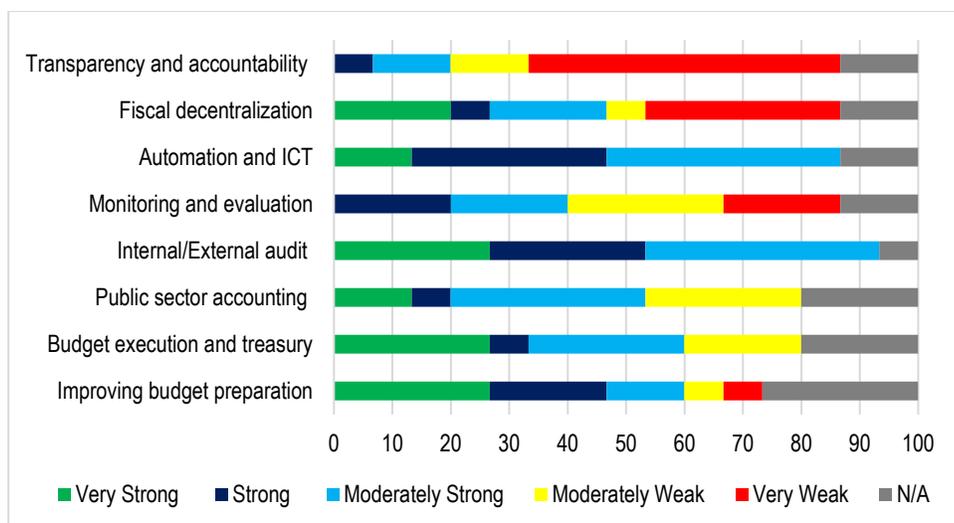
The question about the importance of donors' support and cooperation of stakeholders in PFM reform was coupled with a further clarifying question about the extent of knowledgeability of majority (more

than 66%) of government officials (of all tiers and ranks) about PFM reform. Respondents said that the officials were broadly familiar with the PFM reform – 47% said that they became somewhat knowledgeable about the PFM (Figure 4.22) since 2011, suggesting there is an increasing awareness of the relevance of PFM overall. Of these almost 47% of participants who indicated that the officials became somewhat familiar with the PFM reform, 20% said that since mostly top- and medium-ranking officials are well-aware with the reform itself, and deal with donors and donors’ procedures, but there is a need to establish a Council of Decision-Makers on only the very top level. The majority (80%) of respondents attributed officials’ increasing awareness about the relevance of PFM to training of officials from the Office of the Auditor General and training of members of Parliament in addition to officials from the Ministry of Finance.



**Figure 4.22** Familiarity of public officials with the PFM reform since 2011

Figure 4.23 provides a chart in a stacked bar form that captures the strength of partnership between international organizations, international NGOs and government in different areas of PFM reform in Tajikistan. It shows that cooperation of all stakeholders varies by different PFM functions. The following is the pattern that was found. The partnership between all stakeholders in improving strategic planning and budget preparation system was ranked as very strong by 27% of respondents, as strong by 20% of respondents and as moderately strong by 13.33% of respondents. The partnership with international organization in the issues related to budget execution and treasury operations was ranked as very strong by 27% of respondents, as moderately strong by 33% of respondents and as moderately weak by 20% of respondents.



**Figure 4.23** Ranking of partnership between stakeholders by PFM function

While one-third of respondents (33%) ranked the cooperation on improving the public sector accounting as moderately strong, 27% ranked that as moderately weak. 40% of respondents ranked the level of their organizations' partnership in the areas of internal and external audit as moderately strong and 33% as strong. One third of respondents (33%) ranked partnership in issues of monitoring and evaluation of PFM projects as moderately weak, 20% as very weak, and 20% as moderately strong. This may well suggest that each project funded or implemented by the international organization has its own administrative procedures of reporting and their own line of accountability.

40% of respondents admitted that the most serious and significant challenge in the current PFM reform to be overcome first of all remains to be the capacity building, including training and re-training of officials. Three groups of respondents (20% in each group) named other major challenges that should be addressed immediately in the current stage of reforms:

- a) strategy of budget planning, in particular those issues related to quasi-fiscal activities of the state-owned enterprises (SOE) and 'too optimistic' budget forecasting;
- b) harmonization of public finance legislation and methodology (especially laws of public sector accounting, treasury, taxation, customs and international trade) with each other in order to avoid loopholes and harmonization of few pieces of legislation with international standards of public sector accounting (such as IPSAS) and/or cash commitment and control.
- c) donor coordination and sequence of reform.

While almost all respondents recognized that donor coordination mechanisms do exist, 20% of them acknowledged that donors go on to pursue specific PFM projects that match best with their supply priorities, and overlapping and poor coordination among donors still happens. A participant of this study emphasized the importance of proper coordination along with reform ownership by government within the framework of country's PFM Strategy:

“The major challenge in the current PFM reform process to be addressed first of all is to ensure joint cooperation of all parties/ stakeholders involved. This cooperation should entail strengthened approach, such as ownership and government-led reform agenda, PFM reform strategy and Action plan and common pool of information.” (Interview C 03)

Very limited or very little progress was achieved in two areas of PFM reform: fiscal decentralization component and enhancing transparency and accountability of the all tiers of budgets, as evidenced by the survey results. Forty % of respondents ranked partnership in issues of fiscal decentralization as very weak, but 27% of them ranked that as moderately strong. Fifty-four % of respondents ranked enhancing transparency and accountability of the whole budget cycle through reporting, public access to appropriate data via website, etc. as very weak, 13% as moderately weak, but also 13% as moderately strong.

In general, the above findings of the survey signify a noticeable positive change in PFM reform and policies in public finance. The reform continues. The advice of the IOs in PFM reform as reflected in the PFM Reform Strategy, consequent Action Plans, other policy documentations and subsequent different projects/programmes run in the domain of PFM resulted in the delivery of some components of reform, yet the implementation of the comprehensive PFM reform agenda is not robust with some vexing delays in implementation.

In particular, the results of the survey suggest that building local capacity in public budgeting, improving the processes for budget preparation/execution, making public service more effective and computerization of different PFM domains, were the main drivers of PFM reform during 2010-15. However, the shortage of efficient and effective coordination between all categories of stakeholders created some gaps in the overall reform design and diminished motivations to PFM reform, making some donors reduce financing PFM reform and some to pull out entirely from financing it.

What motivated the PFM reform at its inception was the promise of short-, medium- and long-term solutions identified at the beginning of the reform in the PFM Strategy, with a focus on implementation of solutions, as evidenced by the hypothesis of Andrews (2015) under his “solution and leader driven change” (SLDC) theory. In parallel, what motivates the PFM reform now, at its second phase, which started in 2015-16, is that the reforms motivated by problems identified at the inception phase of PFM reform stimulate appetite for further processes of change, in this case, in the domain of PFM. The latter workings lie exactly within the Andrews’ (2015) hypothesis under the framework of his “problem-driven iterative adaptation” (PDIA). So, the case of PFM reform in Tajikistan support both hypotheses on reform motivations proposed by Andrews (2015).

### **b) How does PFM reform gets implemented?**

The competing hypotheses on how do reforms get implemented, proposed by Andrews (2015), entails the analogous principle with which PFM reform progressed in Tajikistan. Within the framework of the SLDC theory, Andrews (2015) hypothesizes that public sector reform components are in all respects formulated at the beginning of the change process, and are implemented according to a definite plan or certain plan of actions. Similar to Andrews (2015) explanations of positive deviance in reforms, implementation of the PFM reform in Tajikistan has been taking place according to the PFM Reform Strategy signed by the President of Tajikistan in 2009 and relevant three-year Action Plans.

Moreover, under the PDIA framework, Andrews (2015) suggests that positive reform materializes when carrying out experiments and unfolds through a process of trials and errors. It appears that somewhat analogous process seems to emerge since the start of the second phase of the PFM reform in 2015-16. By the second phase, donors learned many lessons on better operationalization the PFM reform agenda and tried to widen their presence in PFM domain. For instance, DFID launched its programme on strengthening Parliamentary oversight of PFM processes and on increasing public demand for budgetary accountability in June 2015, two areas of PFM, where the previous presence and funding of donors was either limited or non-existent.

The results of survey provide evidence for both hypotheses proposed under the SLDC and PDIA frameworks. The hypothesis of Andrews (2015) under both the SLDC and PDIA framework is supported by the responses of the participants. Respondents were asked about most important contributions of their respective organizations to the PFM system in Tajikistan. Their answers included those areas of PFM, which during the inception phase of PFM reform were little known areas, which came to the scene of PFM after they have gone through considerable experimentation by the method of trial and error. For instance, respondents named areas such as preparation of the Medium-Term Expenditure Framework (MTEF) as a part of budget planning, harmonization of cash control and customization of 10 standards of the International Public Sector Accounting Standards (IPSAS) applicable to the PFM environment in Tajikistan. This is a good example of confirming the hypothesis under the PDIA framework.

The respondents also provided examples of their contribution to development or updating PFM Strategy Action Plans, contribution to improvement of legal framework in the internal financial control and adoption of a new Law on Public Finance, to writing analytical paper on budget execution. The latter answers of respondents corroborate Andrews' (2015) hypothesis of driving the reform implementation through a specified plan of actions or piece of legislation.

**c) Who leads the PFM reform process?**

Andrews (2015) has again two competing hypotheses to the question posed. His hypothesis under the SLDC framework is that reform is steered by a top- or high-ranking official holding a position of authority, who is recognized as a leader of reforms. The hypothesis under the PDIA framework is that reform is promoted by a group of players, who perform different tasks needed to drive reform.

The case of PFM reform in Tajikistan is the example of confirming the latter hypothesis only. It is because the World Bank, EU, DFID, IMF, SDC, UNICEF and some other donor organizations, with support of the top management at the Ministry of Finance and approval of the Government have been championing the reform since its inception phase until now, confirming the hypothesis of Andrews (2015) under the SLDC framework. But why were competing hypotheses under both the SLDC and PDIA frames equally applicable to the case of PFM reform in Tajikistan, but not in answering the question about the leadership of the reform process?

Most likely, the answer to this question is tied to, or tangled up with the string of issues of the reform ownership and vested interests of various actors and stakeholders. It goes back to the topic of the ownership of any reform in public sector domain, which is contentious. In this context, Brinkerhoff and Brinkerhoff (2015) believe that what country ownership of the public sector reform in developing countries means in practice remains largely under-examined and disputed. They assert that poor and superficial ownership can be a substantial source of ‘institutional decoupling’ – which entails accepting technical patterns without the necessary social and behavioural changes to ensure the reforms work out as envisioned. Andrews et al. (2014) provides a good example: when in search of a “legitimate looking” project, World Bank and government officials in Mozambique leaned and tilted to a large-scale information technology solution regardless of the failures of analogous earlier projects.

In light of scholars’ discussions above, the participants of this study were asked to assess the status of government ownership in promoting the PFM reform in Tajikistan. One third of respondents (33%) said that PFM reform must originate from government and acknowledged that government should do more to champion the PFM reform, reflected in the following quotes by respondents:

“In my view, the status of the government’s ownership in promoting the PFM reforms requires some actions for improvement.” (Interview C 03)

“PFM reform in Tajikistan when I was last there was largely driven by donors.” (Interview C 04)

“WB and IMF are the drivers of reform, though not always in agreement.” (Interview C 02).

In addition, more than half of respondents (53%) admitted that the issue of country ownership in Tajikistan is further complicated when government officials lack the technical capacity to fully scrutinise the alternatives to what has been proposed, and lack the understanding about how efficiently meet their requirements for implementation specific tasks. In addition to lack of qualification, which could be improved through trainings, respondents as barriers for more effective government ownership named stimulation, staff retention and financial rewards for public officials. Some respondents advised

donors, reformers and international partners look for solutions to get to the core of the problems, be patient for the expected outcomes of reform by having malleable goals:

“Donors should have more insights of insiders and more understanding of beneficiaries’ issues.”  
(Interview C 01)

“No need to rush in implementing PFM reforms -- it is OK if building improved PFM process takes 20 years, and it is very important to have flexible objectives”. (Interview B 02)

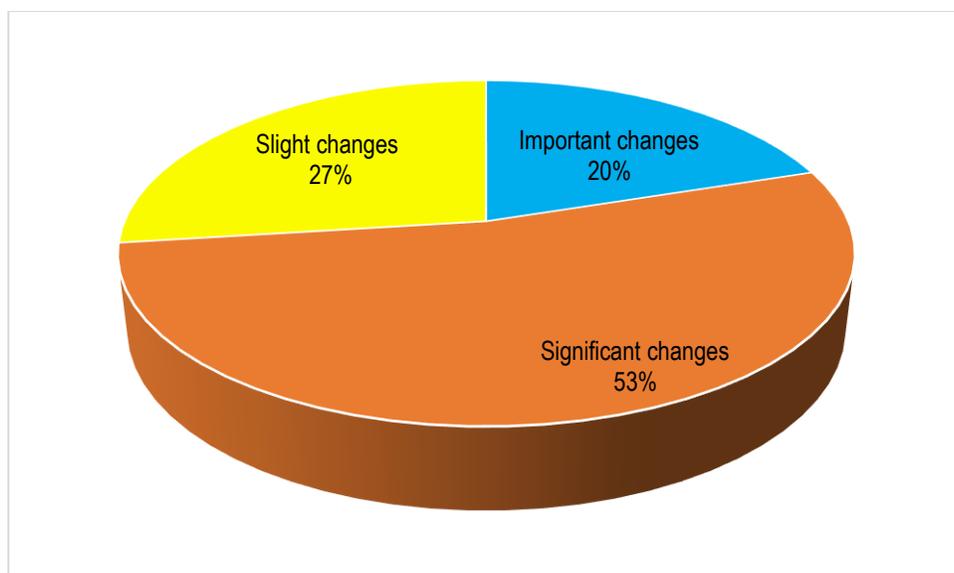
**d) What do the new PFM structures look like?**

To explain changes in public sector reforms, Andrews (2015) proposes a hypothesis under the SLDC framework that positive reforms yield the proper and desirable best practice solutions usually claimed as essential to encourage and promote good governance. Thus, the ultimate reform results are similar to best practice solutions branded at the launch of reform.

The competing hypothesis from the PDIA framework is that positive reforms yield blended or ‘hybrid solutions’, that is, amalgamation of different thoughts from inside and outside, all tailored to the context. Thus, the ultimate reform results are ‘mixed products’ of numerous influences, containing both ‘external’ best practices and ‘domestic’ perfect models and values.

Since the PFM reform continues and we are perhaps only at the middle of the process, we will perhaps know what the new PFM structures look like only in years to come. But the survey data on the extent of changes to PFM systems from its launch till now, the potential effective sources of further reforms and efficiency of PEFA assessment, can be helpful .

More than half of the survey’s participants (53%) said that PFM reform has undergone significant changes, where a few PFM processes have been modified in major ways since the involvement of IOs in PFM reform in Tajikistan. However, the second popular response (27%) was that only slight changes took place where a few PFM processes have been modified in minor ways since the presence of international organizations in the field of PFM. Nevertheless, 20% of respondents characterized changes to PFM as being important changes where many PFM processes have been modified in major ways (Figure 4.24).



**Figure 4.24** Extent of changes in PFM processes according to respondents

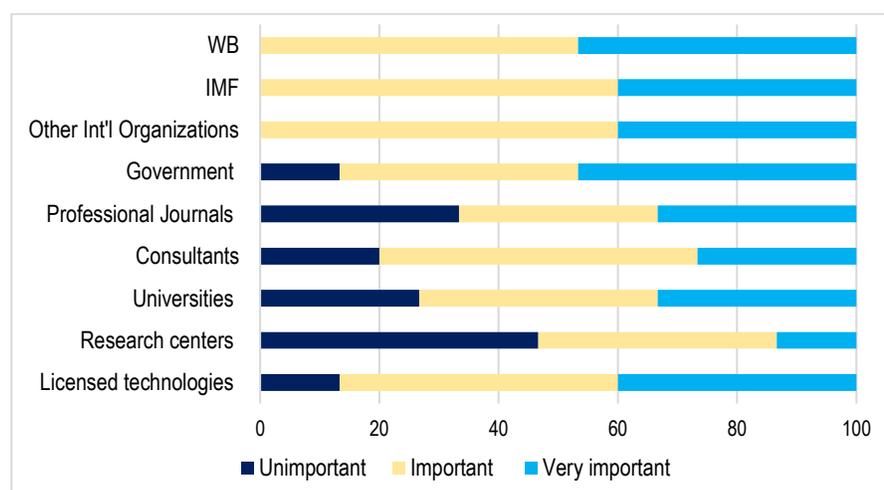
More than half of all participants (53%) of the study said the most effective sources of changes in PFM structure is the World Bank. For one-third of participants the other three most effective sources of changes in PFM structure were: (i) suggestions from different technical assistance programs run by the IMF, (ii) directives from their own organizations, and (iii) requests of either the Ministry of Finance or the government of Tajikistan. The rest of respondents named the Public Expenditure Management Peer Assisted Learning Network (PEMPAL)<sup>15</sup> as an excellent source to facilitate exchange of professional experience among PFM practitioners across the Eastern Europe and Central Asian countries.

The respondents assessed the importance of the international organizations' initiatives in the field of PFM as shown in Figure 4.25. Fifty-three percent of respondents found the latest reform initiatives undertaken by the World Bank as important, and the rest (47%) as very important in strengthening PFM system. Sixty percent of respondents said the fresh initiatives implemented by other international organizations and by the IMF's technical assistance programs are important, and 40% said they are very important in strengthening PFM processes. This suggests that respondents in general view and accept new initiatives by the IOs such as the World Bank and IMF in launching new projects in the field of PFM positively, in addition to being cognizant and aware of the new projects run or funded by IOs. Forty-seven percent of respondents said the utilization of the licensed technologies such as SGB.net (which is now is used increasingly in many transactions by the treasury, including in cash management and commitment control) is important, 40% said it is very important, and 13% said technologies are not that important for successful implementation of any PFM reform. It is an

<sup>15</sup> PEMPAL or the Public Expenditure Management Peer-Assisted Learning network represents a multilateral effort to build capacity and share reform experiences among countries in Central Asia and Eastern Europe, initiated in 2005 by the World Bank and the United Kingdom's Department for International Development.

indication that the majority of respondents are inclined favourably toward customization of the licensed technologies in PFM reform as they can provide incentives for change and technological innovation. However, this also shows that only a small percentage of respondents (13%) are cognizant that PFM reforms could be driven further not only by accepting technologies and technical patterns of the PFM, but also requires deep-rooted social and behavioural changes in thinking. For instance, only a minority of respondents (13%) mentioned that SGB.net is not flexible and based on line items preventing planning and executing local budgets based on activities. Also, only this minority named other shortcomings of the licensed technologies – that further trials and customizations of the technologies are needed on the local level with local staff having trouble understanding them even after receiving training due to lack of capacity. Besides, the respondents also mentioned the issues of connectivity of the system accepting data from local districts and line ministries to central office of the Ministry of Finance.

In addition, 47% of respondents noted the limited role of research centres and think tanks in strengthening the PFM system in Tajikistan, since such centres did not work in the field of PFM reform, while 40% of respondents said the research work of such centres is important in improving PFM system in Tajikistan. This suggests there is an insufficient level of collaboration between implementation of PFM reform by the key players (government and IO) and local research centres, think tanks, local universities and professional journals.



**Figure 4.25** Importance of initiatives in strengthening PFM system

Respondents' perception about the efficiency of regular PEFA assessment somewhat varied. The majority (40%) considered the regular PEFA assessments as efficient tool to reflect changes in PFM system. The view of the one-third (33%) of respondents were that these assessment are efficient only when the PEFA assessments are conducted more accurately and the results for each indicators are easily comparable with each other, and with the performance scores of similar countries. Meanwhile, 27% of respondents noted only a limited role of the PEFA assessments in driving the Tajikistan's PFM

reform agenda overall. The latter category of respondents advised that the PEFA assessments should be complemented by supplementary study:

“PEFA assessment helps, but it usually does not go far enough to explain why things are changing – further qualitative and quantitative research is usually helpful.” (Interview C 04)

#### 4.7 Summary and Conclusion

PFM systems have become a key focus for aid delivery and development, particularly after the 2005 Paris Declaration on Aid Effectiveness. The ODA through country PFM systems has been increasingly a main channel for aid delivery since then, and most likely that development aid and engagement of international organizations in reforming the public sector, primarily through investing to reforming PFM, will grow.

International organizations like the World Bank and the International Monetary Fund have been supporting PFM initiatives, becoming the main drivers of PFM reform as external players. The World Bank and the IMF are two powerful and broadly respected international financial institutions, and looked to for their resources. The number of World Bank-funded projects with a substantive public sector reform (PSR) component, which includes PFM and support to budget reforms, grew four-fold between the early 1990s and 2005. However, as some scholars argue, international organizations’ involvement in the modernization of the PFM systems in developing countries did not improve the PFM processes over the last ten years, and PEFA scores, by and large, suggest disappointing outcomes.

This chapter has attempted to analyze the advice of IOs in the context of PFM reform in Tajikistan. Both the World Bank and the IMF gained leading positions in PFM reform in Tajikistan. The results of this study add to existing knowledge on this subject by providing data from the field, in this instance from Tajikistan. Overall, the main challenges of implementing PFM reforms in Tajikistan are the following:

- The country slowly emerged from a civil war in 1997, its income level is classified as a lower-middle income and it remains a fragile, nascent democracy with documented high levels of corruption;
- Shortage of skilled human resources – in part because of the impact of the civil war on education, and in part because of the fact that many skilled workers have migrated to other countries;
- Tajikistan is transitioning from a centralised to a market economy, requiring radical changes to governance and institutions;
- Multiple development partners, each with their own priorities, methodologies and agendas.

The key finding of Chapter 4 is that IOs achieved some good results in driving PFM reform. The concepts of multi-year budgeting have been adopted through the implementation of the MTEF, budget planning has improved through integrated Economic and Functional Classification budget codes and customization of some standards of IPSAS. Internal audit practices ameliorated and the technical information system such as TFMIS system has better capabilities than few years ago.

However, not all advice and advisory support by IOs has been implemented due to the lack of local capacity, as Tajikistan's PFM reform has to date largely focused on the technical modernization of treasury functions and introducing automated budget processes. For instance, practices of external audit that can meet international standards, fiscal decentralization, local governance, efficiency of public procurement, transparency and accountability of the whole budget cycle through public access to appropriate published data, was not enhanced at all.

It is hard to predict how the new PFM structures will evolve in Tajikistan. The data collected from the review of policy documentations, analysis of the PEFA assessments, and the survey cannot fully confirm the hypothesis under the SLDC frame proposed by Andrews (2015). If we focus on the interim or provisional reform results instead, they are not entirely similar to best practice solutions offered by IOs at the inception phase of PFM reform, as the policy guidance, PEFA assessments and survey results suggest. It is also difficult to support the competing hypothesis from the PDIA framework by Andrews (2015) that 'hybrid solutions' with the blended ideas from the outside and inside, worked entirely in Tajikistan. In fact, so far, PFM reform implementation in Tajikistan offers those 'mixed products' of influences, where external best practices are not fully implemented yet, but domestic best values and perfect models are still sought after.

## Chapter 5

### 5 Conclusions and Policy Implications

This dissertation has explored three critical issues in the political economy of transition states: institutions, tax structures, and a case study of PFM reform. This dissertation has examined factors affecting (i) inadequate/inefficient revenue collection, (ii) changes in revenue structures, and (iii) execution of PFM reform in the context of transition countries. Reforms aimed at improving the tax system and PFM should certainly take into consideration the crucial contributing factors, such as quality of institutions, economic growth and the effectiveness of aid agencies in actual implementation of reform by local government. In this regard, I have estimated quantitative models and analyzed qualitative evidence to answer the research questions and support the relevant hypotheses.

The three main findings of this dissertation are as follows. First, low-quality institutions and socio-economic characteristics influence tax collection negatively, particularly in LMIC, and through tax evasion mechanisms encourage informal solutions between state and taxpayers, primarily in the form of corruption and the shadow economy. Second, economic growth is associated with increase in the ratio of tax revenue-to-GDP. It also affects revenue changes. As a result, tax structures exhibit a U-shaped pattern from traditional society to transitional and to modernity that leads to increased tax structure elasticity, flexibility, or fluctuation over time. Finally, the success rate of implementing reform advice varies in different dimensions of PFM reform that concentrated on technical interventions and produced mixed results.

Chapter 2 attempted to navigate through complex systems of institutions and existent tax policies in transition economies. Two crucial policy implications arise from this chapter. First, taxes are a critical policy issue in transition countries. One of the continuing challenges of many transition countries in building more efficient and high-quality institutions remains inadequate tax collection due to tax evasion. The main factors behind tax evasion are low-quality institutions, when the term institutions is used in its loose form in this context. Manifested in the form of an informal large-scale underground economy, rampant corruption, poor regulatory quality, limited government effectiveness, and inadequate rule of law, low-quality institutions hinder effectiveness of tax collection and are of considerable concern for their economic development and prosperity. Low-quality institutions bring in lower tax revenues in transition economies, too, even though in some countries tax rates are as high as those in developed economies.

Second, with the public finances of many transition countries hampered by institutional constraints, policies that aim to reduce the share of the shadow economy and corruption, construct stronger institutions, establish supremacy of the rule of law, increase government effectiveness, improve regulatory quality, and streamline the design of tax collection, offer prospective sources to generate

greater revenue. While all options pose significant challenges, building higher quality and corruption-resistant institutions could raise and boost tax revenues. One of the ultimate objectives of building higher quality institutions, especially in lower-middle income transition countries, is significant reduction in tax evasion and underground economic activities, corruption and greater compliance.

A key point of Chapter 2 is that low-quality and weak institutions influence tax collection especially in lower middle-income transition economies, thus encouraging informal solutions between state and taxpayers, and directing influence towards inadequate generation of tax revenues, tax evasion, less development, in general, and more dependency on external aid to support national spending. Chapter 2 showed that the concept of how institutional factors influence the ability of the state to generate revenues is inextricably woven into the fabric of the institutional theory framework.

Thus, the future path of development and revenue mobilization in transition countries relies on sensible arrangements, such as how they streamline tax collection, how they reorganize their tax policy-making and their formal and informal institutions to address various complexities to make strategic decisions in each of the countries. Stringent enforcement of institutional rules, investment in human resources and their capacity building, can help to some extent to restrain corruption and to collect taxes more efficiently.

The existence of a large, informal economy in most transition countries, and resultant tax evasion, should be of concern. The institutions studied here are interconnected; for instance, the root of the shadow economy and tax evasion lies in the issue of corruption and weak tax enforcement. Hence, addressing corruption and strengthening institutions of compliance, along with amelioration of government effectiveness, improvement of regulatory quality and supremacy of the rule of law, should be taken as the indispensable part of designing an optimal tax system in transition countries, particularly lower middle-income ones. How to tackle corruption and strengthen institutions? While there are no single and simplistic answers to this question, the following can be done to reduce corruption and improve the quality of institutions to a certain extent to mobilize tax revenues. Launching large-scale anticorruption activities, paying particular attention to cultural norms, social and behavioural changes in thinking and psychology of people, investments in human capital to prepare adequate numbers of dedicated and well-educated professionals, their transparency and accountability, strict enforcement of laws, public sector reform, and good governance.

Chapter 3's main conclusion is that changes in the tax structure and categories of taxes clearly matter when it comes to initiating tax reforms and new tax policies. All the evidence points to affirmative answers to the research questions – economic growth led to a rise in total tax revenue-to-GDP and significant changes in tax structures of transition economies.

As for sizes of potential tax bases, estimates of tax base elasticity suggest that tax revenues in general and taxes on goods and services grow faster than GDP per capita growth in the long-run. Also, the bases of taxes on income, taxes on international trade, all categories of resource direct taxes and non-resource taxes rise more rapidly than GDP per capita growth in the short-run. In other words, the

mentioned tax bases fluctuate more than economic growth over the business cycle. The findings of this study show that taxes on property grow slower than the rate of economic growth in both the long- and short-run in contrast. It is argued, given these findings and the fact that the bulk of revenues in many transition countries are generated by collection of taxes on goods and services, that the focus on reform of VAT is more pivotal for policy-makers in achieving their long-run revenue targets. As for the short-run, tax structures change faster than the rate of economic growth, as the results showed, making almost all categories of taxes, without favouring a particular set, instrumental in selecting strategic policies to fund national priorities.

The broader policy implication of Chapter 3 is that economic growth results in changes to economic structure, government institutions, operation of businesses and consumer behaviour. These changes, in turn, open up opportunities for tax reform and diversification of revenue sources, including the introduction of new taxes that are only possible when the economy has reached a certain level of development and growth.

With economic growth and progress comes improved record keeping, information flow and advances in technologies, even better and more efficient tax administration. As a result of all these, governments' ability to collect higher taxes and concentrate more on specific taxes such as sales and value added taxes, will be enhanced. One can assert that the central arguments articulated by Hinrichs (1966), that as countries move from the lowest income group to the highest, the tax structures exhibit a U-shaped pattern or course of gradual development from traditional society to transitional and to modernity, holds in the case of transition economies.

Our results in Chapter 3 support the idea that use of fiscal policy tools directed towards long-term investment in infrastructure and other initiatives will not only result in higher growth, but strengthen the tax base and further lead to higher tax revenues. This is in addition to providing opportunities to expand the base of certain taxes. It follows that economic development initiatives, even deficit financed ones, will pay off in the long run as future higher tax revenues, caused by economic growth, can be applied to retiring debt. That is, expansionary fiscal policies will prove to be a sensible long-term strategy as the fruits of resulting growth will include higher tax revenues to pay back debt.

Chapter 4's conclusion is that PFM occupies a central role in the realm of governance. Despite its complexities, the reform of the PFM system in Tajikistan is a catalyst to improve aid effectiveness and has enormous potential to achieve other economic goals.

The reported and explained findings of Chapter 4 are based on descriptive evidence produced by a country case study methodology from the: (i) review of the literature and policy documents; (ii) analysis of the PEFA assessments on effectiveness of PFM system; and, (iii) the survey of main actors in PFM reform. The findings suggest that while PFM is evolving rapidly and international organizations provide adequate investments into strengthening it in Tajikistan, the success rate of implementing PFM reform advice varies along different dimensions of reform. PFM reform

implementation during 2010-15 simply has not met all expectations to ensure that government services are improved and more efficient. The practical policy implication so far is that PFM reform plans concentrated largely on technical interventions and produced noticeably mixed results. One can find examples of positive changes in PFM reform, for instance, changes on internal control and audit. Also, improvement in the information systems of the Ministry of Finance and Central Treasury - they are now in a much better condition than they were in 2010. However, effective PFM reform depends on not only delivery of narrow focused technical improvements in certain areas (for instance in the case of Tajikistan, adaptation to the information system to reform treasury operations), but on wide-scale organizational change, and a profound grasp and comprehension of local capacities, traditions, and needs.

The general observation is that as reform of PFM progressed, the push to reform certain areas of PFM at the Ministry of Finance increased, often with the active encouragement of the IOs such as the World Bank and the IMF. For instance, this was the case with integration of the national budget and planning processes, and consolidation of government bank accounts under a treasury single account.

In addition, the efforts of IOs and government in a comprehensive reform in such PFM dimensions as fiscal decentralization and improvement of local governance budgeting, public procurement, external audit, to name only a few, were in most cases fruitless during 2010-15. Two significant factors contributed to this failure. First, there was a lack of coordination among IOs and donors to have concerted efforts to reform PFM, due to each having their own administrative procedures, lines of reporting and accountability. Second, and most importantly, there was a lack of strong and conscious determination in driving the PFM reform further by decision-makers at the level of government with a limited capacity. These factors also caused delays or stagnation in implementing advice offered by IOs at initial phases of PFM reform.

This dissertation as a whole has wider practical implications. Based on the analysis conducted, while designing and implementing policies and programs, the effectiveness of aid and policy directives of the international organizations aimed at lower middle-income transition countries would be significantly enhanced if binding conditions are attached to their financial support packages with prerequisite to comprehensive and wide-ranging institutional, tax policy/tax administration and public financial management reforms. Most importantly, the gradual transformation of lower middle-income transition governments through these reforms to economic powers and influential actors will have profound implications for their citizens and people in terms of improving their conditions of lives.

This dissertation contributes in several ways to the field. First, to my knowledge, it is the first study to use the Government Revenue Dataset - GRD (ITCD, 2016) on taxes and tax classification to study the impact of institutional quality and economic growth on tax collection and tax structures in transitional countries. Second, to my knowledge, this research is the first to examine empirically the relationship of institutions and the tax collection, and linkage between economic growth and tax structures in

transition economies, using panel data and a fixed effects framework. Finally, this research is a contribution to academic and practical debates on the impact of IOs in PFM reform, with the relevant explanations on what has been advised and what has been implemented in a case study of Tajikistan.

**Appendix A.****Appendix A.1** Estimation Results: OLS.

| Dep.Variable: TR                 | OLS                 |                     |                     |                     |                     |
|----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                  | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 |
| <b>Institutions</b>              |                     |                     |                     |                     |                     |
| Shadow Economy                   | -.686***<br>(-2.98) |                     |                     |                     |                     |
| Corruption (TI CPI)              |                     | -.839**<br>(-2.35)  |                     |                     |                     |
| Gov. Effectiveness               |                     |                     | .561***<br>(3.22)   |                     |                     |
| Regulatory Quality               |                     |                     |                     | .523**<br>(3.17)    |                     |
| Rule of Law                      |                     |                     |                     |                     | .545**<br>(2.13)    |
| <b>Development</b>               |                     |                     |                     |                     |                     |
| GDP per capita growth            | .581*<br>(1.67)     | .495*<br>(1.83)     | .414**<br>(2.00)    | .443**<br>(2.31)    | .609**<br>(1.99)    |
| Population growth                | .607*<br>(1.65)     | .781*<br>(1.77)     | .579**<br>(2.23)    | .498*<br>(1.91)     | .472*<br>(1.67)     |
| <b>Openness</b>                  |                     |                     |                     |                     |                     |
| Trade (Exp+Imp/GDP)              | .416*<br>(1.66)     | .455**<br>(2.25)    | .509***<br>(2.76)   | .562***<br>(2.79)   | .633**<br>(2.14)    |
| <b>Economic Structure</b>        |                     |                     |                     |                     |                     |
| Agriculture/GDP                  | -.405***<br>(-4.09) | -.365***<br>(-6.57) | -.347***<br>(-5.78) | -.431***<br>(-6.46) | -.345***<br>(-5.56) |
| <b>Macroeconomic Environment</b> |                     |                     |                     |                     |                     |
| Inflation                        | .141**<br>(2.31)    | .108<br>(1.35)      | .164<br>(1.52)      | .124*<br>(1.89)     | .179**<br>(1.99)    |
| Gross capital formation          | .381<br>(1.16)      | .631**<br>(2.22)    | .596**<br>(2.16)    | .635**<br>(2.33)    | .688**<br>(2.47)    |
| Unemployment                     | -.736**<br>(-2.17)  | -.854**<br>(-2.76)  | -.752***<br>(-2.85) | -.684**<br>(-2.32)  | -.828*<br>(-1.89)   |
| <i>Years after 1998</i>          | .527**<br>(2.36)    | .439***<br>(4.43)   | .565***<br>(2.75)   | .405***<br>(4.99)   | .581***<br>(3.48)   |
| <b>Demographics</b>              |                     |                     |                     |                     |                     |
| Age                              | -.481**<br>(-3.04)  | -.305***<br>(-3.07) | -.343***<br>(-2.93) | -.345**<br>(-2.47)  | -.266**<br>(-2.14)  |
| Urbanization                     | .165<br>(1.27)      | .193<br>(1.48)      | .166<br>(1.54)      | .118<br>(1.49)      | .230*<br>(1.77)     |
| Tourism                          | .645***<br>(3.74)   | .719***<br>(4.93)   | .691***<br>(4.73)   | .764***<br>(4.58)   | .713***<br>(4.79)   |
| <i>Upper-Middle Income</i>       | .315***<br>(3.66)   | .341***<br>(3.89)   | .511***<br>(3.54)   | .313**<br>(2.23)    | .641*<br>(1.69)     |
| <i>Lower-Middle Income</i>       | -.548***<br>(-2.57) | -.323*<br>(-2.64)   | -.237**<br>(-2.10)  | -.264**<br>(-2.38)  | -.351***<br>(-2.74) |
| Constant                         | .169***<br>(6.51)   | .184***<br>(4.77)   | .187***<br>(5.61)   | .128***<br>(7.75)   | .191***<br>(4.91)   |
| F-Test:                          | 14.91***            | 138.48***           | 145.24***           | 141.06***           | 134.30***           |
| Observations                     | 318                 | 396                 | 396                 | 355                 | 355                 |
| Prob > F                         | 0.000               | 0.000               | 0.000               | 0.000               | 0.000               |
| Adj. R-squared                   | 0.908               | 0.862               | 0.879               | 0.897               | 0.871               |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of *t*-statistics shown in parentheses. The OLS specification contained in this table is reported for comparison purposes only.

**Appendix A.2** Estimation Results: Random-effects GLS regression.

| Dep.Variable: <b>TR</b>          | Random-Effects GLS regression |                     |                     |                     |                     |
|----------------------------------|-------------------------------|---------------------|---------------------|---------------------|---------------------|
|                                  | (1)                           | (2)                 | (3)                 | (4)                 | (5)                 |
| <b>Institutions</b>              |                               |                     |                     |                     |                     |
| Shadow Economy                   | -.643***<br>(-3.08)           |                     |                     |                     |                     |
| Corruption (TI CPI)              |                               | -.495**<br>(-2.23)  |                     |                     |                     |
| Gov. Effectiveness               |                               |                     | .381**<br>(1.99)    |                     |                     |
| Regulatory Quality               |                               |                     |                     | .343**<br>(1.99)    |                     |
| Rule of Law                      |                               |                     |                     |                     | .169**<br>(2.08)    |
| <b>Development</b>               |                               |                     |                     |                     |                     |
| GDP per capita growth            | .548<br>(1.45)                | .575*<br>(1.77)     | .549<br>(1.55)      | .458*<br>(1.68)     | .524*<br>(1.64)     |
| Population growth                | .166<br>(1.57)                | .214<br>(1.35)      | .235<br>(1.56)      | .326<br>(1.13)      | .457*<br>(1.79)     |
| <b>Openness</b>                  |                               |                     |                     |                     |                     |
| Trade (Exp+Imp/GDP)              | .241***<br>(2.62)             | .387*<br>(1.74)     | .593*<br>(1.72)     | .411*<br>(1.75)     | .185**<br>(2.33)    |
| <b>Econ.Structure</b>            |                               |                     |                     |                     |                     |
| Agriculture/GDP                  | -.364***<br>(-5.40)           | -.396***<br>(-5.14) | -.367***<br>(-5.57) | -.354***<br>(-4.58) | -.331***<br>(-4.78) |
| <b>Macroeconomic Environment</b> |                               |                     |                     |                     |                     |
| Inflation                        | .197**<br>(2.06)              | .158***<br>(2.67)   | .294*<br>(1.94)     | .283***<br>(2.57)   | .313***<br>(2.74)   |
| Gross capital formation          | .168<br>(1.55)                | .284**<br>(2.02)    | .203**<br>(2.08)    | .296**<br>(1.99)    | .301**<br>(2.12)    |
| Unemployment                     | -.251*<br>(-1.65)             | -.146*<br>(-1.84)   | -.153*<br>(-1.95)   | -.266**<br>(-2.06)  | -.245**<br>(-2.38)  |
| <i>Years after 1998</i>          | .181**<br>(2.22)              | .196***<br>(4.87)   | .224**<br>(4.08)    | .215***<br>(4.34)   | .223<br>(3.83)      |
| <b>Demographics</b>              |                               |                     |                     |                     |                     |
| Age                              | -.629**<br>(-2.06)            | -.597**<br>(-2.17)  | -.563**<br>(-2.48)  | -.597**<br>(-2.35)  | -.561**<br>(-2.14)  |
| Urbanization                     | .702**<br>(2.48)              | .634*<br>(1.67)     | .533**<br>(1.99)    | .568*<br>(1.66)     | .523*<br>(1.81)     |
| Tourism                          | .211**<br>(1.97)              | .189**<br>(2.11)    | .187***<br>(2.95)   | .194**<br>(2.32)    | .185**<br>(2.06)    |
| <i>Upper-Middle Income</i>       | .341*<br>(1.82)               | .446***<br>(2.63)   | .455**<br>(2.02)    | .521**<br>(2.00)    | .491**<br>(1.99)    |
| <i>Lower-Middle Income</i>       | -.612**<br>(-2.27)            | -.461**<br>(-2.27)  | -.404***<br>(-3.05) | -.373**<br>(-2.39)  | -.638**<br>(2.13)   |
| Constant                         | .257**<br>(5.15)              | .204***<br>(5.60)   | .206***<br>(5.84)   | .289***<br>(4.53)   | .192***<br>(4.29)   |
| <i>Wald chi2</i>                 | 168.10***                     | 170.49***           | 157.18***           | 180.85***           | 202.37***           |
| Observations                     | 318                           | 368                 | 396                 | 355                 | 355                 |
| Adj. R-squared                   | 0.828                         | 0.817               | 0.835               | 0.842               | 0.831               |

Note: \*\*\*, \*\*, \* indicate significance at 10%, 5% and 1%, respectively. Absolute value of z-statistics shown in parentheses.

## Appendix B.

### Appendix B.1 Data definition and sources.

| Variables  | Definition and description   | Sources  |
|--|--|--|
| <b>Total Tax Revenues</b> ( $\tau_{it}$ )<br>– dep. var. | Ratio of tax revenue categories as a % of GDP. Tax revenue refers to compulsory transfers to the central government for public purposes. Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. The GRD dataset with general, central governments data, and combined or merged data are employed with 1) basic revenue classification scheme: (a) taxes on incomes, profits, and capital gains; (b) taxes on property; (c) taxes on goods and services; (d) taxes on international trade and transactions; (e) other taxes. 2) expanded revenue classification scheme: (a) non-resource direct taxes; (b) indirect taxes; (c) resource direct taxes; and (d) resource indirect taxes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. | Government Revenue Database (International Centre for Taxation and Development, 2016), World Development Indicators – WDI (2016) and Government Finance Statistics Yearbook - GFSY (IMF, 2016) |
| <b>Direct Taxes:</b>                                     |  |  |
| a) Taxes on income, profits and capital gains            | Taxes on income, profits and capital gains (% of revenue) - Taxes on income, profits, and capital gains are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains. Intragovernmental payments are eliminated in consolidation.   | GRD (ITCD, 2016)   |
| b) Property Taxes  | Total taxes on property  | GRD (ITCD, 2016)   |
| <b>Indirect Taxes:</b>                                   |  |  |
| a) Taxes on goods and services                           | Taxes on goods and services (% of revenue) - Taxes on goods and services include general sales and turnover or value added taxes, selective excises on goods, selective taxes on services, taxes on the use of goods or property, taxes on extraction and production of minerals, and profits of fiscal monopolies.  | GRD (ITCD, 2016)   |
| b) Taxes on international trade                          | Taxes on international trade (% of revenue) - Taxes on international trade include import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes.   | GRD (ITCD, 2016)   |
| c) Other taxes   | Other taxes (% of revenue) - Other taxes include employer payroll or labour taxes, and taxes not allocable to other categories, such as penalties for late payment or non-payment of taxes.  | GRD (ITCD, 2016)   |
| <b>Development</b>                                       |  |  |
| a) GDP per capita growth                                 | GDP per capita growth (annual %) - Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.  | WDI (2016)   |
| b) Population Growth                                     | Population growth (annual %). Population growth (annual %) is the exponential rate of growth of midyear population from year $t-1$ to $t$ , expressed as a percentage. Derived from total population.  | WDI (2016)   |
| <b>Real Openness</b><br>(Export + Import/GDP adj PPP)    | Trade, % of GDP - Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. To calculate real openness, the following formula proposed by Alcalá and Ciccone (2004: 613) was utilized: $Real\ Openness_{AC} = \frac{Imports\ (\$) + Exports\ (\$)}{GDP\ PPP, \$}$ .   | WDI (2016), World Bank national accounts data (2016)   |
| <b>Economic Structure</b><br>Agriculture/GDP             | Agriculture, value added (% of GDP). Agriculture corresponds to the International Standard Industrial Classification (ISIC) divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.  | WDI (2016)   |
| <b>Macroeconomic Context</b>                             |  |  |
| a) Inflation   | Inflation, GDP deflator (annual %) - Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.   | WDI (2016)   |
| b) Gross capital formation                               | Gross capital formation (constant 2005 US\$) - Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices,   | WDI (2016)   |

| Variables   | Definition and description  | Sources  |
|---|---|--|
| c) Unemployment                                     | hospitals, private residential dwellings, and commercial and industrial buildings.<br>Unemployment, total (% of total labour force) - Unemployment refers to the share of the labour force that is without work but available for and seeking employment.   | WDI (2016)   |
| <b>Demographics</b>                                 |   |  |
| a) Age  | Population ages 65 and above as a percentage of the total population. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin.   | WDI (2016)   |
| b) Urbanization                                     | Urban population refers to people living in urban areas as defined by national statistical offices.   | WDI (2016)   |
| c) Population Density                               | Population density is midyear population divided by land area in square kilometers.   | WDI (2016)   |
| d) Tourism  | International tourism, receipts (% of total exports). International tourism receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country. They also may include receipts from same-day visitors, except when these are important enough to justify separate classification. | WDI (2016)   |
| <b>1. Income Level – (33)</b>                       |   |  |
| a) Lower-middle income countries (11):              | Armenia, Cambodia, Kosovo, Kyrgyz Republic, Lao PDR, Moldova, Mongolia, Tajikistan, Ukraine, Uzbekistan and Vietnam.  | WDI (2016);<br>Transitional Economies (TEs) are divided into three income groupings: lower-middle, upper-middle, and high. |
| b) Upper-middle income countries (13):              | Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Macedonia FYR, Montenegro, Romania, Russian Federation, Serbia and Turkmenistan.   | Income is measured using gross national income (GNI) per capita, in U.S. dollars.  |
| c) High-income countries (9):                       | Croatia, Czech Republic*, Estonia*, Hungary*, Latvia, Lithuania, Poland*, Slovak Republic*, Slovenia*.  |  |
| <b>2. Regions/dummy-33</b>                          |   |  |
| a) OECD-member countries (6)                        | Czech Republic, Estonia, Hungary, Poland, Slovak Republic, Slovenia.  | OECD (2016), UN (2016), EU (2016), WB (2016)   |
| b) EU-member countries (11)                         | Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia.   |  |
| c) Non-EU or rest of the East Europe (6)            | Albania, Bosnia and Herzegovina, Macedonia, Montenegro, Kosovo, Serbia;   |  |
| d) FSU East Europe (4)                              | Belarus, Moldova, Russia, Ukraine.  |  |
| e) FSU Caucasus (3)                                 | Armenia, Azerbaijan, Georgia;   |  |
| f) FSU Central Asia (5)                             | Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan;   |  |
| g) Inner and East Asia (4)                          | Cambodia, Lao Republic, Mongolia, Vietnam.  |  |
| <b>2a) Geographic Affiliations/dummy-33</b>         |   |  |
| Balkans (8)   | Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Kosovo, Serbia.  | Pure geographic consideration  |
| Central and East Europe (9)                         | Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia.  |  |
| Rest of Eurasia (16)                                | Armenia, Azerbaijan, Belarus, Cambodia, Georgia, Kazakhstan, Kyrgyzstan, Lao Republic, Moldova, Mongolia, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Vietnam..  |  |
| <b>2b) UN Classif./d.-33</b>                        |   |  |
| <b>a) Developed Economies of Europe:</b>            |   |  |
| New EU member States (11)                           | Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia.   | United Nations (2016) “World Economic Situation and Prospects 2016”  |
| <b>b) Other Economies in Transition:</b>            |   |  |
| South-Eastern Europe (6)                            | Albania, Bosnia- Herzegovina, Kosovo, Macedonia, Montenegro, Serbia.  |  |
| Commonwealth of Independent States and Georgia (12) | Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.  |  |
| <b>c) Developing Economies of Asia:</b>             |   |  |
| East Asia (2)                                       | Vietnam, Mongolia.  |  |
| <b>d) Least Developed Countries:</b>                |   |  |

| Variables   | Definition and description   | Sources |
|---|--|---------|
| East Asia (2)<br><b>Fuel-exporting transition countries (6)</b> | Cambodia, Lao People's Democratic Republic.<br>Azerbaijan, Kazakhstan, Russian Federation, Turkmenistan, Uzbekistan and Vietnam. |         |

#### Appendix B.2 Tax Structure Variables and Columns Abbreviations.

|   |   |  |
|---|---|--|
| <b>I. Total Tax Revenue:</b><br>( $\Delta$ In TR) |   | Total tax revenue, including or excluding social contributions.                          |
| <b>Column 1:</b><br>(inc.SC)                      | a) Taxes including social contributions | Total tax revenue, including social contributions (excluding non-tax revenue and grants) |
| <b>Column 2:</b><br>(exc.SC)                      | b) Taxes excluding social contributions | Total tax revenue, excluding social contributions (excluding non-tax revenue and grants) |

#### A - Basic Revenue Classification, (ICTD GRD, June 2016)

|   |  |  |
|---|--|--|
| <b>II. Direct taxes including social contributions and resource:</b><br>( $\Delta$ In Direct Taxes) |  | Total direct taxes, including resource revenues.   |
| <b>Column 3:</b><br>(INCT)  | a) Taxes on income, profits, and capital gains | Total taxes on income, profits and capital gains, including taxes on natural resource firms. |
| <b>Column 4:</b><br>(PRO)   | b) Taxes on property                           | Total taxes on property.   |

|  |  |   |
|--|--|---|
| <b>III. Indirect Taxes:</b><br>( $\Delta$ In Indirect Taxes) |  | Total Indirect Taxes, including resource revenues. Includes taxes on goods and services, taxes on international trade and other taxes.  |
| <b>Column 5:</b><br>(GST)                                    | a) Taxes on goods and services           | Total taxes on goods and services, which includes (but it not necessarily always equal to) sales taxes and excise taxes.  |
| <b>Column 6:</b><br>(ITT)                                    | b) Taxes on int'l trade and transactions | Total taxes on international trade, including both import and export taxes. In some cases, this figure may also include VAT collected at the border, where countries consistently report revenue in this way. |
| <b>Column 7:</b><br>(OT)                                     | c) Other taxes                           | Total other taxes   |

#### B - Expanded Revenue Classification, (ICTD GRD, June 2016)

|                               |   |
|-------------------------------|---|
| <b>Total Resource Revenue</b> | Total natural resource revenues, including natural resource revenues reported as "tax revenue" or "non-tax revenue". Natural resources are here defined as natural resources that include a significant component |
|-------------------------------|---|

of economic rent, primarily from oil and mining activities.

**Resource taxes**

Component of reported tax revenue that is from natural resource sources, most often, corporate taxation of resource firms.

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|                                    |   |   |
|------------------------------------|---|---|
| <b>IV. Total Resource Revenue:</b> |   | Total resource revenues from both tax and non-tax sources, including and excluding social contributions           |
| (Δ ln RDT)                         |   |   |
| <b>Column 8:</b>                   | a) Resource direct tax including social contributions | Total resource tax revenue, including social contributions. Calculated as “Taxes including social contributions”. |
| (inc.SC)                           |   |   |
| <b>Column 9:</b>                   | b) Resource direct tax excluding social contributions | Total resource tax revenue, excluding social contributions. Calculated as “Taxes excluding social contributions”. |
| (exc.SC)                           |   |   |
| <b>Column 10:</b>                  | c) Resource Component of Indirect Taxes               | Component of indirect taxes from natural resources, for examples through export taxes.                            |
| (RIN)                              |   |   |

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|                                   |  |   |
|-----------------------------------|--|---|
| <b>V. Total Non-Resource Tax:</b> |  | Total non-resource revenues from both tax and non-tax sources, including and excluding social contributions |
| (Δ ln NRDT)                       |  |   |
| <b>Column 11:</b>                 | a) Non-Resource tax including social contributions | Total non-resource tax revenue, including social contributions.   |
| (inc.SC)                          |  |   |
| <b>Column 12:</b>                 | b) Non-resource tax excluding social contributions | Total non-resource tax revenue, excluding social contributions.   |
| (exc.SC)                          |  |   |
| <b>Column 13:</b>                 | c) Non-Resource Component of Indirect Tax          | Total non-resource indirect taxes.  |
| (NRI)                             |  |   |

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## Appendix C.

### Appendix C.1 Advice of initial set of initiatives in strengthening PFM system

|  |
|--|
| <p style="text-align: center;"><b>TASK 1. REINFORCE STABILITY, CREDIBILITY, COMPREHENSIVENESS AND TRANSPARENCY OF THE BUDGET</b></p> <p>1.1 Improve the quality of macroeconomic and fiscal forecasting substantially before 2012.</p> <p>1.2 By 2012, substantially improve quality of budget expenditure planning (improved planning of extra budgetary funds and of supplementary budget).</p> <p>1.3. Ensure that in 2009-2012 government borrowing comply with the approved Public Debt Management Strategy.</p> <p>1.4 Starting 2011, evaluate fiscal risks by 2011, mainly focusing on State-Owned Enterprises (SOEs)</p> <p>1.5 In 2009 develop, approve and start implementing a Plan on approaching the national accounting standards of the public sector to accrual based IPSAS for 2009-2018.</p> <p>1.6 Within the period of 2009 – 2012 develop and implement Unified Chart of Accounts (UCoA) in line with GFS 2001.</p> <p>1.7 Develop and introduce BC comprised of 6 segments in accordance with the concept on BC</p> <p>1.8. Ensure presentation of one Investment Plan starting from the budget 2011.</p> <p>1.9 By 2012, (a) improve the efficiency and effectiveness of revenue collection; (b) develop and integrate an automated tax management system with an automated finance management system.</p> <p>1.10 By 2011, ensure full compliance of public procurement practices with the Law of the Republic of Tajikistan “On Public Procurement of Goods, Works and Services”.</p> <p>1.11 By 2012, develop commitment control system.</p> |
| <p style="text-align: center;"><b>TASK 2. SET CLEAR ROLES AND RESPONSIBILITIES AT CENTRAL LEVEL</b></p> <p>2.1 By 2011, clearly define the (future) PFM functions of line ministries.</p> <p>2.2 Conduct institutional reorganisation of the Ministry of Finance of the Republic of Tajikistan so that the organization structure of the MoF clearly reflects its main functions in the PFM-system by 2011.</p> <p>2.3 By 2012 strengthen the role of the country’ political guidance in the process of budget formulation.</p>  |
| <p style="text-align: center;"><b>TASK 3. BUILD NATIONAL PFM CAPACITY</b></p> <p>3.1 By 2012, the MoF supervises an effective system of advanced training and retraining of personnel employed in the PFM system.</p>  |
| <p style="text-align: center;"><b>TASK 4. IMPROVE CHECKS AND BALANCES</b></p> <p>4.1 By 2012, establish an independent external audit body executing functions of a supreme audit institution of the Republic of Tajikistan. By 2014, the Parliament of the Republic of Tajikistan reviews Budget Execution Reports based on the findings of the supreme audit institution.</p> <p>4.2 By 2018, improve parliamentary inspection of public finance and services. Ensure active participation of the Parliament of Tajikistan in debates on budget documents (activities under this task shall also include measures on building capacity of Upper and Lower Chambers to conduct legal reviews, provide organizational and analytical support and collect information to support activity of members of the Parliament of Tajikistan).</p> <p>4.3 Ensure access of the public to major budgetary documents and policies via the official website of the Ministry of Finance of the Republic of Tajikistan by 2013.</p> <p>4.4 By 2014, ensure that internal audit departments in ministries and departments operate in accordance with international standards of internal audit.</p>   |
| <p style="text-align: center;"><b>TASK 5. INTRODUCE POLICY BASED BUDGETING</b></p> <p>5.1 Ensure that the MTEF principle ‘top-down’ plays a large role in the preparation of the budget of the social sectors for the fiscal year 2010.</p> <p>5.2 Ensure that the MTEF principle ‘down-top’ plays a large role in the preparation of the budget of the social sectors for the fiscal year 2011.</p> <p>5.3 Starting from the fiscal year 2016, the budget is based on the MTEF process across all sectors.</p> <p>5.4 Make preparations for initiating programme and/or performance based budgeting in the long term.</p>   |

**TASK 6. AUTOMATE THE GOVERNMENT'S PFM SYSTEM  
AND IMPLEMENT PROPER TSA**

- 6.1 By 2013, create opportunities for the Ministry of Finance of the Republic of Tajikistan to consolidate the state budget automatically.
- 6.2 By 2012, establish technical capacity to support countrywide IT infrastructure for PFM automation.
- 6.3 By January 1, 2011 create full TSA system at the republican level.
- 6.4 By 2015, create proper TSA, in other words one Treasury account for the republican budget, local budgets and funds-in-trust, including special funds of BOs
- 6.5 By 2015, ensure that budget execution is being monitored and reported on with the use of a new Treasure Management Information System.
- 6.6 By 2012, modernise the existing IT infrastructure of the Treasury to implement all basic functions of cash management and commitment control: cash management forecasting model, commitment control, creation of function in MDCT on accounts payable and electronic signature, creation of suppliers' database.
- 6.7 By 2018, connect all Line Ministries to the TMIS system.
- 6.8 By 2018, automate payroll management in all Main Administrators of Budget Funds.

**TASK 7. DEVELOP INTERGOVERNMENTAL FISCAL RELATIONS**

- 7.1 In the medium term, the budget allocation among different levels of government is based on a stable, objective and transparent methodology.
- 7.2 In the long term, local government is financed in alignment with its functional responsibilities.

**Appendix C.2** Questionnaire on Public Financial Management in Tajikistan.

*Please note that all of the information in this questionnaire will be kept confidential. Your anonymity will be assured as no personal information will be attached to you from the interview.*

There are 3 parts to this questionnaire:

1. Background Data
2. Involvement in PFM Reform
3. PFM Strategy and Change in PFM Structure

**1. Background Data**

1.1. What is your current position?

1.2. Your organization?

1.3. For how long have you worked in current position?

1.4. What are two or three main differences between working for the PFM reform in Tajikistan and in your previous (or current) positions?

1.5. Currently, what issues are central in your work?

1.6. What do you think is the most important motivation and important concern for the Public Financial Management (PFM) system now?

1.7. Why is funding to strengthening PFM reform is important?

1.8. Do you think all government officials and the civil servants realize the importance of donors' support and cooperation of stakeholders in implementing PFM reform agenda?

1.9. To what extent do you think understanding of majority (>66%) of government officials and civil servants about PFM reform agenda has changed since 2011?

- a) Has not changed at all
- b) They have become somewhat knowledgeable about it
- c) They have become more knowledgeable about it

1.10. For the aid money that has been pledged to PFM in Tajikistan, is any of that money 'tied aid' related specifically to training public officials from the following institutions?

- a) Presidential Office (Apparatus)?
- b) Supreme audit institution (SAU) or the Office of the Auditor General?
- c) Parliament?

1.11. What considerations are vital for you?

- Your institution as a whole?
- Your unit/division?
- Your profession/expertise?
- The recipient government?
- Your policy sector/portfolio?
- Formal rules and procedures within your institution/unit/organization?

## **2. Involvement in PFM reform**

2.1. What are your organization's three most important contributions to the PFM system in Tajikistan?  
[If you cannot be precise, rough figures or 'guesstimates' will do]

- Most important?
- Second most important?

- Third most important?

2.2. How many *major* partners does your organization have

a) among international institutions?

b) among national institutions?

2.3. How many *minor* partners does your organization have

a) among international institutions?

b) among national institutions?

2.4. How strong is partnership with other international organizations and NGOs in the following areas of PFM in Tajikistan? Please rank according to the categories shown, if applicable.

|   | Very strong | Strong | Moderately Strong | Moderately Weak | Very Weak | N/A |
|---|-------------|--------|-------------------|-----------------|-----------|-----|
| 1. Improving strategic planning and budget preparation system   |             |        |                   |                 |           |     |
| 2. Budget Execution and Treasury Operations   |             |        |                   |                 |           |     |
| 3. Improving the Public Sector Accounting   |             |        |                   |                 |           |     |
| 4. Internal and External Audit  |             |        |                   |                 |           |     |
| 5. Monitoring, evaluation and feedback  |             |        |                   |                 |           |     |
| 6. Process Automation and ICT Modernization of MoF  |             |        |                   |                 |           |     |
| 7. Institutional reforms and fiscal decentralization  |             |        |                   |                 |           |     |
| 8. Enhancing transparency and accountability of the whole budget cycle (reporting, public access to appropriate data via website, etc.) |             |        |                   |                 |           |     |

2.5. Could you please answer the following questions by reference to your involvement in PFM reform in Tajikistan?

2.5.1. What is the significance of donors/international organizations involvement in PFM reform in Tajikistan?

Agreed? (i.e. you act together/coordinate in an agreed fashion)

Conditional? (what you do depends upon what they do)

Irrelevant (i.e. you run PFM projects independently)

2.5.2. What is the significance of other donors/international organizations actions to your own?

Agreed? (i.e. you act together/coordinate in an agreed fashion)

Conditional? (what you do depends upon what they do)

Irrelevant (i.e. you run PFM projects independently)

2.6. How efficient have been the activities undertaken by the PFM Coordination Council Secretariat so far in two issues below?

|                                 | Very<br>efficient | Efficient | Not<br>enough | Not<br>efficient | Not<br>visible |
|---------------------------------|-------------------|-----------|---------------|------------------|----------------|
| a) Donor<br>coordination        |                   |           |               |                  |                |
| b) Monitoring<br>and evaluation |                   |           |               |                  |                |

2.7. At what PFM niche are your funds/projects aimed?

|  | Significant part | Some part | Small part | N/A |
|--|------------------|-----------|------------|-----|
| 1. Improving strategic<br>planning and budget<br>preparation system  |                  |           |            |     |
| 2. Budget Execution and<br>Treasury Operations   |                  |           |            |     |
| 3. Improving the Public<br>Sector Accounting   |                  |           |            |     |
| 4. Internal and External<br>Audit  |                  |           |            |     |
| 5. Monitoring, evaluation<br>and feedback  |                  |           |            |     |
| 6. Process Automation and<br>ICT Modernization of<br>MoF   |                  |           |            |     |
| 7. Institutional reforms and<br>fiscal decentralization  |                  |           |            |     |
| 8. Enhancing transparency<br>and accountability of the<br>whole budget cycle<br>(reporting, public access<br>to appropriate data via<br>website, etc.) |                  |           |            |     |

2.8. How long have you occupied this niche?

2.9. How much longer do you think you will remain in this niche? Briefly, why you have this time horizon in mind?

2.10 What is the status of the government's ownership in promoting the PFM reforms?

2.11 What else needs to be done to improve the cooperation between donors and governmental institutions?

1.12 What are three major challenges in the current PFM reform process to be addressed initially?

### 3. PFM Strategy and Change in PFM structure

3.1. How often do you review the PFM Strategy?

3.2. How far ahead do you look when evaluating the impact that planned outcomes might have?

3.3. Since the involvement of your organization, what best describes the extent of changes in PFM in Tajikistan?

- a) No change (all PFM processes are still the same)
- b) Slight change (a few PFM processes have been modified in minor ways)
- c) Significant changes (a few PFM processes have been modified in major ways)
- d) Important change (many PFM processes have been modified in major ways)

3.4. What best describes what were the other sources of changes in PFM structure to the extent you have just described? (tick one)

- a) Replication of PFM reform in other post-communist countries or in other countries of the region
- b) Hints from professional journals
- c) Suggestions from the World Bank
- d) Suggestions from the IMF
- e) Suggestions from within your organization
- f) Suggestions from the Ministry of Finance/Government of Tajikistan
- g) Other \_\_\_\_\_
- h) Not applicable

3.5. How important are the following in strengthening PFM system (tick one box in each row)

|   | Unimportant | Important | Very important |
|---|-------------|-----------|----------------|
| a) New initiatives by the WB, such as<br><b>Indicators of the Strength of Public Sector Management Systems (ISPMS*)</b> |             |           |                |
| b) New initiatives by the IMF   |             |           |                |
| c) New initiatives by other int'l organizations   |             |           |                |
| d) New initiatives by the Government  |             |           |                |

- 
- e) Professional or Scientific journals
- 
- f) Government
- 
- g) Consultants or consultancy firms
- 
- h) Universities/academic circles
- 
- i) Research center/think tanks
- 
- j) Licensed technologies, like SGB.NET
- 
- k) Other (please specify) \_\_\_\_\_
- 

3.6. Is regular PEFA assessment an efficient reference or tool to reflect the changes in PFM agenda for the PFM partners (government and donors)?

3.7. Budgetary support programs usually imply fulfilment of conditionalities by the government. What other instruments, in your view, might be useful to apply in getting the reform agenda achieved successfully?

3.8. Have you derived satisfaction from involvement in PFM reform in Tajikistan so far?

- a) Yes  
b) No

3.9. Can you think of particular individuals who you think would be important to interview from your personal networks who could assist with this topic?

3.10. Is there anything important about the PFM system in Tajikistan that I missed to ask you, but you want to raise it now?

**Thank you so much!**

\***ISPMS** - The Indicators of the Strength of Public Management Systems (ISPMS) initiative is a multi-stakeholder effort coordinated by the World Bank to identify and develop international consensus around a comprehensive and comprehensible set of cross-national performance indicators for governance and public management systems that will provide a “health check” and help to prioritize and target reform efforts.

Initially, the initiative has focused on identifying indicators in the areas of public financial management (PFM), procurement, tax administration, public administration and civil service, public information. Transparency, accountability and participation are key themes that cut across these systems.

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