# THE <br> INDIRECT ADVANTAGE OF TRAINING ON PRODUCTIVITY 

by

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#### Abstract

According to the Human Capital (HC) theory, the investment in education/training should benefit a) the employee, by increasing his/her ability to command higher wages, and b) the employer, by increasing the organization's productivity. Research in HC theory generally supports the presence of a positive and direct effect of training on productivity. In this study, we considered the possibility that training might affect productivity in a less direct way. According to this indirect effect hypothesis, training might affect variables such as the turnover within a company, the level of absenteeism, and job satisfaction, which in turn might have positive or negative effects on productivity. The objective of this research was to ascertain both the direct and indirect effect of training on productivity.

To analyze this indirect effect, we adopted a two-step approach. The first step examined the effect of training on absenteeism, turnover, and job satisfaction; the second step examined the effect of training and the other three factors of interest on productivity. It was expected to observe in step one an effect of training on one, or more, of the three variables and then, in step two, an effect of these variables on productivity. In addition, we also expected to observe in step two a direct effect of training on productivity.

To analyze these effects, we used a linear regression approach using crosssectional and longitudinal analyses based on data from the Workplace and Employee Survey (WES) from 1999 to 2005. The results of the first set of analyses were partially consistent with the notion of an indirect effect of training on productivity. We found robust relationships between training and turnover and between training and job


satisfaction in cross-sectional and longitudinal analyses. However, we found a very limited effect of training on absenteeism.

The results of the cross-sectional and longitudinal analyses performed in the second step did not confirm the hypothesis of an indirect effect of training on productivity, since none of the variables of interest: absenteeism, turnover, and job satisfaction, had any consistent effect on productivity. Additionally, no consistent direct effect of training on productivity was observed.

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## 1 Chapter: Introduction

### 1.1. Why Training is Important

For centuries, political theorists have underscored the importance of human capital investment. Both Adam Smith and John Stuart Mill recognized that differing opportunities for education and training allowed certain workers to compete more effectively in the labor market (Mallier and Shafto, 1989). Researchers have traditionally paid more attention to education than to training; only recently have they begun to investigate the topic of training.

This interest in training stems from the changes the economy has been undergoing. Globalization is putting pressure on the organization to constantly adapt to increasingly competitive markets. This new economy will require a dynamic workforce capable not only of adapting to, but also of fostering innovation. Gunderson and Riddell (1995) argued that to ensure Canada's long-term economic growth, the competitive advantage of high wage countries will lie in a "high productivity, high value-added work force" that can produce quality products and services at a competitive cost.

From the point of view of the individual worker, the new economy implies a need to continuously upgrade one's skills to remain competitive in the workforce. The years spent in education generates a form of capital with potentials to produce long-term returns similar to other forms of capital. Increasingly this view has become influential among policy makers, and expanding beyond formal education.

From the perspective of the organization, the new economy implies the need to acquire and maintain an accomplished and skilled workforce. It therefore comes as no surprise that in a survey administered by COMPAS, nearly two third of the executives of Canada's top midcap companies identified the hiring of skilled employees as one of their major challenge. Employee training was a close second (COMPAS, 2005).The changing economic environment has also put pressure on governments to take a more active role in fostering training both nationally and internationally.

### 1.2. Training at the Forefront of Policy Discussions

In Canada, training issues have been at the forefront of policy discussions. Starting in the late 1990s the federal government began to examine the way training was delivered in Canada (Carafa, 2000). Historically, the federal and provincial governments have had shared responsibility for training. The involvement of the federal government in training policies stemmed from the Canadian Employment Insurance Act. This Act consists of two parts: Part 1 provides for income support for people temporarily out of work, and Part II involves active employment benefits to help the unemployed return to work, including labour market training. Provincial governments are also involved in training because of their constitutional responsibility for education. The problem is that this joint responsibility has often been a source of bickering between the two levels of government. Such disputes have often led to limited collaboration and duplication of programs.

In the mid 1990s, the Federal government began the process of transferring labour market training to the provinces. The withdrawal of the Government of Canada from labour market training programs was recognized as an extension of the education system, a provincial responsibility. The transfer of these agreements took place through the signing of the Labour Market Agreement (LMDAs), and by 2005 all provinces had signed LMDAs. These agreements allow the federal government to retain responsibility for EI benefits under EI Act Part 1 (i.e., the passive support measures), but provide for the transfer to the provinces and territories of Part II of the Act (i.e., the active support measures). The transfer to the province is aimed at better tailoring the training policies to the needs of the local economies, and to put in place active labour market measures that better help the unemployed Canadian integrate into the labour market.

In conjunction with implementing similar policy reforms, the Government of Canada has also fostered a culture of learning by promoting a national human capital policy. Productivity has been lagging in Canada and the Government has been trying to address this issue. In 2004, the Liberal Government issued the Innovation Agenda, which consisted of two reports 'Knowledge Matters: Skills and Learning for Canadians', and 'Achieving Excellence: Investing in People, Knowledge and Opportunity'. The former invites all sectors of society to work together in order to ensure Canadians have the tools they need to participate in Canada's workplace. It underscores the importance of creating a well-educated workforce from elementary to post-secondary education for all Canadians. An increasingly skilled workforce is required not only to come up with new and innovative ideas, but to have also the skills in order to implement any new and/or innovative idea (Conference Board of Canada, 2009, 2011). Education and training
systems must rise to the challenge by providing people with the means to learn and retrain throughout their life. In Advantage Canada (2006) which set the agenda for Canada's current government, the Conservative government reiterated its commitment to training and education as critical components for Canada's continued prosperity.

This interest in training is not limited to Canada. At the international level, the Organization for Economic Co-operation and Development (OECD) and the World Bank periodically produce reports underscoring the importance of human capital investment. These organizations also engage in activities that promote such investments (OECD, 2000, 2004, 2007; World Bank, 2010) Developing countries and international organizations look to human capital investment as a means of reducing poverty and income inequality (World Bank, 2011). According to Keeley (2007), the importance of a skilled workforce is also illustrated by the experiences of countries like Germany and the United States, where the advent of mass education, around the end of the $19^{\text {th }}$ century, spurred directly large-scale economic growth. More recently, Asia's "tiger economies, such as Singapore and Korea, experienced increasing levels of literacy before their momentous growth in the 1980s and early 1990s.

### 1.3. Evidence-Based Policy

This interest in training has generated a demand for a better understanding of the effects of training. Training is an investment in human capital. It entails the allocation of resources by a variety of actors: the employer, the employee, and the state, with the expectation of reaping future benefits. For policy makers, education and training are
central policy prescriptions to ensure a country's prosperity. A better understanding of the effects of training is therefore essential not only for private organizations, but also for government and policy makers who have to allocate public resources to foster training.

As governments are under increasing pressure to show greater accountability, efficiency and effectiveness in the administration of policy programs, the need to assess regularly the performance of programs becomes even more compelling. To create the best conditions for growth in the knowledge-based economy, governments need to finetune their policies on education, training, labour adjustment, industrial relations and industry development. Hence, policy/program assessment is necessary in order to make changes and achieve progress in these areas. Both nationally and internationally, steps have been taken to foster more empirical research in education and training. OECD's Center for Educational Research and Innovation (CERI), starting in the 1990s launched the series of "What Works in Innovation in Education" The primary objective of CERI's initiative is to stimulate empirical research aimed at explaining not only what works, but also why, how and under what circumstances. To date, the emphasis of these studies has not been on training, but has focused primarily on assessing and improving teaching and learning tools and/or developing tools for assessing current levels of skills (i.e., International Assessment of Adult Competencies). In an attempt to understand better the impact of training, the Canadian government is not only encouraging workplaces to more actively assess training but it has also put in place surveys to stimulate further research in this area.

In 2007, the federal government, through Human Resources and Skills Development Canada, provided funds to the Canadian Society for Training and

Development (CSTD). The CSTD is a national, not-for-profit, membership association serving the field of workplace learning and performance. The funds were provided over a three-year period to conduct case studies on 12 Canadian firms to assess the value of investing in training (Gillis and Bailey, 2009, 2010).

The Workplace Employee Survey (WES) which is used in this study was designed by the federal government in 1999 with the intent of providing data for researchers to assess workplace practices. The WES allows us to examine the associations between different practices and characteristics of firms and workers over a number of years so as to determine what practices lead to what outcomes. As noted previously, in the last decade the interest in training has increased. This increasing interest is reflected in WES. Indeed, different aspects of training are considered in both the workplace and employee surveys.

The sample for the workplaces comes from the Business Registry of Statistics Canada that contains information on all business locations operating in Canada that have paid employees in March. It does not contain employers operating in Yukon, Nunavut and North West Territories. Employers operating in crop production and annual production; fishing, hunting and trapping; private households, religious and public administration are not included. The employees are then selected from within the sampled workplaces. Given the extensive nature of the survey, it would be very difficult to replicate without incurring excessive costs.

### 1.4. Objective of the Study

The rationale for training is to improve the skill set of workers. It is assumed that training has a direct effect on productivity as a result of the newly acquired skills. However, training could affect productivity in other ways, not necessarily linked to the skill acquisition. In other words, training could have a direct and indirect effect on productivity. There are some indications that suggest the presence of an indirect effect. Specifically, training might affect variables such as the turnover within a company, the level of absenteeism, and job satisfaction. In turn, these variables could have positive or negative effects on productivity ${ }^{1}$. These relations are summarized in Figure 1.1.

The objective of this research was to ascertain whether training has a direct and indirect effect on productivity. To investigate the presence of this direct and indirect effect, we used a two-step approach. In the first step, we investigated the relationships between training and three variables of interest: turnover, absenteeism and job satisfaction that might affect productivity. In the second step, we measured the effect of all these three variables on productivity. The indirect effect hypothesis would predict first an effect of training on level absenteeism, turnover, and job satisfaction; next the hypothesis would predict an effect of all four variables: training, absenteeism, turnover, and job satisfaction, on productivity. The effect of training would demonstrate its direct relationship to productivity possibly via the newly acquired skills; the effects of

[^0]absenteeism, turnover, and job satisfaction, on productivity would be consistent with the notion of an indirect effect of training on productivity mediated by those variables.

We used the data from the Statistics Canada Workplace Employee Survey (WES), which have been collected across several years. The primary advantage of using WES is that we are able to exploit a rich data set from a nationally representative survey of Canadian establishments. The WES data were used to analyze the relationship between these variables using both a cross-sectional and a longitudinal analysis. In the latter case we used differences between pairs of years.


Figure 1.1 - The Indirect Advantage of Training on Productivity

## 2 Chapter: Theoretical Framework: Human Capital Theory

### 2.1 The Basic Tenets of the Human Capital Theory

The renewed emphasis on training has rekindled an interest in the Human Capital (HC) theory, which was first introduced in the 1960s with the work of Gary Becker (1962), Jacob Mincer (1962) and Theodore Schultz (1962). At the core of the HC theory there is the notion that skills are acquired or improved in order to increase productivity. Skills might be acquired through formal schooling, (i.e., formal education) or training programs. Both education and training can be considered an investment in the human capital; like any other investment, this involves incurring costs in the present to obtain future benefits. In this respect, the HC theory deals with the fundamental question of whether this investment is economically worthwhile for either the individual or the organization.

The HC theory has investigated the role of formal education, e.g. to address the issue of whether different levels of formal education afford different rates of return in the form of higher wages. However, in our research we will consider only the HC account of training, which is the acquisition or improvement of skills once the worker is already working.

By affording the worker new skills, training raises the worker's productivity but it might also increase his/her value in the labour market. In correspondence to these benefits, there are direct and indirect costs. The direct costs refer to the actual costs of
acquiring the skills, such as tuition/training outlays, trainers' salaries, and so on; whereas the indirect costs refer to the income/output foregone while acquiring the training. Therefore, from a theoretical perspective, the decision for the trainees or the employer to invest in training is also determined by a cost benefit analysis.

### 2.2 General and Specific Training

With respect to training, an important distinction within the HC theory is that between general and specific training (Becker, 1962; Mincer, 1962). General training refers to the acquisition of general skills; that is, skills that can be used in more than one organization (e.g. a plumber in a renovation company). General training will increase the marginal productivity of the worker receiving that training. However, this increase would be equally useful to other organizations as well. In other words, other companies could also benefit, in terms of productivity, from the increased skills of the trainee. According to the proponents of the HC theory, in a competitive market firms will bid for the trainee's newly acquired skills by offering higher wages equal to the value of the training. Thus, an employer who invests in general training runs the risk of losing the employee to another employer willing to offer wages that are more competitive. This is commonly referred to as the free-rider and/or poaching phenomena. Under these competitive conditions, the wage of the trained worker might eventually increase by the same amount as the increase in productivity. It is easy to see that the employer would gain from the general training only if a) the increase in wage is lower than the increase in productivity or b) the trainee incurs the cost of the training.

Specific training, on the other hand, refers to the acquisition of skills that can be used only in the employer's organization (e.g. paving roads in a region where there is only a single construction company). Specific training increases primarily the productivity of the organization, and is not easily transferable to other organizations. Thus, the rewards for acquiring the additional skills accrue primarily on the organization and not on the trainee. The trainee having learned this organization's specific skills can now perform his/her task more efficiently. However, having acquired these new skills does not put the trainee in any better position to obtain a higher-paid job with another employer unless the prospective employer also requires that specific set of skills. Since there is no competitive demand for the skill, wages need not rise after the training. As a result, according to the HC theory, when the training is specific, wages will rise more slowly than the marginal productivity gain. In this case, the employer would gain from the specific training much more than the trainee. Accordingly, the employer should incur the costs for specific training.

The distinction between general and specific training might be difficult to make in practice; nonetheless, it does have some theoretical value. The distinction was introduced to account for the phenomenon of turnover, which will be examined in more details in Chapter 4. Turnover refers to the rate at which employees change organizations. General training creates the conditions that favor an increase in turnover. This is because the newly acquired general skills provide the employee with a competitive advantage in the labour market; thus, he/she could find more convenient to move to another company. On the contrary, specific training would not provide the employee with the same competitive
advantage and it should result in fewer turnovers. Becker (1975:32) summarized the effect of general and specific training on turnover as follows:

Employees with specific training have less incentive to quit, and firms have less incentive to fire them, than employees with no training or general training, which implies that quit and layoff rates are inversely related to the amount of specific training. Turnover should be least for employees with extremely specific and most for those receiving such general training that productivity is raised less in the firms providing the training than elsewhere...

### 2.3. Earnings growth and productivity growth

The preceding section underscored that the positive effect of training on productivity is associated with a comparable effect on wages. More generally, the HC theory contends that earnings should reflect the level of skills, obtained through education or training, as well as the work experience. Earnings grow with experience because work experience enhances productivity (Mincer, 1974). Earnings growth increases up to a certain age. The combined effects of education, job training, and work experience contribute to the age-earning profile, which has a well-known concave shape. This concave shape reflects two key factors (Gunderson and Riddell, 1993: 453-460): individuals with more years of education generally earn more than those with fewer years of education; and individuals generally continue to add skills, through training and work experience, once on the job. However, the training investment that takes place at a
later age may not pay off as there is a shorter period to recoup the benefits in terms of higher wages and productivity.

Earnings growth might not reflect the actual productivity growth. That is, earning growth might arise because of other institutional arrangements that may appear to be non-productivity related. Examples of this include seniority provisions under collective agreements in either private or public organizations. The proponents of HC theory would argue that "...such practices, however, do not contradict the productivity-augmenting hypothesis, unless it can be shown that growth in earnings under seniority provisions is largely independent of productivity growth" (Mincer, 1974:80). These factors of institutional arrangements were never fully explored by the human capital theory, but could have applied to both private and public organizations.

### 2.4. The Indirect Effect of Training

The HC theory provides a clear framework for analyzing the relations between skills, earning and productivity. However, this framework might not fully capture the complexity of these relations. For example, the relationship between skills and productivity may not be so straightforward. Some authors argued that job performance, and hence productivity, is affected not only by the ability to perform the duties/tasks, but also by the attitudes towards the job (Vroom, 64; Gibson, Ivancevich and Donnelly, 1994). Medoff and Abraham (1980) investigated the relation between education, earning and job performance in managers and professional employees of two American firms. In agreement with the HC theory, the authors found that people with more formal education
and tenure were earning more; however, and in contrast with the HC theory, they also found no link between earnings and performance. The authors speculated that both skill obsolescence and boredom might have been responsible for the decrease in productivity over time. Kaufman (1974) also found that lack of stimulation, and therefore the motivation to work, affected the performance of engineers in their job.

These studies express what a common sense observation is: if employees are unmotivated to work, they might not reach their full potential. As noted in Chapter 1, the competitiveness, and hence the long-term economic growth, of Canadian organizations will depend on their ability to acquire a "high productivity, high value-added work force". This means a skilled workforce operating at its full potential. Not surprisingly, increasingly more organizations are paying attention to the needs of their employees. These organizations are involved in implementing human resources policies/practices aimed at fostering a positive working environment that can meet these needs. To some extent, the implementation of training development policies could have been part of this effort. Thus, fostering a culture of learning could increase not only the skill set of the workforce, but also its commitment to the organization. Or quite the contrary, training may not suffice as a tool to motivate a workforce that is already highly educated. These new developments might have important implications for the HC theory. They open the possibility that the positive contribution of training programs might not be limited to the pure acquisition of new skills, but could extend to other, more general, effects on the organization.

In addition to the direct effect of training on productivity, this research investigated three factors: turnover, absenteeism and job satisfaction, through which training might contribute, albeit indirectly, to the overall productivity of the organization.

## 3 Chapter: Training and Turnover, Absenteeism, and Job Satisfaction

In this chapter, we provide an overview of the research performed on the relations between training and the three variables of interest: turnover, absenteeism, and job satisfaction, which could be at the basis of the indirect effect of training on productivity.

### 3.1. Training and Turnover

Turnover refers to the rate at which employees/workers change organizations. Employees might leave an organization for both job and non-job related reasons. High rates of turnover can be costly for the organization as there are expenses associated with replacing the employee. If the departing employee had also been trained, there is the additional loss of investment in the training. As such, the fear of losing trained workers may lead to less investment in training than is desirable in a competitive market.

As noted in the preceding chapter, the relationship between training and turnover was one of the main contributions of the Human Capital (HC) theory. The HC proponents argued that the rate of turnover depended on the type of training. Turnover should be higher for general training than for specific training. The study of this relation has not been easy, however.

First, the distinction between general and specific training rarely holds in practice. Most training programs contain a mixture of specific and general training. In part, this reflects the need of the organization to have a workforce that has both types of training in
order to be competitive. In addition, the nature of the skill might change over time. Computer training, for example, may have been initially considered as specific training. In some cases, such as learning a specific software package, this might still be the case. However, today many jobs require the use of a computer. Hence, learning how to use a computer, independently of particular software, can be seen as a form of general training. What matters is the nature of the training and how easily it can be transferred to other organizations. Some authors have adopted the general and specific distinction. Others recognizing the difficulty described above have classified training differently.

Krueger and Rouse (1998) investigated the relationship between training and turnover for low skilled workers in two mid-sized American companies, one in service and the other in manufacturing. The training provided general skills such as writing, math as well as specific skills, such as blueprint reading that could not be easily transferable to other jobs. The courses were subsidized by an 18 month grant from the federal Education Department which was part of the federal Education department's attempt to improve workplace literacy for the employer's low skilled workers. The training ran from the end of October 1992 through February 1994. The courses were held on-site and students met twice a week for two hours. The workers voluntarily signed up for the training; however, they could only sign up if their absences did not disrupt the flow of work, as classes met during the regular shifts. The data were obtained from the company's administrative records, and supplemented with survey data that the researchers collected from the employees. The survey elicited qualitative data such as their attitudes towards their job and job performance. The researchers collected both pre and post training data.

To evaluate the effect of training on turnover, the authors used a probit model to estimate the probability of leaving the organization for employees who had received classroom training and those who had not. To this purpose, they defined as "having left the company" those workers that were no longer on payroll one or two years after the training, i.e., from February 1994 to March 1995, for reasons other than a discharge ${ }^{2}$. The result of their analysis indicated that in the manufacturing company, employees who participated in the training were $5 \%$ less likely to have ever left the company than those who did not participate. In the service company, the percentage was 7.7\% (Krueger and Rouse, 1998: 78-79). In other words, having received the training increased the probability of remaining in the company. Notably the differences were not significant. According to HC theory, these results are expected when the "specific" elements of training prevails. This might have been the case because the training involved the ability to read blueprints typical of that industry. However, some other factors might have explained the results. Krueger \& Rouse noted that the participants in the study were less likely to be laid off or discharged; hence, suggesting that the employer valued these trained employees more highly. Thus, the tendency to remain in the organization following training could be determined by the will of the employer rather than that of the employee.

Bishop (1991) used data from the Employment Opportunity Pilot Project Survey of Firms to examine the impact of training on turnover. The survey was administered between February and June 1982 to about 3,400 firms concentrated in South and Midwest

[^1]of the United States. The survey provided information about formal and informal training. Bishop assumed that formal training might be more related to general training, whereas informal training was more related to specific training. Bishop found that turnover was higher for the formal than the informal. These results suggest that formal training, to the extent to which it provides more general skills, contributes to turnover. However, Bishop noted that the effect of formal training might also be because this type of training can be more easily recognized by other organizations.

Leckie et al. (2001) examined the effect of training on turnover by considering the propensity of an organization to invest in training. They used the 1999 WES survey to investigate whether organizations, which were more likely to invest in training, had higher turnover. The authors provided only a descriptive analysis of the data. However, their results showed that while training increases the possibility of turnover, this relationship is not simple. The authors found a very low training rate (31\%) among establishments with zero turnover over the last year, a very high training rate (77\%) among employers with low to medium turnover, and a somewhat lower training rate ( $68 \%$ ) for establishments with a relatively high turnover. Note that the authors did not clarify what they considered medium to high turnover. Nonetheless, their study suggests that training leads to some turnover, although the relationship is a complex one. The authors acknowledged that their results were preliminary since they were limited to only one survey year.

Most recent studies also raise some concerns about the validity of the HC account of the relation between training and turnover. Flaherty (2007) found that tuition reimbursement programs, which are generally linked to the acquisition of general skills,
actually increase employee retention. The author argued that the findings could still be accounted for by the HC theory by assuming that the investment in general human capital is used to complement investments in firm-specific human capital. Koster, De Grip and Fouarge (2009) also found that employer-sponsored general training does not increase the intention to quit, as predicted by HC theory. However, these authors attributed these results to motivational factors; specifically employer-sponsored general training fosters a favorable perception of the commitment of the organization to employee development. This might, in turn, lead to a perception of opportunity for career growth, thereby reducing the intention to quit the organization.

In our study, we investigated the relationship between training and turnover using the data from the WES surveys. In addition to training expenditure, which was also used by Leckie et al. (2001), we considered several other measures of training available in the WES. These included different types of training, such as the employer-sponsored classroom training, employer-sponsored on-the-job training. The rationale for this decision was that training expenditures, as an index of the amount of training provided, do not provide information on the effect of the type of training. The latter could be important because, as shown by Bishop (1991), turnover incidence might vary depending on the type of training (formal vs. informal).

The relationship between training and turnover might also be affected by the employee's perception of the relevance of the training itself vis-a vis the requirements and demands of the job. It is reasonable to expect that workers leave the organization to turn their new skills into pay raises; however, it is also plausible to expect that some workers go away because training is not being provided to meet the demands of the job.

The notion that training might not be sufficient for the demands of the job from the perspective of the employee has not received much attention. We included two training measures based upon the employee perspective regarding the adequacy of training; these were obtained from the Employee survey portion of the WES.

### 3.2 Training and Absenteeism

Krueger and Rouse (1998) also addressed the relationship between training and absenteeism. With respect to absenteeism, the representatives of the manufacturing company had pointed out that absenteeism and tardiness were common employee problems. The organizers of the training program had hypothesized that workers would have more likely come to work when they had class. To test the hypothesis, Krueger and Rouse measured job absenteeism in the manufacturing company as the number of hours that an employee was absent from work, and for which he/she was not paid, each week. Unpaid time also included tardiness. The authors were therefore considering unpaid leave. Their results showed that for each hour of class there was a reduction in unpaid absenteeism of .09 hours ( 5 minutes).

In the case of the service company, absenteeism was calculated as the fraction of the regular workweek that the individual did not work. The results for the service company were similar to those in the manufacturing company. An additional hour of training resulted in a reduction of unpaid absenteeism of .15 hours. The researchers also noted that workers had lower rates of absenteeism during the weeks they had classes and for at least two months afterward.

The evidence suggests that training might reduce absenteeism, although the effect is clearly small. However, as noted by the authors, it is possible that in the long run the effect of training on absenteeism may fade away. A better assessment may require measuring the impact of training on absenteeism over a longer period of time, e.g., one year or more. The dataset used in our study allowed us to examine absenteeism over a number of years using both a cross sectional and longitudinal analysis.

Böckerman et al. (2009) used data from the 2008 Finnish Quality of Work Life Survey to examine the relation between innovative work practices, which included selfmanaged teams, information sharing, incentive pay and employer-sponsored training, on the prevalence of short- and long-term sick leaves. Surprisingly, they found that innovative work practices, and in particular training, were associated with an increase in short-term sick leaves for blue-collar and lower white-collar employees.

For the Canadian context, some evidence of the relation between training and absenteeism came from a study conducted by Dionne and Dostie (2005). These authors used the WES survey (1999-2002) data to investigate the determinants of absenteeism. They focused on certain features in the organization, including the incidence of training.

To measure absenteeism, the investigators used total number of leaves, including paid sick leaves, other paid leaves and unpaid leaves, Furthermore, they controlled for demographic worker information, job and firm characteristics. With respect to training, they included three variables (i.e., industry certified training; other training and having received training in the past year). They found that there was no significant relationship between absenteeism and the first two measures of training. On the contrary, there was a
significant negative relationship between the incidence of absenteeism and training received in the past year (Dionne \& Dostie, 2005:30).

### 3.3 Training and Job Satisfaction

The evidence linking training to job satisfaction is rather limited and conflicting. In their work on the effect of training, Krueger and Rouse (1998) briefly considered, in addition to turnover and absenteeism, also job satisfaction. They found trainees and nontrainees did not differ in the level of satisfaction with the organization. In contrast to Krueger and Rouse, Leckie et al. (2001) found that training could positively affect job satisfaction. These authors using the first 1999 WES set of data from both the employer and employee surveys found that:

- The percentage of employees who were satisfied with their jobs was greater among those who participated in employer-sponsored workplace training as compared to those who did not;
- Employees who reported that the training they received was about right for the demands of their job were more likely to be very satisfied than those who said that the training was too little or too much for the demands of their jobs; and
- Employees in establishments where the amount of training made available to them had increased over the last year were more likely to be very satisfied than those in establishments where training had decreased or had remained stable.

Similar findings have recently been reported by Haile (2009). The author examined the determinants of job satisfaction in Britain using data from the 2004 British Workplace Employment Relations Survey (WERS). One of the most significant determinants of job satisfaction was the presence of a mismatch between the skills demanded by the job and the worker's skills: Workers in jobs that required higher or lower levels of skills than the skills they possessed were less likely to be satisfied with their work.

The importance of satisfaction towards training was also noted by Schmidt (2007) who found that the satisfaction with workplace training is an important component of overall satisfaction. In examining job satisfaction, one needs to also distinguish between overall satisfaction from other aspects of satisfaction. An individual may have satisfaction with many economic facets of his/her job (e.g., pay), but still feel overall job dissatisfaction. In line with this distinction, the WES has two measures of job satisfaction: one provides us with a global attitude and one is related to the facet measures (such as pay) of job satisfaction that are provided by the job. We examined both.

## 4 Chapter: Training and Productivity

Productivity is important. From the employer perspective, increasing productivity can be a matter of survival in an increasingly competitive environment. The issue of productivity is also important for the country. Increases in productivity contribute to higher economic growth, higher standards of living and higher real incomes (Harchaoui and Tarkhani, 2005). Following Harchaoui and Tarkhani, productivity can be increased by building capital; improving production processes; adopting new technologies and improving workers skills.

It is easy to see that all of the above factors could contribute to improving the output of labor, i.e. labor productivity. In economic terms, labor productivity is typically measured as output per worker or output per labour-hour (Bruce 2002). If a worker is provided with better tools and equipment, he/she should be able to produce more output (being it a good or a service). Similarly, if the worker undergoes a training program to upgrade his/her skills, the labor productivity should increase. In the rest of this chapter, we review and discuss the literature on the contribution of training to labor productivity.

### 4.1. Measures of Productivity

Overall, studies have shown that training positively affects productivity. However, the examination of this relationship has not been an easy one, mostly because of the difficulty of measuring productivity. Researchers have measured productivity
either at an individual level, which is the performance of individual workers, or at the organizational level, that is the performance of the organization as a whole.

Productivity has been calculated using subjective and/or objective measures. At the individual level, the productivity of a worker has been measured subjectively using performance appraisals prepared by immediate supervisors. Objective measures, instead, have included measures such as the time required to perform a task, or the number of non-defective unit completed in a unit of time. At the organizational level, subjective measures of the productivity of the organization as a whole have been obtained by subjective assessment given by management. In contrast, objective measures have been obtained through the financial figures of the organizations.

### 4.2. Training and Productivity

### 4.2.1 Training and Productivity at the Individual Level

Holzer et al. (1993) used an objective measure at the individual level to examine the effect of training on productivity. They administered a survey to manufacturing firms that had applied for training grants under the Michigan Job Opportunities Bank upgrade in 1988 and 1989. Productivity was measured by scrap rate (i.e., the percentage of output from a process that fails inspection and cannot be reworked.). The authors controlled for variables that could affect training levels: union status; assistance from the Michigan Modernization Service, sales, employment, and wage levels in the previous year, stated reasons for training. Holzer et al. (1993) estimated the impact of hours of training on
scrap rate. They noted that firms providing more training resulted in higher quality work; that is, they found that the doubling of worker's training reduced scrap rate by $7 \%$.

Similar positive results were also obtained in an experimental study at Garrett Engine, a manufacturer of jet engines Pine and Tingley (1993). The company was concerned about the total downtime (i.e., time when a machine is not being used because the equipment needs repair) of its equipment, which also included the job response time (i.e., the time it takes for a team to respond to a call service) and the job completion time (i.e., the time required to complete a job). In order to improve the total downtime, the organization decided to use a 2-day team-building training program for the maintenance teams that repaired the equipment. Workers were randomly assigned to an experimental group and a control group. Prior to the training, the teams were pre-tested and it was found that the experimental group was slower to respond to the job requests and/or to complete the job. After the program, the downtime of the experimental group improved from 18.4 to 15.8 hours, whereas the control group's down time stayed about the same at 16 hours.

Bishop (1991) used a subjective measure of productivity from the Employment Opportunity Pilot Project Survey of Firms to examine increases in the productivity of newly hired employees who participated in employer sponsored training programs. The survey was administered between February and June 1982 to about 3400 firms concentrated in South and Midwest of the United States. One goal of the survey was a better understanding of the low wage labor market; hence, the sample consisted primarily of establishments in industries with a relatively high proportion of low-wage workers. Productivity was measured subjectively by a question in the survey in which employers
rated their employees' productivity. Employers assessed the productivity of newly hired individuals after 2 weeks, 11 weeks, and 2 years at the firm. Worker productivity was rated from zero to 100 , where 100 equaled the maximum productivity that an employee could get.

In determining the impact of training on productivity, Bishop considered the type of training (e.g., formal and informal), as well as who provided the training (e.g., supervisor, co-worker), and he controlled for both firm (e.g. size) and individual characteristics (e.g. professional category). Overall, the results showed a positive effect of training on productivity, although the size of the effect varied with the statistical model (log or linear) used for the analysis. An increase in informal training from 0 to 100 hours raised productivity of typical employees by 13-15\% in the logarithmic model and 5.3$7.7 \%$ in the linear model (Bishop, 1991: 90).

Bishop noted that subjective measures could not be considered absolute in the sense that it cannot be guaranteed that all employers used the same criteria in assessing productivity. Nollen and Gaertner (1991) showed that subjective measures of productivity taken at the individual level, such as performance appraisal, present additional problems related to the characteristic of the work setting. Nollen and Gaertner (1991) assumed that the relationship between training (on-the-job and classroom), performance and attitudes is not constant across all work settings. To this purpose, they compared factory workers to office workers. The authors used field research data: interviews, focus groups, surveys, and company personnel files, obtained in 1987 in one plant of a Fortune 100 diversified manufacturing firm.

Productivity was measured subjectively using performance appraisals by immediate supervisors. For the factory workers, the appraisals included output measures (e.g., quality and quantity), behavior measures (e.g. absences, housekeeping) and attribute measures (e.g., cooperation, job knowledge). For office employees, the appraisals included descriptions of behavior, including planning, leading, controlling and organizing. Attitudes toward work, defined as willingness to work hard, was measured by a survey administered to employees. The statistical analysis, regression, was conducted separately for factory and office employees.

Overall, the results showed a positive relationship between training and productivity. This relation, however, varied with the type of training and one's attitude towards work. More importantly, the results differed for factory and office workers.

In the factory work setting, the relationship between on-the-job-training and productivity was very positive. Those who reported having received on-the-job-training during the two years before their most recent performance appraisals had appraisal scores that were higher than workers without on-the-job-training (Nollen and Gaertner, 1991: 446-447). However, the relationship between classroom training and productivity was negative. The opposite result was observed for office workers, classroom training had an effect, but on-the-job training did not. Another interesting result was that the attitude about willingness to work made significant contribution to productivity for office workers but not for factory workers. It is possible, as noted by the authors, that the use of performance appraisals in an office setting are more subjective than for factory employees. In the office setting, getting the work done depends more on the ability for supervisor and employee to work together; as such, employees attitudes towards their
supervisors are likely to be related to supervisors' appraisals of employees. Additionally in the office setting, positive attitudes about work can affect the results, as attitudes towards the job influence people's behavior, which in turn can impact performance. In the factory, there is minimum scope for variations in willingness to work hard to affect output. While objective measures such as scrap rate and downtime afford a clearer measure of productivity than subjective measures, they are more difficult to obtain. Subjective measures, on the other hand, may be easier to obtain, but less accurate. In addition, both subjective and objective measure at the individual level often requires accessing additional information about the individual workers in the study. One way to overcome these problems is to examine performance at the organizational level, rather than at the individual level.

### 4.2.2. Training and Productivity at the Organizational Level

Researchers have also-investigated the relation between training and productivity using measures taken at the organizational level. In this approach, productivity is defined as the productivity of the organization itself, not of any specific individual worker. This approach attempts to confirm and complement the results obtained with individual measures of productivity.

One of the first researchers to examine the impact of training on labor productivity at the organizational level was Bartel (1994). In her study, she used the 1983 and 1986 Columbia Business School Surveys that covered a large sample of organizations in the manufacturing sector. The effect of formal training programs
implemented by these organizations in the three years spanned by the two surveys was related to an objective measure of productivity. The incidence of training was defined at the organizational level as the "percentage of the firm's occupational groups for which a formal training program existed". The organization's productivity was defined as valueadded per worker, and it was calculated by dividing the net sales amount, adjusted for the cost of materials, by the number of employees/workers. Bartel examined the relationship between productivity and training within the framework of a non-linear productivity equation (i.e., power function) based on the Cobb-Douglas function. The function requires information regarding amount of labor and capital investments since it assumes that productivity is a power function of capital and labor.

Several control variables were also included in the analysis, such as unionization, age of company, personnel practices. The major finding of this study was that businesses which were operating below their expected labor productivity levels in 1983 and then implemented new employee training programs after that date, experienced a significant increase in labor productivity growth between 1983 and 1986. This higher rate of productivity growth was sufficient to bring these businesses up to the labor productivity levels of comparable businesses by 1986.

Turcotte and Rennison (2004) used the 1999 Workplace and Employee Survey (WES) data to investigate several questions related to the use of technologies in Canadian firms. One of the research questions was whether the productivity benefits are greater when the use of technology is combined with investment in human capital such as education and training. They controlled for both organizational (such as outward oriented firm, i.e., sells a larger share of products/services to the international market) and
individual characteristics. In past studies, the relationship between technology use and productivity at the firm level in Canada had been limited to the manufacturing sector. These studies had also not accounted for the role of technology in productivity. Given the more extensive nature of WES data, Turcotte and Rennison were able to include in their analysis both the manufacturing and non-manufacturing (e.g., service) sector. The inclusion of the service sector was important as this sector accounted for over $80 \%$ of Information and communications technologies (ICT) investment in Canada over the 1989-2000 periods. Boothby et al. (2010) also underscored the importance of training for the effective use of technology for improving productivity.

The training measure used in Turcotte and Rennison's study was the percentage of employees that took computer training that is sponsored by the employer. Technological use was measured as the share of employees at the workplace using computers as part of their normal working duties. These authors used value added per worker to measure the productivity of the organization. Value added was measured as gross revenues minus expenses on material. Expenses on material are equal to gross operating expenditures less payroll and expenses on non-wage benefits and training. As in Bartel, they examined the effect of training and productivity using a Cobb-Douglas function which includes capital and labor inputs. Since capital information is not available in the WES, the authors, albeit recognizing that it was an imperfect measure, utilized information on capital based on industry level data (i.e., average level of capital per location in the industry) obtained from a different survey.

Consistent with past findings (Black and Lynch, 1996), computer training was found to be a highly significant determinant of firm productivity. The results showed that
a 10-percentage point increase in the share of workers receiving computer training is associated with $4.5 \%$ higher productivity. Importantly, it was also found that the impact on productivity from computer skills training was driven by the non-manufacturing sector. Indeed, no similar significant relationship was found in the manufacturing sector.

Leckie et al. (2001) also used the 1999 WES survey to examine whether those organizations, which were more likely to invest in training, were more productive. Contrary to Turcotte and Rennison (2004), these authors used a subjective measure of productivity reported in the employer survey portion of the WES. In this measure, employers were asked to rate their workplace performance in terms of productivity, sales, and profitability. The results showed that those organizations which provided more training, also reported to be more productive. They found that $46 \%$ of establishments that sponsored training also reported increases in productivity in 1998-99.

The effectiveness of training programs on productivity may vary across companies. The Canadian Society for Training and Development (CSTD) measured the impact of training programs in 12 Canadian companies (Gillis and Bailey, 2010). Training was very effective for five companies whereas it was not for the remaining seven. In the latter case, the lack of positive results was attributed to several factors such as training not being aligned with the business; training program not properly designed; and training having limited impact on business outcomes. Gandelman and Santoro (2010) argued that training programs should include content which is reflective of the specific needs of the organization; furthermore, the success of these programs is highly dependent upon the commitment and involvement of top management (Aghazadeh, 2007).

In summary, the positive effect of training on productivity has been demonstrated both at the level of the individual worker and at the level of the organization. In the latter case, the organizational culture can play a significant role. We noticed that the type of training, such as formal and on-the-job-training, as well as firm and individual characteristics, could affect this relationship. In the proposed study, the relationship between training and productivity was examined using an objective measure of productivity based on value added per worker, which refers to the quantity of output produced by a given quantity of labor input.

As in past studies, we considered both formal and informal training. Measures of training included not only the quantity of training (formal \& informal), but also the proportion of employees taking training (formal and informal) in an organization. In addition, we also considered measures of training that take into consideration the perspective of the employee that is if employee in the organization deem the amount of training provided is adequate for the demands of the job and if the amount of training available to the employee has increased.

Recall that some authors have examined the relationship between training and productivity within the context of a productivity function based on a non-linear CobbDouglas function which require knowledge of capital and labor inputs. Since the capital information is not available in the WES, and to the best of our knowledge was not possible to obtain for all survey years considered in this study, we adopted a simplified approach based on a linear function. Hence this study examined whether there was a linear relation between productivity and training either directly or indirectly via other variables (absenteeism, turnover and job satisfaction).

### 4.3. Determinants of Productivity Related to Indirect Variables

### 4.3.1. Turnover and Productivity

There is much research regarding the causes of turnover (due to for example poor pay, bad management), yet comparatively little research exists on the actual effects of turnover.

There are immediate costs associated with employee turnover, which could affect the productivity of the organization in a number of ways. First, if the organization had invested resources on the departing employee, that investment will not have the expected returns. Secondly, there are costs associated with replacing the employee, e.g. hiring a new one. Thirdly, the new employee will require an adjustment period. Finally, the organization will have to spend resources in training the new employee. Hence, the impact of turnover on productivity is assumed to exist because of the costs associated with turnover as well as the loss of employees' acquired knowledge and familiarity with the organization's products and processes. According to Osterman (1987), new employees are rarely as productive as long-tenured ones, since their human capital accumulations are much lower. This is because the accumulation of firm-specific human capital embodied in a workforce determines performance (Strober, 1990).

Research on the impact of turnover on the organization suggests that this relation may not be so straightforward. Perhaps one of the main reasons is that the true costs for an organization associated with employee departure cannot be determined without considering the employee performance. According to Jackofsky, performance and turnover are related in a curvilinear fashion in which " (i) very low performers are pushed out by the organization (ii) low but adequate performers who are allowed to remain on
the job stay because of low ease of movement; and (iii) as performance increases, turnover increases because of increases in ease of movement" (Jackofsky, 1984: 79). While the exit of low performers may not necessarily be bad for the organization, turnover of high performance individuals is likely to impact organizational performance. Jackofsky noted that the desirability of movement can be influenced by the reward administration that is in place within an organization, such as promotions and pay growth. Williams and Livingstone's meta-analysis study confirm this view. The authors found that the negative relationship between performance and turnover was significantly stronger in organizations in which reward contingency was used as compared to those organizations that did not have such a system in place (Williams and Livingstone, 1997: 286-287).

McElroy et al. (2001) examined the impact of turnover and productivity in the United States using financial service company records of 3500 employees working in 31 geographically separated sales regions. Productivity reflected the sales volume produced per month by the average sales representative in each region. This information was obtained from company records, and the productivity measure was calculated by adding the total amount of loans funded per region per month divided by the number of sales employees in the region (2001: 1296).

The authors considered three types of turnover over a two-year period: involuntary (i.e., avoidable turnover such as dismissals), voluntary (i.e., people who voluntarily leave the organization) and reduction in workforce (i.e., downsizing). The authors hypothesized that involuntary turnover -- that is dismissals -- would be positively related to organizational performance. This is because if poor performers are replaced
with better performers, organizational performance should be enhanced. In the case of voluntary turnover, the authors contended that it might not affect organizational performance significantly. The underlining reasons for voluntary turnover are not always clear, and may involve unexpected results. For example, entrance of new employees may entail infusion of new ideas. Voluntary turnover may also involve the departure of poor performers who anticipate a dismissal. With reduction in workforce on the other hand the authors envisioned a negative relationship with organizational performance. This is because with downsizing the employee is not replaced and the departing employees are assumed to have been performing. Contrary to their expectations, the correlation results suggested that all three types of turnover had undesirable consequences for organizational performance. Their findings also suggested that the effects might intensify over a 1-year lag time (2001:1297).

Shaw et al. (2005) also examined the impact of voluntary turnover on workforce performance outcomes in two intra-industry studies: a concrete pipe company and a trucking company. In the production worker study, the two measures of workforce performance used were labor hours per ton and accident rates. For the trucking company three measures of performance were used. The first was the amount of revenue generated by the driver, an out-of service percentage (i.e., violations of federal and state regulations) and the accident frequency ratio.

In both cases, the relationship between voluntary turnover and workforce performance outcome was consistently curvilinear. It was generally negative, but was attenuated as turnover rates rose. The authors described the results as an attenuated negative relationship. These results are in agreement with Price (1977), which had
proposed that successively higher amounts of turnover would be found ultimately to produce, more often than not, successively lower amounts of effectiveness at a decreasing rate. When turnover is very high the organization is geared towards a continual workforce replacement, and increases in voluntary turnover beyond some point are minimally disruptive. When the workforce is being constantly replaced (for example, the turnover rate is 100 percent), marginal increases in voluntary turnover (such as to 110 percent), are proportionally less problematic in terms of productivity and safety than increases at lower average turnover rates (e.g., from 10 to 20 percent).

Hence, in agreement with the human capital theory quits deprive an organization of the skills and abilities necessary for high performance among the workforce. However, Shaw et al. (2005) also showed that beyond a certain point, increases in quit rates are not incrementally erosive. That is, since average firm-specific human capital returns diminish as voluntary turnover increases, the incremental effect of turnover on workforce performance is less severe.

### 4.3.2. Absenteeism and Productivity

Absenteeism, particularly when not anticipated, can potentially have negative consequences for an organization. It can constitute a source of irritation to employers and co-workers. Typically, the work performed by the absentee is either not done or, more likely, performed by a co-worker. As well, the absences of an employee can be bad for the morale of co-workers. A high degree of absenteeism may be an indication of low morale and little commitment towards the organization. More importantly, co-workers
are generally less familiar with the work performed by others and, hence, they might perform that work less efficiently. The result translates into lost of output for the organization.

There are signs in the Canadian context that absenteeism is on the rise. Using data from the Labour Force Survey, which measured absenteeism as time lost due to: illness, disability, personal and family responsibilities, Akyyeampong (2006) found that between 1997 and 2004, overall absenteeism increased from 7.3 to 9.2 days per worker.

Moch and Fitzgibbons (1985) measured the impact of absenteeism on organizational efficiency in a manufacturing industry. They gathered data from company records in a medium-sized assembly and packaging plant in the United States. The company distinguished between unanticipated absences due to sickness and those due to other reasons (anticipated absences). Efficiency was measured using the number of pounds of each product rejected as waste for each week, which were kept in company records. The records used for the analysis spanned a two-year observation period. Moch and Fitzgibbons (1985) suspected that automation might also affect efficiency. To assess the impact of automation they gathered data for those products, which required higher levels of automation, and for those that did not, that is they required high levels of employee involvement. The authors found that absenteeism did not affect efficiency under all conditions. Rather, the results showed that absenteeism affected efficiency only when the absences were unanticipated and when production was not highly automated. Moch and Fitzgibbons' study is important for it provides some insights on the costs of absenteeism for the employer; however, the study was limited to one organization in the manufacturing sector.

The Libet et al. study (2001) on absenteeism and productivity provide further insight also for the service sector. These authors examined one-year (1998-1999) archival data to determine whether absenteeism is related to work productivity at a Veteran Affairs Medical Centre outpatient facility. The study was limited to 22 outpatients' clinicians that included R.N, MSW and PhD.

To derive a measure of absenteeism, the authors focused on two types of leave: sick leave and family care leave. These leaves accrued as a function of number of hours worked. Employees were entitled to take the leaves as they saw fit. Since preliminary analysis indicates that there was a tendency among certain employees to take Mondays and Fridays off, leaves taken in these days were also recorded separately.

Clinical worker's productivity was based on clinician self-report of clinical encounters. The authors chose to represent this variable by including a weighted workload variable; "directs" which represented the average number of hours spent in direct patient contact; and "uniques" which represented the total number of unique patients seen for any clinical reason. They examined the relationship between absenteeism and worker productivity by calculating the correlations between variables in these categories and the incidence of sick/family leave.

The findings provided only a partial confirmation of the relation between absenteeism and productivity. The results did not show a significant inverse correlation between the incidence of sick or family leave and any measure of worker's productivity, although there was a trend in that direction. However, the results did show a significant inverse relationship between the percentage of sick leave and family care leave taken on

Mondays and Fridays and workers' productivity. They also noted that tenure with the organization was inversely related to absenteeism.

The authors noted that some of the correlations were small but in the expected direction. They speculated low statistical power might have obscured potentially significant effects.

The studies above showed that there might be a relationship between absenteeism and productivity as well as between training and absenteeism. In our study, we examined the existence of these relationships. The measures of training and productivity were those proposed in the previous chapters. With respect to the measure of absenteeism, we used paid, unpaid leave and other forms of paid leave. As the reader may recall from the preceding chapters, Dionne and Dostie $(2005,2007)$ as well as Krueger and Rouse (1998) examined the relation between training and absenteeism. Dionne and Dostie used WES data to examine the determinants of absenteeism by focusing on paid and unpaid leaves. The main assumption made by Dionne and Dostie is that leaves could constitute an inducement to absenteeism. The results provided by Krueger and Rouse $(1998)^{3}$ had already shown that absenteeism could be a recurrent practice even when the leave is not paid. We examined unpaid leave, paid sick leave as well as other paid leave separately. We did this over a number of years. In so doing it allowed us to compare the results in terms of their relationships with training and productivity with the same group of employees as well as to extend on past studies. Our study considered three types of

[^2]absenteeism, paid leave (i.e., average day of paid sick in an organization); unpaid (i.e., average days of other paid leave such as education, bereavement) and unpaid leave (i.e., average days of other unpaid leave).

### 4.3.3. Job Satisfaction and Productivity

The interest in job satisfaction stems from the assumption that employee satisfaction could help lower costs through increased productivity and reduced absences, turnover (Cranny et al., 1992).

Job satisfaction might be affected by both economic and non-economic factors. For this reason, it has been argued that measures of job satisfaction related to economic rewards should be separated from overall satisfaction, as they are conceptually different. Overall, satisfaction is essentially the global attitude or feeling individuals have about their job as a whole.

Already in 1964, Vroom showed that job satisfaction and productivity are positively correlated. He reviewed about twenty studies and found a median correlation of about .14. Nearly twenty years after, Iaffaldano and Muchinsky (1985) conducted a similar meta-analysis of several studies. Their results were not very different from those obtained by Vroom. The meta-analysis by Iaffaldano and Muchinsky shows that the correlation between performance and satisfaction is about .17 with a variance of .016 . The studies included in Iaffaldano and Muchinsky's analysis measured productivity using objective (i.e., output) or subjective measures (i.e., performance appraisal). On the contrary, the authors excluded from the analysis those studies that measured job
performance based upon absence, turnover, or union grievances. These variables were excluded in an effort to preserve the clarity of interpretations regarding the satisfactionproductivity relation. Thus, the meta-analysis performed by laffaldano \& Muchinsky shows that a satisfied employee/worker performs more or better. This point was reinforced by a meta-analysis conducted by Podsakoff \& Williams (1986). They examined the results obtained through laboratory and field settings in an attempt to better understand the extent to which rewards are linked to performance. They reported that the average correlation was .27 in situations where rewards were contingent on performance, but only. 17 when they were not ${ }^{4}$. The authors also note that little attention is paid to the effects that other types of reward have on the performance-satisfaction relationship. Training could be a form of reward as it not only allows the employee to perform his/her tasks better, but it could be an indication of the employer's commitment towards the employees since he/she is investing in improving the employee's skill.

In their study using WES data, Dionne and Dostie (2005) found an inverse relationship between job satisfaction and absenteeism. This result should not be surprising in light of the strong effect of job satisfaction on health. Using data from the 2002 Canadian Community Health Survey, Statistics Canada recently reported that while the majority of Canadians in 2002 were satisfied with their jobs, approximately 1 in 12 , that is 1.3 million were not (Shields, 2006). The study found that workers who were dissatisfied with their job were more likely to rate their physical and mental health as fair or poor compared to those who were satisfied. In addition, the level of job satisfaction

[^3]was found to be related to the number of disability days workers had taken in the past two weeks. For every 100 workers who were very satisfied with their jobs, 47 disability days were reported, but for every 100 workers who reported that they were not satisfied with their jobs, the figure was 129 disability days (Shields, 2006: 36). Shields's findings corroborated those of other researchers. Faragher et al. (2005) reviewed a large number of studies on the effect of job satisfaction. The results showed that an increase in job satisfaction is associated with improved health. Interestingly, job satisfaction was more strongly associated with mental/psychological problems than with physical complaints.

We have seen that the relation between job satisfaction and productivity has been verified in numerous studies; however, as seen in Chapter 3, the relation between training and job satisfaction is less clear. In our study, we examined both relationships using the same data set. For our measure of job satisfaction, we will use measures that account for both overall satisfaction as well as facet measures of job satisfaction.

### 4.4. Other Determinants of Productivity

In examining the relation between training and productivity, our analysis will also consider other variables, which have been identified in the literature as having an impact on productivity. These variables are technology, the outward nature of the organization, HR practices, unionization and age of the organizations.

## Technology

Beginning in the 1960 s , changes have taken place in the composition of investment in the Canadian economy. Investments have progressively shifted towards
information and communications technologies (ICT) overshadowing those associated with other forms of investments such as machinery, building structures, land (Baldwin and Gellatly, 2007). The desire to understand better the impact of technologies on Canadian firms led Statistics Canada to develop and administer technology surveys in the manufacturing sector. These surveys include the 1989 Survey of Manufacturing Technology; the 1993 Survey of Innovation and Advanced Technology; and the 1998 Survey of Advanced Technology in Canadian Manufacturing.

Baldwin et al. (1995) were among the first researchers to examine the relations between technology and business performance using data from 1989 Surveys of Manufacturing Technology (SMT) developed by Statistics Canada. The data from this survey was then linked to the Annual Survey of Manufacturers (ASM) for the period 1981 and 1989. ASM is a longitudinal file that contains economic performance data such as data on plants' sale, value added, wages and employment. To examine changes in relative labour productivity, the ratio of output per production worker for technology users and non-users was calculated. The establishments were divided into functional groups which included Design and Engineering; Fabrication and Assembly; Automated Materials Handling System; Inspection and Communications; Automatic Control Devices; Manufacturing Information Systems; and Integration and Control Devices. With the exception of the Fabrication and Assembly group, technology users enjoyed a significant labour productivity over non-users (Baldwin et al., 1995: 23-24). According to the researchers, the lower productivity rating for the Fabrication and Assembly group could be explained by the fact that this group had one of the lowest technology adoption rate.

Baldwin and Sabourin (2001) combined survey data on technology use from the 1998 Survey of Advanced Technology in Canadian Manufacturing (SATM) with longitudinal data on labor productivity from the Annual Survey of Manufacturers (ASM) for the period 1988 to 1997. They focused on technologies associated with the information and communications technology. The sample consisted of plants that used exclusively software technologies, exclusively hardware technologies, exclusively network technologies and those which used various technology combinations. The results of their regression analysis suggested that improvements in relative productivity were linked to use of network communications technologies and the simultaneous use of technologies from all three groups (hardware, software or communications). Those plants that used combined technology strategies experienced the largest gains in productivity.

The above studies focused on the manufacturing sector. Turcotte and Rennison (2004) expanded the scope of these studies by examining also the service sector. As noted in Section 3.3, their study focused on the intensity of technology within these firms and its impact on productivity. They found that computer use made the largest single contribution: a $10 \%$ increase in the share of workers using computers raised productivity by almost $4.5 \%$ (Turcotte and Rennison, 2004: 31). In this study, consistent with the definition used by Turcotte and Rennison, technology was measured as the proportion of employees using computers at work.

## Firms with outward orientation

Economists have argued for centuries that productive industries are those exposed to competition in international markets (Adam Smith, David Ricardo, Balassa \&

Samuelson). Competition is a key driver to productivity. This is because competition forces industries to seek ways to improve their efficiency and price, compared to those operating in closed markets. For example, by competing in international markets, firms are encouraged to improve the quality of their labor, their capital, their management and organizational structure, as well as to adopt best international practices.

Baldwin and Gu (2003) examined the relation between export market participation and productivity performance in the Canadian manufacturing sector using data from the Annual Surveys of Manufacturing (ASM) plants from 1974 to 1996. Labor productivity was defined as value-added per employee. There were limitations to the ASM for it did not contain information on capital stock and investment expenditures. To solve this issue, the authors used energy costs to proxy capital stock. The authors divided the firms in their sample into exporters and non-exporters. They noted that exporters were more productive than non-exporters, as well the productivity difference between exporters and non exporters widened over the period of interest, rising from $24 \%$ in 1974 to $90 \%$ in 1996 (Baldwin and $\mathrm{Gu}, 2003: 9$ ).

The authors then examined whether export participation led to better productivity performance. Using a sample of continuing plants in the 1990-96 period, they compared the productivity growth differentials for three cases: (i) entrants vs. nonentrants; (ii) exiters vs. continuers; and (iii) exiters vs. nonparticipants. Their results showed that entrants to export markets had an average annual labor productivity growth of $5.2 \%$ points higher than that of the nonentrants (Baldwin and Gu, 2003: 14). In the second case, the comparison of the exiters vs. continuers showed that productivity growth was slower for those firms that exited export markets by about $5.6 \%$ per year (Baldwin and Gu,

2003: 15). Finally, the comparison between exiters vs. nonparticipants showed that the plants that exited export markets had slower productivity growth than nonparticipants. In sum, the results showed that those firms oriented towards export markets had higher productivity compared to those who were not.

Turcotte and Rennison (2004), using 1999 WES data that included both the manufacturing and service sectors, found that firms with an outward orientation approach towards trade (i.e., those organizations that sell a larger share of their sales to the international marketplace than to the national market place) exhibited higher productivity levels. They found that the productivity of a domestic owned location that was outward oriented was $40 \%$ higher than its inward-focused counterpart (Turcotte and Rennison (2004:28).

In this study, we also measured the outward orientation nature of the organization as the percentage of total sales from all products and services to USA market and the rest of the world.

## Human Resources Practices and Unionization

Ichniowski et al. (1997) examined the productivity effects of human resources $(\mathrm{HR})$ practices on production lines in the steel finishing processes of 17 unionized and non-unionized steel companies across the United States. The data were gathered through field interview that were conducted for one to three days at each site. To measure the lines of performance, the researchers accounted for the production processes. Information on HR practices was gathered by using both data from the interviews as well supporting information obtained from other sources, such as personnel files, collective
bargaining agreements. The HR variable measured work practices in all major areas of personnel management, including compensation, team-based work organizations, flexible job assignment, employment security, communication procedures, and skills training. The researchers found that clusters of complementary human resources practices had an effect on performance. Specifically, workers' performance is better under a system of practices that included incentive pay plans coupled with work practices such as flexible job design, employee participation in problem solving teams, and training. Overall, the results suggest that HR practices are more relevant when considered in clusters (as a group) than when considered individually.

Boning et al. $(2001,2007)$ also examined the impact of HR practices, such as incentive pay and problem solving teams, on productivity of US steel mills production lines. Data were obtained through site visits and interviews over a three-year period. The incentive pay plan was a function of production, product quality and profits. Problem solving was measured by the presence of a formal team structure designed to involve production workers in indentifying ways to improve the production. Productivity was measured in terms of yield: the ratio of the number of "high quality" tons produced over the total number of tons that had been loaded onto the production line (Boning et al., 2007: 623-625). According to the authors, this measure of productivity captured both the output and the quality dimensions. Furthermore, the authors also noted that workers improved productivity by undertaking activities and decisions that limited and/or prevented the production of low quality output, e.g., due to "wrecks" on the line caused by jams. The results of their study showed that the adoption of these HR practices led to
increases in productivity; the magnitude actually increased where the production process was complex.

The above studies focused on the steel-industry; it could be argued that their results might not generalize to a broader segment of the economy. However, Black and Lynch (2003, 2004) showed that similar results are obtained across different industry sectors. They used data from the 1994 and 1997 Educational Quality of the Workforce (EQW) National Surveys. These surveys had been administered by the U.S. Bureau of the Census to a nationally representative sample of private manufacturing establishments in the USA. The factors considered included incentive plans, such as profit sharing or stock options, and employee participation as measured by unionization. The effect of these factors on productivity was assessed using the Cobb-Douglas production model. The researchers performed two types of analysis: cross sectional and longitudinal analyses.

For the cross sectional analysis, the authors used only the 1997 data. The results showed that organizations offering profit sharing or stock options, and unionized organization had higher productivity levels. The authors also considered whether organizations had undergone a recent HR re-engineering effort. Interestingly, they found that unionized establishments that had gone though a recent re-engineering effort had higher productivity, suggesting that unions can play a positive role by making workplace reorganizations more effective. The longitudinal analysis confirmed the effect of unionization but not that of profit sharing.

In our study, we examined both HR practices and unionization. For clarity, HR practices were aggregated in two clusters. The first included HR practices related to compensation, such as profit sharing, skill based pay, etc. The second cluster included

HR practices related to work organization, such as problem solving teams, flexible job design, etc.

In this study, unionization was measured as the proportion of employees that are unionized at the workplace.

## Age of the organization

According to the product life-cycle theory, there are different stages in the life span of a product/industry (introduction, growth, maturity and decline). Bartel and Lichtenberg (1987) argued that younger organizations might be less productive, particularly at the early stages. To this purpose, they examined the extent to which the product life-cycle was applicable to the high technology industries in the USA. They targeted the high technology field because they assumed that organizations working in this sector were likely to be younger than those working in other sectors.

The determination of whether an industry was classified as being a high technology industry was based on the ratio of Research and Development (R\&D) expenditures to total sales. If the industry was above a certain threshold, it was classified as high technology. The authors developed a database comprising of longitudinal data for 61 manufacturing industries for the period 1960,1970 and 1980. The data were obtained from different sources. The Industrial Analysis and Productivity Research Program (IAPRP) of the US Department of Commerce provided estimates of the number of data on capital stock (plant and equipment), as well as the average age of capital stock for each industry. Data on industry output were obtained from the Census/PRI/Penn Database. They then used a technology matrix developed by Scherer that measured each
industry's R\&D expenditures in 1974. Using Scherer's figure, Bartel and Lichtenberg computed the ratio of 1974 R\&D expenditures to 1974 sales for each of the industry in their database. The ratio was used to distinguish the high technology industry and the rest of the manufacturing sector.

The data on output and capital stock confirmed the product life-cycle approach. For all three years $(1960,1970,1980)$ the capital/labor ratio in the high tech industry was lower than in the other manufacturing industries. Output per worker was lower, and their capital stock was newer. This is because according to the product life cycle-theory, in the early stages growth is slow. At the early stages, output may be rapidly increasing but the capital equipment has yet to be developed and the workforce is focused primarily on finding a competitive production technology.

The WES data set provides information on the years of operation for the establishment. However the variable which measured years in existence was introduced only in 2003 , prior to that we used same address (i.e., time located at the current address) as a proxy for the age of the organization.

## 5 Chapter: Overview of the experimental plan

The goal of the research was to investigate, using the WES data, the indirect advantage of training on the productivity of the organization. The central idea of the research was that training might affect productivity both directly and indirectly. The direct effect is due to the increase in skill set which presumably increases productivity. However, training might affect productivity in other, less direct, ways. Training might affect variables such as the turnover within a company, the level of absenteeism, and job satisfaction. In turn, these variables might have positive or negative effects on productivity. While the direct effect has been the object of research, the indirect effects have received little attention. Nonetheless, in the literature review we have seen some empirical evidence, albeit limited, of this indirect relationship. These studies have typically examined the relations separately, and not comprehensively, and not on the same data set. The link between these variables had never been the object of a specific study over a certain period of time, and certainly not in the Canadian context. From the literature review, we also noted that most researchers had investigated the relation between training and productivity at the level of the individual worker. Few researchers, and only recently, had begun to examine the impact of training on labor productivity at the organizational level. We take advantage of the Workplace and Employee survey (WES) provided by Statistics Canada, which affords the opportunity to examine all of these relations using the same dataset over a period of time, within the Canadian context and at the level of the organization.

To analyze the indirect effect, we adopted a two-step approach. The first step measures, using a regression approach, the effect of training on absenteeism, turnover, and job satisfaction. The next step measures the effect of these variables on productivity. If the indirect effect hypothesis were correct, we would expect to find first an effect of training on the level of absenteeism, turnover, and job satisfaction; next, we would also expect to find an effect of all four variables: training, absenteeism, turnover, and job satisfaction, on productivity. The effect of training would demonstrate its direct relationship to productivity possibly via the newly acquired skills; the effects of absenteeism, turnover, and job satisfaction, on productivity would be consistent with the notion of an indirect effect of training on productivity mediated by those variables. To investigate this hypothesis, we conducted both a cross sectional and longitudinal analyses on the WES data for the years 1999, 2001, 2003, and 2005. Before providing the result in the following sections, we are going to describe:
a) the WES data set
b) the operational definition of all the variables used in the analysis
c) the type of analyses: cross and longitudinal that were used to investigate the above hypothesis.

### 5.1. Characteristics of the Data Set

The Workplace Employee survey (WES) provides the data used for the analysis in this research. The proposed investigation requires information on events taking place in the organization (e.g., training), workers outcomes (e.g., job satisfaction, and
absenteeism), and organizational outcome (e.g., overall productivity). The WES dataset contains this type of information.

The organizations participating in the WES are sampled from the Business Register (BR) maintained by Statistics Canada. The organizations in the survey include both profit and non-profit organizations of various sizes operating in various sectors of the economy, such as retail trade, education, forestry. It does not include employers in Yukon, Nunavut and the Northwest Territories. Employers operating in the public administration; crop production and animal production; fishing; hunting and trapping; private households; and religious organizations are also excluded from the target population. Nonetheless, the WES is a very large survey: over the years there have typically been on average 6,000 workplaces and 20,000 employees in the survey.

### 5.1.1 The Workplace Employee Survey (WES)

WES came about as a response to changes that were taking place in the labor market and among organizations (Picot and Wannell, 1997) in the 1990s. To better understand the nature and the impact of those changes, a very specific dataset was needed which would provide information on the characteristics of both the organization and the workforce. The WES survey addresses this need for it is made up of two questionnaires: one on the organization (the Workplace questionnaire) and the other on the workers (the Employee questionnaire). Both the Workplace and the Employee surveys are administered for the same organization. The Employer questionnaire is usually completed by the human resource manager in a large firm and the business owner in a small firm.

The Employee questionnaire is completed by a sample of workers of the same organization.

Combined, these two questionnaires collect data on four major categories: employee outcomes, workplace characteristics, worker/job characteristics and workplace outcomes. Within each category, a large number of indicators are included. These are summarized in Figure 5.1.

One of the main advantages of WES is that the responses of the employees (using WES Employee questionnaire) can be linked to the characteristic of the organization (using WES Employer questionnaire) and vice versa ${ }^{5}$. For example, the employees' responses to a question on sick leave absenteeism (e.g., Q18b can be related to a response on the performance of the organization (e.g. Q 39), on the employer questionnaire. The relation can also go the other direction. Events taking place in the firms (e.g., Q15 training expenditures) can be related to the outcomes of the workers (e.g., Q38 on overall satisfaction).

### 5.1.2. The Longitudinal Nature of the WES

The most important characteristic of the WES is its longitudinal nature. This provides an opportunity to study the relationships between the variables over time. The WES was first administered in 1999 and ended in 2006.

The Employer questionnaire was administered every year. Some of the organizations in the original dataset abandoned the survey for various reasons. These

[^4]organizations were replaced by others always sampled from the BR. Therefore, for most organizations that participated in the WES there are now up to eight years worth of data, 1999 to 2006. The reference period for each survey was the previous fiscal year (e.g., for WES 1999, it is April 1, 1998 to March 31, 1999).

From each participating organization, a subset of workers was sampled from a list of employees made available to interviewers by the organization itself. A maximum of twenty-four employees were sampled using a probability mechanism. In workplaces with fewer than four employees, all employees are selected. The Employee questionnaire was administered every year; however, employees were followed for two years only. This was due to the difficulty of integrating new employers into the location sample as workers changed companies. Therefore, new samples of employees were selected every two years. This means that there were four samples of employees: first sample 1999-2000; second sample 2001-2002; and the third sample 2003-2004, and fourth sample 20052006.

In our analysis, we used data for the odd years: 1999, 2001, 2003 and 2005 for both the employee and the workplace. There are a number of reasons for doing this. First, there are a greater number of employees and workplaces in the odd years than the even years. This is because there is a tendency to drop out of the survey in the second year. Secondly, the response rate is higher during the odd years than it is during even years. Thirdly, data for some of the operational definitions used in our analysis (e.g., workplace practices) are provided only for the odd years.

In our sample, we also excluded workplaces with ten employees or less. This was done because of confidentiality concerns. We would have been unable to report cases
where there are ten or fewer employees. Additionally, questions on human resources practices, which was one of the explanatory variable used throughout our research, were not available for small organizations. Finally, nonprofit organizations were also removed for the main objective of the research was to examine productivity. A non-profit organization might not be as concerned about productivity as would a for-profit organization.

The WES categorizes the sampled organizations according to their organizational size (4 categories) and economic sector (14 categories). In this work, we considered all organizations, with the already noted exception of those with ten employees or less.

To ensure the representativeness of the sample, Statistics Canada assigned to all sampled units, employees and workplaces, a sampling weight. According to Statistics Canada, these weights should be used in all analyses aimed at estimating the characteristics of the respective population. Recall that the WES consists of two surveys: Workplace and the Employee. The dual nature of the survey was meant to allow the study of the characteristics of the workplace, the characteristics of the employee, as well as the relationships between those characteristics. Accordingly, Statistics Canada provided three sets of weights: the workplace final weight, employee final weights, and the linked weight. The first set is composed of weights given to each organization and it is to be used for analysis pertaining to the characteristics of the workplace. The second set is composed of weights given to each employee within an organization and it is to be used for analysis pertaining to the characteristics of the employees. The third set is composed of weights given to each employee and it is to be used for analysis which connects the
characteristics of the employee (e.g., average age) to the characteristics of the workplace (e.g., the effect of average age of workforce on some performance index).

In this study, the analyses were done on the characteristics of the organization using workplace data; therefore, these analyses used the workplace weights (i.e., the first set). Most workplace data were obtained from the Workplace questionnaire. However, some additional workplace data were obtained from the Employee questionnaire by aggregating individual employee data. For example, we used "average days of sick leave" as one of the measures of absenteeism for an organization. For each organization, the weighted average was obtained from the Employee survey, using the linked weight (i.e., the third set), and added to the workplace data for that organization.


Figure 5.1 - The four categories of data in the WES

### 5.2. Operational Definition of the Variables used in the Study

For each of the four years of interest, we used a group of variables that have been identified in the literature as being related to productivity, and were available in the WES. In addition to productivity, we measured the following variables: training; absenteeism both paid and unpaid; turnover; overall job satisfaction and satisfaction with compensation; number of employees at workplace; outward looking of the organization; use of technology; age of workforce; number of dependent children; average pay; tenure; workplace practices related to compensation and those with human resources; number of promotions; skill level of workforce; and unionized workforce.

The analysis was done at the level of the organization. Accordingly, all data referred to the characteristics of the organization. Therefore, as noted in the previous section, most of the data were obtained directly from the Workplace survey with the exception of few variables which were obtained directly from the employee survey. The data obtained from the employee survey were aggregated to obtain summary measures of the variable for the organization. For example, the level of absenteeism for an organization was calculated as the weighted average of the number of sick days reported by the employees of that organization.

### 5.2.1 Measure of Productivity

The productivity of an organization was defined as value added per worker, as suggested by Turcotte \& Rennision (2004:28), where value added is measured as gross revenue minus expenses on materials. Expenses on materials are equal to gross operating
expenditures less payroll and expenses on non-wage benefits and training. We divided the resulting value by the number of employees:

$$
\text { Productivity }=(\text { revenue- }(\operatorname{expntr}-(\text { grspayrl+sal_expn+trng_exp) })) / \text { ttl_emp. }
$$

| TABLE 5.1 VARIABLES USED IN MEASURING THE PRODUCTIVITY VALUE |  |  |
| :--- | :--- | :--- |
| Code name | WES name | WES description |
| Revenue | Revenue | For this same fiscal year, what was the gross operating revenue from the sale <br> or rental of all products and services for this location? |
| Expntr | Expntr | What were the gross operating expenditures for this location for the most <br> recently completed fiscal year? Please include the payroll and non-wage <br> expenses and the purchase of goods |
| Grspayrl | Grspayrl | What was the total gross payroll for all employees at this location between <br> April 1 [..] and March 31, [..]? (If the information is not available for the <br> specified period, report the total gross payroll for the most recently completed <br> fiscal year.) |
| sal_expn | sal_expn | What was the total expenditure on non-wage benefits at this location between <br> April 1, [..] and March 31, [..]? |
| trng_exp | trng_exp | Please estimate this workplace's total training expenditures between April 1 <br> $[.$.$] and March 31 [.].$ |
| ttl emp | ttl_emp | Number of Employees |
| Notes: <br> Code name is the name used in the syntax file for the analysis <br> WES name is the name used in the WES for the same variable |  |  |

### 5.2.2. Measures of Training

We consider several measures of training. From the Workplace survey, we obtained measures of formal training such as the sum of different types of courses provided in classroom format, the number of employees who received classroom training, and the total training expenditure at workplace per employee. We also obtained measures of informal training, such as the sum of different types of courses provided through onthe job training, and the number of employees who received on-the job-training. Some of these measures were obtained directly from WES variables, whereas the others were obtained by coding of appropriate WES variables.

From the Employee survey, we obtained by aggregation of individual responses additional measures of training such as the percentage of workers claiming that the amount of training available was too little for the demands of the job as well as the percentage of workers claiming that the amount of training available to employees increased.

Table 5.2 summarizes the training variables and illustrates their origin within
WES.

| TABLE 5.2 VARIABLES USED TO MEASURE TRAINING |  |  |  |
| :---: | :---: | :---: | :---: |
| Code name | Description | WES name | WES description |
| Sum_Courses_in_Cl assroom_Format | Sum of different types of courses provided in classroom format. | $\begin{array}{\|l\|} \hline \begin{array}{l} \text { From trng1_2 } \\ \text { trng1_14 } \end{array} \\ \hline \end{array}$ | Between April 1 [..]and March 31 [..], did this workplace pay for or provide any of the following types of classroom job-related training: (e.g., sales, or computers) |
| Proportion_Employe es_Receiving_Classr oom_Training | Proportion of employees who received classroom training, that is the number of employees who received classroom training divided by the number of employees | trn_emp1 <br> ttl_emp. | Please estimate the number of employees who received classroom training between April 1, [..], and March 31, [..]. (Include full-time, part-time, permanent and temporary employees) <br> In the last pay periods of March [..], and March [..], how many employees receiving a T4 Slip were employed at this location? (See Employee Category Definitions at the end of the questionnaire |
| Average_Expenditur e_for_Training | Training expenditure at workplace per employee | $\begin{aligned} & \text { trng_exp } \\ & \text { ttl_emp } \end{aligned}$ |  |
| Sum_Courses_in_O ntheJob_Format | Sum of different types of courses provided through on-the job training | $\begin{aligned} & \text { From trng2_2 to } \\ & \text { trng2_14 } \end{aligned}$ | Between April 1 [..] and March 31 [..], did this workplace pay for or provide any of the following types of on-the-job training? |
| Proportion_Employe es_Receiving_Onthe Job_Training | Proportion of employees who received on-the jobtraining | trn_emp2 | Please estimate the number of employees who received on-the-job training between April 1 [..] and March 31[..]. (Include |


|  |  | tt_emp | full-time, part-time, permanent <br> and temporary employees <br> Same as above |
| :--- | :--- | :--- | :--- |
| Percent_Workers_Cl <br> aiming_Too_Little_- <br> Training_for_Job* | Percentage of workers <br> claiming that the amount <br> of training available was <br> too little for the demands <br> of the job. | amtrain | Would you say that the amount <br> of training that you take is: too <br> little, too much for the demands <br> of the job |
| Percent_Workers_Cl <br> aiming_Availability <br> Training_Increased | Percentage of workers <br> claiming that the amount <br> of training available to <br> employees has increased. | avtrain | Since you began working for <br> this company, has the amount <br> of training available to <br> employees: <br> decreased or remained about the <br> same? |

*These variables were derived from the Employee survey. The summary measures such as average or percentage are computed from the sample itself. Thus, average means the average of the responses of the individual belonging to the organization. Similarly, percentage refers to the percentage of individuals' responses in the sample of the individual belonging to the organization.

### 5.2.3. Measures of Turnover, Absenteeism and Job Satisfaction

The data for turnover were obtained from the workplace survey. We divided the number of resignations by the total number of employee to obtain an index of average turnover. The total number of employees in this case was adjusted to account for seasonal peaks as suggested by Morisette and Rosa (2003). We measured absenteeism from the Employee survey by aggregating individual responses. We used two measures of absenteeism: average number of paid sick leave and average of days of other unpaid leave. The data for job satisfaction were obtained from the Employee survey by aggregating individual responses. We measured both the overall satisfaction as well as satisfaction pertaining to compensation.

Table 5.3 summarizes the turnover, absenteeism and job satisfaction variables and illustrates their origin within WES.

## TABLE 5.3 VARIABLES USED TO MEASURE TURNOVER, ABSENTEEISM, and JOB SATISFACTION

| Code name | Description | WES name | WES description |
| :--- | :--- | :--- | :--- |
| turnover | Number of resignations <br> divided by total number <br> of employees in the <br> workplace which has been <br> adjusted to account for <br> seasonal peaks, if any. | ttl_quit | Same as above <br> Please estimate by reason the <br> number of employees who have <br> permanently left this location <br> between April 1 [..] and March <br> $31[.$.$] Resignations (No special$ <br> incentives) |
| Average_Days_of_Si | Average of "days of paid <br> sick leave" | pd_skc | peak_emp |
| ck_Paid_Leave* |  |  |  |

*These variables are derived from the Employee survey. The summary measures such as average or percentage are computed from the sample itself. Thus, average means the average of the responses of the individual belonging to the organization. Similarly, percentage refers to the percentage of individuals' responses in the sample of the individual belonging to the organization.

### 5.2.4. Measures of Control Variables

We also included in the analysis variables which could possibly have an effect on productivity, such as use of technology; age of workforce; average pay; tenure; workplace practices related to compensation. These variables are listed in Table 5.4.

## TABLE 5.4 CONTROL VARIABLES

| Code name | Description | WES name | WES description |
| :---: | :---: | :---: | :---: |
| Characteristic of the Organization |  |  |  |
| Organization_Age_ same_adr | Time located at same address <br> Years in operation | same_adr <br> yr_exist | Approximately how long has this workplace been located at this address? Please do not exclude periods of temporary shutdown from your answer. <br> This variable was introduced in 2003, and indicates years in operation prior to that same address was used as a proxy for age of organization. |
| ttl_emp | Number of employees employed at this location | ttl_emp | Same as above |
| Percentage_ExportS ales | Percentage of total sales from all products and services that are exported to USA market and the rest of the world. | mrkt_usa <br> mrkt_wld | Between April 1 [..] and March 31 [..], what percentage of your total sales from all products and services were in each of the following market areas: USA <br> Between April $1[.$.$] and March$ $31[.$.$] , what percentage of your$ total sales from all products and services were in each of the following market areas: Rest of the world |
| Characteristics of the Workplace |  |  |  |
| Sum_HR Practices Compensation | Sum of all HR practices related to work compensation practices | incen <br> gains <br> proft | Does your compensation system include the following incentives? Individual incentive systems such as bonuses, piece rate, and commissions are systems that reward individuals on the basis of individual output or performance. <br> Does your compensation system include the following incentives? Group incentives systems such as productivity/quality gainsharing are systems that reward |


|  |  | merit | individuals on the basis of group output or performance. Commonly, these benefits can be in form of money payments in the primary industries <br> Does your compensation system include the following incentives? Profit sharing plan <br> Does your compensation system include the following incentives? Merit pay and skilled based pay. |
| :---: | :---: | :---: | :---: |
| Sum_HR_Practices Organization_of_W ork | Sum of all HR practices related to work organization | From wrk_org1 to wrk_org6 | For non-managerial employees, which of the following practices exist on a formal basis in your workplace? (Employee's suggestion program; Flexible job design; Information sharing with employees; Problem solving teams; Joint labourmanagement committees and Self-directed work groups) |
| Proportion_Fulltime HighSkilled_Work ers | Proportion of full time managers, professionals \& technical/trade to lower skill level of other occupations as per Statistics Canada definition in Appendix of Guide** | full_tim <br> full_mn <br> full $\quad \mathrm{pr}$ <br> full_tc | Of the total employment in March [..] how many were in the following categories? Fulltime employees: working 30 or more hours per week. <br> Of the total employment in March [..], how many were in the following categories? (See Employee Category Definitions at the end of the questionnaire) Full-time Management Full-time Professionals Full-time Technical |
| Proportion_Unionize d_Workforce | Percent of unionization at workplace | ttl_cba ttl_emp. | Of the total employment in March [..], how many employees were covered by collective bargaining agreements at this location? |
| Average_Workplace Promotions* | Average number ofpromotions in <br> workplace | prmtd | Have you ever been promoted while working for this employer? |
| Characteristics of the Workforce |  |  |  |
| Average_Employme nt_Salary | Average salary at the level of the workplace. | grspayrl <br> sal expn | What was the total gross payroll for all employees at this location between April 1 [..] and March $31[.$.$] ?$ |


|  |  |  | What was the total expenditure <br> on non-wage benefits at this <br> location between April [..]and <br> March 31, [..]? |
| :--- | :--- | :--- | :--- |
| Proportion_Employe |  |  |  |
| es_Using_Computer |  |  |  |
| s | Percentage of employees <br> using computers as part of <br> their work | cpu_user | In the last pay periods of <br> March[..] and March [..], how <br> many employees receiving a T4 <br> Slip were employed at this <br> location? |

*These variables are derived from the Employee survey. The summary measures such as average or percentage are computed from the sample itself. Thus, average means the average of the responses of the individual belonging to the organization. Similarly, percentage refers to the percentage of individuals' responses in the sample of the individual belonging to the organization.
** Statistics Canada considers seven categories of employees: (i) Management; (ii) Professionals; (iii) Technical/Trades (iv) Marketing/Sales (v) Clerical/Admin (vi). Production workers with no trade/certification (vii) Other. The ones considered for skill level in the organization are the first three for which at least a certificate and university degree is required. It is then divided by the total number of full time employees.

## 5. 3. Type of Analyses

In the study, we first examined the effect of training on the three variables: turnover, absenteeism and job satisfaction. Next we examined the relationship between these variables (Table 5.2 and 5.3), plus the control variables described above (Table 5.4), and productivity (Table 5.1). In both cases, the relationships were evaluated with a linear regression approach applied to two types of analyses. The first was a cross sectional analysis which examined the relationships between the variables of interest within each single year. The second was a longitudinal analysis based on the differences, for variables, between two years. All analyses were performed using a commercially available statistical program, SPSS V18. Most of the major assumptions of ordinary least squares regression were tested for the most general models of interest. In addition, potential limitations due to multicollinearity were examined. Generally, no major problems were found. The few minor problems that did emerge were deemed to be quite minimal in their impact in light of the properties of large sample analysis.

### 5.3.1. Cross-sectional Analysis

As noted, some of the data were obtained directly from the WES whereas others were obtained by re-coding the WES existing data. In addition, some of the data originated from the Workplace survey whereas others originated from the Employer survey. Thus after recoding, we had to combine all the data in one single, merged, dataset. In practice we
(I) created an intermediate employee data set which coded the variables of interest contained in the Employer survey;
(II) created an intermediate workplace data set which coded the variables of interest in the Workplace survey;
(III) merged the intermediate employee and workplace data set so as to create a single "merged data set" at the organizational level;
(IV) applied the regression approach on the merged data.

A linear regression was applied separately for each of the four years of interest: 1999, 2001 2003, and 2005. As an example the year 1999 is shown below
$Y_{1999}=a+b_{1}\left(X_{11999}\right)+b_{2}\left(X_{2} 1999\right)+\ldots . . . b_{\jmath}\left(X_{1} 1999\right)$,
where $Y$ is the productivity, $a$ is the constant and $b_{1} . . b_{j}$ are the coefficients, and $\mathrm{X}_{1} . . \mathrm{X}_{\mathrm{j}}$ are the predictors.

Statistics Canada recommends the use of weights in all analyses which use WES data. For the regression, we used as suggested by Statistics Canada, the workplace final weight (Statistics Canada, 2004:53).

A simple outlier analysis, based on the Cook's distance (Lorenz, 1987) was performed before the regression. It was decided a priori to exclude cases for which Cook distance $>1$. Missing data were handled using the listwise approach. As noted in Section 5.1.2 above, organizations with fewer than ten employees and those operating for nonprofit purposes were also excluded. Nonetheless, the sample size remained big albeit it varied between 2000 to 3500 organizations depending on the year used.

### 5.3.2. Longitudinal (Differential) Analysis

As shown in the literature review section, one of the first authors to have performed an analysis at the organizational level was Bartel (1994). However, Bartel did not use a cross-sectional analysis, but rather one that can be defined as a differential approach. In
this approach, changes in one dependent variable (increase or decrease) across years are related to similar changes in the independent variables of interest. We decided to use also this approach since we, as Bartel, are performing the analysis at the organizational level.

To create datasets, which contained differences between two years, we used the same datasets for single years for the cross-sectional analysis. As such, the new differential dataset contained differences for all variables contained in those datasets. The only exceptions were the 'age of the organization' and of the 'age of the workforce' as the differences would have yielded constant values.

The differential merged data sets were created for two, four and six year time span for a total of six data sets as shown below:
(I) two year difference: 2001-1999; 2003-2001; 2005-2003
(II) four year difference 2003-1999; 2005-2001
(III) six year difference 2005-1999

For each of these datasets, we performed a linear regression analysis using a model as the example shown below:

$$
Y_{2001}-Y_{1999}=a+b_{1}\left(X_{12001}-X_{11999}\right)+b_{2}\left(X_{2} 2001-X_{21999}\right)+\ldots \ldots . b_{\jmath}\left(X_{J} 2001-X_{j} 1999\right),
$$

where $Y$ is the productivity, $a$ is the constant and $b_{1} . . b_{j}$ are the coefficients, and $\mathrm{X}_{1} . . \mathrm{X}_{\mathrm{J}}$ are the predictors.

Statistics Canada recommends the use of weights in all analyses which use WES data. For the regression on differences between years, we used as suggested by Statistics Canada, the workplace final weight of the least recent year (Statistics Canada, 2004:53). For example, if the regression was being performed on the differences between 20031999, we used the workplace weight for 1999. If, on the other hand, the analysis was
being done on the differences between 2005-2001, we used the workplace weight for 2001.

As we did for the cross-sectional case, we performed an outlier analysis based on the Cook's distance. Here too we decided a priori to exclude cases for which Cook's distance $>1$. Missing data (i.e., cases for which a difference could not be computed) were handled using the listwise approach. All organizations with fewer than 10 employees and those operating for nonprofit purposes were also excluded. The sample size varied depending on the years under analysis ranging from 1800 to 2200.

### 5.4. List of the Analyses

The results of these analyses are presented in the following chapters:
a) Chapter 6-Training vs. Turnover
a. 1 - Cross Sectional
a. 2 -Longitudinal (Differential)
b) Chapter 7 - Training vs. Absenteeism
b. 1 - Cross Sectional
b. 2 - Longitudinal (Differential)
c) Chapter 8 - Training vs. Job Satisfaction
c. 1 - Cross Sectional
c. 2 - Longitudinal (Differential)
d) Chapter 9 - Productivity vs. Training, Turnover Absenteeism, Job Satisfaction
d. 1 - Cross Sectional
d. 2 - Longitudinal (Differential)

## 6 Chapter: The effects of Training on Turnover

Turnover refers to the rate at which employees/workers change organizations. Turnover can be costly for the organization as there are expenses associated with replacing the employee. If the departing employee had also been trained, there is the additional loss of investment in the training. As such, the fear of losing trained workers may lead to less investment in training than is desirable in a competitive market.

In this chapter we will present the results of the cross sectional and longitudinal analyses that examined the relationship between training and turnover.

Turnover was measured as the number of resignations divided by total number of employees adjusted to account for peaks in seasonal employment, if any. With regards to training, we used all the seven training variables which were:
-Percentage of workers claiming that the amount of training available was too little for the demands of the job (Percent Workers_Claiming Too Little Training for Job); -Percentage of workers claiming that the amount of training available to employees has increased (Percent Workers Claiming_Availability Training_Increased); -Average Training Expenditure (Average Expenditure for Training);
-Proportion of employees who received classroom training (Proportion Employees Receiving Classroom Training); -Proportion of employees who received on-the job-training (Proportion Employees Receiving_OntheJob Training);
-Sum of different types of courses provided in classroom format (Sum_Courses in Classroom Format)
-Sum of different types of courses provided through on-the job training (Sum Courses in OntheJob Format).

### 6.1. Training and turnover: Cross-sectional Analysis for 1999

Table 6.1a reports the R square for the 1999 data; Table 6.1 b reports the ANOVA table and Table 6.1 c reports the regression coefficients, standardized and nonstandardized, with their associated significance levels.

| Table 6.1a. Training vs Turnover, 1999 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estımate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 243 | 0059 | 0057 | 1318 | 0059 | 28930 | 7 | 3220 | 0000 |


| Table 6.1b. Training vs Turnover, 1999 - Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 351829 | 7 | 50261 | 28930 | 0000 |
| Residual | 5594195 | 3220 | 1737 |  |  |
| Total | 5946024 | 3227 |  |  |  |


| Table 6.1c. Training vs Turnover, 1999 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | $\begin{aligned} & \hline \text { Std } \\ & \text { Error } \end{aligned}$ | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 0118 | 0008 |  | 15194 | 0000 |  |  |  |
| Percent_Workers_Claiming_Too <br> Little_Tranning_for_Job_99 | 0000 | 0000 | 0000 | -0008 | 0994 | 0025 | 0000 | 0000 |
| Percent_Workers_Claıming_Avall ability_Trainıng_Increased_99 | 0000 | 0000 | -0041 | -2282 | 0023 | -0045 | -0 040 | -0039 |
| Average_Expenditure_for_Tramın g_99 | 0000 | 0000 | -0041 | -2 194 | 0028 | -0054 | -0039 | -0037 |
| Proportion_Employees_Receiving _Classroom_Traming_99 | -0078 | 0014 | -0 141 | -5691 | 0000 | -0032 | -0 100 | -0097 |
| Proportion_Employees_Receıving _OntheJob_Tranıng_99 | 0143 | 0012 | 0271 | 12177 | 0000 | 0199 | 0210 | 0208 |
| Sum Courses_in_Classroom_For mat_99 | 0004 | 0002 | 0052 | 1891 | 0059 | 0001 | 0033 | 0032 |
| Sum_Courses_in_Onthe.Job_Form at_99 | -0003 | 0002 | -0038 | -1525 | 0127 | 0085 | -0027 | -0026 |

### 6.2. Training and turnover: Cross-sectional Analysis for 2001

Table 6.2 a reports the R square for the 2001 data; Table 6.2 b reports the ANOVA table and Table 6.2 c reports the regression coefficients, standardized and nonstandardized, with their associated significance levels.

| Table 6.2a. Training vs Turnover, 2001-Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted | Std Error of the Estimate | R Square Change | F Change | dfl | df2 | Sig F Change |
| 266 | 071 | 069 | 209406 | 071 | 32952 | 7 | 3023 | 000 |


| Table 6.2b. Training vs Turnover, 2001-Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 1011491 | 7 | 144499 | 32952 | 000 |
| Residual | 13256137 | 3023 | 4385 |  |  |
| Total | 14267628 | 3030 |  |  |  |


| Table 6.2c. Training vs Turnover, 2001 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardized Coefficients | $t$ | Sig | Correlations |  |  |
|  | B | Std <br> Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 195 | 010 |  | 19378 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tranning_for_Job_01 | 000 | 000 | -022 | -1248 | 212 | -008 | -023 | -022 |
| Percent_Workers_Claiming_Avall ability_Traıning_Increased_01 | -001 | 000 | -116 | -6 408 | 000 | - 122 | -116 | -112 |
| Average_Expenditure_for_Trainın g_01 | 000 | 000 | -066 | -3312 | 001 | -060 | -060 | -058 |
| Proportion_Employees_Receiving _Classroom_Traming_01 | 035 | 018 | 046 | 1943 | 052 | 025 | 035 | 034 |
| Proportion_Employees_Receiving _OntheJob_Tramıng_01 | 145 | 013 | 237 | 11515 | 000 | 209 | 205 | 202 |
| Sum_Courses_1n_Classroom_For mat_01 | -007 | 003 | -062 | -2230 | 026 | -044 | -041 | -039 |
| Sum_Courses_1n_OntheJob_Form at_01 | -003 | 003 | -022 | -891 | 373 | 031 | -016 | -016 |

### 6.3. Training and turnover: Cross-sectional Analysis for 2003

Table 6.3a reports the R square for the 2003 data; Table 6.3 b reports the ANOVA table and Table 6.3c reports the regression coefficients, standardized and nonstandardized, with their associated significance levels.

| Table 6.3a. Training vs Turnover, 2003 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 239 | 057 | 055 | 147747 | 057 | 26744 | 7 | 3092 | 000 |

Table 6.3b. Training vs Turnover, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 408656 | 7 | 58379 | 26744 | 000 |
| Residual | 6749572 | 3092 | 2183 |  |  |
| Total | 7158228 | 3099 |  |  |  |


| Table 6.3c. Training vs Turnover, 2003 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std <br> Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 116 | 007 |  | 15799 | 000 |  |  |  |
| ```Percent_Workers_Clamming_Too_ Little_Tramnng_for_Job_03``` | 000 | 000 | 021 | 1209 | 227 | 024 | 022 | 021 |
| Percent_Workers_Claiming_Avall ability_Trainng_Increased_03 | 000 | 000 | -043 | -2348 | 019 | -038 | -042 | -041 |
| Average_Expenditure_for_Tramm g_03 | 000 | 000 | -100 | $-4882$ | 000 | -067 | -087 | -085 |
| ```Proportion_Employees_ReceIving Classroom_Tramnng 03``` | 056 | 014 | 102 | 4075 | 000 | 061 | 073 | 071 |
| Proportion_Employees_Receiving OntheJob_Traming_03 | 099 | 011 | 190 | 8690 | 000 | 181 | 154 | 152 |
| ```Sum_Courses_1n_Classroom_For mat_03``` | -011 | 002 | - 138 | -4709 | 000 | -038 | -084 | -082 |
| ```Sum_Courses_in_OntheJob_Form at_03``` | 004 | 002 | 048 | 1878 | 060 | 051 | 034 | 033 |

### 6.4. Training and turnover: Cross-sectional Analysis for 2005

Table 6.4a reports the R square for the 2005 data; Table 6.4 b reports the ANOVA table and Table 6.4 c reports the regression coefficients, standardized and nonstandardized, with their associated significance levels.

Table 6.4a. Training vs Turnover, 2005 - Cross-Sectional Model Summary

| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | dfl | df2 | Sıg F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 406 | 165 | 163 | 151055 | 165 | 98953 | 7 | 3509 | 000 |

Table 6.4b. Training vs Turnover, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 1580516 | 7 | 225788 | 98953 | 000 |
| Resıdual | 8006714 | 3509 | 2282 |  |  |
| Total | 9587230 | 3516 |  |  |  |

Table 6.4c. Training vs Turnover, 2005 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partal | Part |
| (Constant) | 141 | 007 |  | 20161 | 000 |  |  |  |
| Percent_Workers Claiming_Too_ Little_Traming_for_Job_05 | 000 | 000 | -037 | -2 393 | 017 | -018 | -040 | -037 |
| Percent_Workers_Claıming_Aval! <br> ability_Traming_Increased_05 | 000 | 000 | -044 | -2723 | 007 | -044 | -046 | -042 |
| Average_Expenditure_for_Tramın g_05 | 000 | 000 | -078 | -4 210 | 000 | -042 | -071 | -065 |
| Proportion_Employees_Receiving_ <br> Classroom_Trannng_05 | 042 | 014 | 066 | 3094 | 002 | 116 | 052 | 048 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranıng_05 | 238 | 011 | 433 | 22363 | 000 | 341 | 353 | 345 |
| Sum_Courses in Classroom Form at 05 | -007 | 002 | -072 | -2937 | 003 | -055 | -050 | -045 |
| Sum_Courses_1n_OntheJob_Forma t_05 | -014 | 002 | -147 | -6 529 | 000 | 001 | -110 | -101 |

### 6.5. Training and turnover: Longitudinal (differential) Analysis 2001-1999

Tables 6.5 a and 6.5 b and 6.5 c report the R square, ANOVA and the regression coefficients, standardized and non-standardized, with their associated significance levels, for the 2001-1999 data.

| Table 6.5a. Training vs Turnover, 2001-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | ddusted <br> R Square | Std Error <br> of the Estimate | R Square Change | F Change | df1 | df2 | Sig F Change |  |
| 143 | 020 | 017 | 141254 | 020 | 6674 | 7 | 2242 | 000 |  |


| Table 6.5b. Training vs Turnover, 2001-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 93211 | 7 | 13316 | 6674 | 000 |
| Residual | 4473369 | 2242 | 1995 |  |  |
| Total | 4566580 | 2249 |  |  |  |


| Table 6.5c. Training vs Turnover, 2001-1999-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 058 | 005 |  | 11082 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_ 0199 | 001 | 000 | 082 | 3887 | 000 | 087 | 082 | 081 |
| Percent_Workers_Clamming_Avala bility_Trannng_Increased_0199 | -001 | 000 | -086 | -4 076 | 000 | -094 | -086 | -085 |
| Average_Expenditure_for_Tranın g_0199 | 000 | 000 | 000 | -004 | 997 | 016 | 000 | 000 |
| Proportion_Employees_Receiving_ Classroom_Tramnng_0199 | 032 | 013 | 062 | 2515 | 012 | 058 | 053 | 053 |
| Proportion_Employees_Receiving_ OntheJob_Trannıng_0199 | 016 | 010 | 036 | 1569 | 117 | 039 | 033 | 033 |
| Sum_Courses_in_Classroom_Form at_0199 | -003 | 002 | -042 | -1565 | 118 | -002 | -033 | -033 |
| Sum_Courses_1n_OntheJob_Forma t_0199 | -001 | 002 | -016 | -633 | 527 | -008 | -013 | -013 |

### 6.6. Training and turnover: Longitudinal (differential) Analysis 2003-2001

Tables 6.6 a and $6.6 . \mathrm{b}$ and 6.6 c report the R square, ANOVA, and the regression coefficients for the 2003-2001 data.

Table 6.6a. Training vs Turnover, 2003-2001 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 155 | 024 | 021 | 131430 | 024 | 7137 | 7 | 2029 | 000 |

Table 6.6b. Training vs Turnover, 2003-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 86300 | 7 | 12329 | 1727 |  |  |
| Resıdual | 3504851 | 2029 | 2036 |  |  |  |
| Total | 3591151 |  |  |  |  |  |

Table 6.6c. Training vs Turnover, 2003-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -019 | 005 |  | -3881 | 000 |  |  |  |
| ```Percent_Workers_Claıming_Too_ Little_Tramıng_for_Job_0301``` | - 001 | 000 | -092 | -4 161 | 000 | -091 | -092 | -091 |
| ```Percent_Workers_Claıming_Avall ability_Traming_Increased_0301``` | 000 | 000 | -013 | -609 | 543 | -007 | -014 | -013 |
| Average_Expendıture for Traının g_0301 | 000 | 000 | -016 | -692 | 489 | -005 | -015 | -015 |
| Proportıon Employees_Receıving_ <br> Classroom_Tranning_0301 | 055 | 012 | 112 | 4514 | 000 | 057 | 100 | 099 |
| ```Proportion_Employees_Receוving_ OntheJob_Traming_0301``` | 001 | 004 | 009 | 386 | 699 | 015 | 009 | 008 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0301 } \end{aligned}$ | -009 | 002 | $-113$ | -4 327 | 000 | -076 | -096 | -095 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t } 0301 \end{aligned}$ | -001 | 002 | -011 | -470 | 638 | -038 | -010 | -010 |

### 6.7. Training and turnover: Longitudinal (differential) Analysis 2005-2003

Tables 6.7 a and $6.7 . \mathrm{b}$ and 6.7 c report the R square, ANOVA, and the regression coefficients for the 2005-2003 data.

Table 6.7a. Training vs Turnover, 2005-2003 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 219 | 048 | 045 | 123072 | 048 | 15804 | 7 | 2204 | 219 |


| Table 6.7b. Training vs Turnover, 2005-2003 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | SIg |
| Regression | 167564 | 7 | 23938 | 15804 | 000 |
| Residual | 3338334 | 2204 | 1515 |  |  |
| Total | 3505898 | 2211 |  |  |  |


| Table 6.7c. Training vs Turnover, 2005-2003-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \hline \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 015 | 004 |  | 3608 | 000 |  |  |  |
| ```Percent_Workers_Claıming_Too_ Little_Traming_for_Job_0503``` | 000 | 000 | -018 | -879 | 380 | -021 | -019 | -018 |
| ```Percent_Workers_Claiming_Avall ability_Tranning_Increased_0503``` | 001 | 000 | 102 | 4841 | 000 | 112 | 103 | 101 |
| $\begin{aligned} & \text { Average_Expenditure_for_Tramın } \\ & \text { g_0503 } \end{aligned}$ | 000 | 000 | 024 | 1099 | 272 | 030 | 023 | 023 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_0503 | 018 | 012 | 038 | 1568 | 117 | 079 | 033 | 033 |
| Proportion_Employees Receiving_ <br> OntheJob_Training 0503 | 084 | 011 | 180 | 7634 | 000 | 153 | 160 | 159 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0503 } \end{aligned}$ | -002 | 002 | -018 | -737 | 461 | -002 | -016 | - 015 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0503 } \end{aligned}$ | -009 | 002 | -106 | -4 539 | 000 | -044 | -096 | -094 |

### 6.8. Training and turnover: Longitudinal (differential) Analysis 2003-1999

Tables 6.8 a and $6.8 . \mathrm{b}$ and 6.8 c report the R square, ANOVA and the regression coefficients for the 2003-1999 data.

Table 6.8a. Training vs Turnover, 2003-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 239 | 057 | 054 | 133802 | 057 | 16694 | 7 | 1925 | 000 |

Table 6.6b. Training vs Turnover, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 209210 | 7 | 29887 | 16694 | 000 |
| Residual | 3446326 | 1925 | 1790 |  |  |
| Total | 3655536 | 1932 |  |  |  |

Table 6.6c. Training vs Turnover, 2003-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 026 | 006 |  | 4678 | 000 |  |  |  |
|  | 000 | 000 | 020 | 879 | 380 | 018 | 020 | 019 |
| Percent_Workers_Claimıng_Avall <br> ability_Tranning_Increased_0399 | 000 | 000 | 033 | 1485 | 138 | 038 | 034 | 033 |
| ```Average_Expenditure_for_Tramm g_0399``` | 000 | 000 | 020 | 875 | 382 | 031 | 020 | 019 |
| Proportion_Employees_Recerving_ <br> Classroom_Training_0399 | 091 | 012 | 190 | 7283 | 000 | 141 | 164 | 161 |
| Proportion_Employees_Receiving <br> OntheJob_Trainıng_0399 | 050 | 012 | 103 | 4017 | 000 | 136 | 091 | 089 |
| ```Sum_Courses_1n_Classroom_Form at_0399``` | -015 | 002 | -189 | $-6721$ | 000 | -075 | -151 | -149 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0399 } \end{aligned}$ | 001 | 002 | 015 | 528 | 597 | 003 | 012 | 012 |

### 6.9. Training and turnover: Longitudinal (differential) Analysis 2005-2001

Tables 6.9 a and $6.9 . \mathrm{b}$ and 6.9 c report the R square, ANOVA , and the regression coefficients for the 2005-2001 data.

Table 6.9a. Training vs Turnover, 2005-2001 - Longitudinal Model Summary

| $R$ | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | F Change | df1 | df2 |
| :--- | :--- | Stg F Change | R |
| :--- |
| 170 |

Table 6.9b. Training vs Turnover, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | dt | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 97003 | 7 | 13858 | 8091 | 000 |
| Residual | 3261001 | 1904 | 1713 |  |  |
| Total | 3358004 | 1911 |  |  |  |

Table 6.9c. Training vs Turnover, 2005-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -013 | 005 |  | -2 592 | 010 |  |  |  |
| ```Percent_Workers_Clamming_Too_ Little_Tramnng_for_Job_0501``` | 000 | 000 | 008 | 336 | 737 | 000 | 008 | 008 |
| Percent_Workers_Claiming_Aval <br> ability_Training_Increased_0501 | 000 | 000 | 055 | 2403 | 016 | 053 | 055 | 054 |
| $\begin{aligned} & \text { Average_Expendıture_for_Trainın } \\ & \text { g_0501 } \end{aligned}$ | 000 | 000 | -047 | -1964 | 050 | -012 | -045 | -044 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranng_0501 | 041 | 013 | 088 | 3098 | 002 | 095 | 071 | 070 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0501 | 051 | 010 | 126 | 4915 | 000 | 114 | 112 | 111 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0501 } \end{aligned}$ | -002 | 002 | -024 | - 871 | 384 | 012 | -020 | -020 |
| $\begin{aligned} & \text { Sum_Courses_1n_OntheJob_Forma } \\ & \text { t_0501 } \end{aligned}$ | -007 | 002 | -081 | -3221 | 001 | -037 | -074 | -073 |

### 6.10. Training and turnover: Longitudinal (differential) Analysis 2005-1999

Tables 6.10a and 6.10.b and 6.10 c report the R square, ANOVA and the regression coefficients for the 2005-1999 data.

Table 6.10a. Training vs Turnover, 2005-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 251 | 063 | 060 | 113431 | 063 | 17776 | 7 | 1848 | 000 |

Table 6.10b. Training vs Turnover, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 160104 | 7 | 22872 | 17776 | 000 |
| Residual | 2377739 | 1848 | 1287 |  |  |
| Total | 2537843 | 1855 |  |  |  |

Table 6.10c. Training vs Turnover, 2005-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 038 | 005 |  | 8225 | 000 |  |  |  |
| Percent_Workers_Claıming_Too_ <br> Little_Traming_for_Job_0599 | 000 | 000 | 060 | 2648 | 008 | 054 | 061 | 060 |
| Percent_Workers_Claımıng_Avall <br> ability_Traming_Increased_0599 | 000 | 000 | 066 | 2863 | 004 | 086 | 066 | 064 |
| Average_Expenditure_for_Tramn g_0599 | 000 | 000 | -024 | -966 | 334 | 009 | -022 | -022 |
| Proportion_Employees_Receiving_ <br> Classroom_Traınıng_0599 | 053 | 012 | 120 | 4376 | 000 | 161 | 101 | 099 |
| Proportion_Employees_Recerving_ <br> OntheJob_Traning_0599 | 065 | 010 | 173 | 6398 | 000 | 170 | 147 | 144 |
| ```Sum_Courses_in_Classroom_Form at_0599``` | -003 | 002 | -047 | -1703 | 089 | -012 | -040 | -038 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0599 } \end{aligned}$ | -007 | 002 | -111 | -3993 | 000 | -045 | -092 | -090 |

# 6.11. Training and turnover: Summary of Cross-sectional Analysis and Longitudinal (differential) Analysis 

In Table 6.11a we have summarized the cross-sectional data by reporting the (unstandardized) regression coefficient and their associated significance levels. A similar summary is presented in Table 6.11b for the longitudinal (differential) data.

According to the HC theory, the relation between training and turnover depends upon the type of training. An inverse (i.e., signaled by a negative coefficient), relation between training and turnover should be expected when the training received was general in nature, whereas a direct (i.e., signaled by a positive coefficient) relation would be expected when the training received was specific in nature. Many of the training variables considered in the WES, and thus in this study, do not convey the nature of the training; therefore for these variables we focus only on the presence/absence of the relationship.

The first training variable is Percent Workers Claiming Too Little Training for Job, which measures the percentage of employees claiming that the amount of training is too little for the demands of the job. If we assume that the employees' perception is correct, then a large value of this variable signals a lower level of training. From Table 6.11a, it can be seen that the cross-sectional analysis provided no clear evidence for any relation between the employees' perception about the amount of training and turnover. There was a significant effect for 2005, but no effect for 1999, 2001 and 2003. The longitudinal analyses did not provide better results: in fact, there was an effect only for 2001-1999, 2003-2001, and 2005-1999 (see Table 6.11b), but in opposite directions.

Percent Workers Claiming Availability Training Increased, which measures the percentage of employees claiming that the availability of training has increased. If we assume that the employees' perception is correct, then a large value of this variable signals a higher level of training. Unfortunately, the cross-sectional and longitudinal analysis produced inconsistent results. In the cross-sectional analysis, there were significant positive effects in 1999, 2003 and 2005, suggesting that increases in availability of training were associated with increases in turnover in those years. Such results would be consistent with the training being general in nature. However, the data are not robust since a significant negative (i.e., inverse) effect was found for the 2001 data. The longitudinal analysis also produced inconsistent results. A significant effect was found in four out of six cases, but in three occasions: 2005-2003; 2005-2001, and 2005-1999, the effect was positive, whereas in one case, 2001-1999, the effect was negative.

The third variable, Average Expenditure for Training, measures the workplace training expenditure per employee. In the cross-sectional analysis, there was a significant and positive effect in all four years indicating that higher training expenditures are associated with higher levels of turnover. However, the results of the longitudinal analysis did not corroborate this observation: a significant effect was observed only for the 2005-2001 data.

The fourth variable is Proportion Emplovees Receiving Classroom Training, which measures the proportion of employees who received classroom training. If we assume that classroom training provides general training (Bishop, 1991), then we would
expect a direct effect of this measure of training and turnover since more general training should result in more turnover. The data seems to confirm this assumption since the data in Table 6.11a and 6.11 b indicate that the proportion of classroom training had a direct effect in three out four years in the cross-sectional analysis and in five out of six of the longitudinal analyses.

The fifth variable is Proportion Employees Receiving OntheJob Training, which measures the proportion of employees who received on-the job-training. This quantity appears to be related to turnover: Table 6.11 a and 6.11 b indicate that the proportion of 'on the job training' had a direct effect in all four cross-sectional analyses and four out of six longitudinal analyses. According to Bishop (1991) on the-job training is typically related to specific training; hence, we should have found an indirect effect of this measure of training and turnover since more specific training should result in less turnover. However, an inspection of the questions in WES used as the basis for this variable reveal that the training considered is actually of a general nature (e.g., managerial/ sales and marketing/team building/problem solving). If so, the data would indeed be consistent with the hypothesis that specific and general training have different effects on turnover.

The sixth variable, $\underline{\text { Sum Courses in Classroom Format, measures the number }}$ of different courses provided in classroom format. The number of classroom courses has a significant and inverse relation with turnover in three out of four cross-sectional and in two out of six of the longitudinal analyses. In the latter case, however, the sign of the coefficients is also negative in all cases, signaling an inverse relation albeit not a significant one. The presence of an inverse relation is apparently inconsistent with the
results obtained for the proportion of employees who received classroom training illustrated above. Recall that in that case, it was argued that classroom training provides general training (Bishop, 1991) and therefore should increase turnover. If we were using the same argument in this case, we should have observed a positive and not an inverse relation.

The quantity measured by the variable Sum Courses in OntheJob Format, i.e., the number of different courses offered in the on-the-job format, does not appear to be reliably associated to turnover: only one cross-sectional analysis indicated a significant and negative effect of this factor on turnover. Not much clearer is the scenario offered by the longitudinal analyses: the effect was significant and negative in only three cases out of six.

With respect to the variables measuring classroom and on-the-job training, we note that the variables measuring the proportions of employees taking the courses exhibit a positive relation with turnover, whereas the variables measuring the number of course exhibit a negative (albeit not significant) relation with turnover. This apparent inconsistency could be explained if we distinguish between the availability of a course and the actual attendance. It is possible that offering many courses decreases turnover because people feel they have been offered a choice; however, once the employees decide to attend the courses and therefore gain more general skills, then that training could indeed lead to an increase in turnover.

In summary the data confirm that training can have a strong effect on turnover. However, the nature of this effect is not a simple one.

Table 6.11a - Training vs Turnover - Summary Cross-sectional Regression Coefficients

|  | 1999 | 1999 | 2001 | 2001 | 2003 | 2003 | 2005 | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claming_Too_Little_Traming_for_Job | . 000 | . 994 | . 000 | . 212 | . 000 | . 227 | . 000 | . 017 |
| Percent_Workers_Clamıng_Availability_Trainıng_Increased | . 000 | . 023 | -. 001 | . 000 | . 000 | . 019 | . 000 | . 007 |
| Average_Expenditure_for_Traming | . 000 | . 028 | . 000 | . 001 | . 000 | . 000 | . 000 | . 000 |
| Proportion_Employees_Receiving_Classroom_Training | -. 078 | . 000 | . 035 | . 052 | . 056 | . 000 | . 042 | . 002 |
| Proportion_Employees_Receiving_OntheJob_Tramıng | . 143 | . 000 | . 145 | . 000 | . 099 | . 000 | . 238 | . 000 |
| Sum_Courses_in_Classroom_Format | . 004 | . 059 | -. 007 | . 026 | -. 011 | . 000 | -. 007 | . 003 |
| Sum_Courses_m_OntheJob_Format | -. 003 | . 127 | -. 003 | . 373 | . 004 | . 060 | -. 014 | . 000 |

Table 6.11b - Training vs Turnover - Summary Longitudinal Regression Coefficients

|  |  | $\begin{array}{l\|} \hline 2001- \\ 1999 \end{array}$ |  | $\begin{array}{\|l\|} \hline 2003- \\ 2001 \\ \hline \end{array}$ |  | $\begin{aligned} & 2005- \\ & 2003 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \hline 2003- \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{array}{\|l\|} \hline 2005- \\ 2001 \\ \hline \end{array}$ |  | $\begin{aligned} & 2005- \\ & 1999 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | Sig | B | Sig | B | SIg | B | Sig | B | Sig | B | Sig |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Percent_Workers_Clamıng_Too_Little_Tramıng | . 001 | . 000 | $-.001$ | . 000 | . 000 | . 380 | . 000 | . 380 | . 000 | . 737 | . 000 | . 008 |
| Percent_Workers_Claimıng_Availability_Tranm | -. 001 | . 000 | . 000 | . 543 | . 001 | . 000 | . 000 | . 138 | 000 | . 016 | . 000 | . 004 |
| Average_Expenditure_for_Trainıng | . 000 | . 997 | . 000 | . 489 | . 000 | . 272 | . 000 | . 382 | . 000 | . 050 | . 000 | . 334 |
| Proportion_Employees_Receiving_Classroom_Tr | . 032 | 012 | . 055 | . 000 | . 018 | . 117 | . 091 | . 000 | . 041 | . 002 | . 053 | . 000 |
| Proportion_Employees_Receiving_OntheJob_Tra | . 016 | . 117 | . 001 | . 699 | . 084 | . 000 | . 050 | . 000 | . 051 | . 000 | . 065 | . 000 |
| Sum_Courses_1n_Classroom_Format | -. 003 | . 118 | -. 009 | . 000 | -. 002 | . 461 | -. 015 | . 000 | -. 002 | . 384 | -. 003 | . 089 |
| Sum_Courses_In_OntheJob_Format | -. 001 | . 527 | $-.001$ | . 638 | -. 009 | . 000 | . 001 | . 597 | -. 007 | . 001 | -. 007 | . 000 |

## 7 Chapter: The effect of training on absenteeism

Like turnover, absenteeism can be costly for an organization, particularly when not anticipated. Typically, the work performed by the absentee is either not done or, performed by a co-worker. This can cause resentment in the co-worker compelled to increase his/her workload as a result of his colleagues' absence. While the human capital theory examines turnover, it does not consider absenteeism.

Some studies, albeit limited have examined this relation; the results, however, are not conclusive. Some evidence suggests that training may have a positive effect on absenteeism. Kruger and Rouse (1997) found that in both the service and manufacturing sectors, training reduced the number of unpaid sick leave, whereas Dionne and Dostie (2005) did not find any significant effect of training on leave. These studies used different datasets to examine in one case leave and in the other unpaid leave, and they were also limited in time. A better assessment of the impact of training on absenteeism may require measuring the impact of training on absenteeism over a longer period of time.

In this chapter we will present the results of the cross sectional (i.e., section 7.1 to 7.4) and the longitudinal analyses (i.e., section 7.5 to 7.10 ) that examined the relationship between training and absenteeism. A summary and discussion of both analyses is provided in section 7.11.

Absenteeism was measured as average of days of paid sick leave (Average Davs of Sick Paid Leave); average of days of other paid leave
(Average Days of Other Paid Leave) and average of days of other unpaid leave (Average Days of Unpaid Leave).

With regards to training, we used all the seven training variables which were:
-Percentage of workers claiming that the amount of training available was too little for the demands of the job (Percent_Workers_Claiming_Too_Little Training_for_Job); -Percentage of workers claiming that the amount of training available to employees has increased (Percent Workers Claiming Availability Training_Increased); -Average Training Expenditure (Average Expenditure for Training);
-Proportion of employees who received classroom training (Proportion Employees Receiving Classroom Training); -Proportion of employees who received on-the job-training (Proportion Employees Receiving OntheJob Training);
-Sum of different types of courses provided in classroom format (Sum Courses in Classroom Format)
-Sum of different types of courses provided through on-the job training (Sum_Courses in OntheJob Format).

### 7.1. Training and absenteeism: Cross-sectional Analysis for 1999

Tables 7.1.1a, 7.1.1b, and 7.1.1c report the R square, ANOVA, and coefficients for the 1999 paid sick leave data.

| Table 7.1.1a. Training vs Paid Sick Leave, 1999 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | dfl | df2 | Sig F Change |
| 153 | 024 | 021 | 1993674 | 024 | 11089 | 7 | 3223 | 000 |

Table 7.1.1b. Training vs Paid Sick Leave, 1999 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 30852488 | 7 | 4407498 | 11089 | 000 |
| Residual | 1281057363 | 3223 | 397474 |  |  |
| Total | 1311909851 | 3230 |  |  |  |


| Table 7.1.1c. Training vs Paid Sick Leave, 1999 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | S1g | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 792 | 116 |  | 6858 | 000 |  |  |  |
| Percent_Workers_Claıming_Too <br> Little Traınıng_for_Job_99 | 004 | 002 | 032 | 1825 | 068 | 019 | 032 | 032 |
| Percent_Workers Claımıng_Avail ability Trannng_Increased_99 | 009 | 002 | 090 | 4947 | 000 | 102 | 087 | 086 |
| ```Average_Expendıture_for_Trainın g_99``` | 000 | 000 | 040 | 2098 | 036 | 064 | 037 | 037 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_99 | -302 | 185 | -044 | -1629 | 103 | 012 | -029 | -028 |
| Proportion_Employees_ReceIving_ <br> OntheJob_Trainıng_99 | -304 | 171 | -045 | -1774 | 076 | -038 | -031 | -031 |
| ```Sum_Courses_in_Classroom_Form at_99``` | 116 | 028 | 112 | 4129 | 000 | 095 | 073 | 072 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_99 } \end{aligned}$ | -030 | 028 | -027 | -1 044 | 296 | 024 | -018 | -018 |

Tables 7.1.2a, 7.1.2b, and 7.1.2c report the R square, ANOVA, and coefficients for the 1999 other paid leave data.

| R | R Square | Adjusted R Square | Std Error of the Estrmate | R Square Change | F Change | df1 | d12 | Sig F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 160 | 026 | 023 | 1445225 | 026 | 12074 | 7 | 3223 | 000 |

Table 7.1.2a. Training vs Other Paid Leave, 1999 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 17653539 | 7 | 2521934 | 12074 | 000 |
| Residual | 673179738 | 3223 | 208867 |  |  |
| Total | 690833277 | 3230 |  |  |  |

Table 7.1.2c. Training vs Other Paid Leave, 1999 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 273 | 084 |  | 3255 | 001 |  |  |  |
| Percent_Workers_Claıming_Too_ <br> Little_Traıning_for_Job_99 | 002 | 001 | 023 | 1308 | 191 | 010 | 023 | 023 |
| Percent_Workers_Claımıng_Avail ability_Tranning_Increased_99 | 006 | 001 | 077 | 4239 | 000 | 099 | 074 | 074 |
| $\begin{aligned} & \text { Average_Expenditure_for_Tramn } \\ & \text { g_ } 99 \end{aligned}$ | 000 | 000 | 016 | 847 | 397 | 061 | 015 | 015 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Trannng_99 } \end{aligned}$ | 034 | 134 | 007 | 254 | 799 | 055 | 004 | 004 |
| Proportion_Employees_Receiving_ <br> OntheJob_- Trainıng_99 | -286 | 124 | -058 | -2305 | 021 | -016 | -041 | -040 |
| ```Sum_Courses_1n_Classroom_Form at 99``` | 093 | 020 | 124 | 4584 | 000 | 128 | 080 | 080 |
| $\begin{aligned} & \text { Sum_Courses_1n_OntheJob_Forma } \\ & \text { t } 99 \end{aligned}$ | -010 | 021 | -012 | -464 | 642 | 047 | -008 | -008 |

Tables 7.1.3a, 7.1.3b, and 7.1.3c report the R square, ANOVA, and coefficients for the 1999 unpaid leave data.

| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | dfl | df2 | Sig F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 083 | 007 | 005 | 3871458 | 007 | 3206 | 7 | 3222 | 002 |

Table 7.1.3b. Training vs Unpaid Leave, 1999 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 33635114 | 7 | 4805016 | 3206 | 002 |
| Residual | 4829194883 | 3222 | 1498819 |  |  |
| Total | 4862829997 | 3229 |  |  |  |


|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 2780 | 224 |  | 12389 | 000 |  |  |  |
| Percent Workers_Claiming_Too_ <br> Little_Traning_for_Job_99 | 000 | 004 | -001 | -049 | 961 | -003 | -001 | -001 |
| Percent_Workers_Claımıng_Avall ability_Traming_Increased_99 | 000 | 004 | 002 | 118 | 906 | -013 | 002 | 002 |
| Average Expendtture_for_Tramın <br> g_99 | -001 | 000 | -051 | -2667 | 008 | -066 | -047 | -047 |
| Proportion_Employees_Receiving_ Classroom_Tranning_99 | -205 | 360 | -015 | - 570 | 569 | -054 | -010 | -010 |
| Proportion_Employees_Receiving_ OntheJob_Traming_99 | -168 | 333 | -013 | - 504 | 614 | -019 | -009 | -009 |
| Sum_Courses_1n_Classroom_Form at_99 | - 100 | 055 | -050 | -1818 | 069 | -048 | -032 | -032 |
| Sum_Courses_in_OntheJob_Forma t_99 | 112 | 057 | 052 | 1990 | 047 | 001 | 035 | 035 |

### 7.2. Training and absenteeism: Cross-sectional Analysis for 2001

Tables 7.2.1a, 7.2.1b, and 7.2.1c report the R square, ANOVA, and coefficients for the 2001 paid sick leave data.

Table 7.2.1a. Training vs Paid Sick Leave, 2001 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 161 | 026 | 024 | 1824564 | 026 | 11434 | 7 | 3026 | 000 |


| Table 7.2.1b. Training vs Paid Sick Leave, 2001 Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | dt | Mean Square | F | Sig |
| Regression | 26644061 | 7 | 3806294 | 11434 | 000 |
| Residual | 1007366130 | 3026 | 332904 |  |  |
| Total | 1034010191 | 3033 |  |  |  |


| Table 7.2.1c. Training vs Paid Sick Leave, 2001 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlatons |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 611 | 086 |  | 7072 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Trainıng_for_Job_01 | 007 | 002 | 067 | 3675 | 000 | 076 | 067 | 066 |
| Percent_Workers_Clamming_Avall ability_Traming_Increased_01 | 008 | 002 | 097 | 5317 | 000 | 109 | 096 | 095 |
| Average_Expendıture_for_Tramın $\mathrm{g}_{-} 01$ | 000 | 000 | 039 | 1938 | 053 | 086 | 035 | 035 |
| Proportion_Employees_Receiving_ Classroom_Training 01 | 074 | 152 | 012 | 487 | 626 | 079 | 009 | 009 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traning_01 | -011 | 049 | -004 | -230 | 818 | 017 | - 004 | -004 |
| Sum Courses in_Classroom_Form at_01 | 037 | 027 | 038 | 1369 | 171 | 101 | 025 | 025 |
| Sum Courses in OntheJob_Forma t_01 | 024 | 025 | 023 | 994 | 320 | 082 | 018 | 018 |

Tables 7.2.2a, 7.2.2b, and 7.2.2c report the R square, ANOVA, and coefficients for the 2001 other paid leave data.

Table 7.2.2a. Training vs Other Paid Leave, 2001 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 093 | 009 | 006 | 2548561 | 009 | 3759 | 7 | 3024 | 000 |

Table 7.2.2b. Training vs Other Paid Leave, 2001 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 17089873 | 7 | 2441410 | 3759 | 000 |
| Residual | 1964137437 | 3024 | 649516 |  |  |
| Total | 1981227310 | 3031 |  |  |  |


| Table 7.2.2c. Training vs Other Paid Leave, 2001 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | $\begin{aligned} & \text { Std } \\ & \text { Error } \\ & \hline \end{aligned}$ | Beta |  |  | $\begin{array}{\|l\|} \hline \text { Zero- } \\ \text { order } \end{array}$ | Partual | Part |
| (Constant) | 798 | 123 |  | 6468 | 000 |  |  |  |
| Percent Workers_Claiming_Too <br> Little_Tranning_for_Job_01 | 001 | 003 | 007 | 404 | 686 | 016 | 007 | 007 |
| Percent_Workers_Clammng_Avall ability_Tranning_Increased_01 | 003 | 002 | 029 | 1565 | 118 | 040 | 028 | 028 |
| ```Average_Expenditure_for_Trainın g_01``` | 000 | 000 | 039 | 1891 | 059 | 063 | 034 | 034 |
| Proportion_Employees_Receiving_ Classroom_Training_01 | 118 | 217 | 013 | 544 | 586 | 050 | 010 | 010 |
| Proportion_Employees_Receiving_ OntheJob_Trannng_01 | -313 | 149 | -044 | -2 093 | 036 | -007 | -038 | -038 |
| Sum_Courses_in_Classroom_Form at_01 | 030 | 038 | 022 | 774 | 439 | 069 | 014 | 014 |
| Sum_Courses_n_OntheJob Forma t_01 | 062 | 037 | 043 | 1689 | 091 | 056 | 031 | 031 |

Tables 7.2.3a, 7.2.3b, and 7.2.3c report the R square, ANOVA, and coefficients for the 2001 unpaid leave data.

| Table 7.2.3a. Training vs Unpaid Leave, 2001 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |  |  |
| 092 | 008 | 006 | 3453187 | 008 | 3679 | 7 | 3024 | 001 |  |  |


| Table 7.2.3b. Training vs Unpaid Leave, 2001 - Cross-Sectional ANOVA |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  | Sum of Squares | df | Mean Square | F | SIg |  |
| Regression | 30705877 | 7 | 4386554 | 3679 | 001 |  |
| Residual | 3605969120 | 3024 | 1192450 |  |  |  |
| Total | 3636674997 | 3031 |  |  |  |  |

Table 7.2.3c. Training vs Unpaid Leave, 2001 - Cross-Sectional Coefficients

|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 2053 | 166 |  | 12368 | 000 |  |  |  |
| ```Percent_Workers_Clammng_Too_ Little_Tramnng_for_Job_01``` | -006 | 004 | -033 | -1789 | 074 | -041 | -033 | -032 |
| Percent_Workers_Claımıng_Avaıl ability_Trauning Increased_01 | 007 | 003 | 046 | 2487 | 013 | 043 | 045 | 045 |
| Average_Expenditure_for_Tramn g_01 | 000 | 000 | -047 | -2 286 | 022 | -039 | -042 | -041 |
| $\begin{aligned} & \text { Proportion_Employees_Receıving_ } \\ & \text { Classroom_Traınıng_01 } \end{aligned}$ | 841 | 294 | 070 | 2861 | 004 | 019 | 052 | 052 |
| Proportion_Employees_Recerving_ <br> OntheJob_Trainıng_01 | -352 | 202 | -037 | -1741 | 082 | -020 | -032 | -032 |
| $\qquad$ | -116 | 052 | -064 | -2230 | 026 | -023 | -041 | -040 |
| $\begin{aligned} & \text { Sum_Courses_m_OntheJob_Forma } \\ & \text { t_01 } \end{aligned}$ | 074 | 050 | 038 | 1485 | 138 | -006 | 027 | 027 |

### 7.3. Training and absenteeism: Cross-sectional Analysis for 2003

Tables 7.3.1a, 7.3.1b, and 7.3.1c report the R square, ANOVA, and coefficients for the 2003 paid sick leave data.

| Table 7.3.1a. Training vs Paid Sick Leave, 2003 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estrmate | R Square Change | F Change | df1 | df2 | Sig F Change |  |
| 138 | 019 | 117 | 2104247 | 019 | 8618 | 7 | 3096 | 000 |  |


| Table 7.3.1b. Training vs Paid Sick Leave, 2003 - Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 26710736 | 7 | 3815819 | 8618 | 000 |
| Residual | 1370863773 | 3096 | 442785 |  |  |
| Total | 1397574509 | 3103 |  |  |  |


|  | Unstandardızed Coefficients <br> B | $\frac{1}{S \text { Std }}$Error | Standardized Coefficients <br> Beta | $t$ | SIg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | $\begin{array}{\|l\|} \hline \text { Zero- } \\ \text { order } \end{array}$ | Partal | Part |
| (Constant) | 709 | 102 |  | 6966 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Trannng_for_Job_03 | 006 | 002 | 051 | 2865 | 004 | 051 | 051 | 051 |
| Percent_Workers_Claiming_Avail ablity_Tranning_Increased_03 | 008 | 002 | 086 | 4636 | 000 | 103 | 083 | 083 |
| Average_Expenditure_for_Tramn g_03 | 000 | 000 | 044 | 2105 | 035 | 077 | 038 | 037 |
| Proportion_Employees_Receiving_ Classroom_Trainng_ 03 | -069 | 153 | -014 | -451 | 652 | 034 | -008 | -008 |
| Proportion_Employees_Receiving... OntheJob_Tramng_03 | -023 | 144 | -005 | -162 | 871 | 024 | -003 | -003 |
| Sum_Courses__1n_Classroom_Form at 03 | 043 | 033 | 037 | 1299 | 194 | 090 | 023 | 023 |
| Sum_Courses_in_OntheJob_Forma t_03 | 028 | 033 | 022 | 829 | 407 | 071 | 015 | 015 |

Tables 7.3.2a, 7.3.2b, and 7.3.2c report the R square, ANOVA, and coefficients for the 2003 other paid leave data.

Table 7.3.2a. Training vs Other Paid Leave, 2003 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | S1g F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 141 | 020 | 018 | 3531332 | 020 | 8915 | 7 | 3093 | 000 |

Table 7.3.2b. Training vs Other Paid Leave, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sug |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 77821527 | 7 | 11117361 | 1247030 | 8915 |
| Residual | 3857064833 | 3093 |  |  |  |
| Total | 3934886361 | 3100 |  |  |  |

Table 7.3.2c. Training vs Other Paid Leave, 2003 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std <br> Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 898 | 175 |  | 5135 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Training_for_Job_03 | -002 | 004 | -008 | -434 | 665 | -008 | -008 | -008 |
| ```Percent_Workers_Claiming_Avall abllty_Trammng_Increased_03``` | 010 | 003 | 057 | 3076 | 002 | 072 | 055 | 055 |
| $\begin{aligned} & \text { Average_Expenditure_for_Tramin } \\ & \text { g_03 } \end{aligned}$ | 000 | 000 | -029 | -1406 | 160 | 032 | -025 | -025 |
| Proportion_Employees_Receiving_ Classroom Traınıng_03 | 1530 | 298 | 127 | 5135 | 000 | 122 | 092 | 091 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranning_03 | -089 | 266 | -008 | -336 | 737 | 041 | -006 | - 006 |
| ```Sum_Courses_in_Classroom_Form at_03``` | 051 | 058 | 026 | 883 | 377 | 073 | 016 | 016 |
| Sum_Courses_in_OntheJob_Forma t 03 | -090 | 056 | -042 | -1611 | 107 | 014 | -029 | -029 |

Tables 7.3.3a, 7.3.3b, and 7.3.3c report the R square, ANOVA, and coefficients for the 2003 unpaid leave data.

Table 7.3.3a. Training vs Unpaid Leave, 2003 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | F Change | df1 | df2 |
| :--- | :--- | Sıg F Change | S |
| :--- |
| 123 |

Table 7.3.3b. Training vs Unpaid Leave, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 35511989 | 7 | 5073141 | 6829 | 000 |
| Residual | 2297674383 | 3093 | 742863 |  |  |
| Total | 2333186371 | 3100 |  |  |  |

Table 7.3.3c. Training vs Unpaid Leave, 2003 - Cross-Sectional Coefficients

|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sıg | Correlatıons |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -006 | 003 | -038 | -2 100 | 036 | -033 | -038 | -037 |
| Percent_Workers_Claıming Too_ <br> Little_Traming_for_Job_03 | -014 | 002 | -108 | -5 773 | 000 | -097 | -103 | -103 |
| Percent_Workers_Claımıng_Avail ability_Traming_Increased_03 | 000 | 000 | -021 | -1 023 | 306 | -018 | -018 | -018 |
| Average_Expenditure_for_Trannn g_03 | 016 | 230 | 002 | 070 | 944 | 011 | 001 | 001 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Tramıng_03 } \end{aligned}$ | 659 | 205 | 072 | 3212 | 001 | 045 | 058 | 057 |
|  | 038 | 045 | 025 | 855 | 393 | -011 | 015 | 015 |
| ```Sum_Courses_1n_Classroom_Form at_03``` | -050 | 043 | -030 | -1 154 | 249 | -008 | -021 | -021 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_03 } \end{aligned}$ | -006 | 003 | -038 | -2 100 | 036 | -033 | -038 | -037 |

### 7.4. Training and absenteeism: Cross-sectional Analysis for 2005

Tables 7.4.1a, 7.4.1b, and 7.4.1c report the R square, ANOVA, and coefficients for the 2005 paid sick leave data.

Table 7.4.1a. Training vs Paid Sick Leave, 2005 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 177 | 031 | 029 | 1411599 | 031 | 16183 | 7 | 3513 | 000 |

Table 7.4.1b. Training vs Paid Sick Leave, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 22572039 | 7 | 3224577 | 16183 | 000 |
| Resıdual | 700004536 | 3513 | 199261 |  |  |
| Total | 722576576 | 3520 |  |  |  |


| Table 7.4.1c. Training vs Paid Sick Leave, 2005 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partıal | Part |
| (Constant) | 818 | 064 |  | 12832 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traıning for_Job_05 | 004 | 001 | 052 | 3139 | 002 | 057 | 053 | 052 |
| Percent_Workers_Claımıng_Avall ability_Trannng_Increased_05 | 002 | 001 | 034 | 1952 | 051 | 080 | 033 | 032 |
| Average_Expenditure_for_Tramin g_05 | 000 | 000 | 031 | 1561 | 119 | 103 | 026 | 026 |
| Proportion_Employees_Receiving_ <br> Classroom_Trainng_05 | - 066 | 100 | -019 | -662 | 508 | 060 | -011 | -011 |
| Proportion_Employees_Receiving_ <br> OntheJob_Trainıng_05 | 047 | 092 | 015 | 514 | 607 | 056 | 009 | 009 |
| ```Sum_Courses_1n_Classroom_Form at_05``` | 081 | 020 | 103 | 3979 | 000 | 156 | 067 | 066 |
| ```Sum_Courses_In_OntheJob_Forma t 05``` | 041 | 020 | 049 | 2027 | 043 | 134 | 034 | 034 |

Tables 7.4.2a, 7.4.2b, and 7.4.2c report the R square, ANOVA, and coefficients for the 2005 other paid leave data.

| Table 7.4.2a. Training vs Other Paid Leave, 2005 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| 143 | 021 | 019 | 3083642 | 021 | 10528 | 7 | 3512 | 000 |

Table 7.4.2b. Training vs Other Paid Leave, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 70078282 | 7 | 10011183 | 10528 | 000 |
| Residual | 3339507316 | 3512 | 950885 |  |  |
| Total | 3409585598 | 3519 |  |  |  |


| Table 7.4.2c. Training vs Other Paid Leave, 2005 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coeffictents |  | Standardized Coefficients | t | Sig | Correlatıons |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 721 | 139 |  | 5178 | 000 |  |  |  |
| ```Percent_Workers_Claiming_Too_ Little_Tramning_for_Job_05``` | -003 | 003 | -019 | -1 122 | 262 | -012 | -019 | -019 |
| Percent_Workers Claimıng_Aval ability_Tranning_Increased_05 | - 002 | 003 | -014 | - 794 | 427 | 018 | -013 | -013 |
| $\begin{aligned} & \text { Average_Expenditure_for_Trainon } \\ & \text { g_05 } \end{aligned}$ | 001 | 000 | 137 | 6965 | 000 | 136 | 117 | 116 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Training_05 } \end{aligned}$ | -498 | 218 | -067 | -2 279 | 023 | 026 | -038 | -038 |
| ```Proportion_Employees_Receiving_ OntheJob__Trainıng_05``` | 358 | 200 | 052 | 1788 | 074 | 027 | 030 | 030 |
| ```Sum_Courses_1n_Classroom_Form at_05``` | 072 | 045 | 042 | 1605 | 109 | 080 | 027 | 027 |
| $\begin{aligned} & \text { Sum_Courses_in_Onthelob_Forma } \\ & \text { t_05 } \end{aligned}$ | -034 | 045 | -019 | - 769 | 442 | 052 | -013 | -013 |

Tables 7.4.3a, 7.4.3b, and 7.4.3c report the R square, ANOVA, and coefficients for the 2005 unpaid leave data.

Table 7.4.3a. Training vs Unpaid Leave, 2005 - Cross-Sectional Model Summary

|  |  | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 118 | 014 | 012 | 3314916 | 014 | 7042 | 7 | 3509 | 000 |

Table 7.4.3b. Training vs Unpaid Leave, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 54167536 | 7 | 7738219 | 7042 | 000 |
| Residual | 3855924256 | 3509 | 1098867 |  |  |
| Total | 3910091792 | 3516 |  |  |  |

Table 7.4.3c. Training vs Unpaid Leave, 2005 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zero- <br> order | Partial | Part |
| (Constant) | 3155 | 151 |  | 20900 | 000 |  |  |  |
| ```Percent_Workers_Claiming_Too_ Little_Tranning_for_Job_05``` | -017 | 003 | -085 | -5085 | 000 | -086 | -086 | -085 |
| Percent_Workers_Claiming_Avail ability_Traming Increased_05 | -007 | 003 | -041 | -2319 | 020 | -043 | -039 | -039 |
| ```Average_Expenditure_for_Tramnn g_05``` | -001 | 000 | -060 | $-3050$ | 002 | -061 | -051 | -051 |
| Proportion_Employees_Receıving_ <br> Classroom_Tramıng_05 | -221 | 236 | -028 | -935 | 350 | -032 | -016 | -016 |
| ```Proportion_Employees_Receiving_ OntheJob_Tramnng_05``` | 106 | 216 | 014 | 490 | 624 | -008 | 008 | 008 |
| ```Sum_Courses_1n_Classroom_Form at_05``` | 016 | 048 | 009 | 342 | 732 | -021 | 006 | 006 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_05 } \end{aligned}$ | 075 | 048 | 039 | 1574 | 116 | 012 | 027 | 026 |

### 7.5. Training and absenteeism: Longitudinal (differential) Analysis 2001-1999

The following sections provide the results for the longitudinal analyses. Tables
7.5.1a, 7.5.1b and 7.5.1c report the R square, ANOVA and regression coefficients with regards to paid sick leave for the 2001-1999 data.

| R | R Square | Adjusted R Square | Std Error of the Estımate | R Square Change | F Change | dfl | df2 | Sıg F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 113 | 013 | 010 | 2256655 | 013 | 4124 | 7 | 2245 | 000 |

Table 7.5.1b. Training vs Paid Sick Leave, 2001-1999-Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Stg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 14699367 | 7 | 2099910 | 4124 | 000 |
| Residual | 1143264408 | 2245 | 509249 |  |  |
| Total | 1157963775 | 2252 |  |  |  |


| Table 7.5.1c. Training vs Paid Sick Leave, 2001-1999-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | 1 | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | -105 | 083 |  | -1 262 | 207 |  |  |  |
| Percent_Workers_Claımıng_Too <br> Little_Tranıng_for_Job_0199 | 001 | 002 | 010 | 464 | 643 | 004 | 010 | 010 |
| Percent_Workers_Claiming_Availa bility_Tramıng_Increased_0199 | 010 | 002 | 094 | 4433 | 000 | 097 | 093 | 093 |
| Average_Expendıture_for_Trainın g_0199 | 000 | 000 | 030 | 1348 | 178 | 023 | 028 | 028 |
| Proportion_Employees_Receiving_ Classroom_Traning_0199 | -244 | 165 | -035 | -1482 | 138 | -024 | -031 | -031 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_0199 | 037 | 064 | 013 | 580 | 562 | 014 | 012 | 012 |
| Sum_Courses_n_Classroom_Form at_0199 | -002 | 032 | -001 | -053 | 958 | 004 | -001 | -001 |
| Sum_Courses_1n_OntheJob_Forma t_0199 | 050 | 029 | 041 | 1708 | 088 | 044 | 036 | 036 |

Tables $7.5 .2 \mathrm{a}, 7.5 .2 \mathrm{~b}$ and 7.5 .2 c report the R square, ANOVA and regression coefficients for the other paid leave 2001-1999 data.

| Table 7.5.2a. Training vs Other Paid Leave, 2001-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | SIg F Change |  |
| 047 | 002 | -001 | 2978376 | 002 | 724 | 7 | 2243 | 652 |  |


| Table 7.5.2b. Traing vs Other Paid Leave, 2001-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 4495894 | 7 | 642271 | 724 | 652 |
| Residual | 1989703267 | 2243 | 887072 |  |  |
| Total | 1994199162 | 2250 |  |  |  |


| Table 7.5.2c. Training vs Other Paid Leave, 2001-1999-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 568 | 110 |  | 5172 | 000 |  |  |  |
| Percent_Workers_Claıming_Too_ <br> Little_Traınıng_for_Job_0199 | -001 | 003 | -007 | -343 | 731 | -009 | -007 | -007 |
| Percent_Workers_Claımıng_Avala bility Trainıng_Increased_0199 | 004 | 003 | 028 | 1319 | 187 | 026 | 028 | 028 |
| $\begin{aligned} & \text { Average_Expenditure for_Traının } \\ & \text { g_0199 } \end{aligned}$ | 000 | 000 | 024 | 1092 | 275 | 025 | 023 | 023 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_0199 | - 159 | 234 | -018 | $-680$ | 496 | -002 | -014 | -014 |
| Proportion Employees_Receiving_ <br> OntheJob_Traming_0199 | -001 | 199 | 000 | -007 | 995 | -007 | 000 | 000 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0199 } \end{aligned}$ | 055 | 043 | 033 | 1261 | 207 | 020 | 027 | 027 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0199 } \end{aligned}$ | -033 | 042 | -020 | -789 | 430 | -005 | -017 | -017 |

Tables 7.5.3a, 7.5.3b and 7.5.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2001-1999 data.

| Table 7.5.3a. Training vs Unpaid Leave, 2001-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estrmate | R Square Change | F Change | df1 | df2 | Sig F Change |  |
| 144 | 021 | 018 | 4716852 | 021 | 6797 | 7 | 2244 | 000 |  |


| Table 7.5.3b. Traing vs Unpaid Leave, 2001-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 105857370 | 7 | 15122481 | 6797 | 000 |
| Residual | 4992606923 | 2244 | 2224869 |  |  |
| Total | 5098464293 | 2251 |  |  |  |


| Table 7.5.3c. Training vs Unpaid Leave, 2001-1999 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std <br> Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partıal | Part |
| (Constant) | - 588 | 173 |  | -3 396 | 001 |  |  |  |
| Percent_Workers_Claıming_Too_ <br> Little_Trainng_for_Job_0199 | 017 | 005 | 072 | 3414 | 001 | 075 | 072 | 071 |
| Percent_Workers_Claiming_Availa <br> bilty_Tranning_Increased_0199 | 004 | 005 | 016 | 769 | 442 | 020 | 016 | 016 |
| Average_Expenditure_for_Tramn g_-0199 | 000 | 000 | 005 | 235 | 814 | -007 | 005 | 005 |
| Proportion_Employees_Receiving Classroom_Traming_0199 | 640 | 370 | 044 | 1727 | 084 | -011 | 036 | 036 |
| Proportion_Employees_Receiving_ OntheJob_Traming_0199 | -1410 | 315 | -110 | -4 482 | 000 | - 060 | -094 | -094 |
| Sum_Courses_in_Classroom_Form at_0199 | -212 | 068 | -081 | -3090 | 002 | -013 | -065 | -065 |
| Sum_Courses_In_OntheJob_Forma t 0199 | 319 | 065 | 124 | 4904 | 000 | 064 | 103 | 102 |

### 7.6. Training and absenteeism: Longitudinal (differential) Analysis 2003-2001

Tables 7.6.1a, 7.6.1b and 7.6.1c report the R square, ANOVA and regression coefficients for the paid sick leave 2003-2001 data.

Table 7.6.1a. Training vs Paid Sick Leave, 2003-2001 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estimate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 066 | 004 | 001 | 2727632 | 004 | 1269 | 7 | 2033 | 262 |

Table 7.6.1b. Training vs Paid Sick Leave, 2003-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 6607482 | 7 | 943926 | 1269 | 262 |
| Residual | 1512547489 | 2033 | 743998 |  |  |
| Total | 1519154971 | 2040 |  |  |  |

Table 7.6.1c. Training vs Paid Sick Leave, 2003-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlatıons |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partıal | Part |
| (Constant) | 088 | 098 |  | 902 | 367 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for Job 0301 | -003 | 003 | -020 | -895 | 371 | -024 | -020 | -020 |
| Percent_Workers_Claıming_Availa bilty_Tranıng_Increased_0301 | 001 | 003 | 010 | 434 | 664 | 010 | 010 | 010 |
| $\begin{aligned} & \text { Average_Expendture_for_Tramnn } \\ & \text { g_0301 } \end{aligned}$ | 000 | 000 | -002 | -079 | 937 | -001 | -002 | -002 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_0301 | 361 | 250 | 037 | 1445 | 149 | 008 | 032 | 032 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_0301 | -003 | 076 | -001 | -043 | 966 | 007 | -001 | -001 |
| $\begin{aligned} & \text { Sum_Courses_1n_Classroom_Form } \\ & \text { at_0301 } \end{aligned}$ | - 112 | 044 | -067 | -2 525 | 012 | -038 | -056 | -056 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0301 } \end{aligned}$ | 076 | 044 | 041 | 1740 | 082 | 023 | 039 | 039 |

Tables 7.6.2a, 7.6.2b and 7.6.2c report the R square, ANOVA and regression coefficients for the other paid leave 2003-2001 data.

| Table 7.6.2a. Training vs Other Paid Leave, 2003-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | dfl | df2 | Slg F Change |  |
| 047 | 002 | -001 | 3850216 | 002 | 656 | 7 | 2032 | 710 |  |

Table 7.6.2b. Training vs Other Paid Leave, 2003-2001- Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 6804239 | 7 | 972034 | 656 | 710 |
| Residual | 3012270660 | 2032 | 1482417 |  |  |
| Total | 3019074899 | 2039 |  |  |  |


| Table 7.6.2c. Training vs Other Paid Leave, 2003-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 445 | 138 |  | 3215 | 001 |  |  |  |
| $\begin{aligned} & \text { Percent_-Workers_Claıming_Too_ } \\ & \text { Little_Training_for_Job_0301 } \end{aligned}$ | 002 | 004 | 013 | 561 | 575 | 014 | 012 | 012 |
| Percent_Workers_Claıming_Availa bility_Trainng_Increased_0301 | -002 | 004 | -014 | -611 | 542 | -012 | -014 | -014 |
| Average_Expendıture_for_Traimn g_0301 | 000 | 000 | -009 | -413 | 679 | -009 | -009 | -009 |
| $\begin{aligned} & \text { Proportıon_Employees_Receıving_ } \\ & \text { Classroom_Traınıng_0301 } \end{aligned}$ | -462 | 353 | -033 | -1309 | 191 | -015 | -029 | -029 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0301 | 042 | 107 | 009 | 394 | 694 | 008 | 009 | 009 |
| $\begin{aligned} & \text { Sum_Courses_1n_Classroom_Form } \\ & \text { at_0301 } \end{aligned}$ | 087 | 063 | 037 | 1381 | 167 | 026 | 031 | 031 |
| $\begin{aligned} & \text { Sum_Courses_1n_OntheJob_Forma } \\ & \text { t_0301 } \end{aligned}$ | 034 | 061 | 013 | 551 | 582 | 023 | 012 | 012 |

Tables 7.6.3a, 7.6.3b and 7.6.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2003-2001 data.

| Table 7.6.3a. Training vs Unpaid Leave, 2003-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estmate | R Square Change | F Change | df1 | df2 | Sig F Change |  |
| 056 | 003 | 000 | 3098087 | 003 | 903 | 7 | 2032 | 503 |  |

Table 7.6.3b. Training vs Unpaid Leave, 2003-2001 - Longitudinal ANOVA

|  | Sum of Squares | Df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :---: |
| Regression | 6065231 | 7 | 866462 | 959814 | 903 |
| Residual | 1950342461 | 2032 |  |  |  |
| Total | 1956407692 | 2039 |  |  |  |


| Table 7.6.3c. Training vs Unpaid Leave, 2003-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | -108 | 111 |  | -967 | 334 |  |  |  |
| ```Percent_Workers_Clamming_Too_ Little_Traming_for_Job_0301``` | -003 | 003 | -021 | -942 | 347 | -019 | -021 | -021 |
| Percent_Workers_Clamming_Avala bility_Trainng_Increased_0301 | 002 | 003 | 017 | 771 | 441 | 020 | 017 | 017 |
| $\begin{aligned} & \text { Average_Expenditure_for_Train!n } \\ & \text { g_0301 } \end{aligned}$ | 000 | 000 | -025 | -1090 | 276 | -017 | -024 | -024 |
| Proportion_Employees_Receiving_ <br> Classroom_Training_0301 | 166 | 285 | 015 | 585 | 559 | 021 | 013 | 013 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0301 | 025 | 086 | 007 | 294 | 769 | 010 | 007 | 007 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0301 } \end{aligned}$ | 047 | 050 | 025 | 929 | 353 | 033 | 021 | 021 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0301 } \end{aligned}$ | 047 | 049 | 023 | 953 | 340 | 032 | 021 | 021 |

### 7.7. Training and absenteeism: Longitudinal (differential) Analysis 2005-2003

Tables 7.7.1a, 7.7.1b and 7.7.1c report the R square, ANOVA and regression coefficients for the paid sick leave 2005-2003 data.

Table 7.7.1a. Training vs Paid Sick Leave, 2005-2003 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Stg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 061 | 004 | 001 | 1820451 | 004 | 1185 | 7 | 2206 | 308 |


| Table 7.7.1b. Training vs Paid Sick Leave, 2005-2003 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | 2748396 | 7 | 392628 | 1185 | 308 |
| Residual | 731077592 | 2206 | 331404 |  |  |
| Total | 733825989 | 2213 |  |  |  |

Table 7.7.1c. Training vs Paid Sick Leave, 2005-2003 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 335 | 063 |  | 5352 | 000 |  |  |  |
| Percent_Workers Clammng_Too_ <br> Little_Training for_Job_0503 | -003 | 002 | -027 | -1 268 | 205 | -025 | -027 | -027 |
| Percent_Workers_Claımıng_Avaıla bility_Training_Increased_0503 | -002 | 002 | -022 | -1 006 | 315 | -015 | -021 | -021 |
| Average_Expenditure for Trainın g_0503 | 000 | 000 | -027 | -1234 | 217 | -033 | -026 | -026 |
| Proportion_Employees_Receiving _ <br> Classroom_Traming_0503 | -154 | 170 | -023 | -909 | 363 | -036 | -019 | -019 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0503 | -103 | 147 | -016 | -698 | 485 | -032 | -015 | -015 |
| Sum_Courses_in_Classroom_Form at_0503 | -002 | 030 | -002 | -072 | 942 | -024 | -002 | -002 |
| Sum_Courses_1n_OntheJob_Forma t_0503 | -020 | 030 | -015 | -654 | 513 | -027 | -014 | -014 |

Tables 7.7.2a, 7.7.2b and 7.7.2c report the R square, ANOVA and regression coefficients for the other paid leave 2005-2003 data.

Table 7.7.2a. Training vs Other Paid Leave, 2005-2003 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Stg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 125 | 016 | 013 | 4052115 | 016 | 4998 | 7 | 2202 | 000 |

Table 7.7.2b. Training vs Other Paid Leave, 2005-2003- Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Stg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 57441675 | 7 | 8205954 | 4998 | 000 |
| Resıdual | 3615604505 | 2202 | 1641964 |  |  |
| Total | 3673046180 | 2209 |  |  |  |

Table 7.7.2c. Training vs Other Paid Leave, 2005-2003 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -616 | 141 |  | -4 377 | 000 |  |  |  |
| Percent_Workers Claıming Too <br> Little_Traming_for_Job_0503 | -014 | 004 | -068 | -3151 | 002 | -053 | -067 | -067 |
| Percent_Workers_Claıming_Availa <br> bility_Tramıng_Increased_0503 | -014 | 004 | -085 | -3945 | 000 | -074 | -084 | -083 |
| $\begin{aligned} & \text { Average_Expendıture_for_Traının } \\ & \text { g_0503 } \end{aligned}$ | -001 | 000 | -034 | -1554 | 120 | -008 | -033 | -033 |
| $\begin{aligned} & \text { Proportıon_Employees_Receiving_ } \\ & \text { Classroom_Traınıng_0503 } \end{aligned}$ | 984 | 391 | 062 | 2519 | 012 | 064 | 054 | 053 |
| $\begin{aligned} & \text { Proportion_Employees_Receıving_ } \\ & \text { OntheJob_Traming_0503 } \end{aligned}$ | - 121 | 332 | -008 | - 364 | 716 | 007 | -008 | -008 |
| ```Sum_Courses_1n_Classroom_Form at_0503``` | 045 | 069 | 017 | 662 | 508 | 045 | 014 | 014 |
| $\begin{aligned} & \text { Sum_Courses_1n_OntheJob_Forma } \\ & \text { t_0503 } \end{aligned}$ | 067 | 068 | 023 | 985 | 325 | 034 | 021 | 021 |

Tables 7.7.3a, 7.7.3b and 7.7.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2005-2003 data.

| Table 7.7.3a. Training vs Unpaid Leave, 2005-2003 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | dfl | d12 | Stg F Change |
| 211 | 045 | 042 | 3333836 | 045 | 14748 | 7 | 2205 | 000 |

Table 7.7.3b. Training vs Unpaid Leave, 2005-2003 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Stg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 114737566 | 7 | 16391081 | 14748 | 000 |
| Residual | 2450739653 | 2205 | 1111447 |  |  |
| Total | 2565477219 | 2212 |  |  |  |


|  | Unstandardzzed Coefficients |  | Standardized Coefficients | $\mathrm{t}$ | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std | Beta |  |  | Zero- | Partal | Part |
| (Constant) | 174 | 115 |  | 1516 | 130 |  |  |  |
| Percent_Workers_Clammg Too_ <br> Little_Traning_for_Job_0503 | 010 | 004 | 057 | 2669 | 008 | 082 | 057 | 056 |
| Percent_Workers_Claıming_Avala bility_Traning_Increased_0503 | -020 | 003 | - 146 | -6918 | 000 | - 154 | - 146 | -144 |
| Average_Expenditure_for_Tramin g_0503 | -001 | 000 | -059 | -2721 | 007 | -025 | -058 | -057 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranıng_0503 | 485 | 311 | 038 | 1559 | 119 | 060 | 033 | 032 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranning_0503 | -250 | 270 | -021 | -927 | 354 | 020 | -020 | -019 |
| Sum_Courses_n_Classroom_Form at 0503 | 155 | 056 | 069 | 2780 | 005 | 093 | 059 | 058 |
| Sum_Courses_in_OntheJob_Forma t 0503 | 182 | 055 | 076 | 3282 | 001 | 101 | 070 | 068 |

### 7.8. Training and absenteeism: Longitudinal (differential) Analysis 2003-1999

Tables 7.8.1a, 7.8.1b and 7.8.1c report the R square, ANOVA and regression coefficients for the paid sick leave 2003-1999 data.

| Table 7.8.1a. Training vs Paid Sick Leave, 2003-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | df1 | df2 | ge |
| 102 | 010 | 007 | 2053046 | 010 | 2919 | 7 | 1927 | 005 |


| Table 7.8.1b. Training vs Paid Sick Leave, 2003-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | SIg |
| Regression | 8612275 | 7 | 1230325 | 2919 | 005 |
| Residual | 812229762 | 1927 | 421500 |  |  |
| Total | 820842037 | 1934 |  |  |  |


| Table 7.8.1c. Training vs Paid Sick Leave, 2003-1999-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partıal | Part |
| (Constant) | 009 | 084 |  | 110 | 913 |  |  |  |
| Percent_Workers_Claıming_Too <br> Little_Traınıng_for_Job_0399 | 009 | 003 | 076 | 3299 | 001 | 076 | 075 | 075 |
| Percent_Workers_Claiming_Availa bility_Tramıng_Increased_0399 | 000 | 002 | 005 | 208 | 835 | -006 | 005 | 005 |
| ```Average_Expendıture_for_Tramm g_0399``` | 000 | 000 | -052 | -2 182 | 029 | -061 | -050 | -049 |
| Proportion_Employees_Receiving_ <br> Classroom_Training_0399 | - 124 | 172 | -021 | -721 | 471 | -034 | -016 | -016 |
| ```Proportion_Employees_Receiving_ OntheJob_Trammng_0399``` | 016 | 176 | 003 | 091 | 928 | -020 | 002 | 002 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0399 } \end{aligned}$ | 005 | 033 | 005 | 166 | 868 | -026 | 004 | 004 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0399 } \end{aligned}$ | -033 | 032 | -029 | -1 034 | 301 | -038 | -024 | -023 |

Tables 7.8.2a, 7.8.2b and 7.8.2c report the R square, ANOVA and regression coefficients for the other paid leave 2003-1999 data.

Table 7.8.2a. Training vs Other Paid Leave, 2003-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Stg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 076 | 006 | 002 | 3427026 | 006 | 1609 | 7 | 1926 | 128 |

Table 7.8.2b. Training vs Other Paid Leave, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | SIg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 13225810 | 7 | 1889401 | 1609 | 128 |
| Residual | 2261992664 | 1926 | 1174451 |  |  |
| Total | 2275218473 | 1933 |  |  |  |

Table 7.8.2c. Training vs Other Paid Leave, 2003-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficents |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | $\begin{aligned} & \hline \text { Std } \\ & \text { Error } \\ & \hline \end{aligned}$ | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partal | Part |
| (Constant) | 576 | 141 |  | 4098 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tramıng_for_Job_0399 | 001 | 004 | 005 | 229 | 819 | 000 | 005 | 005 |
| Percent_Workers_Claiming_Availa bility_Tranıng_Increased_0399 | 007 | 004 | 043 | 1844 | 065 | 041 | 042 | 042 |
| Average_Expenditure_for_Trainin g_0399 | 000 | 000 | -030 | -1234 | 217 | -011 | -028 | -028 |
| Proportion_Employees_Receiving_ Classroom_Tranning_0399 | 341 | 286 | 035 | 1190 | 234 | 022 | 027 | 027 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranning_0399 | -430 | 295 | -042 | -1460 | 144 | -009 | -033 | -033 |
| Sum_Courses_in_Classroom_Form at_0399 | 063 | 055 | 032 | 1134 | 257 | 048 | 026 | 026 |
| Sum_Courses_1n_OntheJob_Forma t_0399 | 062 | 054 | 032 | 1146 | 252 | 033 | 026 | 026 |

Tables 7.8.3a, 7.8.3b and 7.8.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2003-1999 data.

Table 7.8.3a. Training vs Unpaid Leave, 2003-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Stg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 108 | 012 | 008 | 3899172 | 012 | 3256 | 7 | 1927 | 002 |

Table 7.8.3b. Training vs Unpaid Leave, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 34654715 | 7 | 4950674 | 3256 | 002 |
| Residual | 2929722156 | 1927 | 1520354 |  |  |
| Total | 2964376871 | 1934 |  |  |  |


| Table 7.8.3c. Training vs Unpaid Leave, 2003-1999-Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partual | Part |
| (Constant) | - 864 | 160 |  | -5413 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tranning_for_Job_0399 | - 010 | 005 | -046 | -1994 | 046 | -047 | -045 | -045 |
| Percent_Workers_Claımıng_Availa bility_Tranning_Increased_0399 | 003 | 004 | 016 | 716 | 474 | 031 | 016 | 016 |
| Average_Expenditure_for_Tranın g_0399 | 000 | 000 | -007 | - 296 | 767 | 001 | -007 | -007 |
| Proportion_Employees_Receiving_ <br> Classroom_Traıning_0399 | - 193 | 326 | -017 | - 592 | 554 | 008 | -013 | -013 |
| Proportion_Employees_Recerving_ OntheJob_Tramng_0399 | 677 | 335 | 058 | 2019 | 044 | 070 | 046 | 046 |
| Sum_Courses_n_Classroom_Form at_0399 | -047 | 063 | -021 | -748 | 454 | 007 | -017 | -017 |
| $\begin{aligned} & \text { Sum_Courses_m_OntheJob_Forma } \\ & \text { t_0399 } \end{aligned}$ | 146 | 061 | 067 | 2393 | 017 | 078 | 054 | 054 |

### 7.9. Training and absenteeism: Longitudinal (differential) Analysis 2005-2001

Tables 7.9.1a, 7.9.1b and 7.9.1c report the R square, ANOVA and regression coefficients for the paid sick leave 2005-2001 data.

| Table 7.9.1a. Training vs Paid Sick Leave, 2005-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| 044 | 002 | -002 | 2072473 | 002 | 539 | 7 | 1908 | 806 |

Table 7.9.1b. Training vs Paid Sick Leave, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 1619598 | 7 | 231371 | 539 | 806 |
| Resıdual | 819513202 | 1908 | 429514 |  |  |
| Total | 821132799 | 1915 |  |  |  |


| Table 7.9.1c. Training vs Paid Sick Leave, 2005-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 310 | 076 |  | 4074 | 000 |  |  |  |
| Percent_Workers_Clamıng_Too_ <br> Little_Trainng_for_Job_0501 | 002 | 002 | 021 | 882 | 378 | 024 | 020 | 020 |
| Percent_Workers_Claımıng_Avalla <br> bility_Trainıng_Increased_0501 | -003 | 002 | -029 | -1255 | 210 | -032 | -029 | -029 |
| $\begin{aligned} & \text { Average_Expendıture_for_Tramın } \\ & \text { g_0501 } \end{aligned}$ | 000 | 000 | 012 | 504 | 615 | 013 | 012 | 012 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Trainıng_0501 } \end{aligned}$ | 147 | 186 | 022 | 788 | 431 | 015 | 018 | 018 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0501 | 005 | 058 | 002 | 083 | 934 | 005 | 002 | 002 |
| $\begin{aligned} & \text { Sum_Courses_In_Classroom_Form } \\ & \text { at_0501 } \end{aligned}$ | -022 | 034 | -018 | -651 | 515 | -004 | -015 | -015 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t } 0501 \end{aligned}$ | 003 | 031 | 002 | 099 | 921 | 000 | 002 | 002 |

Tables 7.9.2a, 7.9.2b and 7.9.2c report the R square, ANOVA and regression coefficients for the other paid leave 2005-2001 data.

| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 125 | 016 | 012 | 2737672 | 016 | 4308 | 7 | 1906 | 000 |

Table 7.9.2b. Training vs Other Paid Leave, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | S1g |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 22600070 | 7 | 3228581 | 4308 | 000 |
| Residual | 1428518177 | 1906 | 749485 |  |  |
| Total | 1451118246 | 1913 |  |  |  |


| Table 7.9.2c. Training vs Other Paid Leave, 2005-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -071 | 101 |  | -705 | 481 |  |  |  |
| Percent Workers_Claiming_Too_ <br> Little_Trannng_for_Job_0501 | -011 | 003 | -087 | -3741 | 000 | -086 | -085 | -085 |
| Percent_Workers_Claımıng_Avalla bilty_Trannng_Increased_0501 | 000 | 003 | 000 | -006 | 995 | 015 | 000 | 000 |
| Average_Expenditure_for_Tramın g_0501 | 000 | 000 | 025 | 1055 | 292 | 041 | 024 | 024 |
| Proportion_Employees_Receiving_ <br> Classroom_Traıning_0501 | -355 | 246 | -039 | -1444 | 149 | 019 | -033 | -033 |
| Proportion_Employees_Receiving_ OntheJob_Tranning_0501 | 004 | 076 | 001 | 055 | 956 | -001 | 001 | 001 |
| Sum_Courses_ın_Classroom_Form at_0501 | 162 | 045 | 099 | 3613 | 000 | 079 | 082 | 082 |
| Sum_Courses_in_OntheJob_Forma t_0501 | -045 | 041 | -027 | -1116 | 265 | 001 | -026 | -025 |

Tables 7.9.3a, 7.9.3b and 7.9.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2005-2001 data.

| Table 7.9.3a. Training vs Unpaid Leave, 2005-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | SIg F Change |  |
| 157 | 025 | 021 | 3164393 | 025 | 6895 | 7 | 1906 | 000 |  |

Table 7.9.3b. Training vs Unpaid Leave, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 48330694 | 7 | 6904385 | 6895 | 000 |
| Residual | 1908551326 | 1906 | 1001339 |  |  |
| Total | 1956882020 | 1913 |  |  |  |


| Table 7.9.3c. Training vs Unpaid Leave, 2005-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | Stg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partıal | Part |
| (Constant) | 561 | 116 |  | 4833 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_0501 | 001 | 003 | 006 | 260 | 795 | 010 | 006 | 006 |
| Percent_Workers_Claımıng_Availa bility_Trainıng_Increased_0501 | -006 | 003 | -041 | -1791 | 073 | -043 | -041 | -041 |
| Average Expenditure_for_Traının $\mathrm{g}_{-} 0501$ | 000 | 000 | -009 | -355 | 722 | -006 | -008 | -008 |
| Proportion_Employees_Receiving_ <br> Classroom_Traming_0501 | -259 | 300 | -025 | -864 | 388 | -022 | -020 | -020 |
| Proportion_Employees_Receiving <br> OntheJob_Trainıng_0501 | -090 | 248 | -009 | -365 | 715 | 033 | -008 | -008 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0501 } \end{aligned}$ | -006 | 052 | -003 | - 125 | 901 | 021 | -003 | -003 |
| Sum_Courses_m_OntheJob_Forma t_0501 | 307 | 050 | 154 | 6152 | 000 | 147 | 140 | 139 |

7.10. Training and absenteeism: Longitudinal (differential) Analysis 2005-1999

Tables 7.10.1a, 7.10.1b and 7.10.1c report the R square, ANOVA and regression coefficients for the paid sick leave 2005-1999 data.

Table 7.10.1a. Training vs Paid Sick Leave, 2005-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | S1g F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 084 | 007 | 003 | 2002521 | 007 | 1856 | 7 | 1850 | 073 |

Table 7.10.1b. Training vs Paid Sick Leave, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 5210277 | 7 | 744325 | 1856 | 073 |
| Residual | 741867004 | 1850 | 401009 |  |  |
| Total | 747077281 | 1857 |  |  |  |

Table 7.10.1c. Training vs Paid Sick Leave, 2005-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coeffictents | t | Sıg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 113 | 081 |  | 1403 | 161 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tramnng_for_Job_0599 | - 002 | 002 | -020 | -854 | 393 | -020 | -020 | -020 |
| $\begin{aligned} & \text { Percent_Workers_Claiming_Availa } \\ & \text { bılıty_Training_Increased_0599 } \end{aligned}$ | -004 | 002 | -047 | -1994 | 046 | -052 | -046 | -046 |
| $\begin{aligned} & \text { Average_Expendıture_for_Traının } \\ & \text { g_0599 } \end{aligned}$ | 000 | 000 | -041 | -1609 | 108 | -051 | -037 | -037 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_0599 | -018 | 185 | -003 | -100 | 920 | -039 | -002 | -002 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_ 0599 | -190 | 167 | -035 | -1 144 | 253 | -050 | -027 | - 026 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0599 } \end{aligned}$ | 005 | 031 | 004 | 152 | 880 | -023 | 004 | 004 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0599 } \end{aligned}$ | -009 | 030 | -008 | -297 | 766 | -031 | -007 | -007 |

Tables 7.10.2a, 7.10.2b and 7.10.2c report the R square, ANOVA and regression coefficients for the other paid leave 2005-1999 data.

| Table 7.10.2a. Training vs Other Paid Leave, 2005-1999- Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Adjusted <br> R Square |  |  |  |  |  |  |  |  |  | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| R | R Square |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 077 | 006 | 002 | 2408072 | 006 | 1576 | 7 | 1849 | 138 |  |  |  |  |  |  |  |


| Table 7.10.2b. Training vs Other Paid Leave, 2005-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | SIg |
| Regression | 6395630 | 7 | 913661 | 1576 | 138 |
| Residual | 1072200242 | 1849 | 579881 |  |  |
| Total | 1078595873 | 1856 |  |  |  |


|  | Unstandardized Coefficients <br> B | Error | $\begin{array}{\|l} \hline \begin{array}{l} \text { Standardzed } \\ \text { Coefficients } \end{array} \\ \hline \text { Beta } \\ \hline \end{array}$ | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partal | Part |
| (Constant) | 149 | 097 |  | 1536 | 125 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_0599 | 003 | 003 | 021 | 892 | 372 | 021 | 021 | 021 |
| Percent_Workers_Claimmg_Availa <br> bilty_Tramnng_Increased_0599 | 005 | 003 | 044 | 1871 | 062 | 046 | 043 | 043 |
| $\begin{aligned} & \text { Average_Expenditure_for_Trainin } \\ & \text { g_0599 } \end{aligned}$ | 000 | 000 | 030 | 1180 | 238 | 036 | 027 | 027 |
| Proportion_Employees_Receiving_ <br> Classroom_Traming_0599 | -231 | 224 | -032 | -1035 | 301 | -005 | -024 | -024 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranning_0599 | 057 | 201 | 009 | 286 | 775 | 015 | 007 | 007 |
| Sum_Courses_n_Classroom_Form at_0599 | 024 | 037 | 018 | 649 | 516 | 036 | 015 | 015 |
| Sum_Courses_1n_OntheJob_Forma t_0599 | 039 | 037 | 030 | 1067 | 286 | 048 | 025 | 025 |

Tables 7.10.3a, 7.10.3b and 7.10.3c report the R square, ANOVA and regression coefficients for the unpaid leave 2005-1999 data.

| Table 7.10.3a. Training vs Unpaid Leave, 2005-1999- Longitudinal Model Summary |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: |
|  |  |  |  |  |  |  |  |  |  |
| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estimate | R Square Change | F Change | df1 | df2 | SIg F Change |  |
| 172 | 030 | 026 | 3998461 | 030 | 8056 | 7 | 1850 | 000 |  |

Table 7.10.3b. Training vs Unpaid Leave, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 90155915 | 7 | 12879416 | 8056 | 000 |
| Residual | 2957722401 | 1850 | 1598769 |  |  |
| Total | 3047878316 | 1857 |  |  |  |


| Table 7.10.3c. Training vs Unpaid Leave, 2005-1999 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 019 | 161 |  | 119 | 906 |  |  |  |
| Percent_Workers_Claiming_Too_Littl e_Training_for_Job_0599 | -003 | 005 | -014 | -618 | 536 | -028 | -014 | -014 |
| Percent_Workers_Claiming_Avallabilh ty_Training_Increased_0599 | 004 | 004 | 022 | 957 | 339 | 039 | 022 | 022 |
| $\begin{aligned} & \text { Average_Expenditure_for_Traning_0 } \\ & 599 \end{aligned}$ | -001 | 000 | -053 | -2 132 | 033 | -021 | -050 | -049 |
| Proportion_Employees_Receiving_Cla ssroom_Tranning_0599 | -128 | 370 | -011 | -345 | 730 | -003 | -008 | -008 |
| Proportion_Employees_Receiving_On theJob_Traming_0599 | -039 | 333 | -004 | - 118 | 906 | 046 | -003 | -003 |
| Sum_Courses_1n_Classroom_Format_ 0599 | 048 | 062 | 021 | 782 | 434 | 072 | 018 | 018 |
| $\begin{aligned} & \text { Sum_Courses_1n_OntheJob_Format_0 } \\ & 599 \end{aligned}$ | 346 | 061 | 160 | 5691 | 000 | 161 | 131 | 130 |

### 7.11. Training and absenteeism: Summary of Cross-sectional Analysis and Longitudinal (differential) Analysis

### 7.11.1 Training and Paid Sick Leave

Table 7.11.1a shows the summary, regression coefficients and their associated significance levels, of the cross-sectional analyses based on paid sick leave data (Average Days of Sick Paid Leave) as dependent variable. Table 7.11.1b shows the equivalent summary for the longitudinal analyses. In general, we would expect an inverse relationship between training and absenteeism, albeit the evidence reported in the literature is not conclusive. The cross-sectional analyses show that only three variables have a significant relationship over multiple years.

The first variable is Percent Workers Claiming Too Little Training for Job, which measures the percentage of employees claiming that the amount of training is too little for the demands of the job. If we assume that employees' perception is correct, then a large value of this variable signals a lower level of training. Therefore, we would expect a positive relationship between this variable and paid sick leave. Specifically, higher values of this variable should be associated with higher values of absenteeism. From Table 7.11.1a, we can confirm the presence of a positive and significant relationship for the 2001, 2003, and 2005 data; the 1999 data also exhibited the same positive relation albeit at a higher significance level $(\mathrm{p}=0.068)$. Two other training variables exhibited a strong relation with absenteeism, as measured by paid sick leave. However, the results were not in the expected direction and thus somewhat in contradiction with those described above. The variable

Percent Workers Claiming Availability Training Increased measures the percentage of employees claiming that the availability of training has increased. If we assume that the employees' perception is correct, then a large value of this variable signals a higher level of training. Accordingly, we would expect higher values of this variable to be accompanied by lower values of paid sick leave (i.e., inverse relationship). However, the data show the opposite: a significant and positive relationship for all four years. A similar scenario occurred for the training expenditure, Average Expenditure for Training, which showed a positive and significant relationship three out of four years instead of an inverse relationship.

The longitudinal analyses were not informative. Unfortunately, no insight is offered by the results of the longitudinal analyses that show that none of the training variables had an effect.

### 7.11.2 Training and Other paid leave

Table 7.11 .2 a and 7.11 .2 b show the summary of other paid leave for the crosssectional and longitudinal analyses, respectively. The results show virtually no effect for any of the training variables.

### 7.11.3 Training and Unpaid Leave

Table 7.11 .3 a and 7.11 .3 b show the summary of unpaid leave for the crosssectional and longitudinal analyses, respectively. Also in this case, the results are rather inconsistent. For the cross-sectional analysis, only two variables seem to have some effect. The first is Percent Workers Claiming Availability Training Increased, which
measures the percentage of employees claiming that the availability of training has increased. The relation with the unpaid leave measure was significant in three out of four years (2001, 2003, and 2005). However, the direction of the effect was positive for 2001 and negative for the other two years. The other variable is Average Expenditure for Training, which measures the workplace training expenditure per employee. Again the relation with the unpaid leave measure was significant in three out of four years (1999, 2001, and 2005), but in the opposite the direction.

The longitudinal data are shown in Table 7.11.3b. From the table, it can be seen that the only variable that had some effect was Sum Courses in OntheJob Format, which showed a positive and significant relation five times out of six.

In summary, the cross-sectional analysis and the longitudinal analysis show rather inconsistent results. To some extent this parallels what was found in the literature (see Chapter 3). The relationship between training and absenteeism, if any, might be more complex than assumed.

Table 7.11.1a - Training and Paid Sick Leave - Summary Cross-Sectional Regression Coefficients

|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficients | Sig. | Coefficients | Stg. | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Traming_for_Job | 004 | 068 | 007 | . 000 | 006 | . 004 | 004 | . 002 |
| Percent_Workers_Claıming_Availability_Tramıng_Increased | 009 | . 000 | 008 | . 000 | 008 | . 000 | 002 | . 051 |
| Average_Expenditure_for_Tramıng | 000 | . 036 | 000 | . 053 | 000 | . 035 | 000 | 119 |
| Proportion_Employees_Receiving_Classroom_Tranng | - 302 | 103 | 074 | 626 | -069 | 652 | -066 | 508 |
| Proportion_Employees_Receiving_OntheJob_Tranıng | - 304 | 076 | -011 | 818 | -023 | 871 | 047 | 607 |
| Sum_Courses_m_Classroom_Format | 116 | . 000 | 037 | 171 | 043 | 194 | 081 | . 000 |
| Sum_Courses_1n_OntheJob_Format | -030 | 296 | 024 | 320 | 028 | 407 | 041 | . 043 |

Table 7.11.1b - Training and Paid Sick Leave - Summary Longitudinal Regression Coefficients

|  |  | $\begin{aligned} & 2001 \\ & - \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & - \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & - \\ & 2003 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & - \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & - \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & - \\ & 1999 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coeff |  | Coeff |  | Coeff. |  | Coeff. |  | Coeff. |  | Coeff |  |
|  | B | Sig | B | Sig. | B | Sig. | B | Sig. | B | Sig. | B | Sig |
| Percent_Workers_Claımıng_Too_Littl | 001 | 643 | -003 | 371 | -003 | 205 | 009 | . 001 | 002 | 378 | -002 | 393 |
| Percent_Workers_Claımıng_Availabil | 010 | . 000 | 001 | 664 | -002 | 315 | 000 | 835 | -003 | 210 | -004 | . 046 |
| Average_Expenditure_for_Tranning | 000 | 178 | 000 | 937 | 000 | 217 | 000 | . 029 | 000 | 615 | 000 | 108 |
| Proportion_Employees_Receiving_Cl | -244 | 138 | 361 | 149 | - 154 | 363 | - 124 | 471 | 147 | 431 | -018 | 920 |
| Proportion_Employees_Receiving_On | 037 | 562 | -003 | 966 | - 103 | 485 | 016 | 928 | 005 | 934 | -190 | 253 |
| Sum_Courses_in_Classroom_Format | -002 | 958 | -112 | . 012 | -002 | 942 | 005 | 868 | -022 | 515 | 005 | 880 |
| Sum_Courses_1n_OntheJob_Format | 050 | 088 | 076 | 082 | -020 | 513 | -033 | 301 | 003 | 921 | -009 | 766 |

## Table 7.11.2a - Training and Other Paid Leave - Summary Cross-Sectional Regression Coefficients

|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficients | Sig. | Coefficients | Sig. | Coefficients | Sig | Coefficients | Sig. |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too_Little_Traıning_for_Job | 002 | 191 | 001 | 686 | -002 | 665 | -003 | 262 |
| Percent_Workers_Claımıng_Availability_Trannın_Increased | 006 | . 000 | 003 | 118 | 010 | . 002 | -002 | 427 |
| Average_Expenditure_for_Training | 000 | 397 | 000 | . 059 | 000 | 160 | 001 | . 000 |
| Proportion_Employees_Receiving_Classroom_Traming | 034 | 799 | 118 | 586 | 1530 | . 000 | -498 | . 023 |
| Proportion_Employees_Receiving_OntheJob_Traming | -286 | 021 | -313 | 036 | -089 | 737 | 358 | 074 |
| Sum_Courses_1n_Classroom_Format | 093 | . 000 | 030 | 439 | 051 | 377 | 072 | 109 |
| Sum_Courses_1n_OntheJob_Format | -010 | 642 | 062 | 091 | -090 | 107 | -034 | 442 |

Table 7.11.2b-Training and Other Paid Leave - Summary Longitudinal Regression Coefficients

|  |  | $\begin{aligned} & 2001 \\ & - \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & - \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & - \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & \hline 2003 \\ & - \\ & 1999 \end{aligned}$ |  | $\begin{array}{\|l\|} \hline 2005 \\ - \\ 2001 \\ \hline \end{array}$ |  | $\begin{array}{\|l\|} \hline 2005 \\ - \\ 1999 \\ \hline \end{array}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | Sig. | B | Sig. | B | Sig. | B | Sig | B | Sig. | B | Sig. |
| Percent_Workers_Clamıng_Too_Little_Trainıng_for_Jo | -001 | 731 | 002 | 575 | -014 | . 002 | 001 | 819 | -011 | . 000 | 003 | 372 |
| Percent_Workers_Clammng_Avallability_Traınıng_Increa | 004 | 187 | -002 | 542 | -014 | . 000 | 007 | 065 | 000 | 995 | 005 | 062 |
| Average_Expenditure_for_Tranıng | 000 | 275 | 000 | 679 | -001 | 120 | 000 | 217 | 000 | 292 | 000 | 238 |
| Proportion_Employees_Receiving_Classroom_Training | -159 | 496 | -462 | 191 | 984 | . 012 | 341 | 234 | -355 | 149 | -231 | 301 |
| Proportion_Employees_Recerving_OntheJob_Tranıng | -001 | 995 | 042 | 694 | -121 | 716 | -430 | 144 | 004 | 956 | 057 | 775 |
| Sum_Courses_In_Classroom_Format | 055 | 207 | 087 | 167 | 045 | 508 | 063 | 257 | 162 | . 000 | 024 | 516 |
| Sum_Courses_1n_OntheJob_Format | -033 | 430 | 034 | 582 | 067 | 325 | 062 | 252 | -045 | 265 | 039 | 286 |

Table 7.11.3a - Training and Unpaid Leave - Summary Cross-Sectional Regression Coefficients

|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficients | Sig | Coefficients | Sig. | Coefficients | Sig. | Coefficients | Sig. |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Tramıng_for_Job | 000 | 961 | -006 | 074 | -006 | . 036 | -017 | . 000 |
| Percent_Workers_Claımıng_Avaılability_Tramnng_Increased | 000 | 906 | 007 | . 013 | -014 | . 000 | -007 | . 020 |
| Average_Expenditure_for_Training | -001 | . 008 | 000 | . 022 | 000 | 306 | -001 | . 002 |
| Proportion_Employees_Receiving_Classroom_Tranning | -205 | 569 | 841 | . 004 | 016 | 944 | -221 | 350 |
| Proportion_Employees_Receiving_OntheJob_Traning | -168 | 614 | -352 | 082 | 659 | . 001 | 106 | 624 |
| Sum_Courses_m_Classroom_Format | - 100 | 069 | -116 | . 026 | 038 | 393 | 016 | 732 |
| Sum_Courses_ın_OntheJob_Format | 112 | 047 | 074 | 138 | -050 | 249 | 075 | 116 |

Table 7.11.3b - Training and Unpaid Leave - Summary Longitudinal Regression Coefficients

|  |  | $\begin{aligned} & 2001- \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003- \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & \hline 2003- \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 1999 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coeff. |  | Coeff. |  | Coeff. |  | Coeff |  | Coeff. |  | Coeff |  |
|  | B | Sig. | B | Sig. | B | Sig. | B | Sig. | B | Sig. | B | Sig. |
| Percent_Workers_Claımıng_Too_L | 017 | . 001 | -003 | 347 | 010 | . 008 | -010 | 046 | 001 | 795 | -003 | 536 |
| Percent_Workers_Claıming_Availa | 004 | 442 | 002 | 441 | -020 | . 000 | 003 | 474 | -006 | 073 | 004 | 339 |
| Average_Expenditure_for_Tranıng | 000 | 814 | 000 | 276 | -001 | . 007 | 000 | 767 | 000 | 722 | -001 | . 033 |
| Proportion_Employees_Recerving_ | 640 | 084 | 166 | 559 | 485 | 119 | -193 | 554 | -259 | 388 | -128 | 730 |
| Proportion_Employees_Receiving_ | -1410 | . 000 | 025 | 769 | -250 | 354 | 677 | . 044 | -090 | 715 | -039 | 906 |
| Sum_Courses_m_Classroom_Form | -212 | . 002 | 047 | 353 | 155 | . 005 | -047 | 454 | -006 | 901 | 048 | 434 |
| Sum_Courses_ın_OntheJob_Forma | 319 | . 000 | 047 | 340 | 182 | . 001 | 146 | . 017 | 307 | . 000 | 346 | 000 |

## 8 Chapter: The effect on Training on Job Satisfaction

In Chapter 3, we noted that the evidence linking training to job satisfaction is rather limited and conflicting. Krueger and Rouse (1998) found trainees and non-trainees did not differ in the level of satisfaction with the organization. In contrast to Krueger \& Rouse, Leckie et al. (2001) using 1999 WES data found a positive relationship between training and job satisfaction. However, these studies were descriptive, preliminary, and limited in years. In our study, we will look for a more direct relation between the two variables for multiple years. This chapter will present the results of both the cross sectional and longitudinal analyses that examined the relationship between training and job satisfaction.

Job satisfaction can be affected by both economic and non-economic factors. For this reason, the WES reports on two types of job satisfaction: one specifically related to economic rewards and the other related to overall job satisfaction. In this study, the more general attitude, or feeling, towards the job and the organization was measured as the median of the employees' ratings of overall satisfaction (Median Overall Satisfaction). The satisfaction related to economic rewards was measured as the median of the employees' ratings of satisfaction relative to monetary compensation (Median Compensation Satisfaction). To improve clarity, we recoded the original job satisfaction data provided by the WES so that higher values of these two variables signaled increasing levels of satisfaction (see Chapter 5 for details).

With regards to training, we used all the seven training variables which were:
-Percentage of workers claiming that the amount of training available was too little for the demands of the job (Percent Workers Claiming Too Little Training for Job);
-Percentage of workers claiming that the amount of training available to employees has increased (Percent Workers Claiming_Availability Training_Increased);
-Average Training Expenditure (Average Expenditure for Training); -Proportion of employees who received classroom training (Proportion Employees Receiving Classroom Training);
-Proportion of employees who received on-the job-training (Proportion Employees Receiving OntheJob Training);
-Sum of different types of courses provided in classroom format (Sum Courses in Classroom Format)
-Sum of different types of courses provided through on-the job training (Sum Courses in OntheJob Format).

### 8.1. Training and job satisfaction: Cross-sectional Analysis for 1999

Tables 8.1.1a, 8.1.1b, and 8.1.1c report the R square, ANOVA, and coefficients for the 1999 overall job satisfaction data.

Table 8.1.1a. Training vs Overall job satisfaction, 1999-Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | dfl | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 356 | 127 | 125 | 285630 | 127 | 66684 | 7 | 3221 | 000 |

Table 8.1.1b. Training vs Overall job satisfaction, 1999 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 3808254 | 7 | 544036 | 66684 | 000 |
| Resıdual | 26278305 | 3221 | 8158 |  |  |
| Total | 30086559 | 3228 |  |  |  |

Table 8.1.1c. Training vs Overall job satisfaction, 1999 - Cross-Sectional Coefficients

|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std <br> Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 3234 | 017 |  | 195432 | 000 |  |  |  |
| ```Percent_Workers_Claıming_Too_ Little_Tramıng for Job_99``` | -003 | 000 | -178 | -10589 | 000 | -229 | - 183 | -174 |
| Percent_Workers_Claımıng_Avail ability_Training_Increased_99 | 004 | 000 | 247 | 14316 | 000 | 270 | 245 | 236 |
| ```Average_Expenditure_for_Trammn g_99``` | 000 | 000 | 062 | 3404 | 001 | 064 | 060 | 056 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Traming_99 } \end{aligned}$ | 058 | 027 | 056 | 2179 | 029 | 023 | 038 | 036 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_99 | -092 | 025 | -089 | -3747 | 000 | -085 | -066 | -062 |
| ```S um_Courses_In_Classroom_For mat_99``` | -010 | 004 | -062 | -2 427 | 015 | -018 | -043 | -040 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t } 99 \end{aligned}$ | -010 | 004 | -056 | -2343 | 019 | -093 | -041 | -039 |

Tables 8.1.2a, 8.1.2b, and 8.1.2c report the R square, ANOVA, and coefficients for the 1999 compensation job satisfaction data.

Table 8.1.2a. Training vs Compensation job satisfaction, 1999-Cross-Sectional Model Summary

|  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $R$ | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| 321 | 103 | 101 | 327840 | 103 | 52918 | 7 | 3222 | 000 |


| Table 8.1.2b. Training vs Compensation job satisfaction, 1999 - Cross-Sectional <br> ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | SIg |
| Regression | 3981263 | 7 | 568752 | 52918 | 000 |
| Residual | 34629677 | 3222 | 10748 |  |  |
| Total | 38610940 | 3229 |  |  |  |


| Table 8.1.2c. Training Coefficients | vs Compensation |  | job satisfaction, |  | $199$ | - Cross-Sectional |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correl | 10ns |  |
|  | B | Std <br> Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 2888 | 019 |  | 152053 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ Little_Tranning_for_Job_99 | -002 | 000 | -116 | -6813 | 000 | -159 | - 119 | -114 |
| Percent_Workers_Claimıng_Avail ability_Tranmng_Increased_99 | 003 | 000 | 194 | 11084 | 000 | 228 | 192 | 185 |
| ```Average_Expenditure_for_Traının g_99``` | 000 | 000 | 116 | 6337 | 000 | 136 | 111 | 106 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_99 | 096 | 030 | 082 | 3163 | 002 | 072 | 056 | 053 |
|  | - 140 | 028 | - 120 | -4981 | 000 | -088 | -087 | -083 |
| ```Sum_Courses_1n_Classroom_Form at_99``` | 002 | 005 | 012 | 478 | 633 | 050 | 008 | 008 |
| ```Sum_Courses_m_OntheJob_Forma t_99``` | -017 | 005 | -091 | -3721 | 000 | -084 | -065 | -062 |

### 8.2. Training and job satisfaction: Cross-sectional Analysis for 2001

Tables 8.2.1a, 8.2.1b, and 8.2.1c report the R square, ANOVA, and coefficients for the 2001 overall job satisfaction data.

Table 8.2.1a. Training vs Overall job satisfaction, 2001 - Cross-Sectional Model Summary

| $R$ | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 321 | 103 | 101 | 323821 | 103 | 49542 | 7 | 3025 | 000 |

Table 8.2.1b. Training vs Overall job satisfaction, 2001 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Slg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 3636471 | 7 | 519496 | 49542 | 000 |
| Residual | 31720154 | 3025 | 10486 |  |  |
| Total | 35356624 | 3032 |  |  |  |


| Table 8.2.1c. Training vs Overall job satisfaction, 2001 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sıg | Correlations |  |  |
|  | B | Std <br> Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partual | Part |
| (Constant) | 3155 | 016 |  | 202971 | 000 |  |  |  |
|  | -004 | 000 | -198 | -11269 | 000 | -217 | -201 | -194 |
| Percent_Workers_Claıming_Avall ability_Tranıng_Increased_01 | 004 | 000 | 236 | 13416 | 000 | 251 | 237 | 231 |
| Average_Expendıture_for_Tramın g_01 | 000 | 000 | 016 | 812 | 417 | 021 | 015 | 014 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_01 | 013 | 027 | 011 | 499 | 618 | 028 | 009 | 009 |
| Proportion_Employees_Receıving_ OntheJob_Traming_01 | 002 | 009 | 003 | 187 | 852 | 007 | 003 | 003 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_01 } \end{aligned}$ | -007 | 005 | -038 | -1380 | 168 | 002 | -025 | -024 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_01 } \end{aligned}$ | 004 | 004 | 021 | 924 | 356 | -002 | 017 | 016 |

Tables 8.2.2a, 8.2.2b, and 8.2.2c report the R square, ANOVA, and coefficients for the 2001 compensation job satisfaction data.

| Table 8.2.2a. Training vs Compensation job satisfaction, 2001 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted <br> R Square | Std Error of the Estumate | R Sauare Change | F Change | df1 | df2 | Sig F Change |
| 275 | 076 | 074 | 349974 | 076 | 35365 | 7 | 3022 | 000 |

Table 8.2.2b. Training vs Compensation job satisfaction, 2001 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 3032068 | 7 | 433153 | 35365 | 000 |
| Residual | 37014068 | 3022 | 12248 |  |  |
| Total | 40046136 | 3029 |  |  |  |

Table 8.2.2c. Training vs Compensation job satisfaction, 2001 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | $\begin{aligned} & \text { Std } \\ & \text { Error } \end{aligned}$ | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 2945 | 017 |  | 175188 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tranning_for_Job_01 | -004 | 000 | -188 | -10 582 | 000 | -202 | -189 | -185 |
| Percent_Workers_Clamıng_Avaıl ability_Training_Increased_01 | 002 | 000 | 144 | 8041 | 000 | 149 | 145 | 141 |
| Average_Expenditure_for_Trainın g_01 | 000 | 000 | -026 | -1295 | 195 | -016 | -024 | -023 |
| Proportion_Employees_Receiving_ Classroom_Traming_01 | 091 | 030 | 072 | 3042 | 002 | 040 | 055 | 053 |
| Proportion_Employees_Receiving_ OntheJob_Tranıng_01 | -090 | 021 | -088 | -4 266 | 000 | -101 | -077 | -075 |
| Sum_Courses_1n Classroom_Form at_01 | 004 | 005 | 020 | 715 | 475 | 000 | 013 | 013 |
| Sum Courses_in_OntheJob Forma t_01 | -011 | 005 | -054 | -2 183 | 029 | -077 | - 040 | -038 |

### 8.3. Training and job satisfaction: Cross-sectional Analysis for 2003

Tables 8.3.1a, 8.3.1b, and 8.3.1c report the R square, ANOVA, and coefficients for the 2003 overall job satisfaction data.

| Table 8.3.1a. Training vs Overall job satisfaction, 2003 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estımate | R Square Change | F Change | dfl | df2 | Sig F Change |
| 267 | 071 | 069 | 300249 | 071 | 33872 | 7 | 3095 | 000 |

Table 8.3.1b. Training vs Overall job satisfaction, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2137478 | 7 | 305354 | 33872 | 000 |
| Residual | 27901237 | 3095 | 9015 |  |  |
| Total | 30038715 | 3102 |  |  |  |

Table 8.3.1c. Training vs Overall job satisfaction, 2003 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Slg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partial | Part |
| (Constant) | 3244 | 015 |  | 218169 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_03 | -004 | 000 | -200 | -11503 | 000 | -208 | -202 | -199 |
| Percent_Workers_Claimmg_Avail ability_Tramıng_Increased_03 | 002 | 000 | 165 | 9115 | 000 | 158 | 162 | 158 |
| Average_Expenditure_for_Tramin g_03 | 000 | 000 | 041 | 2039 | 042 | 015 | 037 | 035 |
| Proportion_Employees_Receiving_ Classroom_Tramıng_03 | -056 | 025 | -053 | -2 212 | 027 | -032 | -040 | -038 |
| Proportion_Employees_Receiving_ OntheJob_Tramıng_03 | 026 | 023 | 025 | 1164 | 245 | 012 | 021 | 020 |
| Sum_Courses_In_Classroom_Form at_03 | -007 | 005 | -039 | -1368 | 171 | -016 | -025 | -024 |
| Sum_Courses_ın_OntheJob_Forma t_03 | -004 | 005 | -020 | -773 | 440 | -012 | -014 | -013 |

Tables 8.3.2a, 8.3.2b, and 8.3.2c report the R square, ANOVA, and coefficients for the 2003 compensation job satisfaction data.

Table 8.3.2a. Training vs Compensation job satisfaction, 2003 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 259 | 067 | 065 | 329821 | 067 | 31926 | 7 | 3096 | 000 |

Table 8.3.2b. Training vs Compensation job satisfaction, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2431099 | 7 | 347300 | 31926 | 000 |
| Resıdual | 33678906 | 3096 | 10878 |  |  |
| Total | 36110005 | 3103 |  |  |  |

Table 8.3.2c. Training vs Compensation job satisfaction, 2003 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sog | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 2889 | 016 |  | 181144 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Tramıng_for_Job_03 | -004 | 000 | -185 | -10642 | 000 | -189 | -188 | -185 |
| Percent_Workers_Claiming_Avall ability_Traming_Increased_03 | 003 | 000 | 163 | 8988 | 000 | 173 | 159 | 156 |
| Average Expenditure_for_Trainın g_03 | 000 | 000 | 060 | 2961 | 003 | 072 | 053 | 051 |
| Proportion_Employees_Receiving_ <br> Classroom_Traming_03 | 031 | 024 | 039 | 1282 | 200 | 039 | 023 | 022 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranning_03 | -032 | 023 | - 042 | -1427 | 154 | 014 | -026 | -025 |
| Sum_Courses_1n_Classroom_Form at_03 | -004 | 005 | -019 | -698 | 485 | 054 | -013 | -012 |
| Sum_Courses_m_OntheJob_Forma t_03 | 000 | 005 | -002 | -083 | 934 | 024 | -001 | -001 |

### 8.4. Training and job satisfaction: Cross-sectional Analysis for 2005

Tables 8.4.1a, 8.4.1b, and 8.4.1c report the R square, ANOVA, and coefficients for the 2005 overall job satisfaction data.

Table 8.4.1a. Training vs Overall job satisfaction, 2005 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 236 | 056 | 054 | 315979 | 056 | 29701 | 7 | 3513 | 000 |

Table 8.4.1b. Training vs Overall job satisfaction, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2075817 | 7 | 296545 | 29701 | 000 |
| Residual | 35074744 | 3513 | 9984 |  |  |
| Total | 37150560 | 3520 |  |  |  |


| Table 8.4.1c. Training vs Overall job satisfaction, 2005 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 3217 | 014 |  | 225537 | 000 |  |  |  |
| ```Percent_Workers_Clammng_Too_ Little_Traming_for_Job_05``` | -003 | 000 | -166 | -10 120 | 000 | -173 | -168 | -166 |
| ```Percent_Workers_Clammng_Avall ability_Tramıng_Increased_05``` | 003 | 000 | 158 | 9128 | 000 | 156 | 152 | 150 |
| ```Average_Expenditure_for_Tramnın g_05``` | 000 | 000 | -027 | -1388 | 165 | 000 | -023 | -023 |
| $\begin{aligned} & \text { Proportion_Employees_Receiving_ } \\ & \text { Classroom_Training_05 } \end{aligned}$ | 019 | 022 | 025 | 863 | 388 | -007 | 015 | 014 |
| Proportion_Employees_Receiving_ <br> OntheJob_Trannng_05 | - 040 | 021 | -055 | -1946 | 052 | -038 | -033 | -032 |
| ```Sum_Courses_m_Classroom_Form at_05``` | 004 | 005 | 021 | 808 | 419 | 032 | 014 | 013 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_05 } \end{aligned}$ | -004 | 005 | -020 | -834 | 404 | 002 | -014 | -014 |

Tables 8.4.2a, 8.4.2b, and 8.4.2c report the R square, ANOVA, and coefficients for the 2005 compensation job satisfaction data.

| Table 8.4.2a. Training vs Compensation job satisfaction, 2005 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | dfl | df2 | SIg F Change |
| 348 | 121 | 119 | 317033 | 121 | 68890 | 7 | 3511 | 000 |

Table 8.4.2b. Training vs Compensation job satisfaction, 2005 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 4846882 | 7 | 692412 | 68890 | 000 |
| Residual | 35289017 | 3511 | 10051 |  |  |
| Total | 40135899 | 3518 |  |  |  |


| Table 8.4.2c. Training Coefficients | vs Compensation job satisfaction, 2005 - Cross-Sectional |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlatons |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partal | Part |
| (Constant) | 3056 | 014 |  | 213160 | 000 |  |  |  |
| Percent_Workers_Claıming_Too_ <br> Little_Traming_for_Job_05 | -006 | 000 | -290 | -18221 | 000 | -294 | -294 | -288 |
| Percent_Workers_Clamming_Avall ability_Training_Increased_05 | 000 | 000 | 027 | 1586 | 113 | 053 | 027 | 025 |
| Average_Expenditure_for_Trainn g_05 | 000 | 000 | 062 | 3321 | 001 | 086 | 056 | 053 |
| Proportion_Employees_Receiving_ Classroom_Training_05 | 137 | 023 | 171 | 6067 | 000 | 046 | 102 | 096 |
| Proportion_Employees_Receiving_ OntheJob_Trannng_05 | -151 | 021 | -199 | -7253 | 000 | -079 | -121 | -115 |
| Sum_Courses_1n_Classroom_Form at_05 | 010 | 005 | 051 | 2095 | 036 | 072 | 035 | 033 |
| Sum_Courses_1n_OntheJob_Forma t_05 | -009 | 005 | -046 | -1997 | 046 | -034 | -034 | -032 |

### 8.5. Training and job satisfaction: Longitudinal (differential) Analysis 2001-1999

Tables 8.5.1a, 8.5.1b and 8.5.1c report the R square, ANOVA and regression coefficients with regards to overall job satisfaction for the 2001-1999 longitudinal data.

Table 8.5.1a. Training vs Overall job satisfaction, 2001-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | dfl | df2 | Stg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 304 | 093 | 090 | 353368 | 093 | 32688 | 7 | 2243 | 000 |

Table 8.5.1b. Training vs Overall job satisfaction, 2001-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2857179 | 7 | 408168 | 32688 | 000 |
| Residual | 28008043 | 2243 | 12487 |  |  |
| Total | 30865222 | 2250 |  |  |  |

Table 8.5.1c. Training vs Overall job satisfaction, 2001-1999 - Longitudinal Coefficients

|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \hline \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partial | Part |
| (Constant) | -058 | 013 |  | -4 441 | 000 |  |  |  |
| Percent_Workers_Claiming_Too <br> Little_Tranning_for_Job_0199 | -004 | 000 | -250 | -12320 | 000 | -251 | -252 | -248 |
| Percent_Workers_Claıming_Availa <br> bility_Traming_Increased_0199 | 002 | 000 | 122 | 5977 | 000 | 141 | 125 | 120 |
| Average_Expendture_for_Tramın g_0199 | 000 | 000 | 070 | 3259 | 001 | 076 | 069 | 066 |
| Proportion_Employees_Receiving_ <br> Classroom_Tranning_0199 | 014 | 028 | 012 | 494 | 622 | 013 | 010 | 010 |
| Proportion_Employees_Recerving_ <br> OntheJob_Tranıng_0199 | -071 | 024 | -071 | -2996 | 003 | -031 | -063 | -060 |
| Sum_Courses_in_Classroom_Form at 0199 | 008 | 005 | 037 | 1467 | 143 | 050 | 031 | 029 |
| Sum_Courses_In_OntheJob_Forma t_0199 | 013 | 005 | 064 | 2632 | 009 | 052 | 055 | 053 |

Tables 8.5.2a, 8.5.2b and 8.5.2c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2001-1999 data.

| Table 8.5.2a. Training vs Compensation job satisfaction, 2001-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted | Std Error | R Square Change | F Change | df1 | d2 | Sig F Change |
| 329 | 108 | 105 | 366682 | 108 | 38873 | 7 | 2243 | 000 |

Table 8.5.2b. Training vs Compensation job satisfaction, 2001-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Slg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 3658692 | 7 | 522670 | 13446 | 38873 |
| Residual | 30158426 | 2243 |  |  |  |
| Total | 33817118 | 2250 |  |  |  |

Table 8.5.2c. Training vs Compensation job satisfaction, 2001-1999 - Longitudinal Coefficients

|  | Unstandardızed Coefficients |  | Standardized Coefficients | $t$ | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -034 | 013 |  | -2518 | 012 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Ltttle_Tranning_for_Job_0199 | -005 | 000 | -271 | -13 494 | 000 | -276 | -274 | -269 |
| Percent_Workers_Claiming_Availa <br> bilty_Tranıng_Increased_0199 | 003 | 000 | 146 | 7251 | 000 | 159 | 151 | 145 |
| $\begin{aligned} & \text { Average_Expenditure_for_Tramın } \\ & \text { g_0199 }^{2} \end{aligned}$ | 000 | 000 | 019 | 884 | 377 | 036 | 019 | 018 |
| Proportion_Employees_Receiving_ <br> Classroom_Trainıng_0199 | 055 | 029 | 047 | 1925 | 054 | 028 | 041 | 038 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming_0199 | -085 | 024 | -081 | -3456 | 001 | -057 | -073 | -069 |
| Sum_Courses_ı_Classroom_Form at_0199 | 015 | 005 | 070 | 2807 | 005 | 045 | 059 | 056 |
| Sum_Courses_In_OntheJob_Forma t_0199 | -003 | 005 | -015 | -607 | 544 | -015 | -013 | -012 |

### 8.6. Training and job satisfaction: Longitudinal (differential) Analysis 2003-2001

Tables $8.6 .1 \mathrm{a}, 8.6 .1 \mathrm{~b}$ and 8.6 .1 c report the R square, ANOVA and regression coefficients for the overall job satisfaction 2003-2001 data.

| Table 8.6.1a. Training vs Overall job satisfaction, 2003-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | $\begin{aligned} & \hline \text { Adjusted } \\ & \text { R Square } \\ & \hline \end{aligned}$ | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 362 | 131 | 128 | 332335 | 131 | 43892 | 7 | 2032 | 000 |

Table 8.6.1b. Training vs Overall job satisfaction, 2003-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 3393431 | 7 | 484776 | 43892 | 000 |
| Residual | 22442802 | 2032 | 11045 |  |  |
| Total | 25836233 | 2039 |  |  |  |


| Table 8.6.1c. Training vs Overall job satisfaction, 2003-2001 - Longitudinal |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correl |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -028 | 012 |  | -2371 | 018 |  |  |  |
| $\begin{aligned} & \text { Percent_Workers_Claming_Too_ } \\ & \text { Little_Tranning_for_Job_0301 } \end{aligned}$ | -005 | 000 | - 310 | -14876 | 000 | -320 | -313 | -308 |
| Percent_Workers_Claımıng_Avarla bility_Training_ Increased 0301 | 002 | 000 | 136 | 6529 | 000 | 164 | 143 | 135 |
| $\begin{aligned} & \text { Average_Expenditure_for_Trainın } \\ & \text { g_0301 } \end{aligned}$ | 000 | 000 | -038 | -1785 | 074 | -044 | -040 | -037 |
| Proportion_Employees_Receiving <br> Classroom_Traınıng_0301 | -051 | 031 | -040 | -1624 | 105 | -050 | -036 | -034 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_0301 | 052 | 025 | 047 | 2071 | 039 | 018 | 046 | 043 |
| $\begin{aligned} & \text { Sum_Courses_1n_Classroom_Form } \\ & \text { at_0301 } \end{aligned}$ | 011 | 005 | 052 | 2066 | 039 | -027 | 046 | 043 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0301 } \end{aligned}$ | -023 | 006 | -099 | -4141 | 000 | -067 | -091 | -086 |

Tables 8.6.2a, 8.6.2b and 8.6.2c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2003-2001 data.

| Table 8.6.2a. Training vs Compensation job satisfaction, 2003-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 289 | 083 | 080 | 370768 | 083 | 26404 | 7 | 2032 | 000 |


| Table 8.6.2b. Training vs Compensation job satisfaction, 2003-2001 - Longitudinal |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| ANOVA |  |  |  |  |  |
|  | Sum of Squares | df | Mean Square | F | Sig |
|  | 2540786 | 7 | 362969 | 26404 | 000 |
| Regression | 27933756 | 2032 | 13747 |  |  |
| Residual | 30474542 | 2039 |  |  |  |
| Total |  |  |  |  |  |


| Table 8.6.2c. Training vs Compensation job satisfaction, 2003-2001 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | $t$ | Sıg | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \hline \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partial | Part |
| (Constant) | -042 | 013 |  | -3168 | 002 |  |  |  |
| Percent_Workers_Claiming_Too <br> Little_Traming_for_Job_0301 | -005 | 000 | -247 | -11519 | 000 | -258 | -248 | -245 |
| Percent_Workers_Claiming_Availa bility_Traming_Increased_0301 | 002 | 000 | 116 | 5431 | 000 | 145 | 120 | 115 |
| Average_Expenditure_for_Tramin g_0 0301 | 000 | 000 | -045 | -2071 | 038 | -042 | -046 | -044 |
| Proportion_Employees_Receiving_ Classroom_Traınng_0301 | 065 | 034 | 047 | 1911 | 056 | 006 | 042 | 041 |
| Proportion_Employees_Receiving_ OntheJob_Tranning_0301 | -002 | 010 | -004 | -182 | 855 | 003 | -004 | -004 |
| Sum_Courses_in_Classroom_Form at_0301 | -005 | 006 | -021 | -841 | 400 | -023 | -019 | -018 |
| Sum_Courses_1n_Onthelob_Forma t_0301 | 003 | 006 | 011 | 471 | 638 | 007 | 010 | 010 |

### 8.7. Training and job satisfaction: Longitudinal (differential) Analysis 2005-2003

Tables 8.7.1a, 8.7.1b and 8.7.1c report the R square, ANOVA and regression coefficients for the overall job satisfaction 2005-2003 data.

| Table 8.7.1a. Training vs Overall job satisfaction, 2005-2003 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Slg F Change |
| 262 | 069 | 066 | 381251 | 069 | 23200 | 7 | 2206 | 000 |

Table 8.7.1b. Training vs Overall job satisfaction, 2005-2003 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | $F$ | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2360492 | 7 | 337213 | 23200 | 000 |
| Residual | 32064717 | 2206 | 14535 |  |  |
| Total | 34425209 | 2213 |  |  |  |

Table 8.7.1c. Training vs Overall job satisfaction, 2005-2003 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficıents | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std <br> Error | Beta |  |  | Zero- order | Partual | Part |
| (Constant) | 024 | 013 |  | 1794 | 073 |  |  |  |
| Percent_Workers_Claiming Too_ <br> Little_Traming_for_Job_0503 | -004 | 000 | -212 | -10 112 | 000 | -227 | -210 | -208 |
| Percent_Workers_Claıming_Availa bility_Traming_Increased_0503 | 002 | 000 | 103 | 4911 | 000 | 133 | 104 | 101 |
| Average_Expenditure_for_Tramin g_0503 | 000 | 000 | -046 | -2 181 | 029 | -028 | -046 | -045 |
| Proportion_Employees_Receiving_ <br> Classroom_Traning_0503 | 089 | 036 | 061 | 2515 | 012 | 042 | 053 | 052 |
| Proportion_Employees_Receiving_ <br> OntheJob_Tranngg_0503 | -069 | 031 | -051 | -2 252 | 024 | -051 | -048 | -046 |
| Sum_Courses_ın_Classroom_Form at 0503 | -002 | 006 | -008 | -343 | 732 | 020 | -007 | -007 |
| Sum_Courses_In_OntheJob_Forma $\mathrm{t} \_0503$ | 013 | 006 | 047 | 2048 | 041 | 015 | 044 | 042 |

Tables 8.7.2a, 8.7.2b and 8.7.2c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2005-2003 data.

| Table 8.7.2a. Training vs Compensation job satisfaction, 2005-2003 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 276 | 076 | 073 | 375100 | 076 | 25889 | 7 | 2202 | 000 |

Table 8.7.2b. Training vs Compensation job satisfaction, 2005-2003 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2549814 | 7 | 364259 | 25889 | 000 |
| Residual | 30982082 | 2202 | 14070 |  |  |
| Total | 33531896 | 2209 |  |  |  |

Table 8.7.2c. Training vs Compensation job satisfaction, 2005-2003 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std <br> Error | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | 051 | 013 |  | 3906 | 000 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_ 0503 | -005 | 000 | - 240 | -11627 | 000 | -239 | -241 | -238 |
| Percent_Workers_Claıming_Avala <br> bility_Trannng_Increased_ 0503 | 001 | 000 | 045 | 2153 | 031 | 068 | 046 | 044 |
| Average_Expenditure_for_Traının g 0503 | 000 | 000 | -013 | - 597 | 551 | 028 | -013 | -012 |
| Proportion_Employees_Receiving Classroom_Tranning_0503 | 127 | 035 | 087 | 3593 | 000 | 114 | 076 | 074 |
| Proportion_Employees_Receiving_ OntheJob_Traming_0503 | 048 | 032 | 034 | 1513 | 130 | 030 | 032 | 031 |
| Sum_Courses_ın_Classroom_Form at_0503 | 015 | 006 | 057 | 2310 | 02.1 | 087 | 049 | 047 |
| Sum_Courses_m_OntheJob_Forma t_0503 | -009 | 006 | -033 | -1436 | 151 | -003 | -031 | -029 |

### 8.8. Training and job satisfaction: Longitudinal (differential) Analysis 2003-1999

Tables 8.8.1a, 8.8.1b and 8.8.1c report the R square, ANOVA and regression coefficients for the overall job satisfaction 2003-1999 data.

Table 8.8.1a. Training vs Overall job satisfaction, 2003-1999 - Longitudinal Model Summary

| R | R Square |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | | Adjusted |
| :--- |
| R Square |$\quad$| Std Error |
| :--- |
| of the Estimate | R Square Change | F Change | df1 |
| :--- | :--- | df2 | Sig F Change |
| :--- |
| 199 |

Table 8.8.1b. Training vs Overall job satisfaction, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 929778 | 7 | 132825 | 11326 | 000 |
| Residual | 22575235 | 1925 | 11727 |  |  |
| Total | 23505013 | 1932 |  |  |  |

Table 8.8.1c. Training vs Overall job satisfaction, 2003-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | $\begin{aligned} & \text { Std } \\ & \text { Error } \end{aligned}$ | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | -043 | 014 |  | -3028 | 002 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Traming_for_Job_0399 | -002 | 000 | -104 | -4 590 | 000 | -106 | - 104 | -103 |
| Percent_Workers_Claıming Availa bility_Tramng_Increased_0399 | 002 | 000 | 127 | 5587 | 000 | 143 | 126 | 125 |
| Average_Expenditure_for_Tramın g_0399 | 000 | 000 | -053 | -2235 | 026 | -044 | -051 | -050 |
| Proportion_Employees_Receiving_ <br> Classroom_Trainng_0399 | -073 | 029 | -073 | -2 538 | 011 | -019 | -058 | -057 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_ 0399 | 090 | 029 | 087 | 3045 | 002 | 040 | 069 | 068 |
| Sum_Courses_in_Classroom_Form at 0399 | 018 | 006 | 093 | 3334 | 001 | 034 | 076 | 074 |
| Sum_Courses_m_OntheJob_Forma t_0399 | -014 | 005 | -070 | -2517 | 012 | -002 | -057 | -056 |

Tables 8.8.2a, 8.8.2b and 8.8.2c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2003-1999 data.

| Table 8.8.2a. Training vs Compensation job satisfaction, 2003-1999 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 166 | 028 | 024 | 363246 | 028 | 7841 | 7 | 1925 | 000 |

Table 8.8.2b. Training vs Compensation job satisfaction, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 724187 | 7 | 103455 | 7841 | 000 |
| Residual | 25399986 | 1925 | 13195 |  |  |
| Total | 26124173 | 1932 |  |  |  |

Table 8.8.2c. Training vs Compensation job satisfaction, 2003-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | $\begin{aligned} & \hline \text { Std } \\ & \text { Error } \\ & \hline \end{aligned}$ | Beta |  |  | Zeroorder | Partial | Part |
| (Constant) | -031 | 015 |  | -2095 | 036 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Ltttle_Trainng_for_Job_0399 | -002 | 000 | -096 | -4 222 | 000 | -102 | -096 | -095 |
| Percent_Workers_Claiming_Availa <br> bility_Tranıng_Increased_0399 | 002 | 000 | 109 | 4768 | 000 | 117 | 108 | 107 |
| Average_Expenditure_for_Tramın g_0399 | 000 | 000 | -016 | -681 | 496 | 002 | -016 | -015 |
| Proportion_Employees_Receiving_ <br> Classroom_Traınıng_0399 | 039 | 030 | 037 | 1285 | 199 | 051 | 029 | 029 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_0399 | 016 | 031 | 015 | 517 | 605 | 022 | 012 | 012 |
| Sum_Courses_m_Classroom_Form at 0399 | 010 | 006 | 049 | 1755 | 079 | 035 | 040 | 039 |
| Sum_Courses_1n_OntheJob_Forma t_0399 | -012 | 006 | -059 | $-2131$ | 033 | -021 | -049 | -048 |

### 8.9. Training and job satisfaction: Longitudinal (differential) Analysis 2005-2001

Tables 8.9.1a, 8.9.1b and 8.9.1c report the R square, ANOVA and regression coefficients for the overall job satisfaction 2005-2001 data.

Table 8.9.1a. Training vs Overall job satisfaction, 2005-2001 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 229 | 052 | 049 | 385771 | 052 | 15079 | 7 | 1908 | 000 |

Table 8.9.1b. Training vs Overall job satisfaction, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 1570876 | 7 | 224411 | 15079 | 000 |
| Residual | 28394688 | 1908 | 14882 |  |  |
| Total | 29965565 | 1915 |  |  |  |

Table 8.9.1c. Training vs Overall job satisfaction, 2005-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| (Constant) | 028 | 014 |  | 1945 | 052 |  |  |  |
| Percent_Workers Claiming_Too_ <br> Little_Training_for_Job_0501 | -003 | 000 | -169 | -7453 | 000 | -187 | -168 | -166 |
| Percent_Workers_Claımıng_Availa bility_Tramıng_Increased_0501 | 002 | 000 | 116 | 5119 | 000 | 145 | 116 | 114 |
| Average_Expenditure_for_Trainın <br> g_-0501 | 000 | 000 | -061 | -2 573 | 010 | -041 | -059 | -057 |
| Proportion_Employees_Receiving <br> Classroom_Tranning_0501 | 033 | 035 | 026 | 961 | 337 | 015 | 022 | 021 |
| Proportion_Employees_Receiving_ <br> OntheJob_Trainng_0501 | -006 | 011 | -013 | - 586 | 558 | -010 | -013 | -013 |
| Sum_Courses_in_Classroom_Form at_0501 | -001 | 006 | -006 | -223 | 823 | 000 | -005 | -005 |
| Sum_Courses_In_OntheJob_Forma t_0501 | 007 | 006 | 030 | 1303 | 193 | 030 | 030 | 029 |

Tables 8.9.2a, 8.9.2b and 8.9.2c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2005-2001 data.

| Table 8.9.2a. Training vs Compensation job satisfaction, 2005-2001 - Longitudinal Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estumate | R Square Change | F Change | df1 | df2 | Sig F Change |
| 252 | 063 | 060 | 395110 | 063 | 18452 | 7 | 1906 | 000 |

Table 8.9.2b. Training vs Compensation job satisfaction, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 2016430 | 7 | 288061 | 18452 | 000 |
| Residual | 29754876 | 1906 | 15611 |  |  |
| Total | 31771306 | 1913 |  |  |  |

Table 8.9.2c. Training vs Compensation job satisfaction, 2005-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partual | Part |
| (Constant) | 024 | 015 |  | 1624 | 104 |  |  |  |
| Percent_Workers_Claiming_Too_ <br> Little_Trannng_for_Job_0501 | -004 | 000 | -224 | -10014 | 000 | -228 | -224 | -222 |
| Percent_Workers_Claiming_Availa bility_Traming_Increased_0501 | 001 | 000 | 039 | 1722 | 085 | 070 | 039 | 038 |
| Average_Expenditure_for_Tramın g_0501 | 000 | 000 | -072 | -3 066 | 002 | -027 | -070 | -068 |
| Proportion_Employees_Receiving_ Classroom_Traming_0501 | 103 | 035 | 077 | 2895 | 004 | 077 | 066 | 064 |
| Proportion_Employees_ReceIving_ OntheJob_Tranning_0501 | -003 | 011 | -005 | -239 | 811 | 004 | -005 | -005 |
| Sum_Courses_1n_Classroom_Form at 0501 | 006 | 006 | 026 | 985 | 325 | 052 | 023 | 022 |
| Sum_Courses_1n_OntheJob_Forma t_0501 | 004 | 006 | 015 | 647 | 518 | 028 | 015 | 014 |

### 8.10. Training and job satisfaction: Longitudinal (differential) Analysis 2005-1999

Tables 8.10.1a, 8.10.1b and 8.10.1c report the R square, ANOVA and regression coefficients for the overall job satisfaction 2005-1999 data.

Table 8.10.1a. Training vs Overall job satisfaction, 2005-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 253 | 064 | 060 | 351389 | 064 | 18056 | 7 | 1848 | 000 |

Table 8.10.1b. Training vs Overall job satisfaction, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Stg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 1560610 | 7 | 222944 | 18056 | 000 |
| Residual | 22818002 | 1848 | 12347 |  |  |
| Total | 24378611 | 1855 |  |  |  |


| Table 8.10.1c. Training vs Overall job satisfaction, 2005-1999 - Longitudinal Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | Zeroorder | Partıal | Part |
| (Constant) | 031 | 014 |  | 2143 | 032 |  |  |  |
| ```Percent_Workers_Claıming_Too_ Little_Traming_for_Job_0599``` | -003 | 000 | -168 | -7348 | 000 | -178 | -168 | -165 |
| Percent_Workers_Claıming_Availa bility_Traming_Increased_0599 | 002 | 000 | 138 | 6036 | 000 | 140 | 139 | 136 |
| $\begin{aligned} & \text { Average_Expenditure_for_Trainn } \\ & \text { g_0599 } \end{aligned}$ | 000 | 000 | -065 | -2679 | 007 | -099 | -062 | -060 |
| $\begin{aligned} & \text { Proportion_Employees_Receıving_ } \\ & \text { Classroom_Traınıng_0599 } \end{aligned}$ | -079 | 032 | -073 | -2441 | 015 | -063 | -057 | -055 |
| Proportion_Employees_Receiving_ <br> OntheJob_Training_0599 | 044 | 030 | 045 | 1506 | 132 | -029 | 035 | 034 |
| $\begin{aligned} & \text { Sum_Courses_1n_Classroom_Form } \\ & \text { at_0599 } \end{aligned}$ | -004 | 005 | -021 | - 775 | 439 | -076 | -018 | -017 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0599 } \end{aligned}$ | -013 | 005 | -066 | -2387 | 017 | -052 | -055 | -054 |

Tables $8.10 .2 \mathrm{a}, 8.10 .2 \mathrm{~b}$ and 8.10 .2 c report the R square, ANOVA and regression coefficients for the compensation job satisfaction 2005-1999 data.

| Table 8.10.2a. Training vs Compensation job satisfaction, 2005-1999 - Longitudina Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | dfl | d12 | Stg F Change |
| 267 | 071 | 068 | 350994 | 071 | 20198 | 7 | 1848 | 000 |

Table 8.10.2b. Training vs Compensation job satisfaction, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | 1741823 | 7 | 248832 | 20198 | 000 |
| Residual | 22766829 | 1848 | 12320 |  |  |
| Total | 24508652 | 1855 |  |  |  |

Table 8.10.2c. Training vs Compensation job satisfaction, 2005-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Stg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partıal | Part |
| (Constant) | 003 | 014 |  | 232 | 817 |  |  |  |
| Percent_Workers Claimıng_Too_ <br> Little_Training_for_Job_0599 | -003 | 000 | -167 | -7336 | 000 | -174 | -168 | -164 |
| Percent_Workers_Claimıng_Availa bility_Tramıng_Increased_0599 | 002 | 000 | 106 | 4629 | 000 | 103 | 107 | 104 |
| $\begin{aligned} & \text { Average_Expendtture_for_Tramm } \\ & \text { g_0599 } \end{aligned}$ | 000 | 000 | 016 | 675 | 500 | 003 | 016 | 015 |
| Proportion_Employees_Receiving <br> Classroom_Traınıng_0599 | -015 | 032 | -014 | -475 | 635 | -021 | -011 | -011 |
| Proportion_Employees_Receiving_ <br> OntheJob_Traming 0599 | -085 | 030 | -086 | $-2887$ | 004 | -124 | -067 | -065 |
| $\begin{aligned} & \text { Sum_Courses_in_Classroom_Form } \\ & \text { at_0599 } \end{aligned}$ | 023 | 005 | 113 | 4214 | 000 | 040 | 098 | 094 |
| $\begin{aligned} & \text { Sum_Courses_in_OntheJob_Forma } \\ & \text { t_0599 } \end{aligned}$ | -028 | 005 | - 146 | -5 297 | 000 | -106 | - 122 | -119 |

### 8.11. Training and job satisfaction: Summary of Cross-sectional Analysis and Longitudinal (differential) Analysis

### 8.11.1 Training and overall job satisfaction

Table 8.11.1a and 8.11.1b show the summary of training and overall job satisfaction, Median Overall Satisfaction, for the cross-sectional and longitudinal analysis, respectively. As discussed in Chapter 3, we could expect that higher levels of training would be associated with higher levels of job satisfaction, and vice versa. The results seem to confirm this expectation, but only for those variables that measured training as perceived by the worker.

This trend can already be seen from the results of the variable that measures the percentage of employees claiming that the amount of training is too little for the demands of the job: Percent Workers Claiming Too Little Training for Job. As noted previously, we can assume that a large value of this variable underlies a lower level of training, at least as perceived by the employees. Recall also that, to improve clarity, we recoded the original job satisfaction data so that higher values of the job satisfaction variables, in this case Median Overall Satisfaction, signaled increasing levels of satisfaction (see Chapter 5 for details). Accordingly, if the effect of training on job satisfaction is as hypothesized above, then we would expect an inverse relationship between these two variables. For the cross-sectional analysis, we would expect that higher values of the variable Percent Workers Claiming Too Little Training for Job be associated with lower values of the variable Median Overall Satisfaction, and vice versa. For the longitudinal analysis, we would expect that increases (or decreases) in the
training variable be associated with decreases (increases) of the job satisfaction variable. The results provide strong support for the inverse relationship between these two variables. The cross-sectional analysis, see Table 8.11.1a, show a significant and negative relation for all four years under investigation. The inverse relationship between these two variables is also found in the longitudinal analysis: Table 8.11 .1 b show a significant relationship in the expected direction for all six pairs of years.

The other variable based on the level of training as perceived by the employee is Percent Workers Claiming Availability Training Increased, which measures the percentage of employees claiming that the availability of training has increased. As noted, if we assume that the employees' perception is correct, then a large value of this variable signals a higher level of training, and vice versa. Therefore, we should observe a direct, positive, relationship between this training variable and overall job satisfaction. For the cross-sectional analyses, we would expect that higher values of the Percent Workers Claiming Availability Training Increased to be associated with higher values of Median Overall Satisfaction, and vice versa. Similarly for the longitudinal analyses, we would expect that increases of the training variable to be associated with increases in overall job satisfaction, and vice versa. Also for this measure of training, the results indicate a strong association with overall job satisfaction: all crosssectional and all longitudinal analyses in Tables 8.11 .1a and 8.11 .1b show a significant and positive negative relation.

With regards to the other training variables, none show a consistent pattern of results for the cross-sectional analyses: at best the regression coefficients are significantly different from zero only in two cases out of four.

For the longitudinal analyses, there seems to be some effect of training expenditure (variable Average Expenditure for Training). Increases in training expenditures should result in increases in overall job satisfaction, and vice versa. The data in Table 8.11.1b show the expected positive relation in all six analyses; the effect is significant ( $\mathrm{p}<0.05$ ) in five out of six cases and very close to the significance level in the last case $(\mathrm{p}=0.74)$.

The variable Sum Courses in OntheJob Format, which measure the number of on-the-job training courses, also exhibited numerous significant relations with overall job satisfaction. In general, we would expect higher values of the variable to be associated with higher values of satisfaction, and vice versa. Unfortunately, the data suggest a contrasting pattern. There is a significant effect in five of the six longitudinal analyses, but only in two cases the direction of the effect is in the expected direction.

### 8.11.2 Training and job satisfaction related to compensation

The second measure of job satisfaction was based on monetary compensation (Median Compensation Satisfaction). The summary results for this variable are presented in Table 8.11.2a (cross-sectional analyses) and Table 8.11.2b (longitudinal analyses).

The results of the two measures of training based on employees' perceptions: Percent Workers Claiming Too Little Training for Job and Percent Workers Claiming Availability Training Increased were substantially the same as for overall job satisfaction for both cross-sectional and longitudinal analyses.

The results for the other training variables are less consistent and differ between types of analyses. In the cross-sectional analyses, four variables exhibit significant relationships three out of four times (see Table 8.11.2a). Average Expenditure for Training and the Proportion Emplovees Receiving Classroom Training show positive relationships: that is increases in the values of these variables were associated with increases in the compensation satisfaction variable, and vice versa. On the contrary, Proportion Emplovees Receiving OntheJob Training and

Sum Courses in OntheJob Format were characterized by negative relationships. These latter results are rather surprising since they indicate that an increase on-the-job training was actually associated with a decrease in compensation satisfaction. As such, they suggest that acquiring on-the-job skills carry an expectation of higher monetary compensation.

The results of the cross-sectional analyses were not corroborated by those of the longitudinal analyses, however. The only result that matched in part the findings of the cross-sectional analyses was for the Proportion Emplovees Receiving Classroom Training variable that exhibited significant relationships four out of six times (see Table 8.11.2b).

In summary, these results suggest that the level of training can positively affect job satisfaction. However, this relation appears to depend more consistently on the perceived level of training (e.g., perceived adequacy or availability of training) than on the actual level of training (e.g., expenditure or number of courses offered).

| Table 8.11.1a - Training and Overall Satisfaction - Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | Coefficients | Sig. | Coefficients | Sig. | Coefficients | Sig. | Coefficients | Sig. |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too_Little_Tramng_for_Job | -003 | . 000 | -004 | . 000 | -004 | . 000 | -003 | . 000 |
| Percent_Workers_Claımıng_Avalability_Tramng_Increased | 004 | . 000 | 004 | . 000 | 002 | . 000 | 003 | . 000 |
| Average_Expenditure_for_Tranıng | 000 | . 001 | 000 | 417 | 000 | . 042 | 000 | 165 |
| Proporton_Employees_Receiving_Classroom_Training | 058 | . 029 | 013 | 618 | -056 | . 027 | 019 | 388 |
| Proportion_Employees_Receiving__OntheJob_Traming | -092 | . 000 | 002 | 852 | 026 | 245 | - 040 | . 052 |
| Sum_Courses_1n_Classroom_Format | -010 | . 015 | -007 | 168 | -007 | 171 | 004 | 419 |
| Sum_Courses_ın_OntheJob_Format | -010 | . 019 | 004 | 356 | -004 | 440 | -004 | 404 |

Table 8.11.1b - Training and Overall Satisfaction - Summary Longitudinal Regression Coefficients


Table 8.11.2a - Training and Compensation Satisfaction - Summary Cross-Sectional Regression Coefficients

|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sıg | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too_Little_Trannng_for_Job | -002 | . 000 | -004 | . 000 | - 004 | . 000 | -006 | . 000 |
| Percent_Workers_Claıming_Avallability_Tramnng_Increased | 003 | . 000 | 002 | . 000 | 003 | . 000 | 000 | 113 |
| Average_Expenditure_for_Traming | 000 | . 000 | 000 | 195 | 000 | . 003 | 000 | . 001 |
| Proportion_Employees_Receiving_Classroom_Training | 096 | . 002 | 091 | . 002 | 031 | 200 | 137 | . 000 |
| Proportion_Employees_Receiving_OntheJob_Traming | -140 | . 000 | -090 | . 000 | -032 | 154 | -151 | . 000 |
| Sum_Courses_1n_Classroom_Format | 002 | 633 | 004 | 475 | -004 | 485 | 010 | . 036 |
| Sum_Courses_in_OntheJob_Format | -017 | . 000 | -011 | . 029 | 000 | 934 | -009 | . 046 |

Table 8.11.2b - Training and Compensation Satisfaction - Summary Longitudinal Regression Coefficients

|  |  | $\begin{aligned} & 2001- \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003- \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003- \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005- \\ & 1999 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too_Little_T | -005 | . 000 | -005 | . 000 | -005 | . 000 | -002 | . 000 | -004 | . 000 | -003 | . 000 |
| Percent_Workers_Claımıng_Availability_ | 003 | . 000 | 002 | . 000 | 001 | . 031 | 002 | . 000 | 001 | 085 | 002 | . 000 |
| Average_Expenditure_for_Trainıng | 000 | 377 | 000 | . 038 | 000 | 551 | 000 | 496 | 000 | . 002 | 000 | 500 |
| Proportion_Employees_Receiving_Classr | 055 | . 054 | 065 | . 056 | 127 | . 000 | 039 | 199 | 103 | . 004 | -015 | 635 |
| Proportion_Employees_Receiving_OntheJ | -085 | . 001 | -002 | 855 | 048 | 130 | 016 | 605 | -003 | 811 | -085 | . 004 |
| Sum_Courses_in_Classroom_Format | 015 | . 005 | -005 | 400 | 015 | . 021 | 010 | 079 | 006 | 325 | 023 | . 000 |
| Sum_Courses_1n_OntheJob_Format | -003 | 544 | 003 | 638 | -009 | 151 | -012 | . 033 | 004 | 518 | - 028 | . 000 |

## 9 Chapter: The effect of Training Turnover, Absenteeism, Job

## Satisfaction on Productivity

The results reported in the last three chapters were very interesting and in line, at least partially, with the notion of an indirect effect of training on productivity. Indeed, we found some strong relations between training on one hand and turnover, job satisfaction, and to a lesser extent absenteeism, on the other.

To investigate further the existence of the indirect effect we examined, using the regression approach, the effect of training, absenteeism, turnover, and job satisfaction on productivity. We expected all four factors to have some effect on productivity: the effect of training would confirm the direct effect of training on productivity, whereas the effect of the other three factors would prove the existence of the indirect effect hypothesized.

The literature indicates that, in addition to the four factors mentioned above, several other factors might affect productivity. Since the WES does provide information on some of these factors, we included them in the analysis as control variables. The regression analysis was performed on both cross-sectional and longitudinal data. Both analyses included the following variables (details regarding these variables are available in Chapter 5):

1) PRODUCTIVITY
-Value added per worker
2) TURNOVER
-Average turnover was measured as the number of resignations divided by total number of employees adjusted to account for peaks in seasonal employment, if any (Turnover)
3) ABSENTEEISM
-Average of days of pard sick leave (Average Days of Sick Paid Leave)
-Average of days of other pard leave (Average Davs of Other Patd Leave)
-Average of days of other unpard leave (Average Days of Unpald Leave)
4) JOB SATISFACTION
-Median overall satısfaction of indıviduals in the workplace (Medıan Overall Satısfaction).
-Median satisfaction in compensation of individuals at the workplace (Medıan_Compensation_Satisfaction)
5) TRAINING
-Average Training Expenditure (Average Expenditure for Training)
-Percentage of workers claiming that the amount of trainnng available was too little for the demands of the job (Percent Workers Claiming Too Little Training for Job)
-Percentage of workers claiming that the amount of training available to employees has increased (Percent Workers Claiming Avallability Training Increased).
-Sum of different types of courses provided in classroom format (Sum Courses in_Classroom Format)
-Sum of different types of courses provided through on-the job traming
(Sum Courses in OntheJob Format)
-Proportion of employees who received classroom training
(Proportion Employees Receiving Classroom Training)

- Proportion of employees who recerved on-the job-training
(Proportion Employees Receiving OntheJob Training)

6) CONTROL VARIABLES
-Age of the organization measured as time at the last address (Organzzation Age)
-Number of employees (Total Number of Employees)
-Percentage of total sales from products \& services that are exported to USA \& World (Percentage ExportSales)
-Percentage of employees using computers (Proportıon Emplovees Using Computers)
-Average age of workforce (Average Age Workforce).
-Percentage of employees having kids 1-6 years of age (Percent Workers_Having_Young_Klds)
-Average pay (Workplace Average Pay)
-Average family income from other sources other than employment (Average_Family Other_Income)
-Average tenure of workforce (Average Workforce Tenure)
-Sum of all HR practices related to work organization (Sum HR Practices Organizatıon of Work)
-Sum of all HR practices related to work compensation practices (Sum HR_Practices Compensatoon)
-Average number of promotions (Average Workplace Promotions)
-Proportion of managers, professional, technical/trade as measure of skill level
(Proportion Fulltime HighSkilled Workers)
-Percentage of unionized workers (Proportion Unionized Workforce)
The results of the cross-sectional and longitudinal analyses are presented in the following sections.

### 9.1. Cross-sectional Analysis for 1999

Tables 9.1a and 9.1b report the R square and ANOVA for the 1999 data. Table 9.1c reports the regression coefficients, standardized and non-standardized, with their associated significance levels.

| Table 9.1a. Determinants of Productivity, 1999 - Cross-Sectional Model Summary |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | df1 | d12 | Stg F Change |
| 302 | 091 | 082 | $140338 \mathrm{E}+06$ | 091 | 10304 | 27 | 2768 | 000 |


| Table 9.1b. Determinants of Productivity, 1999 - Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | $5479 \mathrm{E}+14$ | 27 | $2029 \mathrm{E}+13$ | 10304 | 000 |
| Residual | $5452 \mathrm{E}+15$ | 2768 | $196 \mathrm{E}+12$ |  |  |
| Total | $5999 \mathrm{E}+15$ | 2795 |  |  |  |


| Table 9.1c. Determinants of Productivity, 1999 - Cross-Sectional Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partal | Part |
| Constant | -71717422 | 39680105 |  | -1807 | 071 |  |  |  |
| Percent_Workers_Claımıng_To | 252210 | 163955 | 032 | 1538 | 124 | 062 | 029 | 028 |
| Percent_Workers_Claiming_Av | 312576 | 153724 | 043 | 2033 | 042 | 076 | 039 | 037 |
| Average_Expenditure_for_Tran | 7504 | 8938 | 018 | 840 | 401 | 108 | 016 | 015 |
| Proportion_Employees_Receivi | 5851304 | 14494933 | 012 | 404 | 686 | 071 | 008 | 007 |
| Proportion_Employees_Receivı | -1743650 | 14179385 | -004 | -123 | 902 | -006 | -002 | -002 |
| Sum_Courses_in_Classroom_Fo | 6227968 | 2227383 | 084 | 2796 | 005 | 096 | 053 | 051 |
| Sum_Courses_in_OntheJob_For | -3590 124 | 2302225 | -045 | -1 559 | 119 | 004 | -030 | -028 |
| Average_Days_of_Sick Paid_L | 317882 | 1488789 | 004 | 214 | 831 | 042 | 004 | 004 |
| Average_Days_of_Other_Paid_ | -1025032 | 1868472 | -010 | - 549 | 583 | 029 | -010 | -010 |
| Average_Days_of_Unpard_Leav | -710355 | 664154 | -020 | -1070 | 285 | -061 | -020 | -019 |
| Turnover_99 | -2697 628 | 17854727 | -003 | -151 | 880 | -035 | -003 | -003 |


| Medıan_Overall_Satısfaction_9 | 14310406 | 10419737 | 031 | 1373 | 170 | 064 | 026 | 025 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Medran Compensation_Satisfac | 3363361 | 9101675 | 008 | 370 | 712 | 073 | 007 | 007 |
| Organizatıon_Age_99 | 422861 | 311286 | 029 | 1358 | 174 | 033 | 026 | 025 |
| Total_Number_of_Employees_9 | 53635 | 54427 | 019 | 985 | 324 | 051 | 019 | 018 |
| Percentage_ExportSales_99 | -172760 | 196730 | -017 | -878 | 380 | 026 | -017 | -016 |
| Proportion_Employees_Using_ | 58213550 | 12255426 | 099 | 4750 | 000 | 132 | 090 | 086 |
| Average_Age_Workforce_99 | I188 185 | 653016 | 041 | 1820 | 069 | 076 | 035 | 033 |
| Percent_Workers_Having_Youn | 264095 | 176487 | 028 | 1496 | 135 | 043 | 028 | 027 |
| Workplace_Average_Pay_99 | 1918 | 234 | 181 | 8207 | 000 | 230 | 154 | 149 |
| Average_Famıly_Other_Income | 740 | 628 | 022 | 1178 | 239 | 041 | 022 | 021 |
| Average Workforce Tenure_99 | -1253 135 | 1060734 | -029 | -1 181 | 238 | 045 | -022 | -021 |
| Sum_HR_Practices_Compensatı | 4345639 | 4043735 | 022 | 1075 | 283 | 103 | 020 | 019 |
| Sum HR Practices Organızatio | -8479 818 | 2886218 | -063 | -2938 | 003 | -024 | -056 | -053 |
| Average_Workplace_Promotion | -4936946 | 5693936 | -018 | -867 | 386 | 041 | -016 | -016 |
| Proportion_Fultime_HıghSkille | -95253 497 | 14527084 | -126 | -6557 | 000 | -065 | - 124 | -119 |
| Proportion_Unıonzed_Workfor | -22046 025 | 14923192 | -029 | -1477 | 140 | -009 | -028 | -027 |

### 9.2. Cross-sectional Analysis for 2001

Table 9.2a, Table 9.2b, Table 9.2c report the R square, ANOVA, and regression coefficients, respectively, for the 2001 data.

| R | R Square | Adjusted R Square | Std Error of the Estimate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 290 | 084 | 075 | $112865 \mathrm{E}+06$ | 084 | 9141 | 27 | 2686 | 000 |

Table 9.2b. Determinants of Productivity, 2001 - Cross-Sectional ANOVA

|  | Sum of Squares | Df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $3144 \mathrm{E}+14$ | 27 | $1164 \mathrm{E}+13$ | 9141 | 000 |


| Residual | $3422 \mathrm{E}+15$ | 2686 | $1274 \mathrm{E}+12$ |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Total | $3736 \mathrm{E}+15$ | 2713 |  |  |  |

Table 9.2c. Determinants of Productivity, 2001 - Cross-Sectional Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| Constant | 1291226 | 35132684 |  | 037 | 971 |  |  |  |
| Percent_Workers_Claıming_Too | -241993 | 147800 | -034 | -1637 | 102 | -013 | -032 | -030 |
| Percent_Workers_Claimming Av | 276554 | 125641 | 045 | 2201 | 028 | 100 | 042 | 041 |
| Average_Expenditure_for_Train | -002 | 6413 | 000 | 000 | 100 | 075 | 000 | 000 |
| Proportion_Employees_Receivin | 10914052 | 10417583 | 025 | 1048 | 295 | 064 | 020 | 019 |
| Proportion_Employees_Receivin | 82024 | 3151929 | 000 | 026 | 979 | 014 | 001 | 000 |
| Sum_Courses_in_Classroom_Fo | -1363 591 | 1885046 | -021 | - 723 | 470 | 060 | -014 | -013 |
| Sum_Courses_ın_OntheJob_For | -206214 | 1837728 | -003 | -112 | 911 | 047 | -002 | -002 |
| Average_Days_of_Sick_Paid_L | 2141229 | 1375352 | 030 | 1557 | 120 | 059 | 030 | 029 |
| Average_Days_of_Other_Pard_ | -238605 | 734211 | -006 | -325 | 745 | -018 | -006 | -006 |
| Average_Days_of_Unpard_Leav | -528 179 | 690712 | -014 | - 765 | 445 | -032 | -015 | -014 |
| Turnover_01 | 2554727 | 12902832 | 004 | 198 | 843 | -050 | 004 | 004 |
| Medıan_Overall_Satısfaction_01 | 18149693 | 8952855 | 048 | 2027 | 043 | 071 | 039 | 037 |
| Medıan_Compensation_Satisfact | $-23286776$ | 8203534 | -068 | $-2839$ | 005 | 043 | -055 | -052 |
| Organization_Age_01 | 83866 | 190916 | 009 | 439 | 660 | 003 | 008 | 008 |
| Total_Number_of_Employees_0 | 28138 | 40756 | 014 | 690 | 490 | 034 | 013 | 013 |
| Percentage_ExportSales_01 | -72 429 | 161848 | -009 | -448 | 655 | 032 | -009 | -008 |
| Proportion_Employees_Using_C | 27576393 | 10656744 | 054 | 2588 | 010 | 121 | 050 | 048 |
| Average_Age_Workforce_ 01 | -206 105 | 585352 | -008 | -352 | 725 | 037 | -007 | -007 |
| Percent_Workers_Havıng_Youn | 11063 | 152752 | 001 | 072 | 942 | 019 | 001 | 001 |
| Workplace_Average_Pay_01 | 1987 | 166 | 253 | 11938 | 000 | 263 | 224 | 220 |
| Average_Famıly_Other_Income | -1 174 | 714 | -032 | -1 644 | 100 | 023 | -032 | -030 |
| Average_Workforce_Tenure_01 | -385850 | 906728 | -011 | -426 | 670 | 059 | -008 | -008 |


| Sum_HR_Practices_Compensatı | 2662462 | 3405033 | 016 | 782 | 434 | 061 | 015 | 014 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Sum_HR_Practices_Organızatıo | -1295 759 | 2649204 | -010 | -489 | 625 | -015 | -009 | -009 |
| Average_Workplace_Promotion | 9164919 | 4618429 | 043 | 1984 | 047 | 091 | 038 | 037 |
| Proportion_Fultime_HighSkille | -4894 850 | 12017126 | -008 | -407 | 684 | 025 | -008 | -008 |
| Proporton_Unıonized_Workfor | -3386804 | 11639132 | -006 | -291 | 771 | 006 | -006 | -005 |

### 9.3. Cross-sectional Analysis for 2003

Table 9.3a, Table 9.3b, Table 9.3c report the R square, ANOVA, and regression coefficients, respectively, for the 2003 data.

Table 9.3a. Determinants of Productivity, 2003 - Cross-Sectional Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 384 | 148 | 139 | 95538180072 | 148 | 17720 | 27 | 2764 | 000 |

Table 9.3b. Determinants of Productivity, 2003 - Cross-Sectional ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $4367 \mathrm{E}+14$ | 27 | $1617 \mathrm{E}+13$ | 17720 | 000 |
| Residual | $2523 \mathrm{E}+15$ | 2764 | $9128 \mathrm{E}+11$ |  |  |
| Total | $2960 \mathrm{E}+15$ | 2791 |  |  |  |

Table 9.3c. Determinants of Productivity, 2003 - Cross-Sectional Coefficients

|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \\ & \hline \end{aligned}$ | Partial | Part |
| Constant | -76006 907 | 30850444 |  | -2 464 | 014 |  |  |  |
| Percent_Workers_Claıming_Too | -205909 | 125969 | -031 | -1635 | 102 | -008 | -031 | -029 |
| Percent_Workers_Claiming_Av | -387981 | 100628 | -075 | -3856 | 000 | -001 | -073 | -068 |
| Average_Expenditure_for_Train | 247 | 6984 | 001 | 035 | 972 | 101 | 001 | 001 |
| Proportion_Employees_Receivin | -13387167 | 7864608 | -056 | -1702 | 089 | 036 | -032 | -030 |
| Proportion_Employees_Receivin | 1081773 | 7335439 | 005 | 147 | 883 | 012 | 003 | 003 |


| Sum_Courses_in_Classroom_Fo | 5134448 | 1609563 | 088 | 3190 | 001 | 078 | 061 | 056 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Sum_Courses_ın_OntheJob_For | -1603941 | 1674207 | -025 | -958 | 338 | 008 | -018 | -017 |
| Average_Days_of_Sick_Paid_L | -1187490 | 893241 | -024 | -1329 | 184 | 011 | -025 | -023 |
| Average_Days_of_Other_Pard | -468912 | 394977 | -022 | -1 187 | 235 | -027 | -023 | -021 |
| Average_Days_of_Unpard_Leav | -1794 692 | 721539 | -045 | -2487 | 013 | -064 | -047 | -044 |
| Turnover_03 | 8025003 | 14263832 | 011 | 563 | 574 | -053 | 011 | 010 |
| Medıan_Overall_Satısfaction_03 | 30229263 | 7986833 | 081 | 3785 | 000 | 116 | 072 | 066 |
| Median_Compensation_Satısfact | 10231686 | 6967742 | 031 | 1468 | 142 | 106 | 028 | 026 |
| Organızatıon_Age 03 | 467340 | 136340 | 065 | 3428 | 001 | 113 | 065 | 060 |
| Total_Number_ot_Employees_0 | -9757 | 30868 | -006 | - 316 | 752 | 013 | -006 | -006 |
| Percentage_ExportSales_03 | -225942 | 142085 | -030 | -1590 | 112 | - 002 | -030 | -028 |
| Proportion_Employees_Using C | 23450190 | 9160819 | 050 | 2560 | 011 | 132 | 049 | 045 |
| Average_Age Workforce_03 | -1460 390 | 488931 | -066 | -2987 | 003 | 037 | -057 | -052 |
| Percent_Workers_Having_Youn | 214841 | 132879 | 029 | 1617 | 106 | 074 | 031 | 028 |
| Workplace_Average_Pay_03 | 2117 | 135 | 325 | 15695 | 000 | 328 | 286 | 276 |
| Average Family_Other_Income | 008 | 385 | 000 | 020 | 984 | -003 | 000 | 000 |
| Average_Workforce_Tenure_03 | 594226 | 715909 | 019 | 830 | 407 | 073 | 016 | 015 |
| Sum HR Practıces_Compensatı | -6229005 | 2857240 | -043 | -2 180 | 029 | 023 | -041 | -038 |
| Sum_HR_Practıces_Organızatıo | 4082386 | 2197286 | 037 | 1858 | 063 | 021 | 035 | 033 |
| Average_Workplace_Promotion | 5962866 | 3407214 | 035 | 1750 | 080 | 095 | 033 | 031 |
| Proportion_Fulitıme_HıghSkille | -29295 944 | 10039313 | -054 | -2918 | 004 | -020 | -055 | -051 |
| Proportıon_Unıonızed_Workfor | -18979 259 | 10890212 | -034 | -1743 | 081 | -034 | -033 | -031 |

### 9.4. Cross-sectional Analysis for 2005

The R square, ANOVA, and regression coefficients for the 2005 data are shown in Table 9.4a, Table 9.4b, and Table 9.4c, respectively.

| R | R Square | $\begin{aligned} & \text { Adjusted } \\ & \text { R Square } \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline \text { Std Error } \\ & \text { of the Estimate } \\ & \hline \end{aligned}$ | R Square Change | F Change | dfl | df2 | Sig F Change |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 282 | 080 | 072 | 114823 E+06 | 080 | 10001 | 27 | 3124 | 000 |


| Table 9.4b. Determinants of Productivity, 2005 - Cross-Sectional ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | $3560 \mathrm{E}+14$ | 27 | $1319 \mathrm{E}+13$ | 10001 | 000 |
| Residual | $4119 \mathrm{E}+15$ | 3124 | $1318 \mathrm{E}+12$ |  |  |
| Total | $4475 \mathrm{E}+15$ | 3151 |  |  |  |

Table 9.4c. Determinants of Productivity, 2005 - Cross-Sectional Coefficients

|  | Unstandardızed Coefficients |  | Standardized Coefficients | t | S1g | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| Constant | 8364101 | 35752665 |  | 234 | 815 |  |  |  |
| Percent_Workers_Claımıng_Too | 48431 | 137452 | 007 | 352 | 725 | 024 | 006 | 006 |
| Percent_Workers_Clammg_Av | -152303 | 124459 | -023 | -1224 | 221 | 033 | -022 | -021 |
| Average_Expenditure_for_Train | 7131 | 7799 | 019 | 914 | 361 | 048 | 016 | 016 |
| Proportion_Employees_Receivin | -9808 431 | 9498028 | -035 | -1 033 | 302 | 023 | -018 | -018 |
| Proportion_Employees_Receivin | 1668715 | 9073378 | 006 | 184 | 854 | 015 | 003 | 003 |
| Sum_Courses_1n_Classroom_Fo | -845055 | 1839649 | -012 | -459 | 646 | 021 | -008 | -008 |
| Sum_Courses_1n_OntheJob_For | 2177354 | 1878212 | 029 | 1159 | 246 | 028 | 021 | 020 |
| Average_Days_of_Sck_Paid_L | 2484619 | 1574854 | 029 | 1578 | 115 | 077 | 028 | 027 |
| Average_Days_of_Other_Paid_ | -663959 | 647349 | -018 | -1026 | 305 | 006 | -018 | -018 |
| Average_Days_of_Unpard_Leav | -824 241 | 557835 | -027 | -1478 | 140 | -063 | -026 | -025 |
| Turnover_05 | -4997 736 | 14524872 | -007 | -344 | 731 | -057 | -006 | -006 |
| Median_Overall_Satisfaction_05 | 2719376 | 8282587 | 007 | 328 | 743 | 031 | 006 | 006 |
| Medran_Compensation_Satisfact | -13119651 | 7952592 | -034 | -1650 | 099 | 014 | -030 | -028 |
| Organization_Age_05 | 426025 | 157879 | 053 | 2698 | 007 | 089 | 048 | 046 |
| Total_Number_of_Employees_0 | 17730 | 37051 | 009 | 479 | 632 | 018 | 009 | 008 |
| Percentage_ExportSales_05 | -276044 | 158581 | -031 | -1741 | 082 | 023 | -031 | -030 |


| Proportion_Employees_Using_C | 6311265 | 10945461 | 012 | 577 | 564 | 098 | 010 | 010 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Average_Age_Workforce_05 | 408842 | 534318 | 016 | 765 | 444 | 064 | 014 | 013 |
| Percent_Workers_Having_Youn | -107049 | 167376 | -012 | -640 | 522 | 017 | -011 | -011 |
| Workplace_Average_Pay_05 | 1867 | 139 | 266 | 13448 | 000 | 262 | 234 | 231 |
| Average_Family_Other_Income | - 598 | 547 | -019 | -1 092 | 275 | 010 | - 020 | -019 |
| Average_Workforce_Tenure_05 | -378 027 | 790655 | -011 | -478 | 633 | 037 | -009 | -008 |
| Sum_HR_Practices_Compensatı | -2917435 | 3451684 | -016 | -845 | 398 | 040 | -015 | -015 |
| Sum_HR_Practices_Organizatio | 1856416 | 2321452 | 015 | 800 | 424 | 001 | 014 | 014 |
| Average_Workplace_Promotion | 4610591 | 3219772 | 028 | 1432 | 152 | 032 | 026 | 025 |
| Proportion_Fulltime_HighSkille | -9648 492 | 11664131 | -015 | -827 | 408 | 010 | -015 | -014 |
| Proportion_Unionized_Workfor | -13424 631 | 13313356 | -020 | -1008 | 313 | -010 | -018 | -017 |

### 9.5. Differential Analysis 2001-1999

The R square, ANOVA, and regression coefficients for the 2001-1999 data are shown in Table 9.5a, Table 9.5b, and Table 9.5 c , respectively.

Table 9.5a. Determinants of Productivity, 2001-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estimate | R Square Change | F Change | df1 | df2 | Sig F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 305 | 093 | 083 | $121807 \mathrm{E}+06$ | 093 | 8935 | 25 | 2176 | 000 |


| Table 9.5b. Determinants of Productivity, 2001-1999 - Longitudinal ANOVA |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
|  | Sum of Squares | df | Mean Square | F | Sig |
| Regression | $3314 \mathrm{E}+14$ | 25 | $1326 \mathrm{E}+13$ | 8935 | 000 |
| Residual | $3229 \mathrm{E}+15$ | 2176 | $1484 \mathrm{E}+12$ |  |  |
| Total | $3560 \mathrm{E}+15$ | 2201 |  |  |  |



| Constant | $-21739630$ | 4988120 |  | -4 358 | 000 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Percent_Workers_Claımıng_Too | -224 239 | 138162 | -036 | -1623 | 105 | -013 | -035 | -033 |
| Percent_Workers_Claiming_Av | 298526 | 130377 | 050 | 2290 | 022 | 056 | 049 | 047 |
| Average_Expenditure_for_Train | -8731 | 7491 | -026 | -1 166 | 244 | 019 | -025 | -024 |
| Proportion_Employees_Receivin | 5445235 | 9598534 | 014 | 567 | 571 | 044 | 012 | 012 |
| Proportion_Employees_Receivin | 615225 | 3475661 | 004 | 177 | 860 | 015 | 004 | 004 |
| Sum_Courses_in_Classroom_Fo | 8488981 | 1847892 | 117 | 4594 | 000 | 099 | 098 | 094 |
| Sum_Courses_in_OntheJob For | -1915 777 | 1685821 | -027 | -1136 | 256 | 027 | -024 | -023 |
| Average_Days_of Sick_Paid_L | 3558618 | 1167343 | 063 | 3048 | 002 | 073 | 065 | 062 |
| Average_Days_of_Other_Pard_ | 161984 | 837221 | 004 | 193 | 847 | - 006 | 004 | 004 |
| Average_Days_of_Unpard_Leav | -656799 | 555802 | -025 | -1 182 | 237 | -014 | -025 | -024 |
| Turnover 0199 | $-11519327$ | 18249144 | -014 | -631 | 528 | -004 | -014 | -013 |
| Median_Overall_Satısfaction_01 | -27490 395 | 8111248 | -079 | -3 389 | 001 | -070 | -072 | -069 |
| Medıan_Compensatıon Satıffact | -6175 583 | 7809391 | -019 | - 791 | 429 | -010 | -017 | -016 |
| Total_Number_of_Employees_0 | 58610 | 119566 | 010 | 490 | 624 | -008 | 011 | 010 |
| Percentage_ExportSales_0199 | -728750 | 253569 | -065 | -2874 | 004 | -094 | -061 | -059 |
| Proportion Employees_Using_C | -23965 680 | 16818237 | -030 | -1425 | 154 | -030 | -031 | -029 |
| Percent_Workers_Having_Youn | -31445 | 156126 | -004 | -201 | 840 | -022 | -004 | -004 |
| Workplace_Average_Pay_0199 | 2156 | 229 | 197 | 9411 | 000 | 195 | 198 | 192 |
| Average_Famıly_Other_Income | 1496 | 584 | 054 | 2559 | 011 | 070 | 055 | 052 |
| Average_Workforce_Tenure_01 | 434789 | 952136 | 010 | 457 | 648 | 046 | 010 | 009 |
| Sum_HR_Practıces_Compensatı | -19371539 | 3790906 | -107 | -5 110 | 000 | -110 | -109 | -104 |
| Sum_HR_Practices_Organızatıo | -1902383 | 2681198 | -015 | -710 | 478 | 004 | -015 | -014 |
| Average_Workplace Promotion | 6878877 | 5009663 | 030 | 1373 | 170 | 048 | 029 | 028 |
| Proportıon_Fulltıme_HıghSkılle | -17754 931 | 17090486 | -022 | -1 039 | 299 | 016 | -022 | -021 |
| Proportıon_Unıonızed_Workfor | 49003884 | 17388115 | 061 | 2818 | 005 | 090 | 060 | 058 |

### 9.6. Differential Analysis 2003-2001

The R square, ANOVA, and regression coefficients for the 2003-2001 data are shown in Table 9.6a, Table 9.6b, and Table 9.6c, respectively.

Table 9.6a. Determinants of Productivity, 2003-2001 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | S1g F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 296 | 088 | 076 | 43425103550 | 088 | 7612 | 25 | 1976 | 000 |

Table 9.6b. Determinants of Productivity, 2003-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sıg |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $3589 \mathrm{E}+13$ | 25 | $1435 \mathrm{E}+12$ | 7612 | 000 |
| Residual | $3726 \mathrm{E}+14$ | 1976 | $1886 \mathrm{E}+11$ |  |  |
| Total | $4085 \mathrm{E}+14$ | 2001 |  |  |  |

Table 9.6c. Determinants of Productivity, 2003-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | $\begin{aligned} & \text { Zero- } \\ & \text { order } \end{aligned}$ | Partial | Part |
| Constant | -345499 | 1683768 |  | -205 | 837 |  |  |  |
| Percent_Workers_Claiming_Too | -93 306 | 52966 | -041 | -1762 | 078 | -064 | -040 | -038 |
| Percent_Workers_Claiming_Av | 84276 | 43959 | 044 | 1917 | 055 | 065 | 043 | 041 |
| Average_Expenditure_for_Train | 9331 | 3106 | 069 | 3004 | 003 | 053 | 067 | 065 |
| Proportion_Employees_Receivin | 1346446 | 4127566 | 008 | 326 | 744 | -007 | 007 | 007 |
| Proportion_Employees_Receivin | 306563 | 1213879 | 006 | 253 | 801 | 013 | 006 | 005 |
| Sum_Courses_m_Classroom_Fo | -2117114 | 741050 | -076 | -2857 | 004 | -086 | -064 | -061 |
| Sum_Courses_m_OntheJob_For | -533 549 | 727206 | -017 | -734 | 463 | -048 | -017 | -016 |
| Average_Days_of_Sick_Pard_L | -754 818 | 363622 | -046 | -2076 | 038 | -036 | -047 | -045 |
| Average_Days_of_Other_Paid_ | 14335 | 200139 | 002 | 072 | 943 | -003 | 002 | 002 |
| Average_Days_of Unpald_Leav | -73696 | 244056 | -007 | -302 | 763 | -031 | -007 | -006 |
| Turnover_0301 | 6744827 | 5963912 | 025 | 1131 | 258 | 054 | 025 | 024 |
| Median_Overall_Satisfaction_03 | 4433420 | 3186445 | 035 | 1391 | 164 | 068 | 031 | 030 |


| Median_Compensation_Satisfact | 6824569 | 2838882 | 060 | 2404 | 016 | 067 | 054 | 052 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Total_Number_of_Employees_0 | 17810 | 55373 | 007 | 322 | 748 | -031 | 007 | 007 |
| Percentage_ExportSales_0301 | -59 402 | 118297 | -011 | -502 | 616 | -034 | -011 | -011 |
| Proportion_Employees_Using_C | -6658909 | 6778587 | -022 | -982 | 326 | -043 | -022 | -021 |
| Percent_Workers_Having_Youn | -92 804 | 59636 | -035 | -1556 | 120 | -044 | -035 | -033 |
| Workplace_Average_Pay_0301 | 1064 | 104 | 229 | 10252 | 000 | 235 | 225 | 220 |
| Average_Famıly_Other_Income | 242 | 172 | 031 | 1409 | 159 | 033 | 032 | 030 |
| Average_Workforce_Tenure_03 | 387593 | 332805 | 027 | 1165 | 244 | 028 | 026 | 025 |
| Sum_HR_Practices_Compensatı | -1635 512 | 1570266 | -024 | -1 042 | 298 | -042 | -023 | -022 |
| Sum_HR_Practices_Organizatıo | -1083 614 | 1077291 | -023 | -1 006 | 315 | -042 | -023 | -022 |
| Average_Workplace_Promotion | -3554 456 | 1611304 | -051 | -2 206 | 028 | -027 | -050 | -047 |
| Proportion_Fulltıme_HighSkille | -814 639 | 6464764 | -003 | -126 | 900 | -002 | -003 | -003 |
| Proportion_Unionized_Workfor | 7221019 | 10957482 | 015 | 659 | 510 | 013 | 015 | 014 |

### 9.7. Differential Analysis 2005-2003

The R square, ANOVA, and regression coefficients for the 2005-2003 data are shown in Table 9.7a, Table 9.7b, and Table 9.7c, respectively.

Table 9.7a. Determinants of Productivity, 2005-2003 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | dfl | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 241 | 058 | 047 | 56099318981 | 058 | 5282 | 25 | 2147 | 000 |

Table 9.7b. Determinants of Productivity, 2005-2003 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $4156 \mathrm{E}+13$ | 25 | $1662 \mathrm{E}+12$ | 5282 | 000 |
| Residual | $6757 \mathrm{E}+14$ | 2147 | $3147 \mathrm{E}+11$ |  |  |
| Total | $7173 \mathrm{E}+14$ | 2172 |  |  |  |

Table 9.7c. Determinants of Productivity, 2005-2003 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| Constant | 5665916 | 2138484 |  | 2650 | 008 |  |  |  |
| Percent_Workers_Claıming_Too | 58685 | 67809 | 020 | 865 | 387 | -021 | 019 | 018 |
| Percent_Workers_Claiming_Av | 14197 | 53188 | 006 | 267 | 790 | 009 | 006 | 006 |
| Average_Expenditure_for_Train | -10650 | 4790 | -050 | -2 223 | 026 | -056 | -048 | -047 |
| Proportion_Employees_Receivin | 632453 | 5398938 | 003 | 117 | 907 | -007 | 003 | 002 |
| Proportion_Employees_Receivin | -1983 336 | 4763481 | -010 | -416 | 677 | -003 | -009 | -009 |
| Sum_Courses_m_Classroom_Fo | 513427 | 965054 | 014 | 532 | 595 | 005 | 011 | 011 |
| Sum_Courses_in_Onthe.Job_For | -271 657 | 965435 | -007 | -281 | 778 | -017 | -006 | -006 |
| Average_Days_of_Sick_Paid_L | -318528 | 666076 | -010 | -478 | 633 | 017 | -010 | -010 |
| Average_Days_of_Other_Pard_ | -69993 | 189334 | -008 | -370 | 712 | 022 | -008 | -008 |
| Average_Days_of_Unpard_Leav | -705 161 | 365837 | -042 | -1928 | 054 | -047 | -042 | -040 |
| Turnover_0503 | -2951576 | 10729349 | -006 | -275 | 783 | 000 | -006 | -006 |
| Medıan_Overall_Satisfaction_05 | 1488716 | 3474731 | 010 | 428 | 668 | 011 | 009 | 009 |
| Median_Compensation_Satisfact | 625981 | 3353093 | 005 | 187 | 852 | 003 | 004 | 004 |
| Total_Number_of_Employees_0 | -142 140 | 88598 | -034 | -1604 | 109 | -068 | -035 | -034 |
| Percentage_ExportSales_0503 | 52360 | 168302 | 007 | 311 | 756 | 003 | 007 | 007 |
| Proportion_Employees_Using_C | 11326008 | 10159879 | 025 | 1115 | 265 | 040 | 024 | 023 |
| Percent_Workers_Having_Youn | -64 170 | 73123 | -019 | -878 | 380 | -009 | -019 | -018 |
| Workplace_Average_Pay_0503 | 1416 | 143 | 218 | 9896 | 000 | 215 | 209 | 207 |
| Average_Family_Other_Income | -549 | 283 | -043 | -1944 | 052 | -011 | -042 | -041 |
| Average_Workforce_Tenure_05 | -89586 | 386335 | -005 | -232 | 817 | -010 | -005 | -005 |
| Sum_HR_Practices_Compensatı | -93210 | 1946990 | -001 | -048 | 962 | -015 | -001 | -001 |
| Sum_HR_Practices_Organızatio | -1727044 | 1246463 | -031 | -1386 | 166 | -024 | -030 | -029 |
| Average_Workplace_Promotion | $-3317879$ | 1588744 | -047 | -2 088 | 037 | -034 | -045 | -044 |
| Proportion_Fullime_HıghSkılle | -6889 766 | 8434137 | -018 | -817 | 414 | -022 | -018 | -017 |
| Proportion_Unıonized_Workfor | 3245154 | 12452901 | 006 | 261 | 794 | 009 | 006 | 005 |

### 9.8. Differential Analysis 2003-1999

The R square, ANOVA, and regression coefficients for the 2003-1999 data are shown in Table 9.8a, Table 9.8b, and Table 9.8c, respectively.

Table 9.8a. Determinants of Productivity, 2003-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Slg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 221 | 049 | 036 | $126348 \mathrm{E}+06$ | 049 | 3829 | 25 | 1872 | 000 |

Table 9.8b. Determinants of Productivity, 2003-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $1528 \mathrm{E}+14$ | 25 | $6113 \mathrm{E}+12$ | 3829 | 000 |
| Residual | $2988 \mathrm{E}+15$ | 1872 | $1596 \mathrm{E}+12$ |  |  |
| Total | $3141 \mathrm{E}+15$ | 1897 |  |  |  |

Table 9.8c. Determinants of Productivity, 2003-1999 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sig | Correl | ions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partal | Part |
| Constant | -27183 945 | 6027333 |  | -4510 | 000 |  |  |  |
| Percent_Workers_ClammengToo | -32311 | 172932 | -004 | -187 | 852 | 007 | -004 | -004 |
| Percent_Workers_Clarming_Av | -81005 | 140774 | -014 | -575 | 565 | 011 | -013 | -013 |
| Average_Expenditure_for_Tran | 8622 | 8596 | 024 | 1003 | 316 | 037 | 023 | 023 |
| Proportion_Employees Receivin | -8135 430 | 11301675 | -022 | -720 | 472 | 060 | -017 | -016 |
| Proportion_Employees_Receivin | 17599392 | 11418195 | 046 | 1541 | 123 | 041 | 036 | 035 |
| Sum_Courses_in_Classroom_Fo | 6726792 | 2123443 | 092 | 3168 | 002 | 059 | 073 | 071 |
| Sum_Courses_1n_OntheJob_For | -6051863 | 2082572 | -084 | -2906 | 004 | -037 | -067 | -066 |
| Average_Days_of_Sick_Paid_L | 4638269 | 1444583 | 074 | 3211 | 001 | 077 | 074 | 072 |
| Average_Days_of_Other_Paid_ | -144379 | 648860 | -005 | -223 | 824 | 003 | -005 | -005 |
| Average_Days_of_Unpard_Leav | -727676 | 755526 | -022 | -963 | 336 | -027 | -022 | -022 |
| Turnover_0399 | 31478672 | 19880948 | 041 | 1583 | 114 | 051 | 037 | 036 |
| Median_Overall_Satisfaction_03 | 3471853 | 9051795 | 010 | 384 | 701 | 031 | 009 | 009 |


| Median_Compensatıon_Satısfact | 13449858 | 8179631 | 044 | 1644 | 100 | 040 | 038 | 037 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Total_Number_of_Employees_0 | -16237 | 115559 | -003 | -141 | 888 | -025 | -003 | -003 |
| Percentage_ExportSales_0399 | 498804 | 306328 | 039 | 1628 | 104 | 026 | 038 | 037 |
| Proportion_Employees_Using_C | 47424453 | 18753279 | 060 | 2529 | 012 | 067 | 058 | 057 |
| Percent_Workers_Having_Youn | -49368 | 183533 | -006 | -269 | 788 | 002 | -006 | -006 |
| Workplace_Average_Pay_0399 | 1445 | 280 | 119 | 5155 | 000 | 134 | 118 | 116 |
| Average_Famıly_Other_Income | -255 | 466 | -013 | - 546 | 585 | 005 | -013 | $-012$ |
| Average_Workforce_Tenure_03 | 1345483 | 1063470 | 031 | 1265 | 206 | 045 | 029 | 029 |
| Sum_HR_Practices_Compensatı | -6414046 | 4155239 | -037 | -1 544 | 123 | -054 | -036 | -035 |
| Sum_HR_Practices_Organızatıo | -682 255 | 2846600 | -006 | -240 | 811 | -002 | -006 | -005 |
| Average_Workplace_Promotion | 7637368 | 5038745 | 036 | 1516 | 130 | 056 | 035 | 034 |
| Proportion_Fulltıme_HıghSkılle | -29278060 | 16882489 | -040 | -1734 | 083 | -050 | -040 | -039 |
| Proportion_Unıonızed_Workfor | -1845 714 | 24207512 | -002 | -076 | 939 | 008 | -002 | -002 |

### 9.9. Differential Analysis 2005-2001

The R square, ANOVA, and regression coefficients for the 2005-2001 data are shown in Table 9.9a, Table 9.9b, and Table 9.9c, respectively.

Table 9.9a. Determinants of Productivity, 2005-2001 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estımate | R Square Change | F Change | df1 | df2 | Sıg F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 251 | 063 | 051 | 86739940693 | 063 | 4993 | 25 | 1851 | 000 |

Table 9.9b. Determinants of Productivity, 2005-2001 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $9392 \mathrm{E}+13$ | 25 | $3757 \mathrm{E}+12$ | 4993 | 000 |
| Residual | $1393 \mathrm{E}+15$ | 1851 | $7524 \mathrm{E}+11$ |  |  |
| Total | $1487 \mathrm{E}+15$ | 1876 |  |  |  |

Table 9.9c. Determinants of Productivity, 2005-2001 - Longitudinal Coefficients

|  | Unstandardized Coefficients |  | Standardized Coefficients | t | Sıg | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partıal | Part |
| Constant | $-1800942$ | 3760591 |  | -479 | 632 |  |  |  |
| Percent_Workers_Claıming_Too | -282467 | 102538 | -068 | -2 755 | 006 | -065 | - 064 | - 062 |
| Percent_Workers_Claiming_Av | -90896 | 101967 | -022 | -891 | 373 | -009 | -021 | -020 |
| Average_Expenditure_for_Tram | 11766 | 5825 | 049 | 2020 | 044 | 036 | 047 | 045 |
| Proportıon_Employees_Receıvın | $-10449366$ | 8318396 | -036 | -1256 | 209 | -021 | -029 | -028 |
| Proportion_Employees_Receivin | 81464 | 2434886 | 001 | 033 | 973 | -006 | 001 | 001 |
| Sum_Courses_m_Classroom_Fo | -1961822 | 1497763 | -037 | -1310 | 190 | -064 | -030 | -029 |
| Sum_Courses_in_OntheJob_For | -845 347 | 1359186 | -015 | -622 | 534 | -061 | -014 | -014 |
| Average_Days_of_Sick_Paid_L | 1903646 | 973771 | 044 | 1955 | 051 | 062 | 045 | 044 |
| Average_Days_of_Other_Paid_ | -203 712 | 422757 | -012 | -482 | 630 | 018 | -011 | -011 |
| Average_Days_of_Unpat_Leav | -126322 | 489307 | -006 | -258 | 796 | -024 | -006 | -006 |
| Turnover_0501 | 8027595 | 12110950 | 016 | 663 | 508 | 020 | 015 | 015 |
| Median_Overall_Satısfaction_05 | 15229295 | 6417589 | 068 | 2373 | 018 | 059 | 055 | 053 |
| Median_Compensation_Satısfact | -8806 266 | 5979065 | -043 | -1473 | 141 | 001 | -034 | -033 |
| Total_Number of Employees_0 | -26677 | 88859 | -007 | -300 | 764 | -039 | -007 | -007 |
| Percentage_ExportSales_0501 | 70471 | 211839 | 008 | 333 | 739 | 003 | 008 | 007 |
| Proportion_Employees Using_C | 7547640 | 12955868 | 014 | 583 | 560 | -006 | 014 | 013 |
| Percent_Workers_Having_Youn | -36884 | 114748 | -007 | -321 | 748 | -013 | -007 | -007 |
| Workplace_Average_Pay_0501 | 1559 | 203 | 185 | 7683 | 000 | 196 | 176 | 173 |
| Average_Famıly_Other_Income | -460 | 459 | -024 | -1002 | 317 | -003 | -023 | -023 |
| Average_Workforce_Tenure_05 | 621736 | 636206 | 026 | 977 | 329 | -002 | 023 | 022 |
| Sum_HR_Practices_Compensatı | -1265 596 | 2782640 | -011 | -455 | 649 | -024 | -011 | -010 |
| Sum_HR_Practıces_Organızatıo | -3975 529 | 2108888 | -045 | -1885 | 060 | -046 | -044 | -042 |
| Average_Workplace_Promotion | -6491484 | 2769792 | -056 | -2 344 | 019 | -041 | -054 | -053 |
| Proportıon_Fulltıme_HıghSkılle | 35831143 | 12618344 | 067 | 2840 | 005 | 070 | 066 | 064 |
| Proportion_Unıonızed_Workfor | 7164988 | 15562143 | 011 | 460 | 645 | -010 | 011 | 010 |

### 9.10. Differential Analysis 2005-1999

The R square, ANOVA, and regression coefficients for the 2005-1999 data are shown in Table 9.10a, Table 9.10b, and Table 9.10c, respectively.

Table 9.10a. Determinants of Productivity, 2005-1999 - Longitudinal Model Summary

| R | R Square | Adjusted <br> R Square | Std Error <br> of the Estimate | R Square Change | F Change | df1 | df2 | S1g F Change |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 242 | 059 | 046 | $149380 \mathrm{E}+06$ | 059 | 4481 | 25 | 1794 | 000 |

Table 9.10b. Determinants of Productivity, 2005-1999 - Longitudinal ANOVA

|  | Sum of Squares | df | Mean Square | F | Sig |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Regression | $2500 \mathrm{E}+14$ | 25 | $9999 \mathrm{E}+12$ | 4481 | 000 |
| Residual | $4003 \mathrm{E}+15$ | 1794 | $2231 \mathrm{E}+12$ |  |  |
| Total | $4253 \mathrm{E}+15$ | 1819 |  |  |  |

Table 9.10c. Determinants of Productivity, 2005-1999 - Longitudinal Coefficients

|  | Unstandardızed Coefficients |  | Standardızed Coefficients | t | Sig | Correlations |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | Std Error | Beta |  |  | Zeroorder | Partial | Part |
| Constant | -20006 512 | 7125080 |  | -2 808 | 005 |  |  |  |
| Percent_Workers_Claımıng_Too | -99 747 | 198960 | -013 | -501 | 616 | -002 | -012 | -011 |
| Percent_Workers_Clamme_Av | 222963 | 172991 | 032 | 1289 | 198 | 032 | 030 | 030 |
| Average_Expenditure_for_Tran | -21 177 | 11187 | -048 | -1893 | 059 | -010 | -045 | -043 |
| Proportion_Employees_Receivin | 2342097 | 14605856 | 005 | 160 | 873 | 027 | 004 | 004 |
| Proportion_Employees_Receivin | -7648894 | 13902015 | -019 | - 550 | 582 | 033 | -013 | -013 |
| Sum_Courses_in_Classroom_Fo | 7271898 | 2396903 | 086 | 3034 | 002 | 070 | 071 | 069 |
| Sum_Courses_1n_OntheJob For | 1592492 | 2384442 | 020 | 668 | 504 | 040 | 016 | 015 |
| Average_Days_of_Sick_Paid L | 3600954 | 1775960 | 048 | 2028 | 043 | 063 | 048 | 046 |
| Average_Days_of_Other_Pad_ | -128593 | 832394 | -004 | -154 | 877 | -002 | -004 | -004 |
| Average_Days_of_Unpaid_Leav | 690963 | 906047 | 018 | 763 | 446 | 009 | 018 | 017 |
| Turnover_0599 | 25813642 | 26153526 | 027 | 987 | 324 | 028 | 023 | 023 |
| Median_Overall_Satisfaction_05 | -4752 382 | 11417778 | -012 | -416 | 677 | -029 | -010 | -010 |


| Median_Compensation_Satisfact | -5945 714 | 10008013 | -017 | - 594 | 553 | -013 | - 014 | - 014 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Total_Number_of_Employees_0 | -85 266 | 117984 | -017 | -723 | 470 | -023 | -017 | -017 |
| Percentage_ExportSales_0599 | -1702809 | 362402 | -113 | -4 699 | 000 | -096 | - 110 | -108 |
| Proportion_Employees_Using_C | -64736 144 | 22307796 | -069 | -2902 | 004 | -045 | -068 | -066 |
| Percent_Workers_Having_Youn | -276 592 | 207372 | -032 | -1334 | 182 | -013 | -031 | -031 |
| Workplace_Average_Pay_( 0599 | 1869 | 288 | 152 | 6497 | 000 | 149 | 152 | 149 |
| Average_Family_Other_Income | 1249 | 692 | 043 | 1805 | 071 | 037 | 043 | 041 |
| Average_Workforce_Tenure_05 | 1457429 | 1089988 | 034 | 1337 | 181 | 031 | 032 | 031 |
| Sum_HR_Practices_Compensatı | -11456852 | 5277042 | -052 | -2 171 | 030 | - 044 | -051 | -050 |
| Sum_HR_Practices_Organızatıo | 475031 | 3245665 | 004 | 146 | 884 | 005 | 003 | 003 |
| Average_Workplace_Promotion | -2617326 | 5371074 | -012 | -487 | 626 | 011 | -012 | -011 |
| Proportion_Fulltıme_HıghSkille | -8549 361 | 19835275 | -010 | -431 | 667 | 010 | -010 | -010 |
| Proportion_Unıonzed_Workfor | 67615270 | 24080322 | 068 | 2808 | 005 | 064 | 066 | 064 |

### 9.11. Summary of Analyses

To summarize the cross-sectional results, we have reported in Table 9.11a the regression coefficients for the four survey years under study. The results of the longitudinal (differential) analyses are summarized in Table 9.11b. It is easy to see that, overall, the differential analysis generated results similar to those observed with the cross-sectional analysis.

The results of both the cross-sectional and longitudinal analyses did not provide consistent evidence in support the notion of a direct effect of training on productivity. In that sense, they were surprising because not expected from the findings reported in the literature. Also not consistent were the results related to the absenteeism, turnover and
job satisfaction variables. This inconsistency is somewhat more surprising for the variables computed using the Workplace surveys than for those computed from the Employee surveys. Indeed, while the employee samples at the basis of the Employee survey changed every two years, the workplace sample remained relatively constant since changes were limited to replacing companies that had dropped out. Finally, we note that despite the relatively large number of variables used as predictors, the amount of variance in productivity explained by the model was small for all years.

To better illustrate the effects of the various variables, in the following sections we will distinguish among training variables (see Table 5.2), other variables of interest, which include variables on absenteeism, turnover and job satisfaction (see Table 5.3), and control variables (see Table 5.4).

### 9.11.1 Training and Productivity

In Chapter 4, we noted that studies in the literature suggest a positive relationship between training which positively affects productivity both at the individual and organizational levels. However, from the cross-sectional analyses reported in Table 9.11a, it is easy to see that none of the seven training variables we used in this study had a consistent effect on productivity across different years. One variable that showed some effect was Percent Workers Claiming Availability Training Increased, which measures the percentage of workers claiming that the amount of training available has increased. As noted in the previous chapters, higher levels of this variable imply higher levels of training if we assume that the perception of the workers regarding levels of training within the workplace is accurate. If so, higher levels of this variable should be
associated with higher levels of productivity. In other words, we would expect a positive relation with productivity. Consistently with this rationale, a significant and positive effect was found for 1999 and 2001; however, the data show also a significant and negative effect for 2003. The only other case of a significant effect regarded the variable Sum Courses in Classroom Format. This variable measures the number of training courses provided in classroom format; therefore, we would expect a positive relation with productivity, i.e., more courses should result in more productivity. However, the effect was significant and positive, as expected, only for 1999 and 2003; no effect was found for 2001 and 2005. None of the other variables related to training seemed to have any impact on productivity.

The lack of results in the cross-sectional analyses could be explained if training had a delayed effect: that is, it might take time for training to produce an improvement in productivity. If so, we should have observed the expected effect in the longitudinal analyses. However, the results of the longitudinal analyses also provided little evidence of an effect of training on productivity.

The variable Percent Workers Claiming Too Little Training for Job and the variable Percent Workers Claiming Availability Training Increased exhibited an effect in the expected directions in only two analyses out of six. Expenditures on training, Average Expenditure for Training, had an effect in four out of six analyses, but in two cases the effect was inversely related to productivity contrary to expectations: i.e., increases in expenditures were associated with decreases in productivity. A similar outcome was also observed for Sum Courses in Classroom Format: there was a
significant effect in four analyses, but again, in one case (i.e., 2003-2001) the effect was opposite to what was expected.

In sum, both the cross-sectional and the longitudinal analyses provided no robust evidence of a direct effect of training on productivity. This was quite surprisingly considering the results reported by the literature.

### 9.11.2 Absenteeism and Productivity

The cross-sectional analyses showed virtually no effect of any variable measuring absenteeism (see Table 9.11a). Indeed, only the Average Days of Unpaid Leave variable, which measures the average days of other unpaid leave (e.g. disability leave), had an effect; however, that was only for the 2003 data. The longitudinal analyses also provided inconsistent results (see Table 9.11 b ). Only measure of absenteeism showed some effect: Average Days of Sick Paid Leave. This predictor exhibited an effect in five out of six analyses; however, in four of those cases the direction of the effect was positive suggesting that increases in paid sick leaves improve productivity!

### 9.11.3 Turnover and Productivity

There was no effect of turnover in neither the cross-sectional nor the longitudinal analyses.

### 9.11.4 Job Satisfaction and Productivity

Higher levels of job satisfaction should be associated with higher levels of productivity. However, the results of the analyses failed to provide convincing evidenced
of this relation. In the cross-sectional analyses, overall satisfaction with all aspects of the job, Median Overall Satisfaction, had a positive and significant effect only in 2001 and 2003. Satisfaction for pay and benefits, Median Compensation Satisfaction, had a positive significant effect only in 2001. Similar results were observed for the longitudinal analyses. Overall satisfaction with all aspects of the job had an effect only in 2001-1999 and 2005-2001. However, the direction of the effect was opposite in the two comparisons. Satisfaction for pay and benefits had a significant effect for the 2003-2001 case only.

### 9.11.5 Control Variables and Productivity

The cross-sectional analyses showed that among the control variables, only two predictors appeared to have some effect on productivity. The first variable was average pay, Workplace Average Pay, which had the expected positive effect on productivity in all four survey years, confirming that higher level of pay are associated with higher levels of productivity. The other variable was the proportion of employees using computers, Proportion Employees Using Computers. Considering today's business environment, we can expect a higher use of technology to be associated with higher levels of productivity. A significant effect consistent with this expectation was observed for the 1999, 2001 and 2003 data.

Some variables showed some moderate effect. The data show that older organizations tend to be more productive; indeed there was a significant and positive effect of the age of organization, Organization Age, in 2003 and 2005. The same result was observed for the organization skill level

Proportion Fulltime HighSkilled Workers, which was also significant for the years 1999 and 2003. However, the direction of the effect was contrary to what might reasonably expected since in both cases the coefficients were negative. All of the other control variables exhibited either a limited effect (i.e., they showed a significant effect in only one case) or no effect at all.

The results of the longitudinal analyses confirmed the consistent and robust effect on productivity of average pay (Workplace Average Pay): significant and positive effects were observed in all six analyses. The average number of promotions, Average Workplace Promotions, resulted significant in three analyses. However, the results were somewhat puzzling since the direction of the effect was negative.

Among the other control variables, a few such as level of unionization, export sales, and proportion of employees using computers seemed to have some effect albeit in a very limited fashion. Consistently with other research in literature, increases in level of unionization (Proportion Unionized Workforce) appear to be related to increases in productivity for the 2001-1999 and 2005-1999 differential analyses. The proportion of employees using computers, Proportion Emplovees Using Computers also had an effect on productivity in two analyses, but the effects were in opposite direction. The effects of the level of openness to export (Percentage ExportSales) were significant, but with a negative coefficient, in 2001-1999 and 2005-1999. Also contrary to expectations were the results relative to the number of HR practices related to compensation (Sum HR Practices Compensation) which also had an effect on productivity in the same years. All other variables had either limited effect, i.e., one comparison years only, or no effect at all.

Table 9.11a - Determinants of Productivity-Summary Cross-Sectional Regression Coefficients

|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Coefficrent | Sig | Coefficient | Sug | Coefficient | Sig | Coefficient | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_TraI ning for Job | 25221 | 0124 | -241993 | 0102 | -205909 | 0102 | 48431 | 0725 |
| Percent_Workers_Claımıng_Avalability_Tra ming_Increased | 312576 | 0.042 | 276554 | 0.028 | -387981 | 0.000 | -152303 | 0221 |
| Average Expenditure_for_Training | 7504 | 0401 | -0 002 | 1000 | 0247 | 0972 | 7131 | 0361 |
| Proportion_Employees_Receiving_Classroo m_Training | 5851304 | 0686 | 1091405 | 0295 | -133872 | 0089 | -9808 43 | 0302 |
| $\qquad$ | -174365 | 0902 | 82024 | 0979 | 1081773 | 0883 | 1668715 | 0854 |
| Sum_Courses in_Classroom_Format | 6227968 | 0.005 | -136359 | 0470 | 5134448 | 0.001 | -845055 | 0646 |
| Sum_Courses in_OntheJob_Format | -3590 12 | 0119 | -206214 | 0911 | -160394 | 0338 | 2177354 | 0246 |
| Average Days_of_Sick Paid_Leave | 317882 | 0831 | 2141229 | 0120 | -118749 | 0184 | 2484619 | 0115 |
| Average Days_of_Other_Paid_Leave | -102503 | 0583 | -238605 | 0745 | -468912 | 0235 | -663959 | 0305 |
| Average_Days_of_Unpard_Leave | -710355 | 0285 | -528 179 | 0445 | -1794 69 | 0.013 | -824 241 | 014 |
| Turnover | -269763 | 0880 | 2554727 | 0843 | 8025003 | 0574 | -4997 74 | 0731 |
| Medıan_Overall_Satısfaction | 1431041 | 0170 | 1814969 | 0.043 | 3022926 | 0.000 | 2719376 | 0743 |
| Median_Compensation_Satısfaction | 3363361 | 0712 | -23286 8 | 0.005 | 1023169 | 0142 | -131197 | 0099 |
| Organization Age | 422861 | 0174 | 83866 | 0660 | 46734 | 0.001 | 426025 | 0.007 |
| Total_Number of Employees | 53635 | 0324 | 28138 | 0490 | -9757 | 0752 | 1773 | 0632 |
| Percentage_ExportSales | -17276 | 0380 | -72429 | 0655 | -225942 | 0112 | -276044 | 0082 |
| Proportion_Employees_Using_Computers | 5821355 | 0.000 | 2757639 | 0.010 | 2345019 | 0.011 | 6311265 | 0564 |
| Average_Age_Workforce | 1188185 | 0069 | -206105 | 0725 | -146039 | 0.003 | 408842 | 0444 |
| Percent Workers_Having_Young_Kıds | 264095 | 0135 | 11063 | 0942 | 214841 | 0106 | -107049 | 0522 |
| Workplace_Average_Pay | 1918 | 0.000 | 1987 | 0.000 | 2117 | 0.000 | 1867 | 0.000 |
| Average Family Other_Income | 074 | 0239 | -1174 | 0100 | 0008 | 0984 | -0 598 | 0275 |
| Average =Workforce_Tenure | -125314 | 0238 | -38585 | 0670 | 594226 | 0407 | -378027 | 0633 |
| Sum_HR Practices_Compensation | 4345639 | 0283 | 2662462 | 0434 | -622901 | 0.029 | -291744 | 0398 |
| Sum_HR Practices_Organızation_of_Work | -8479 82 | 0.003 | -1295 76 | 0625 | 4082386 | 0063 | 1856416 | 0424 |
| Average Workplace_Promotıons | -493695 | 0386 | 9164919 | 0.047 | 5962866 | 0.080 | 4610591 | 0152 |
| Proportion_Fulltıme_HıghSkilled_Workers | -95253 5 | 0.000 | -489485 | 0684 | -292959 | 0.004 | -964849 | 0408 |
| Proportıon_Unıonızed_Workforce | -22046 | 014 | -33868 | 0771 | -18979 3 | 0081 | -134246 | 0313 |

In summary, the longitudinal analyses produced results similar to those observed for the cross-sectional ones. In particular, the only relevant variable appears to be average pay. All other variables were either not relevant or still exhibited a high degree of
inconsistency. For some of the variables the lack of relevance was surprising. In particular, among the training variables there is the proportion of employees who received classroom training. This is a rather basic measure of amount of training; as such, one might expect it to be the first to show some form of relation with productivity. Also interesting was the fact that none of the measures of informal training had an effect.

Therefore the results of both cross-sectional and longitudinal analyses do not support the notion of a direct effect of training on productivity as often reported. The absence of any effect on productivity of the other variables of interests: turnover, absenteeism and job satisfaction, also indicate the absence of the indirect effect postulated in Chapter 1.

| Table 9.11b - Determinants of Productivity - Summary Longitudinal (Differential) Regression Coefficients |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\begin{aligned} & 2001- \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003- \\ & 2001 \end{aligned}$ |  | $\begin{array}{\|l\|} 2005- \\ 2003 \end{array}$ |  | $\begin{array}{\|c\|} 2003- \\ 1999 \end{array}$ |  | $\left\lvert\, \begin{aligned} & 2005- \\ & 2001 \end{aligned}\right.$ |  | $\begin{aligned} & 2005- \\ & 1999 \end{aligned}$ |
|  | Coefficient | Sig | Coefficient | Sig | Coefficient | Sıg | Coefficient | Sıg | Coefficient | Sıg | Coefficient | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Trannng_for_Job | -224239 | 0105 | -93 306 | 0.078 | 58685 | 0387 | -32 311 | 0852 | -282467 | 0.006 | -99747 | 0616 |
| Percent_Workers_Claımıng_Availabılıty_Tranıng_Increased | 298526 | 0.022 | 84276 | 0.055 | 14197 | 0790 | -81005 | 0565 | -90896 | 0373 | 222963 | 0198 |
| Average Expendıture_for_Traning | -8731 | 0244 | 9331 | 0.003 | -1065 | 0.026 | 8622 | 0316 | 11766 | 0.044 | -21 177 | 0.059 |
| Proportion Employees_Receiving Classroom Trainıng | 5445235 | 0571 | 1346446 | 0744 | 632453 | 0907 | -813543 | 0472 | -10449 4 | 0209 | 2342097 | 0873 |
| Proportion_Employees_Receiving_OntheJob_Tranıng | 615225 | 0860 | 306563 | 0801 | -1983 34 | 0677 | 1759939 | 0123 | 81464 | 0973 | -7648 89 | 0582 |
| Sum_Courses in Classroom Format | 8488981 | 0.000 | -211711 | 0.004 | 513427 | 0595 | 6726792 | 0.002 | -1961 82 | 019 | 7271898 | 0.002 |
| Sum Courses_1n_OntheJob Format | -191578 | 0256 | -533549 | 0463 | -271 657 | 0778 | -605186 | 0.004 | -845347 | 0534 | 1592492 | 0504 |
| Average_Days_of Sick Paid_Leave | 3558618 | 0.002 | -754818 | 0.038 | -318528 | 0633 | 4638269 | 0.001 | 1903646 | 0.051 | 3600954 | 0.043 |
| Average_Days_of_Other_Paid_Leave | 161984 | 0847 | 14335 | 0943 | -69 993 | 0712 | -144 379 | 0824 | -203712 | 063 | -128 593 | 0877 |
| Average_Days_of_Unpard_Leave | -656799 | 0237 | -73696 | 0763 | -705 161 | 0.054 | -727676 | 0336 | -126322 | 0796 | 690963 | 0446 |
| Turnover | -115193 | 0528 | 6744827 | 0258 | -295158 | 0783 | 3147867 | 0114 | 8027595 | 0508 | 2581364 | 0324 |
| Median Overall_Satisfaction | -27490 4 | 0.001 | 443342 | 0164 | 1488716 | 0668 | 3471853 | 0701 | 152293 | 0.018 | -4752 38 | 0677 |
| Median Compensation Satisfaction | -6175 58 | 0429 | 6824569 | 0.016 | 625981 | 0852 | 1344986 | 0100 | -880627 | 0141 | -5945 71 | 0553 |
| Total_Number of Employees | 5861 | 0624 | 1781 | 0748 | -142 14 | 0109 | -16237 | 0888 | -26677 | 0764 | -85 266 | 047 |
| Percentage ExportSales | -72875 | 0.004 | -59 402 | 0616 | 5236 | 0756 | 498804 | 0104 | 70471 | 0739 | -170281 | 0.000 |
| Proportion_Employees Using_Computers | -23965 7 | 0154 | -665891 | 0326 | 1132601 | 0265 | 4742445 | 0.012 | 754764 | 056 | -647361 | 0.004 |
| Percent_Workers_Having_Young_Kıds | -31445 | 0840 | -92804 | 0120 | -6417 | 0380 | -49368 | 0788 | -36884 | 0748 | -276592 | 0182 |
| Workplace_Average_Pay | 2156 | 0.000 | 1064 | 0.000 | 1416 | 0.000 | 1445 | 0.000 | 1559 | 0.000 | 1869 | 0.000 |
| Average Family_Other_Income | 1496 | 0.011 | 0242 | 0159 | -0 549 | 0052 | -0255 | 0585 | -046 | 0317 | 1249 | 0071 |
| Average Workforce_Tenure | 434789 | 0648 | 387593 | 0244 | -89586 | 0817 | 1345483 | 0206 | 621736 | 0329 | 1457429 | 0181 |
| Sum_HR_Practices_Compensation | -193715 | 0.000 | -163551 | 0298 | -9321 | 0962 | -641405 | 0123 | -12656 | 0649 | -114569 | 0.030 |
| Sum_HR Practices Organization_of_Work | -1902 38 | 0478 | -108361 | 0315 | -172704 | 0166 | -682 255 | 0811 | -3975 53 | 0.060 | 475031 | 0884 |
| Average Workplace Promotions | 6878877 | 0170 | -355446 | 0.028 | -331788 | 0.037 | 7637368 | 013 | -649148 | 0.019 | -261733 | 0626 |
| Proportion Fulltıme_HighSkilled Workers | -177549 | 0299 | -814639 | 0900 | -6889 77 | 0414 | -29278 1 | 0083 | 3583114 | 0.005 | -854936 | 0667 |
| Proportion Unionized_Workforce | 4900388 | 0.005 | 17221019 | 051 | 3245154 | 0794 | -184571 | 0939 | 1764988 | 0645 | 6761527 | 0.005 |

## 10 Chapter: Discussion

The acquisition of new skills is generally a costly endeavor. The Human Capital Theory considers the costs associated with the acquisition of new skills, which might be obtained through formal education or training programs, as an investment. For the individual, this investment has the scope of improving his/her wage; for the organization, the investment is aimed at increasing productivity (Becker, 1962, 1977; Mincer, 1962, 1974, 1981, 1988). In this work, we focused only the HCT account of training from the perspective of the organization. The notion that training directly improves productivity through an increase of workers' skills has been object of much research (Becker, 1975; Bartel, 1987, 1994, 2000; Bishop, 1991; Nollen \& Gaertner, 1991; Black \& Lynch, 1996 Krueger \& Rouse, 1998; Leckie et al., 2001). Overall, this research has attempted to verify and possibly measure this direct relationship. In this work, we considered an additional mode in which training might affect productivity: that is, by creating organizational conditions that foster higher levels of productivity. Specifically, in addition to the direct effect generally reported in the literature whereby training improves productivity through an increase of skills, we also hypothesized a secondary, indirect effect via factors such absenteeism, turnover, and job satisfaction. That is, we hypothesized that training affects absenteeism, turnover, and job satisfaction and these in turn affect productivity. The objective of this work was to investigate the existence of this indirect effect using both cross-sectional and longitudinal analyses of data from the WES surveys. To this purpose, we planned a two-step approach using both cross-sectional and
longitudinal analyses. The first step was aimed at investigating, using a regression approach, the effect of training on absenteeism, turnover, and job satisfaction; the second step was aimed at investigating the effect of training and the other three factors on productivity. It was reasoned that if training had an indirect effect, we would have observed in step one an effect of training on one, or more, of the three variables and then in step two we would have observed an effect of these variables on productivity. In addition, we also expected to observe in step two a direct effect of training on productivity.

The relationships between training and the other three variables (i.e., step one) were examined in Chapters 6, 7, and 8. The results were very interesting and in line, at least partially, with the notion of an indirect effect of training on productivity. To better interpret the results, we considered only the overall pattern of results, i.e., effects that were consistent over different survey years.

We found a robust relationship between training and turnover (Chapter 6). This was particularly true for the objective measures of training, such as the amount of training expenditure and proportion of employees who received classroom or on-the jobtraining. However, the lack of information regarding the nature of the training with respect to the distinction between general and specific training made it difficult to evaluate the consistency of the results with the HC theory. The latter postulates that the relation between training and turnover depends upon the type of training (Becker, 1962; Bishop, 1991). General training, which can be transferred across organizations, should result in an increase of turnover, whereas specific training, which cannot be transferred across organizations, should result in a decrease of turnover. The data in Chapter 6
suggest, in most cases, a positive relation between training and turnover. This is true for measures of training which is nominally of general nature, e.g., 'classroom' training. In this case, the results are consistent with the HC theory (Becker, 1962, 1977; Mincer, 1962, 1974, 1981, 1988). However, the positive relation was observed also for measures of training which is nominally of specific nature, e.g., 'on-the-job' training. In this case, the results are not consistent. However, it should be noted that the subjects/topics included in the WES questions that measured 'on-the-job' training are the same as those in the "classroom" training questions; and in both cases the training is of rather general nature, e.g., literacy. This implies that the WES questions are actually distinguishing the mode of delivery, "classroom" vs. 'on-the-job', as opposed to the content. Accordingly, the 'on-the-job' training measured by the WES is likely not specific in the sense considered by the HC theory (i.e., 'specific' is only training that cannot be transferred across organizations). In sum, even the results of the 'on-the-job' training are likely to be consistent with the HC theory.

We found a more limited effect of training on absenteeism (Chapter 7), as measured by the number of paid and unpaid leaves. The HC theory does not address the relation between training and absenteeism. Nonetheless, we would expect an inverse relationship between training and absenteeism. We have seen, however, that the findings reported in the literature were rather mixed, suggesting a more complex relation (Kruegher \& Rouse, 1998; Dionne \& Dostie, 2005; Böckerman, Johansson and Kauhanen, 2009). Our results confirmed such complexity. We did find some evidence in favor of a relationship between training and absenteeism. But the effect appeared
complex since some measures of training suggested a relationship in the expected direction whereas others did not.

The results regarding job satisfaction (Chapter 8) were more interesting. Again this is a relation that has not been addressed in the context of the HC theory. We hypothesized that training should increase job satisfaction because it creates an environment favorable to the workers. The results confirmed this expectation. We found a strong and consistent effect of training on job satisfaction. This relation, however, was observed for the subjective measures (i.e., as perceived by the workers) of training but not for the objective measure of training (e.g., expenditures for training). This suggests that the level of job satisfaction depends mostly upon the perceived level of training, rather than on the actual level of training.

The relationships between productivity and the four variable of interest: training, absenteeism, turnover, and job satisfaction, (i.e., step two) were examined in Chapters 9. Again, to better interpret the results, we considered only the overall pattern of results, i.e., effects that were consistent over different survey years.

The results failed to indicate any consistent effect of absenteeism, turnover, and job satisfaction on productivity; hence, the results did not confirm the hypothesized secondary, indirect, effect of training on productivity. More importantly, the results also failed to confirm the direct effect of training on productivity: none of the training variables had a consistent effect on productivity. Indeed, some significant effects were occasionally observed, but these effects were not observed for all survey years. These results were the most surprising for they were not consistent with the Human Capital theory and the literature.

The only robust and consistent effect on productivity was that of average pay. The data confirmed this relation in all survey years for both cross-sectional and longitudinal analyses.

The reasons underlining the absence of the training effect on productivity are unclear. These results might be due to both characteristics of the Canadian population and of the organizations. Canadians already have a very high level of education; accordingly, additional level of training might have marginal, if any, effect on productivity. This might not be true for very specific type of training, but is likely for general training. It is interesting to note that the measure of training in the WES even when defined as specific (e.g., on the job) involve knowledge in skills which serve well in all modern organizations.

Another possible reason for the lack of an effect is that the analyses performed in this study considered only linear relationships. Thus, it is possible that a relation between training and productivity exists, but this relation is a nonlinear one. It should be noted that some authors have investigated the effect of training using a nonlinear analysis based upon the Cobb-Douglas approach, which describes the relation between capital, labour and productivity. Unfortunately, this approach could be used in this work because the WES does not provide information on capital. Considering the wealth of information provided by the WES, the lack of indicators about invested capital is somewhat disappointing. Finally, we should note that we considered organizations from all economic sectors and sizes (but higher than 10 employees). Perhaps the effect of training is limited to, or more pronounced for, organizations of a given size or belonging to a specific economic sector. The WES provides some information to categorize the sampled
organizations according to their economic sector and organizational size. Therefore, we performed multiple analyses, similar to those reported in Chapter 9, for the different economic sectors and organization sizes. The results of these analyses are summarized in Appendix 1. These results were not discussed in the main manuscript because the results were substantially similar to those for the overall data sets reported in Chapter 9.

The effect of training on productivity might also be delayed in time. Therefore in future research, it would be useful to devote some attention to lagged predictors as it is likely that some of the relevant relations occur in a gradual or lagged manner.

Although this study did not confirm the positive effect of training on productivity, either directly or indirectly, it did provide new and interesting insights on the benefits of training. Indeed, we found interesting results pertaining to the effect of training on the indirect variables, particularly with regards to job satisfaction. As the reader will recall we considered two types of satisfaction, one related to overall job satisfaction and the other with economic facets of his/her job (i.e., compensation related). The results show a positive relation between training and both types of job satisfaction in the cross-sectional and longitudinal analysis. Perhaps even more interesting is that this consistent result is present only when we consider perceived level of training as opposed to the actual level of training (e.g., expenditure or number of courses offered). Specifically, the relation is present only for the Percent Workers Claiming Availability Training Increased, which measures the percentage of employees claiming that the availability of training has increased, and Percent Workers Claiming Too Little Training for Job, which measures the percentage of employees claiming that the amount of training is too little for the demands of the job.

These findings are interesting for two reasons. First they suggest that to assess the relevance of training, we need to consider also how the workers perceive the training itself. For example, an organization may spend a lot of resources on training, but the workers might find it insufficient, not related to work. As a result they might resist and not embrace the effort of the organization. The second reason is that the findings also suggest that training can act as a motivational tool for improving the psychological well being of the workers.

The results obtained with job satisfaction may signal that there are other issues which possibly affect productivity. Some authors have speculated that boredom, lack of stimulation and therefore motivation to work affected the performance/productivity relation (Kaufman, 1970; Medoff \& Abraham, 1980). Therefore, these results suggest the opportunity to further investigate the role of job satisfaction within the workplace.

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## Appendix I

The WES categorizes the sampled organizations according to their organizational size (4 categories) and economic sector (14 categories). To verify whether the effect of training is limited to, or more pronounced for, organizations of a given size or belonging to a specific economic sector, we performed multiple analyses, similar to those reported in Chapter 9, for the different economic sectors and organization sizes. The summarized results of these analyses are reported below.
A. ORGANIZATION SIZE - Summary Cross-Sectional Regressions Coefficients


| Table Al 1- Determinants of Productivity - Summary Cross-Sectional Regressions Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Organzation Size > $10-19$ |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 425 | $\mathrm{N}=$ | 347 | $\mathrm{N}=$ | 376 | $\mathrm{N}=$ | 434 |
|  | Coefficient |  | Coefficient |  | Coefficient |  | Coefficient |  |
|  | B | Sıg | B | Sig | B | Sig | B | Sig |
| Percent Workers Claiming Too Ltttle Traning for Job | 449422 | 244 | 49674 | 737 | -228026 | 332 | 182698 | 273 |
| Percent Workers Claımıng Avallability Tranning Increased | 512330 | 161 | 190443 | 108 | -875 448 | . 000 | 138245 | 355 |
| Average Expenditure for Traming | - 198 | 995 | 11157 | 130 | 15092 | 444 | 4565 | 693 |
| Proporton_Employees_Receiving_Classroom_Traming | 42556929 | 348 | 14180226 | 221 | -15061 639 | 490 | -25881929 | 147 |
| Proportion_Employees_Recelving_OntheJob_Training | -59323646 | 115 | -2550 457 | 793 | -1658868 | 933 | -689 584 | 969 |
| Sum_Courses_m_Classroom_Format | -837002 | 905 | -1348652 | 619 | 6774585 | 118 | -21 063 | 995 |
| Sum_Courses_in_OntheJob_Format | -2921 069 | 639 | -693 493 | 786 | 2024441 | 596 | 2220781 | 514 |
| Average_Days_of_Sick_Paid_Leave | -26033 992 | . 000 | 5014694 | . 016 | 3690545 | 308 | 7322170 | . 006 |
| Average_Days_of_Other Paid Leave | 14142450 | 126 | 114816 | 910 | -1391054 | 073 | -144026 | 929 |
| Average_Days_of_Unpad_Leave | -1882 768 | 289 | -1289 027 | 215 | -3157455 | 025 | -754223 | 247 |
| Turnover $=$ | 13139294 | 775 | 43029576 | . 002 | 8091872 | 816 | -7502 127 | 712 |
| Median_Overall Satisfaction | 17432560 | 488 | 36562420 | . 000 | 2122335 | 905 | -10743964 | 309 |
| Median_Compensation_Satisfaction | -22740 860 | 306 | -35769 621 | . 000 | 60087559 | . 000 | -6790 564 | 510 |
| Organizatıon_Age | 22143 | 978 | 719319 | . 000 | 221485 | 521 | 96848 | 686 |
| Total Number of Employees | 1544994 | 745 | -1424084 | 388 | -2859 734 | 260 | -2167670 | 204 |
| Percentage ExportSales | -347 015 | 536 | 13573 | 955 | 57463 | 886 | -36573 | 881 |
| Proportion Employees Using Computers | 82244022 | . 015 | 2246875 | 850 | 53512205 | . 009 | -3342693 | 828 |
| Average_Age Workforce | 2521926 | 098 | 369455 | 497 | -1303904 | 231 | 1765326 | . 010 |
| Percent Workers Having Young_Kıds | 443456 | 236 | 73177 | 609 | -137913 | 579 | 127961 | 528 |
| Workplace_Average_Pay | 1611 | . 009 | 1415 | . 000 | 2493 | . 000 | 1346 | . 000 |
| Average Family Other Income | 988 | 512 | -1 505 | 060 | -034 | 956 | -469 | 501 |
| Average_Workforce_Tenure | -897880 | 717 | -1828967 | . 054 | -3148 082 | . 030 | -793888 | 427 |
| Sum_HR_Practices_Compensation | 6058152 | 533 | 6791596 | 072 | -5493 480 | 368 | -3287409 | 491 |
| Sum_HR_Practices Organization of Work | 103773 | 989 | -4614867 | 136 | -504672 | 923 | 3765824 | 249 |
| Average Workplace Promotions | -2530815 | 859 | 14296685 | . 011 | 9822570 | 168 | -141273 | 972 |
| Proportion_Fulltıme_HighSkilled Workers | -113095411 | . 002 | -2961 220 | 814 | -42530986 | . 052 | -36750314 | . 015 |
| Proportion_Unionized_Workforce | -6534 565 | 889 | 14755590 | 387 | -32030948 | 288 | 30344773 | 309 |


| Table A1 2 - Determinants of Productivity - Summary Cross-Sectional Regressions Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Organization Size 20-99 |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 1270 | $\mathrm{N}=$ | 1241 | $\mathrm{N}=$ | 1297 | $\mathrm{N}=$ | 1524 |
|  | Coefficient |  | Coefficient |  | Coefficient |  | Coefficient |  |
|  | B | Sig | B | Sig | B | Sig | B | Sig |
| Percent_Workers Claimıng_Too Little_Traınıng_for_Job | 11246 | 964 | -224 993 | 411 | -46908 | 623 | 26927 | 907 |
| Percent Workers Claımıng Availability Tranning Increased | 172665 | 477 | 254200 | 307 | -31522 | 690 | -309 345 | 123 |
| Average Expenditure for Trainıng | 15595 | 144 | 5757 | 589 | 7353 | 087 | 5527 | 662 |
| Proportion Employees Receiving Classroom Tramıng | -8886 728 | 647 | 22926029 | 276 | -1475 429 | 787 | -2759 593 | 830 |
| Proportion_Employees Receiving OntheJob_Training | 21314109 | 288 | 27854101 | 161 | -518 159 | 918 | -5346720 | 663 |
| Sum Courses in Classroom Format | 7422628 | . 017 | -2729 746 | 398 | -365 256 | 744 | -2373 999 | 337 |
| Sum Courses in OntheJob Format | -2802 782 | 394 | 1347587 | 689 | 521017 | 653 | 6080336 | . 019 |
| Average Days of Sick Paid Leave | 13318948 | . 000 | 2161999 | 358 | -939 070 | . 045 | 567084 | 801 |
| Average Days of Other_Paid Leave | -7385 721 | . 004 | 801488 | 500 | 329922 | 252 | -613744 | 433 |
| Average_Days_of_Unpatd Leave | -1400690 | 111 | -947 591 | 340 | -309091 | 595 | -1543 013 | 137 |
| Turnover | -7849 239 | 751 | -34995 853 | 124 | -16632447 | 075 | 4497845 | 838 |
| Median Overall Satisfaction | 1776153 | 910 | 38383544 | . 015 | 6799127 | 201 | 5370390 | 660 |
| Median_Compensation_Satisfaction | 18553792 | 184 | -25059 084 | 108 | 2692113 | 557 | -15985 359 | 192 |
| Organization_Age | 535911 | 254 | -439 842 | 194 | 26146 | 773 | 402083 | 080 |
| Total_Number_of Employees | 492851 | 141 | -398956 | 165 | 228630 | . 029 | -147726 | 573 |
| Percentage ExportSales | 275866 | 329 | -144301 | 592 | -127222 | 165 | -451919 | . 047 |
| Proportion_Employees_Using_Computers | 40514272 | . 022 | 10278395 | 584 | 8727233 | 144 | 8570922 | 584 |
| Average_Age_Workforce | -122 629 | 904 | -914459 | 431 | -424 764 | 205 | -792658 | 329 |
| Percent_Workers_Having_Young_Kids | 549036 | 087 | 255855 | 388 | 81700 | 431 | -263 178 | 309 |
| Workplace_Average_Pay | 1818 | . 000 | 1871 | . 000 | 1205 | . 000 | 1940 | . 000 |
| Average_Family_Other_Income | 449 | 613 | -377 | 771 | 829 | . 035 | 034 | 967 |
| Average Workforce Tenure | 1377117 | 437 | 2910652 | 080 | 464227 | 387 | 1109821 | 366 |
| Sum HR Practices Compensation | 2036 | 1000 | -1345656 | 817 | 2753354 | 186 | -2802339 | 583 |
| Sum HR Practices Organızation of Work | -13461975 | . 001 | 2409445 | 578 | 1144968 | 413 | 828253 | 802 |
| Average Workplace Promotions | -10568 468 | 231 | -8969 703 | 243 | 486828 | 836 | 8805637 | 078 |
| Proportion Fulltime_HighSkilled Workers | -86433606 | . 000 | -34217053 | 100 | -30289 474 | . 000 | 15540156 | 394 |
| Proportion_Unionized_Workforce | -42714202 | . 034 | -55696073 | 005 | -1410254 | 842 | -10489 544 | 547 |


| Table A1 3 - Determinants of Productivity - Summary Cross-Sectional Regressions Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Organızatıon Size 100-499 |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 889 | $\mathrm{N}=$ | 905 | $\mathrm{N}=$ | 918 | $\mathrm{N}=$ | 979 |
|  | Coefficient |  | Coefficient |  | Coefficient |  | Coefficrent |  |
|  | B | Sig | B | Sig | B | Sig | B | Sig |
| Percent Workers_Claımıng_Too Little Tranıng for Job | -103 623 | 846 | -1060851 | . 052 | -323821 | 559 | -92254 | 796 |
| Percent Workers_Claımıng_Avalability_Trainıng_Increased | 224088 | 648 | -1000 587 | . 044 | -334 166 | 508 | -487019 | 131 |
| Average_Expenditure for Traning | 26169 | 185 | -56084 | . 003 | -3182 | 886 | 22660 | . 060 |
| Proportion_Employees_Receiving_Classroom_Training | -37539740 | 278 | 30345977 | 285 | -51558617 | 189 | 4172595 | 869 |
| Proportion_Employees Receiving_OntheJob_Traınıng | 13544239 | 711 | -945 661 | 753 | 89477597 | . 013 | 20534152 | 355 |
| Sum_Courses in_Classroom_Format | 5830560 | 203 | 9813895 | 060 | -1662 846 | 779 | -3876 415 | 269 |
| Sum_Courses_in OntheJob_Format | -3006 676 | 521 | -11105888 | . 041 | -8431816 | 154 | -471450 | 892 |
| Average_Days_of Sick_Pard_Leave | 532141 | 717 | 946338 | 696 | -6320502 | 125 | 3478479 | 120 |
| Average_Days of Other Pard_Leave | 7834 | 997 | 372892 | 850 | -1394479 | 630 | -754712 | 568 |
| Average Days of Unpard Leave | -1044 578 | 606 | -666704 | 764 | 288750 | 909 | -813315 | 518 |
| Turnover | -16008 415 | 815 | 11853935 | 794 | -25216581 | 677 | -40181189 | 290 |
| Medıan Overall Satısfaction | -8788 597 | 777 | 14642340 | 620 | 31498668 | 371 | 30335516 | 150 |
| Median Compensation_Satısfaction | 1938099 | 942 | 7049840 | 828 | 13137455 | 683 | 16734501 | 417 |
| Organizatıon_Age | -378211 | 555 | -1007 445 | 106 | 809251 | 090 | 624146 | . 019 |
| Total Number_of Employees | 220425 | 081 | -77457 | 561 | 5886 | 969 | 36215 | 688 |
| Percentage_ExportSales | -937727 | . 007 | -308631 | 379 | -651 576 | 129 | 211353 | 419 |
| Proportion Employees_Using_Computers | 72803606 | . 060 | 55245675 | 151 | -21934 240 | 626 | -9995948 | 703 |
| Average_Age_Workforce | -1385392 | 609 | -641912 | 782 | -1720335 | 468 | -1401166 | 277 |
| Percent_Workers_Having_Young_Kıds | -158292 | 800 | -653 309 | 316 | 77460 | 907 | -530296 | 209 |
| Workplace_Average_Pay | 3028 | . 000 | 4920 | . 000 | 5383 | . 000 | 2414 | . 000 |
| Average_Family_Other Income | 110 | 968 | -906 | 593 | 4099 | 181 | - 578 | 711 |
| Average_Workforce Tenure | 504713 | 872 | 3128018 | 325 | -1919 413 | 536 | -2364 579 | 205 |
| Sum_HR_Practices Compensation | 31821366 | . 003 | 11642089 | 284 | -5807221 | 631 | 302974 | 966 |
| Sum_HR Practices Organization_of_Work | -14995008 | . 052 | -7695403 | 317 | 9545921 | 266 | -67799 | 989 |
| Average Workplace Promotions | 48548970 | . 002 | 23127702 | 091 | 15474515 | 323 | 3839250 | 682 |
| Proportion Fulltime HıghSkilled Workers | -123556 303 | . 007 | -36661778 | 417 | -58952621 | 262 | -8290 257 | 787 |
| Proportion Unionızed_Workforce | -14269 014 | 670 | -56481 116 | 112 | -17369 540 | 662 | -14994 615 | 528 |


| Table Al 4 - Determinants of Productivity - Summary Cross-Sectional Regressions Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 207 | $\mathrm{N}=$ | 215 | $\mathrm{N}=$ | 194 | $\mathrm{N}=$ | 210 |
|  | Coefficlent |  | Coefficlent |  | Coefficient |  | Coefficient |  |
|  | B | Sig | B | Sig | B | Sig | B | SI 9 |
| Percent Workers_Claiming_Too_Little Trainung for_Job_99 | -2009 082 | 312 | -234382 | 606 | -663 126 | 071 | -1270 660 | 036 |
| Percent_Workers_Claiming_Availability_Tramnng_Increased 99 | -4668 397 | . 023 | 191882 | 590 | -275 924 | 368 | 198598 | 739 |
| Average Expenditure_for_Trainın_99 | 22677 | 663 | 23817 | . 040 | -22 723 | . 024 | -19661 | 188 |
| Proportion_Employees_Receiving_Classroom_Traming_99 | -100416775 | 493 | -51346563 | . 012 | 3560239 | 839 | 9200049 | 815 |
| Proportion Employees Receiving OntheJob Trainıng 99 | 337023166 | . 018 | 4469514 | 820 | 4023106 | 722 | 41461518 | 287 |
| Sum Courses in_Classroom_Format 99 | 5074282 | 786 | 2125865 | 539 | 2991097 | 209 | 5480073 | 316 |
| Sum Courses in OntheJob Format 99 | -7655 081 | 647 | 2822621 | 381 | -2307785 | 293 | -125 210 | 980 |
| Average Days of Sick Paid Leave 99 | -9756593 | 398 | 1359706 | 531 | 1429125 | 450 | 1509144 | 700 |
| Average Days of Other Pard Leave 99 | -17211093 | 216 | 193730 | 913 | -1068926 | 284 | -1477513 | 596 |
| Average Days of Unpald Leave 99 | 215949 | 980 | -1076 430 | 475 | 1346268 | 631 | 736889 | 824 |
| Turnover 99 | 24257098 | 906 | 47403994 | 352 | -36420 520 | 392 | -70572 072 | 290 |
| Medran_Overall_Satıfaction_99 | 57628846 | 580 | -4902 770 | 828 | 21104390 | 249 | 82569687 | 017 |
| Median_Compensation_Satisfaction_99 | 100826135 | 332 | -782332 | 971 | -21118288 | 288 | -26896849 | 430 |
| Organızatıon_Age_99 | -129718 | 937 | 885003 | . 013 | -62853 | 750 | -414065 | 352 |
| Total_Number_of_Employees_99 | -58022 | 560 | 18627 | 404 | 2565 | 792 | -4368 | 831 |
| Percentage ExportSales 99 | -1977209 | 093 | -480 585 | . 048 | -90818 | 627 | -308475 | 437 |
| Proportion_Employees Using_Computers_99 | 65885186 | 712 | 64203494 | . 022 | 17218016 | 382 | 17006780 | 684 |
| Average_Age Workforce 99 | 29780048 | . 015 | 310406 | 881 | -1782151 | 228 | -1349573 | 651 |
| Percent Workers Having Young_Kıds 99 | 3881190 | 152 | -230807 | 640 | -624 519 | 118 | 1543350 | 064 |
| Workplace Average Pay 99 | 1808 | 439 | 1257 | . 005 | 1595 | . 000 | 2281 | 000 |
| Average_Family Other_Income 99 | 8141 | 573 | -6145 | . 018 | 1131 | 608 | 028 | 994 |
| Average Workforce_Tenure 99 | 9781299 | 368 | -690556 | 767 | 2451185 | 077 | -2110079 | 533 |
| Sum_HR_Practices_Compensation_99 | 27206676 | 514 | 6636023 | 408 | -2960 175 | 607 | -79800 | 995 |
| Sum_HR Practices Organization_of Work 99 | -35161542 | 272 | 3702201 | 470 | -1075378 | 759 | -2262 476 | 787 |
| Average_Workplace Promotions 99 | 24310229 | 557 | -5770216 | 514 | 3591653 | 580 | 16003781 | 256 |
| Proportion_Fulltime_HighSkilled Workers_99 | -118255132 | 538 | -65436624 | . 052 | -553530 | 983 | -25345615 | 619 |
| Proportion_Unionized Workforce_99 | -105516559 | 427 | 16846143 | 535 | -24862 973 | 257 | -17756498 | 678 |




| Table B1 1-Determınants of Productivity - Summary Longitudinal (Differential) Regressions Coefficients |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\text { Organization Size }>10-19$ |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 226 | $\mathrm{N}=$ | 225 | $\mathrm{N}=$ | 250 | $\mathrm{N}=$ | 199 | $\mathrm{N}=$ | 202 | $\mathrm{N}=$ | 194 |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | Sig | B | Sig | B | Sig | B | Sig | B | Sig | B | Sig |
| Percent_Workers_Claiming_Too_Little_Training_for_ Job | 9906 | 784 | -870 | 940 | 22005 | 031 | 26017 | 341 | -31 87 | 799 | -639 79 | 036 |
| Percent_Workers_Claıming_Availability_Tramnng_Inc reased | 28015 | 425 | 9858 | 323 | 4005 | 621 | -19160 | 415 | 13112 | 286 | 76024 | 003 |
| Average_Expenditure_for_Training | -67 16 | 061 | 2974 | 003 | -1868 | 038 | 4372 | 068 | 1058 | 246 | -26 64 | 267 |
| Proportion_Employees_Receiving_Classroom_Trainın g | 6749674 | 086 | -14160 99 | 240 | -321 33 | 975 | 1692086 | 369 | 2549388 | 108 | 2034728 | 470 |
| Proportion_Employees_Recerving_OntheJob_Traming | $-4574460$ | 126 | 2047229 | 042 | 171810 | 836 | -10223 46 | 625 | 1822343 | 124 | -24695 69 | 204 |
| Sum_Courses_in_Classroom_Format | 179216 | 792 | -3015 77 | 219 | 41053 | 844 | -8039 54 | 117 | -1148327 | 000 | -618 05 | 894 |
| Sum_Courses_in_OntheJob_Format | 473347 | 413 | -525196 | 026 | 335106 | 105 | -25851 | 950 | -5705 69 | 029 | -776 52 | 857 |
| Average_Days_of_Sick_Paid_Leave | 208913 | 698 | 28565 | 887 | -5027 | 971 | 49095 | 920 | 609691 | 002 | 245227 | 599 |
| Average_Days_of_Other_Paid_Leave | 138509 | 567 | -48167 | 287 | -48264 | 162 | -41662 | 901 | -81697 | 516 | -279597 | 534 |
| Average_Days_of_Unpaid_Leave | -237293 | 210 | 67159 | 436 | -113590 | 064 | 63504 | 701 | 47036 | 699 | 145187 | 474 |
| Turnover | -3825703 | 562 | 2366197 | 189 | -1386895 | 445 | -5301 72 | 889 | -12540 61 | 477 | 5202480 | 190 |
| Median_Overall_Satisfaction | -1310691 | 603 | 685999 | 419 | -1373 54 | 811 | 2714042 | 118 | 1623103 | 059 | 288313 | 876 |
| Median_Compensation_Satisfaction | -17282 71 | 437 | 1388545 | 065 | 163152 | 768 | -584795 | 701 | -13428 70 | 118 | -28190 77 | 064 |
| Total_Number_of_Employees | 271768 | 197 | -559 61 | 482 | 18090 | 788 | -762 12 | 490 | -61426 | 469 | -101892 | 352 |
| Percentage_ExportSales | 8079 | 928 | -24637 | 662 | 223713 | 000 | 106328 | 234 | 41457 | 194 | -166594 | 028 |
| Proportion_Employees_Using_Computers | -51824 86 | 280 | -129662 | 942 | -1267625 | 529 | -11744 41 | 714 | 3664487 | 072 | -4941792 | 186 |
| Percent_Workers_Having_Young_Kıds | 18234 | 637 | -1323 | 925 | -6620 | 592 | -61827 | 021 | 746 | 956 | -545 41 | 068 |
| Workplace_Average_Pay | 221 | 000 | 079 | 002 | 151 | 000 | 121 | 013 | 111 | 000 | 121 | 002 |
| Average_Family _Other_Income | 531 | 007 | 030 | 306 | -120 | 025 | 002 | 978 | -0 35 | 599 | 198 | 118 |
| Average_Workforce_Tenure | -1294 13 | 628 | -86 70 | 906 | -14323 | 820 | -247 11 | 895 | 36326 | 662 | -111792 | 468 |
| Sum_HR_Practices_Compensation | -41669 65 | 000 | -494761 | 296 | -165593 | 662 | -1362728 | 059 | 546950 | 229 | -473398 | 590 |
| Sum_HR_Practices_Organization_of_Work | -4478 79 | 558 | -3973 01 | 214 | -216593 | 357 | 149016 | 773 | -4073 31 | 267 | -9626 53 | 061 |
| Average_Workplace_Promotions | 2730869 | 070 | -686888 | 084 | -815789 | 000 | 2291567 | 025 | -129159 | 682 | 477449 | 522 |
| Proportion_Fulltme_HighSkilled_Workers | 1632710 | 747 | 1574286 | 330 | -2219193 | 098 | -14174 85 | 614 | -1019732 | 600 | -114789 | 970 |
| Proportion_Unıonized_Workforce | 9832161 | 104 | 9614612 | 045 | -37772 06 | 062 | 626775 | 918 | -16026 09 | 547 | 6564396 | 207 |


| Organızatıon Sıze 20-99 |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 1018 | $\mathrm{N}=$ | 927 | $\mathrm{N}=$ | 1025 | $\mathrm{N}=$ | 861 | $\mathrm{N}=$ | 884 | $\mathrm{N}=$ | 839 |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | S1g | B | Sig | B | Sig | B | Sıg | B | Sig | B | Sıg |
| Percent_Workers_Claımıng_Too_Little_Traınıng_fo r Job | -34112 | 048 | -4596 | 526 | 3392 | 567 | 6132 | 779 | -328 76 | 040 | 13294 | 617 |
| Percent Workers_Claımıng_Avallabılıty_Traınıng_I ncreased | 2143 | 897 | -38 29 | 557 | 902 | 851 | -187 17 | 276 | -229 33 | 155 | -25797 | 231 |
| Average_Expenditure_for_Trainıng | 746 | 315 | 231 | 536 | -284 | 433 | 2039 | 017 | 1636 | 047 | 1454 | 248 |
| Proportion_Employees_Receiving_Classroom_Train ing | -894 31 | 934 | 1385634 | 010 | -3379 06 | 388 | -27470 88 | 055 | -1087182 | 376 | -13926 65 | 462 |
| Proportion_Employees_Receiving_OntheJob_Tramı ng | 2931666 | 004 | -367738 | 446 | -5400 26 | 156 | 3465256 | 016 | 236892 | 825 | 1966203 | 287 |
| Sum_Courses_in_Classroom_Format | 836231 | 000 | -2029 77 | 026 | 177016 | 011 | 1046845 | 000 | -171507 | 389 | 276076 | 327 |
| Sum_Courses in OntheJob_Format | -5829 68 | 007 | 116717 | 247 | -1264 64 | 065 | -662721 | 008 | -14868 | 940 | 284697 | 323 |
| Average_Days_of_Sick_Paid_Leave | 1075497 | 000 | -26256 | 499 | -24725 | 646 | 1304687 | 000 | 271747 | 075 | 1294892 | 000 |
| Average_Days_of_Other_Pard_Leave | -112047 | 310 | 36811 | 174 | 7856 | 582 | 74929 | 355 | -20785 | 683 | -31732 | 696 |
| Average_Days_of_Unpand_Leave | -54302 | 359 | -55871 | 037 | -68597 | 025 | -1145 23 | 150 | -37762 | 527 | 5974 | 951 |
| Turnover | -1751476 | 407 | -12283 30 | 085 | 145297 | 862 | 3425122 | 146 | -688762 | 702 | 751303 | 822 |
| Median_Overall_Satısfaction | $-2205822$ | 021 | -4679 82 | 247 | 474524 | 092 | -361364 | 731 | 2243569 | 019 | -511146 | 719 |
| Median_Compensation_Satisfaction | 295323 | 762 | 422626 | 220 | 113975 | 670 | 2092832 | 031 | -864122 | 308 | 956 | 999 |
| Total_Number_of_Employees | 2195 | 916 | 28278 | 026 | -569 17 | 000 | 18188 | 443 | -3788 | 876 | -24570 | 319 |
| Percentage_ExportSales | -59305 | 055 | -46979 | 001 | -97 23 | 397 | 25150 | 436 | -40018 | 204 | -120419 | 005 |
| Proportion_Employees_Using_Computers | -1420282 | 529 | -1263753 | 166 | 3093612 | 000 | 9606089 | 000 | -24603 72 | 187 | -45608 40 | 108 |
| Percent_Workers_Having_Young_Kıds | 10082 | 635 | -12027 | 166 | -85 45 | 141 | -1415 | 952 | -1042 | 954 | -282 47 | 279 |
| Workplace_Average_Pay | 221 | 000 | 132 | 000 | 118 | 000 | 109 | 001 | 137 | 000 | 157 | 000 |
| Average Famıly_Other_Income | -032 | 606 | 005 | 866 | -022 | 264 | -055 | 408 | -0 06 | 931 | 095 | 193 |
| Average_Workforce_Tenure | 150001 | 245 | 1606 | 974 | -62190 | 052 | 106137 | 461 | 22630 | 820 | 232278 | 098 |
| Sum_HR_Practices_Compensation | -13206 84 | 004 | -1985 61 | 305 | 162077 | 270 | -1319435 | 011 | 171495 | 651 | -1725820 | 007 |
| Sum_HR_Practices_Organızatıon_of_Work | 140759 | 669 | -246 35 | 851 | -180048 | 054 | -334872 | 308 | -1809 85 | 528 | 534774 | 164 |
| Average_Workplace_Promotions | -416091 | 491 | -120854 | 573 | -156602 | 275 | 223659 | 700 | -1024225 | 024 | -903570 | 206 |
| Proportion_Fulltıme_HıghSkılled_Workers | -20964 37 | 313 | -1549889 | 063 | 671850 | 321 | -3228380 | 101 | 4549706 | 009 | -31002 | 989 |
| Proportıon_Unıonızed_Workforce | -1303063 | 521 | -2031185 | 101 | 1364750 | 175 | -903506 | 711 | -799223 | 707 | 1726079 | 503 |


| Organization Size 100-499 |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\begin{aligned} & \hline 2001 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \hline 2003 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{array}{r} 2005 \\ 2003 \\ \hline \end{array}$ |  | $\begin{aligned} & \hline 2003 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \hline 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 769 | $\mathrm{N}=$ | 694 | $\mathrm{N}=$ | 738 | $\mathrm{N}=$ | 688 | $\mathrm{N}=$ | 642 | $\mathrm{N}=$ | 646 |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | SIg | B | Sig | B | Sig | B | Sig | B | Sig | B | SIg |
| Percent_Workers_Claiming_..Too_Little_Training_ for Job | -525 77 | 326 | -24655 | 242 | -598 40 | 091 | -264 78 | 687 | -75831 | 001 | -800 86 | 234 |
| Percent_Workers_Claımıng_Availability_Training Increased | 47312 | 368 | 10446 | 578 | -253 40 | 405 | 57435 | 289 | -49901 | 016 | 48630 | 489 |
| Average_Expenditure_for_Training | -98 49 | 000 | 979 | 279 | -3448 | 121 | -7610 | 011 | -254 | 806 | -7351 | 017 |
| Proportion_Employees_Receıving_Classroom_Tra ming | -57968 11 | 096 | -1395199 | 225 | 2315621 | 466 | -80298 85 | 076 | 425790 | 769 | -155214 65 | 002 |
| Proportion_Employees_Receiving_OntheJob_Trai ning | -426 95 | 903 | 20694 | 870 | 1165225 | 659 | 3830425 | 375 | -4301 64 | 591 | 1474174 | 738 |
| Sum_Courses_in_Classroom_Format | 1949552 | 000 | -3804 65 | 073 | -1435 47 | 741 | 1569521 | 009 | 33269 | 893 | 1888337 | 004 |
| Sum_Courses_In_OntheJob_Format | -6167 10 | 207 | 485805 | 014 | -1957 14 | 643 | -984769 | 124 | 463715 | 041 | -7952 71 | 197 |
| Average_Days_of_Sick_Paid_Leave | -67 78 | 969 | -1853 32 | 051 | -686 39 | 732 | 67390 | 779 | -339 87 | 715 | -2073 54 | 446 |
| Average_Days_of_Other_Pard_Leave | -514 48 | 777 | 67332 | 441 | 12872 | 933 | -182429 | 521 | 116211 | 217 | -758 63 | 787 |
| Average_Days_of_Unpaid_Leave | -420 00 | 827 | 13755 | 870 | -485 56 | 742 | 160637 | 590 | 63085 | 483 | -126804 | 654 |
| Turnover | -67558 72 | 271 | 2941642 | 189 | 1852300 | 732 | -82209 08 | 420 | 2723253 | 364 | -90005 58 | 349 |
| Median_Overall_Satisfaction | -68462 64 | 016 | 1746621 | 133 | -3080 35 | 880 | -81059 27 | 041 | -1138181 | 422 | -7216152 | 082 |
| Median_Compensation_Satisfaction | 8445938 | 009 | -12006 94 | 318 | -22022 01 | 271 | 7021766 | 047 | 85639 | 949 | 3967555 | 361 |
| Total_Number_of_Employees | 28070 | 260 | -3719 | 713 | -5597 | 807 | 22811 | 360 | -59 82 | 414 | 6978 | 726 |
| Percentage ExportSales | -143408 | 020 | 126598 | 000 | -39503 | 477 | 17301 | 855 | 42367 | 124 | -33751 | 716 |
| Proportion_Employees_Using_Computers | -39812 82 | 431 | 704404 | 736 | -31481 46 | 449 | 2230744 | 715 | 4976667 | 017 | 3982017 | 539 |
| Percent_Workers_Havmg_Young_Kids | -98 46 | 864 | 13495 | 553 | -26 17 | 947 | 28096 | 684 | 17433 | 528 | -4157 | 961 |
| Workplace_Average_Pay | 489 | 000 | 125 | 006 | 183 | 020 | 474 | 000 | 007 | 850 | 653 | 000 |
| Average_Family_Other_Income | 264 | 318 | -069 | 458 | -4 34 | 020 | -5 42 | 123 | -064 | 372 | -2 47 | 459 |
| Average_Workforce_Tenure | -110591 | 723 | 29525 | 816 | 216830 | 329 | -3362 94 | 329 | 287005 | 025 | -1116290 | 004 |
| Sum_HR_Practices_Compensation | 3279160 | 016 | 67825 | 880 | 201545 | 805 | 2013038 | 176 | -1091855 | 053 | 2664788 | 122 |
| Sum_HR_Practices_Organization_of_Work | 262946 | 766 | 95963 | 763 | -198691 | 742 | -14643 31 | 152 | -10573 30 | 002 | -6768 63 | 535 |
| Average_Workplace_Promotions | 1133434 | 405 | 532126 | 343 | 1038990 | 312 | 1805560 | 346 | 833301 | 167 | 4334254 | 041 |
| Proportion_Fulltime_HighSkilled_Workers | -12273287 | 070 | 879904 | 760 | -34997 85 | 577 | 3866272 | 695 | 3207594 | 272 | -40893 04 | 667 |
| Proportion_Unionized_Workforce | 6729337 | 240 | 6546371 | 016 | 631205 | 944 | 4272680 | 650 | 9779906 | 001 | 1261189 | 890 |


| Table B1 4- Determınants of Productivity - Summary Longitudinal (Differental) Regressions Coeffictents |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \\ & \hline \end{aligned}$ |
|  |  | 185 |  | 152 |  | 156 |  | 143 |  | 143 |  | 134 |
|  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  | Coeff |  |
|  | B | Sig | B | Sig | B | Sig | B | Sig | B | Sig | B | Sig |
| Percent_Workers_Claımıng_Too_Little_Tranıng_ for Job | -2599 36 | 193 | -35715 | 372 | 31452 | 462 | 166194 | 492 | 451 | 991 | -6128 05 | 009 |
| Percent_Workers_Claiming_Avallability_Traming Increased | -1690 00 | 365 | -70591 | 060 | 73559 | 057 | -2962 60 | 098 | 36398 | 440 | -3989 57 | 073 |
| Average_Expenditure for_Tranıng | 9246 | 155 | -583 | 641 | -733 | 559 | -7031 | 255 | 599 | 638 | 6026 | 285 |
| Proportion_Employees_Receiving_Classroom_Tra ining | -68776 82 | 567 | -5521 01 | 829 | 1485083 | 594 | 2746663 | 847 | -20248 92 | 471 | 1068831 | 934 |
| Proportion_Employees_Receiving_OntheJob_Traı ning | 11703532 | 258 | 954080 | 534 | 405473 | 790 | 16838503 | 233 | 1914014 | 418 | 218408 | 988 |
| Sum_Courses_m_Classroom_Format | 660403 | 699 | 220017 | 515 | -549151 | 084 | -15356 33 | 361 | 354464 | 423 | -25538 72 | 244 |
| Sum_Courses_1n_OntheJob_Format | -7079 75 | 607 | -5897 03 | 056 | 477831 | 100 | 82951 | 955 | -3092 98 | 478 | 461251 | 776 |
| Average_Days_of_Sick Paid Leave | 1121086 | 048 | 82293 | 617 | -1187 72 | 510 | -1055 85 | 913 | 327389 | 208 | -3643 63 | 761 |
| Average_Days_of_Other_Patd_Leave | -7469 89 | 421 | -453 46 | 629 | -658 12 | 568 | -399189 | 751 | 13006 | 942 | -15932 19 | 210 |
| Average_Days_of_Unpaid_Leave | -405826 | 569 | 41845 | 780 | 517527 | 007 | -329381 | 742 | 229090 | 222 | 235775 | 833 |
| Turnover | 10399045 | 622 | -8466 75 | 880 | 1112191 | 737 | -5745707 | 696 | 2869770 | 707 | 55316514 | 339 |
| Medıan_Overall_Satisfaction | 726112 | 934 | 2706114 | 230 | -168294 | 937 | -21270 86 | 830 | -4819 03 | 862 | -63228 59 | 508 |
| Medıan_Compensation_Satıfaction | 1537778 | 891 | -560065 | 809 | -564858 | 782 | -70690 37 | 483 | $-487612$ | 846 | -2735391 | 806 |
| Total_Number_of_Employees | -895 | 954 | -781 | 876 | -59 01 | 202 | -6609 | 658 | -1286 | 788 | 1673 | 903 |
| Percentage_ExportSales | 95809 | 662 | -62 33 | 876 | 12015 | 718 | 148411 | 356 | -37971 | 415 | -2449 92 | 262 |
| Proportion_Employees_Using_Computers | -151634 01 | 363 | 1088665 | 812 | 4308486 | 194 | 1989723 | 904 | 3551649 | 445 | 22558687 | 265 |
| Percent_Workers_Having_Young_Kıds | -665 79 | 731 | 9588 | 815 | 23705 | 575 | 172315 | 473 | 20095 | 713 | -1169 11 | 647 |
| Workplace_Average_Pay | -142 | 531 | 006 | 946 | 163 | 010 | 017 | 954 | 039 | 641 | 020 | 947 |
| Average_Family_Other_Income | -1254 | 247 | 067 | 788 | -283 | 131 | 138 | 900 | 235 | 319 | 1461 | 194 |
| Average_Workforce_Tenure | 1056336 | 204 | 337011 | 130 | -482 76 | 782 | 1328607 | 167 | -180 69 | 953 | 2526434 | 021 |
| Sum_HR_Practices_Compensation | 7503439 | 110 | -1174889 | 197 | -567323 | 387 | -2514 19 | 954 | -1236582 | 212 | 3977067 | 398 |
| Sum_HR_Practices_Organization_of_Work | 1993707 | 434 | 330808 | 555 | -372 15 | 933 | 2049099 | 453 | -1890 39 | 800 | -46029 84 | 176 |
| Average_Workplace_Promotions | -49785 96 | 187 | -822090 | 310 | -2008 81 | 785 | -78 19 | 998 | 249364 | 814 | -26629 66 | 569 |
| Proportion_Fulltme_HıghSkilled_Workers | -14789280 | 510 | 7902895 | 168 | -6735 87 | 872 | -142449 54 | 503 | 9675721 | 155 | -80178 49 | 780 |
| Proportion_Unıonızed_Workforce | -113059 08 | 591 | -4851 56 | 940 | 3245216 | 523 | -11336322 | 580 | 2891916 | 643 | 7610652 | 743 |

C. ORGANIZATION SECTOR - Summary Cross-Sectional Regressions Coefficients


| Table C 11 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Forestry, minıng, oll, and gas extraction |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 140 | $\mathrm{N}=$ | 123 | $\mathrm{N}=$ | 112 | $\mathrm{N}=$ | 127 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too_Little_Training_for_Job | -3057928 | 049 | -606 623 | 331 | -554 640 | 542 | 2109006 | 047 |
| Percent_Workers_Claımıng_Avaılabılity_Trainıng_Increased | 315444 | 814 | 502624 | 428 | 60132 | 920 | 310687 | 667 |
| Average_Expenditure_for_Trainıng | 14579 | 432 | -44 523 | 039 | -16313 | 218 | -22 124 | 300 |
| Proportion_Employees_Receıving_Classroom_Traınıng | 60306212 | 546 | 20402344 | 529 | -7119948 | 785 | 94318614 | 074 |
| Proportion_Employees_Receiving_OntheJob_Traınıng | -149595616 | 177 | -16766521 | 526 | -54885 685 | 191 | -103251914 | 010 |
| Sum_Courses_1n_Classroom_Format | 35938249 | 032 | 12097186 | 172 | 7260832 | 477 | -300732 | 979 |
| Sum_Courses_in_OntheJob_Format | 8239033 | 660 | 5320167 | 536 | 9928023 | 250 | -4273 826 | 706 |
| Average_Days_of_Sick_Pard_Leave | 21279563 | 093 | -3383289 | 680 | -5791000 | 564 | -392 131 | 960 |
| Average_Days_of_Other_Pard_Leave | 10912289 | 116 | 153101 | 940 | -3337202 | 462 | -4517421 | 457 |
| Average_Days_of_Unpard_Leave | -3170327 | 497 | -490429 | 927 | -1408550 | 811 | 100714 | 959 |
| Turnover | -113814713 | 719 | -57310989 | 545 | 11185496 | 934 | -85103 376 | 407 |
| Medıan_Overall_Satısfaction | -148482243 | 090 | 18409949 | 744 | -27949 909 | 543 | -28433739 | 538 |
| Median_Compensatıon_Satısfaction | 171258842 | 029 | 90559517 | 155 | 49599876 | 440 | -41780 235 | 258 |
| Organızatıon_Age | -2064 858 | 312 | -225328 | 736 | 44335 | 946 | -1408871 | 072 |
| Total_Number_of_Employees | -221969 | 421 | 95750 | 429 | -138 147 | 350 | 74474 | 647 |
| Percentage_ExportSales | 626800 | 581 | 386207 | 317 | 791800 | 127 | 591943 | 420 |
| Proportion_Employees_Using_Computers | 245517414 | 013 | 8480458 | 861 | -19074 335 | 779 | -56033 025 | 449 |
| Average_Age_Workforce | 7221383 | 218 | 4018635 | 244 | -2333566 | 439 | -11927 379 | 001 |
| Percent_Workers_Having_Young_Kıds | 2149225 | 051 | -1318404 | 076 | -27419 | 972 | -1519279 | 149 |
| Workplace_Average_Pay | -113 | 912 | 1604 | 030 | 3580 | 000 | 2907 | 000 |
| Average_Famıly_Other_Income | 10999 | 234 | 5390 | 273 | 5305 | 200 | -2823 | 268 |
| Average_Workforce_Tenure | -12433606 | 142 | -525823 | 903 | 4225360 | 287 | 6784986 | 169 |
| Sum_HR_Practices_Compensation | -38013606 | 254 | -624 620 | 969 | -8563 403 | 616 | 4177053 | 801 |
| Sum_HR_Practices Organization_of_Work | -9703 324 | 659 | -14572339 | 189 | -18254 503 | 240 | -3363804 | 827 |
| Average_Workplace_Promotions | 118991137 | 001 | -12614165 | 494 | -19233839 | 225 | 752326 | 977 |
| Proportion_Fulltıme_HıghSkılled_Workers | 13029437 | 912 | -39011 731 | 522 | 23591284 | 739 | 34265818 | 593 |
| Proportion_Unıonızed_Workforce | -15761312 | 872 | -90497 736 | 094 | -25006 952 | 679 | 31427977 | 676 |


| Labour intensive tertiary manufacturing |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 217 | $\mathrm{N}=$ | 184 | $\mathrm{N}=$ | 176 | $\mathrm{N}=$ | 175 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sıg | Coefficients | Sg |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Tramıng_for_Job | -58 722 | 866 | 41457 | 811 | 103456 | 345 | -25 063 | 876 |
| Percent_Workers_Claiming_Availability_Trammng_Increased | 811278 | 058 | 67235 | 666 | 168299 | 084 | -211571 | 189 |
| Average_Expenditure_for_Training | 59346 | 032 | 28653 | 057 | 26347 | 034 | 24096 | 021 |
| Proporton_Employees_Receiving_Classroom_Traning | -23941 549 | 620 | 6958865 | 212 | 23998069 | 043 | 15361038 | 375 |
| Proportion_Employees_Receiving_OntheJob_Training | 14803269 | 631 | -2536386 | 857 | 10331468 | 276 | 9220184 | 425 |
| Sum_Courses_in_Classroom_Format | 733981 | 899 | 383415 | 857 | -2259 549 | 286 | -2304 241 | 371 |
| Sum_Courses_m_OntheJob_Format | -854290 | 875 | 2131613 | 440 | -2339 729 | 206 | -721819 | 759 |
| Average_Days_of_Sick_Pard_Leave | -757582 | 582 | 1122896 | 601 | -1339 428 | 204 | 1308687 | 364 |
| Average_Days_of_Other_Pard_Leave | 16020707 | 068 | 726333 | 516 | 178818 | 624 | -1109 413 | 442 |
| Average_Days_of_Unpaid_Leave | -99 032 | 966 | -114671 | 931 | -648430 | 593 | -23223 | 977 |
| Turnover | -18760 271 | 714 | 28114890 | 052 | 6948999 | 691 | 25505385 | 250 |
| Median_Overall_Satisfaction | 10384038 | 729 | 301238 | 985 | 938432 | 873 | -36374 677 | 001 |
| Median_Compensation_Satisfaction | 18819028 | 391 | 9371591 | 462 | 12341838 | 046 | 7554701 | 377 |
| Organization_Age | -186138 | 691 | 144557 | 397 | 170989 | 308 | -393993 | 059 |
| Total_Number_of_Employees | 118131 | 224 | 16177 | 642 | -13314 | 629 | -16187 | 684 |
| Percentage_ExportSales | 173443 | 618 | 526955 | 002 | 304484 | 005 | -9 647 | 942 |
| Proportion_Employees_Using_Computers | -45102686 | 436 | 17205028 | 400 | 31339598 | 015 | 10098730 | 549 |
| Average_Age_Workforce | 30749 | 988 | -455 803 | 510 | 157454 | 757 | 811387 | 185 |
| Percent_Workers_Having_Young_Kıds | 249172 | 523 | 5729 | 973 | 96596 | 410 | 95348 | 694 |
| Workplace_Average_Pay | 1852 | 023 | 1053 | 000 | 1429 | 000 | 1871 | 000 |
| Average Famıly_Other_Income | -3683 | 447 | 451 | 871 | -1433 | 338 | 864 | 489 |
| Average_Workforce_Tenure | 3147171 | 241 | -212861 | 856 | 335419 | 583 | 100111 | 919 |
| Sum_HR_Practices_Compensation | -11869 061 | 264 | 16437466 | 001 | 794273 | 817 | -2850 887 | 489 |
| Sum_HR_Practices_Organızation_of_Work | -503199 | 948 | -11464 284 | 003 | -5228720 | 004 | 3235958 | 223 |
| Average_Workplace_Promotions | -18599 153 | 332 | -3315804 | 657 | 4150583 | 124 | -7104755 | 227 |
| Proportion_Fulitıme_HighSkilled_Workers | -45544 565 | 264 | 8988788 | 632 | -40448 236 | 009 | 12291953 | 484 |
| Proportion_Unıonized_Workforce | -30390 412 | 362 | -21386986 | 161 | -10574014 | 340 | 42053094 | 009 |


| Table C 13 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Prımary product manufacturıng |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 194 | $\mathrm{N}=$ | 175 | $\mathrm{N}=$ | 191 | $\mathrm{N}=$ | 177 |
|  | Coefficients | Sig | Coefficients | Sıg | Coefficients | SIg | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Clauming_Too_Luttle_Tranning_for_Job | 430815 | 197 | -976 807 | 000 | -243942 | 218 | -364212 | 279 |
| Percent_Workers_Clamıng_Availability_Traming_Increased | 176710 | 544 | -417875 | 034 | -157282 | 416 | -19 117 | 950 |
| Average_Expenditure_for_Tranıng | -18788 | 328 | 31418 | 027 | 64842 | 000 | 34987 | 031 |
| Proportion_Employees_Receiving_Classtoom_Training | 53489712 | 161 | 5054467 | 820 | -13668 583 | 453 | -44350 007 | 085 |
| Proportion_Employees_Receiving_OntheJob_Traning | 21375019 | 519 | 25367035 | 235 | -3754 861 | 765 | 12701213 | 536 |
| Sum_Courses_In_Classroom_Format | 6928691 | 138 | -3295472 | 297 | -1416372 | 597 | 7050188 | 095 |
| Sum_Courses_ın_OntheJob_Format | -4402766 | 325 | 3832541 | 224 | 600698 | 834 | -5870874 | 146 |
| Average_Days_of_Sick_Paid_Leave | -378730 | 793 | -1898664 | 476 | -510920 | 646 | 3295509 | 433 |
| Average_Days_of_Other_Paid_Leave | 9051182 | 042 | -557806 | 528 | -4780 232 | 003 | -1815289 | 063 |
| Average_Days_of_Unpaid_Leave | -120 736 | 935 | 4279967 | 001 | 1263663 | 369 | -904 078 | 454 |
| Turnover | -37590609 | 445 | 25054634 | 464 | 30482088 | 357 | 132605237 | 039 |
| Median_Overall_Satısfaction | 23281394 | 299 | -36568 553 | 009 | 24924525 | 072 | 12251349 | 476 |
| Median_Compensation_Satisfaction | -4913 151 | 766 | 42496745 | 002 | -42696610 | 002 | 37573104 | 031 |
| Organızation_Age | 20156 | 971 | -489 693 | 117 | -268232 | 229 | -497223 | 158 |
| Total_Number_of_Employees | 24688 | 711 | 20318 | 689 | -9 507 | 817 | 17532 | 765 |
| Percentage_ExportSales | -542957 | 040 | -20131 | 909 | 114039 | 505 | -37624 | 883 |
| Proportion_Employees_Using_Computers | 3579683 | 936 | 23637163 | 345 | 25570747 | 229 | -47536015 | 123 |
| Average_Age_Workforce | 1003297 | 608 | 2421706 | 071 | -3304770 | 001 | 3655002 | 032 |
| Percent Workers_Having_Young_Kıds | -760 595 | 063 | 342182 | 191 | -140616 | 536 | 504151 | 197 |
| Workplace_Average_Pay | 485 | 439 | 1786 | 000 | 1500 | 000 | 1548 | 000 |
| Average_Family_Other_Income | -169 | 965 | 3203 | 020 | -3959 | 026 | 349 | 875 |
| Average Workforce Tenure | 2227628 | 362 | -301710 | 858 | 3402106 | 005 | -2572 376 | 204 |
| Sum_HR_Practices_Compensation | 30146196 | 001 | 3837509 | 465 | 1815893 | 714 | 18311689 | 006 |
| Sum_HR_Practices_Organızation_of_Work | -17602668 | 006 | 2809544 | 475 | 1471041 | 680 | 8493073 | 103 |
| Average_Workplace_Promotions | 9324299 | 407 | 12894425 | 030 | -6605 082 | 298 | 19523896 | 089 |
| Proportion_Fultime_HighSkilled_Workers | 10751120 | 823 | -38516039 | 121 | -16932 094 | 467 | -9914 570 | 759 |
| Proportion_Unionized_Workforce | 23939617 | 370 | 39888644 | 039 | -13178446 | 431 | 15874112 | 504 |


| Table C 14 - Determınants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Secondary product manufacturing |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 169 | $\mathrm{N}=$ | 164 | $\mathrm{N}=$ | 153 | $\mathrm{N}=$ | 168 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Clamming_Too_Little_Traming_tor_Job | -222 196 | 754 | -46560 | 810 | -448 136 | 101 | -24232 | 907 |
| Percent_Workers_Clamme_Availability_Training_Increased | -266714 | 669 | -267910 | 120 | -73655 | 784 | -222 526 | 337 |
| Average_Expenditure_for_Training | 44363 | 308 | -724 | 958 | -26536 | 291 | 32589 | 039 |
| Proportion_Employees_Receiving_Classroom_Training | -34104479 | 668 | 36428024 | 026 | -16065 274 | 546 | -2765 711 | 887 |
| Proportion_Employees_Receiving_OntheJob_Training | 120158081 | 048 | 22033080 | 191 | 4592883 | 784 | 2082079 | 912 |
| Sum_Courses_in_Classroom_Format | -1486297 | 875 | -188652 | 944 | 8827879 | 022 | 1276045 | 729 |
| Sum Courses_1n_OntheJob_Format | -15229951 | 124 | 1155266 | 677 | -4965 579 | 181 | 5320862 | 170 |
| Average_Days_of_Sick_Paid_Leave | -4188387 | 465 | -614832 | 412 | 2352777 | 532 | 2334920 | 526 |
| Average_Days of_Other_Paid_Leave | -4808 881 | 197 | -1000 959 | 285 | -2338991 | 214 | -5546195 | 019 |
| Average_Days_of_Unpaid_Leave | -568 100 | 852 | -290 337 | 664 | 102030 | 876 | 634831 | 741 |
| Turnover | 66405850 | 639 | 19172172 | 408 | 51840848 | 301 | -43006 096 | 297 |
| Median_Overall_Satısfaction | -6491439 | 844 | 3678333 | 796 | -22735 605 | 188 | -21478 797 | 184 |
| Median_Compensation_Satisfaction | -31216005 | 429 | 13742904 | 315 | -14958450 | 343 | 30297381 | 090 |
| Organızation_Age | -85 842 | 936 | -392 625 | 188 | 317016 | 186 | -40 059 | 866 |
| Total_Number_of_Employees | 21134 | 873 | 10083 | 805 | -5 294 | 925 | -75 129 | 185 |
| Percentage ExportSales | -958 278 | 083 | 22479 | 888 | -415680 | 037 | -648531 | 001 |
| Proportion_Employees_Using_Computers | 28631118 | 745 | 3285734 | 849 | -21948922 | 326 | -16677209 | 441 |
| Average_Age_Workforce | 69903 | 981 | -224 691 | 792 | 1170957 | 400 | 814742 | 518 |
| Percent_Workers_Having_Young_Kids | 1275778 | 073 | 235510 | 271 | 14131 | 953 | -45 584 | 869 |
| Workplace_Average_Pay | 1213 | 336 | 1236 | 001 | 1721 | 000 | 1326 | 000 |
| Average_Family_Other_Income | 719 | 864 | 2797 | 091 | 540 | 809 | -2 253 | 108 |
| Average_Workforce_Tenure | -335 635 | 940 | 1123138 | 289 | -1028 339 | 465 | -267997 | 835 |
| Sum_HR_Practices Compensation | 11728225 | 492 | 4018066 | 420 | 6502164 | 328 | 7377615 | 194 |
| Sum_HR_Practices_Organization_of_Work | 8851002 | 453 | -3864 489 | 270 | 15250245 | 001 | 3961108 | 350 |
| Average_Workplace Promotions | 31465453 | 134 | 6976568 | 159 | -2025 297 | 786 | 13776163 | 094 |
| Proportion_Fultıme_HıghSkilled_Workers | 23521500 | 623 | -15086 468 | 290 | 23231255 | 334 | -56154 420 | 003 |
| Proportion_Unionized_Workforce | 37613205 | 429 | 9923108 | 528 | -18662 467 | 397 | 4454355 | 838 |


| Table C 15 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Capital intensıve tertiary manufacturing |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 214 | $\mathrm{N}=$ | 211 | $\mathrm{N}=$ | 192 | $\mathrm{N}=$ | 208 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too_Little_Traming_for_Job | -161935 | 672 | -319277 | 052 | 243094 | 224 | -327 237 | 022 |
| Percent_Workers_Clammng_Availability_Tranning_Increased | -497512 | 150 | -34 657 | 812 | 366078 | 013 | -142979 | 411 |
| Average_Expenditure_for_Tranıng | 26527 | 286 | 2594 | 761 | 26091 | 052 | 20347 | 085 |
| Proportion_Employees_Receiving_Classroom_Training | 24669611 | 540 | 8876334 | 596 | -8301203 | 592 | -19690 175 | 166 |
| Proportion_Employees_Receiving_OntheJob_Training | -14580 791 | 655 | 4949879 | 680 | -14976 181 | 248 | 8785558 | 523 |
| Sum_Courses_1n_Classroom_Format | 642449 | 896 | 1509250 | 446 | -2213801 | 379 | 6698308 | 001 |
| Sum_Courses_1n_OntheJob_Format | -925865 | 846 | -2326922 | 286 | -297974 | 909 | $-5177106$ | 011 |
| Average_Days_of_Sick_Paid_Leave | -4339 654 | 489 | 1088092 | 301 | 2869770 | 356 | 3090592 | 026 |
| Average_Days_of_Other_Paid_Leave | -4106 181 | 307 | 225241 | 891 | 580244 | 525 | -565 605 | 580 |
| Average_Days_of_Unpaid_Leave | -1424817 | 629 | -4166 198 | 056 | 340730 | 835 | -1447544 | 185 |
| Turnover | -93005 207 | 178 | -45331 317 | 035 | -10903 304 | 788 | 39698213 | 254 |
| Median_Overall_Satısfaction | -13293 202 | 575 | 5051317 | 595 | 7908333 | 429 | 13489171 | 081 |
| Medran_Compensation_Satisfaction | 1079054 | 956 | -29079 831 | 000 | 10245069 | 328 | -6451390 | 465 |
| Organızation_Age | 245389 | 762 | -528 010 | 106 | -198478 | 353 | 227029 | 263 |
| Total_Number_of_Employees | 22638 | 722 | -13818 | 591 | -5419 | 702 | -2874 | 819 |
| Percentage_ExportSales | -219202 | 498 | -276259 | 016 | -158119 | 185 | 39274 | 703 |
| Proportion_Employees_Using_Computers | 8435709 | 808 | 37419401 | 003 | -3425 220 | 847 | 27898906 | 058 |
| Average_Age_Workforce | 2831032 | 034 | -847 146 | 231 | -447264 | 528 | -250 162 | 730 |
| Percent_Workers_Having_Young_Kıds | 502315 | 178 | 41757 | 769 | -272638 | 075 | -35613 | 817 |
| Workplace_Average_Pay | 1185 | 017 | 728 | 000 | 1211 | 000 | 776 | 000 |
| Average_Family_Other_Income | 4722 | 000 | -350 | 765 | -2 408 | 251 | -546 | 519 |
| Average_Workforce_Tenure | -6317846 | 014 | 1841180 | 204 | 254996 | 816 | 803617 | 337 |
| Sum_HR_Practices_Compensation | 13142394 | 228 | 9986984 | 018 | 4588130 | 266 | -111025 | 977 |
| Sum_HR_Practices_Organization_of_Work | -3378741 | 620 | 3373790 | 140 | 3190517 | 224 | -1286 743 | 572 |
| Average_Workplace_Promotions | 51888604 | 001 | 12145455 | 022 | -12580 426 | 009 | -5224802 | 200 |
| Proportion_Fulltıme_HighSkilled_Workers | -32284627 | 420 | -16062 718 | 157 | 20495426 | 176 | -4711905 | 688 |
| Proportion_Unionized_Workforce | 18862699 | 666 | 43369780 | 023 | 6801380 | 714 | -7768 329 | 567 |


| Table C 16 - Determınants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Construction |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 324 | $\mathrm{N}=$ | 292 | $\mathrm{N}=$ | 303 | $\mathrm{N}=$ | 433 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too_Little_Training_for_Job | -746606 | 003 | -75988 | 393 | -138 178 | 677 | -222 113 | 158 |
| Percent_Workers_Clammg_Avalability_Trammng_Increased | 14204 | 954 | 162573 | 030 | 91060 | 727 | -185393 | 153 |
| Average_Expenditure_for_Tramıng | 15848 | 352 | 15052 | 022 | -15694 | 421 | 20378 | 010 |
| Proportion_Employees_Receiving_Classroom_Training | 23298481 | 319 | -2110 399 | 739 | 26504132 | 293 | -3009 032 | 757 |
| Proportion_Employees_Receiving_OntheJob_Traming | -5865368 | 813 | 4596471 | 202 | -2929 184 | 860 | 430394 | 965 |
| Sum_Courses_1n_Classroom_Format | -124 617 | 980 | 241761 | 859 | 3128045 | 593 | -3401 807 | 231 |
| Sum_Courses_1n_OntheJob_Format | -1900 231 | 707 | -364 996 | 742 | 1862193 | 711 | 410956 | 856 |
| Average_Days_of_Sick_Paid_Leave | 6714389 | 084 | -601943 | 159 | -728 027 | 906 | 992201 | 680 |
| Average_Days_of_Other_Pard_Leave | -736964 | 897 | 720731 | 041 | -4633283 | 031 | -1245057 | 186 |
| Average_Days_of_Unpard_Leave | 1406698 | 189 | 306395 | 574 | -2743 023 | 184 | 331457 | 703 |
| Turnover | 62137114 | 195 | 16309786 | 068 | -7707631 | 819 | 3591493 | 752 |
| Median_Overall_Satısfaction | -50630289 | 001 | 3188634 | 483 | 10822432 | 604 | 15485431 | 140 |
| Medıan_Compensation_Satisfaction | 10646929 | 565 | -5145699 | 184 | -30911 077 | 169 | -29971079 | 001 |
| Organızation_Age | -357965 | 570 | 492790 | 004 | -269 043 | 521 | 411373 | 059 |
| Total_Number_of_Employees | -50421 | 820 | -12783 | 766 | -24724 | 929 | -4 087 | 974 |
| Percentage_ExportSales | 686782 | 324 | 1540713 | 000 | -3159 019 | 219 | -862891 | 047 |
| Proportion_Employees_Using_Computers | 102327956 | 003 | -3370 912 | 744 | 40018874 | 285 | -14082 698 | 349 |
| Average_Age_Workforce | 909213 | 538 | 226087 | 497 | -2022 485 | 159 | -1567 188 | 059 |
| Percent_Workers_Having_Young_Kıds | 344518 | 205 | -111302 | 112 | -399 428 | 242 | -130624 | 523 |
| Workplace_Average_Pay | 1308 | 000 | 1079 | 000 | 1212 | 000 | 1016 | 000 |
| Average_Family_Other_Income | 024 | 993 | -113 | 787 | 1101 | 500 | 5916 | 000 |
| Average_Workforce_Tenure | -1361830 | 428 | -1780 132 | 001 | -737490 | 739 | 50593 | 960 |
| Sum_HR_Practices_Compensation | -6945810 | 253 | 414309 | 840 | -5208617 | 566 | -6261960 | 117 |
| Sum_HR_Practices_Organızation_of_Work | -13327166 | 005 | -1502859 | 342 | -675 638 | 915 | -795 212 | 780 |
| Average_Workplace_Promotions | 953352 | 921 | 1531311 | 508 | -9951 743 | 255 | 3064093 | 493 |
| Proportion_Fultime_HighSkilled_Workers | 16022136 | 506 | 4649281 | 469 | 18524034 | 472 | -23889 783 | 067 |
| Proportion_Unionized_Workforce | 46760012 | 020 | 16416998 | 009 | -20101 302 | 427 | -548683 | 968 |

Table C 17 - Determinants of Productıvity Summary Cross-Sectional Regression Coefficients

| Transportation, warehousing, wholesale |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 402 | $\mathrm{N}=$ | 396 | $\mathrm{N}=$ | 415 | $\mathrm{N}=$ | 486 |
|  | Coefficients | Sıg | Coefficients | Sıg | Coefficıents | Sig | Coefficıents | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Training_for_Job | 927961 | 037 | 436255 | 050 | 157891 | 507 | 449143 | 082 |
| Percent_Workers_Claımıng_Avaılability_Traınıng_Increased | 1572008 | 000 | -726044 | 000 | -441059 | 036 | -460 648 | 050 |
| Average_Expenditure_for_Training | 93121 | 000 | - 246 | 966 | 46187 | 002 | 23575 | 142 |
| Proportion_Employees_Receiving_Classroom_Training | 34783748 | 472 | 10066727 | 540 | -65206332 | 024 | -103300 777 | 000 |
| Proportion_Employees_Receiving_OntheJob_-Trainıng | 52331932 | 234 | 7509638 | 542 | 18641230 | 462 | 65708851 | 006 |
| Sum_Courses_in_Classroom_Format | -2648 281 | 685 | 2251939 | 379 | 4457321 | 297 | 7438429 | 043 |
| Sum_Courses_in_OntheJob_Format | -6226986 | 336 | 2970661 | 268 | -4315452 | 259 | -6541944 | 141 |
| Average_Days_of_Sick_Paid_Leave | 33142656 | 000 | 489595 | 831 | -1067554 | 247 | -2075078 | 544 |
| Average_Days_of_Other_Pard_Leave | 6155177 | 439 | 2609259 | 031 | -626852 | 271 | -359 940 | 579 |
| Average_Days_of_Unpaid_Leave | -2365030 | 570 | -4488491 | 018 | -2135 888 | 295 | 658211 | 657 |
| Turnover | 49197355 | 482 | 19722224 | 357 | 38873563 | 286 | -81972 670 | 061 |
| Medıan_Overall_Satısfaction | 62774237 | 015 | 21926665 | 099 | 28844833 | 069 | -19460 065 | 185 |
| Median_Compensation_Satisfaction | 23936342 | 373 | 33611708 | 017 | 7810743 | 645 | 15562688 | 263 |
| Organızatıon_Age | 882884 | 316 | 436418 | 221 | 624503 | 031 | 487316 | 073 |
| Total_Number_of_Employees | -120429 | 554 | 20218 | 760 | 81921 | 326 | 117610 | 180 |
| Percentage ExportSales | -2168031 | 001 | -27977 | 888 | -145795 | 675 | 92176 | 696 |
| Proportion_Employees_Using_Computers | -130528 267 | 004 | 9605753 | 564 | 8568273 | 697 | 38017891 | 066 |
| Average_Age Workforce | -5571559 | 012 | -1048839 | 298 | -318689 | 805 | -2149631 | 096 |
| Percent_Workers_Having_Young_Kıds | -980689 | 114 | 542339 | 044 | 188564 | 502 | 464254 | 142 |
| Workplace_Average_Pay | 3316 | 000 | 762 | 001 | 639 | 029 | 1500 | 000 |
| Average_Famuly_Other_Income | -1842 | 734 | -334 | 676 | -536 | 632 | -1299 | 420 |
| Average_Workforce_Tenure | -1712857 | 542 | 3437264 | 002 | -1409857 | 293 | 3420269 | 007 |
| Sum_HR_Practices_Compensation | 18351003 | 156 | 4780297 | 342 | 6785259 | 321 | -9286568 | 131 |
| Sum_HR_Practices_Organızatıon_of_Work | -9446591 | 349 | -5963 876 | 136 | 7035851 | 160 | -8959612 | 075 |
| Average_Workplace_Promotions | 2552668 | 877 | 804484 | 912 | -6331221 | 312 | -11756333 | 033 |
| Proportıon_Fulltıme HıghSkılled_Workers | -131218 423 | 007 | -32687520 | 116 | -39064 183 | 129 | -62065 361 | 014 |
| Proportion_Uniontzed_Workforce | -131661881 | 030 | 62454629 | 003 | 42632764 | 146 | 58029295 | 037 |


| Table C 18 -Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Communication and other utilities |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 109 | $\mathrm{N}=$ | 126 | $\mathrm{N}=$ | 153 | $\mathrm{N}=$ | 129 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claimıng_Too_Little_Traming_for_Job | 399847 | 708 | -343411 | 206 | -59 820 | 850 | 94247 | 758 |
| Percent_Workers_Claimıng_Availability_Training_Increased | -239 653 | 832 | 197268 | 451 | -213983 | 400 | 218981 | 507 |
| Average_Expenditure_for_Trammg | 4340 | 859 | -4247 | 653 | 3868 | 745 | 12835 | 330 |
| Proportion_Employees_Receiving_Classroom_Training | 46362544 | 661 | 7402236 | 788 | 34697114 | 294 | -2352 526 | 924 |
| Proportion_Employees_Receiving_OntheJob_Traning | -14193 450 | 885 | 43914530 | 092 | 84838591 | 003 | 8965444 | 767 |
| Sum_Courses_In_Classroom_Format | -10882210 | 492 | -1313119 | 731 | -8014150 | 101 | 7792252 | 027 |
| Sum_Courses_1n_OntheJob_Format | 17530362 | 236 | -4485 834 | 310 | 6794776 | 148 | 457579 | 918 |
| Average_Days_of_Sick_Pard_Leave | -1810916 | 741 | -2472 824 | 366 | 713809 | 787 | -707059 | 612 |
| Average_Days_of_Other_Paid_Leave | 4395300 | 491 | -175628 | 840 | -1831708 | 299 | -1460 029 | 588 |
| Average_Days_of_Unpaid_Leave | 2900674 | 629 | 134418 | 895 | 3424344 | 420 | -1710227 | 379 |
| Turnover | -36447 190 | 570 | -34471 344 | 383 | 6027522 | 890 | -5990 849 | 898 |
| Median_Overall_Satisfaction | -12297 157 | 832 | -8326 284 | 596 | 7099911 | 728 | -44217563 | 039 |
| Median_Compensation_Satisfaction | -8451 788 | 892 | -3976 718 | 816 | 33744879 | 088 | 3118139 | 908 |
| Organization_Age | 2285023 | 172 | -333719 | 335 | -409 984 | 177 | -183604 | 592 |
| Total_Number_of_Employees | -28185 | 871 | 366457 | 000 | 246007 | 003 | 29825 | 714 |
| Percentage_ExportSales | -636218 | 808 | 182821 | 615 | 160895 | 767 | -1941262 | 006 |
| Proportion_Employees_Using_Computers | 81588542 | 355 | 27261916 | 395 | -38059 961 | 197 | -52144 454 | 138 |
| Average_Age_Workforce | -206191 | 972 | -1061517 | 385 | -101630 | 948 | -2499 034 | 097 |
| Percent_Workers_Having_Young_Kıds | 1099016 | 364 | 54658 | 848 | 1041685 | 011 | -916 116 | 011 |
| Workplace_Average_Pay | 3399 | 154 | 1268 | 009 | 2469 | 000 | 1844 | 000 |
| Average_Family_Other_Income | 5364 | 491 | -929 | 568 | -7445 | 022 | -1119 | 466 |
| Average_Workforce_Tenure | -4613628 | 489 | 1722906 | 377 | -525 192 | 807 | 2435990 | 200 |
| Sum_HR_Practices_Compensation | -9683 460 | 781 | -11611226 | 083 | -12948890 | 311 | 6112819 | 504 |
| Sum_HR_Practices_Organization_of_Work | -5964 141 | 821 | 2965138 | 517 | 9362132 | 181 | 2326524 | 729 |
| Average_Workplace_Promotions | 917555 | 954 | -990 441 | 898 | -20574 643 | 062 | -619944 | 956 |
| Proportion_Fulltime_HıghSkilled_Workers | -80941 838 | 343 | 36435539 | 175 | -16222264 | 623 | -26648633 | 369 |
| Proportion_Unionized_Workforce | -101037435 | 397 | -25797457 | 264 | -59374 238 | 058 | -32039 530 | 275 |

Table C 19 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients

| Retal trade and consumer services |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 278 | $\mathrm{N}=$ | 252 | $\mathrm{N}=$ | 275 | $\mathrm{N}=$ | 333 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too_Little_Tramıng_for_Job | -99 361 | 652 | -217968 | 241 | 82438 | 662 | 52076 | 601 |
| Percent_Workers_Claımıng_Availability_Trainıng_Increased | 175514 | 376 | 399940 | 026 | -117728 | 431 | -108638 | 241 |
| Average_Expenditure_for_Traming | 40480 | 108 | 78617 | 000 | 11945 | 357 | 4326 | 539 |
| Proportion_Employees_Receiving_Classroom_Training | -49796 323 | 019 | 11881353 | 411 | 24994750 | 040 | -10387193 | 259 |
| Proportion_Employees_Receiving_OntheJob_Traning | -7417528 | 698 | -5207399 | 464 | -13602071 | 189 | -1305920 | 868 |
| Sum_Courses_1n_Classroom_Format | 3941663 | 169 | -1293 441 | 545 | -513713 | 816 | 913805 | 493 |
| Sum_Courses_1n_OntheJob_Format | -1287345 | 656 | -4271 560 | 047 | -356463 | 873 | 1597718 | 199 |
| Average_Days_of_Sick_Pard_Leave | -3219 330 | 274 | 5458863 | 006 | -654 683 | 680 | 1915124 | 234 |
| Average_Days_of_Other_Pard_Leave | 289746 | 914 | -979 848 | 187 | -943961 | 671 | -451609 | 494 |
| Average_Days_of_Unpard_Leave | -899840 | 134 | 164262 | 851 | 293453 | 772 | -474 456 | 223 |
| Turnover | -333827 | 986 | -10671186 | 306 | -10290 415 | 499 | 4663194 | 650 |
| Median_Overall_Satsfaction | -4098 272 | 783 | 14720097 | 194 | 3016747 | 807 | -5001 843 | 430 |
| Medran_Compensation_Satisfaction | -10193269 | 396 | -61533387 | 000 | 782994 | 932 | -4696043 | 413 |
| Organization_Age | 123750 | 764 | -678919 | 025 | 311931 | 131 | -209 138 | 077 |
| Total_Number_of_Employees | 311750 | 040 | 71019 | 331 | 124053 | 116 | 32704 | 409 |
| Percentage_ExportSales | -1247271 | 120 | 126096 | 756 | -115924 | 773 | -242929 | 412 |
| Proportion_Employees_Using_Computers | 40505969 | 010 | 11983667 | 321 | 24436007 | 056 | 8288164 | 263 |
| Average_Age_Workforce | 169439 | 836 | 1793988 | 008 | -180011 | 795 | 205577 | 525 |
| Percent_Workers_Having_Young_Kıds | 7076 | 976 | 69392 | 738 | 459091 | 054 | 158623 | 219 |
| Workplace_Average_Pay | 4329 | 000 | 1276 | 001 | 1955 | 000 | 1186 | 000 |
| Average_Family_Other_Income | 323 | 638 | -1091 | 388 | -108 | 910 | 009 | 978 |
| Average_Workforce_Tenure | 1452661 | 342 | -2221 352 | 088 | -1027461 | 386 | 623475 | 258 |
| Sum_HR_Practices_Compensation | 917956 | 863 | -2209 813 | 582 | -6087 777 | 150 | 7293662 | 005 |
| Sum_HR_Practices_Organization_of _Work | -4646 956 | 220 | -5263 720 | 057 | -2051 628 | 511 | -2729 619 | 079 |
| Average_Workplace_Promotions | -18793 460 | 015 | 18759128 | 000 | 21954823 | 001 | 5004915 | 017 |
| Proportion_Fullime_HıghSkilled_Workers | -16235462 | 452 | -1588 665 | 925 | -12341 723 | 415 | -226982 | 980 |
| Proportion_Unionized_Worhforce | -54213914 | 004 | -17147201 | 194 | -11678 626 | 386 | -1364 195 | 868 |


| Table C 110 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Finance and insurance |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 203 | $\mathrm{N}=$ | 250 | $\mathrm{N}=$ | 240 | $\mathrm{N}=$ | 273 |
|  | Coefficients | Sig | Coefficients | Sig | Coetficients | Sig | Coefficients | SIg |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claumıng_Too_Little_Traning_for_Job | 846946 | 176 | 730475 | 005 | -764 855 | 016 | -31771 | 934 |
| Percent_Workers_Clauming_Availability_Traming_Increased | -217502 | 794 | 162254 | 510 | -394298 | 118 | 371437 | 224 |
| Average_Expenditure_for_Traming | 9761 | 706 | -3111 | 813 | 9884 | 315 | 3228 | 795 |
| Proportion_Employees_Receiving_Classroom_Training | -1754 129 | 976 | -6208964 | 772 | -80729 112 | 000 | -65699 440 | 006 |
| Proportion_Employees_Receiving OntheJob_Training | -9991 054 | 829 | -28729925 | 161 | 22065786 | 192 | 35139969 | 146 |
| Sum_Courses_1n_Classroom_Format | -687633 | 925 | 1645813 | 602 | 1799628 | 547 | 2750438 | 359 |
| Sum_Courses_1n_OntheJob_Format | -6949474 | 330 | 5235203 | 172 | 4960102 | 102 | 2501242 | 427 |
| Average_Days_of_Sick_Pard_Leave | -1663757 | 726 | 8914867 | 002 | -4116 492 | 246 | 2995102 | 178 |
| Average_Days_of_Other_Paid_Leave | -3599 053 | 314 | -189 347 | 884 | 1240954 | 265 | -2571 441 | 139 |
| Average_Days_of_Unpaid_Leave | -886 698 | 814 | 2888869 | 111 | -1286853 | 308 | 2919328 | 281 |
| Turnover | -143847 316 | 522 | -59455 253 | 198 | 36522998 | 678 | -180825067 | 020 |
| Median_Overall_Satısfaction | -52789 423 | 300 | 13998441 | 416 | 15749819 | 398 | 20905907 | 262 |
| Median_Compensation_Satısfaction | 57325341 | 227 | -20447410 | 164 | -10041 748 | 612 | -8099 905 | 730 |
| Organızation_Age | 311967 | 765 | -881 162 | 001 | -256454 | 286 | -100646 | 721 |
| Total_Number_of_Employees | 394885 | 005 | 115254 | 083 | 42867 | 463 | 152311 | 028 |
| Percentage_ExportSales | 1741956 | 408 | -626606 | 315 | -310028 | 676 | 2596121 | 006 |
| Proportion_Employees_Using_Computers | 78058400 | 180 | 71388807 | 020 | -41411242 | 253 | 138889152 | 016 |
| Average_Age_Workforce | -5427 155 | 175 | 1355309 | 259 | 5218949 | 000 | 1769313 | 126 |
| Percent_Workers_Having_Young_Kids | -977342 | 233 | 38963 | 886 | -552157 | 158 | -1644 292 | 000 |
| Workplace_Average_Pay | -407 | 768 | 1047 | 001 | 773 | 009 | 1098 | 000 |
| Average_Family_Other_Income | 6440 | 223 | 2099 | 049 | 1235 | 239 | 833 | 311 |
| Average_Workforce_Tenure | 513309 | 922 | 1343164 | 523 | -2927 749 | 104 | -6950417 | 000 |
| Sum_HR_Practices_Compensation | -13911886 | 392 | 16030168 | 014 | -10577282 | 145 | -22245 584 | 003 |
| Sum_HR_Practices_Organization_of_Work | -7198 209 | 528 | 3326703 | 533 | -2858458 | 538 | -6505 494 | 189 |
| Average_Workplace_Promotions | -622 500 | 980 | -874946 | 897 | -2402 259 | 729 | 20066265 | 028 |
| Proportion_Fullime_HighSkilled_Workers | 85686569 | 324 | 4790497 | 854 | 72991415 | 008 | -44228990 | 135 |
| Proportion_Unionized Workforce | 385472 | 993 | -62752609 | 001 | -88003 873 | 002 | -67185 809 | 025 |


| Table C 111 - Determmants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Real estate, rental and leasing operations |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 122 | $\mathrm{N}=$ | 104 | $\mathrm{N}=$ | 102 | $\mathrm{N}=$ | 109 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too Little_Training_for_Job | 542746 | 469 | 633433 | 159 | 57137 | 936 | -464 798 | 360 |
| Percent_Workers_Claıming_Availability_Training_Increased | -738997 | 493 | 1277588 | 072 | 89344 | 900 | -272269 | 518 |
| Average_Expenditure_for_Traning | 65714 | 318 | 39002 | 181 | 147219 | 045 | 5554 | 912 |
| Proportion_Employees_Receiving_Classroom_Training | 22899784 | 743 | -101606 464 | 163 | -12906211 | 894 | 68067130 | 224 |
| Proportion_Employees_Receiving_OntheJob_Training | -102632 081 | 236 | 76230658 | 244 | 111985423 | 117 | 106960130 | 058 |
| Sum_Courses_1n_Classroom_Format | 17000602 | 264 | 14878231 | 195 | 3552171 | 790 | -9570 892 | 238 |
| Sum_Courses_1n_OntheJob_Format | -12960 186 | 331 | -20680210 | 089 | -9701943 | 377 | -3470 270 | 617 |
| Average_Days_of_Sick_Paid_Leave | 32676470 | 025 | -24841 775 | 025 | 4593234 | 693 | -10103 022 | 218 |
| Average_Days_of_Other_Paid_Leave | -44604 934 | 098 | 28178481 | 035 | -6935347 | 696 | 8323113 | 400 |
| Average_Days_of_Unpat_Leave | -2104 048 | 539 | -555 409 | 936 | 687384 | 901 | -6222 116 | 259 |
| Turnover | -17452 435 | 898 | 9213408 | 886 | 30045082 | 833 | -12032 464 | 914 |
| Median_Overall_Satısfaction | 14842287 | 780 | 54504381 | 141 | 6843178 | 872 | -7588 320 | 790 |
| Median_Compensation_Satısfaction | -114938 435 | 060 | -12974278 | 688 | -31477558 | 605 | -19257 468 | 611 |
| Organzation_Age | 820208 | 671 | 5405026 | 000 | 404960 | 683 | 1009485 | 215 |
| Total_Number_of_Employees | 11288 | 954 | 180415 | 421 | -495898 | 172 | -108010 | 623 |
| Percentage_ExportSales | 3463408 | 017 | -45437 | 958 | 465675 | 709 | -2146 161 | 265 |
| Proportion_Employees_Using_Computers | 28876926 | 709 | 37110328 | 551 | -17692379 | 777 | -14960 282 | 754 |
| Average_Age_Workforce | -9184424 | 008 | -388286 | 889 | 2359635 | 463 | -70 203 | 971 |
| Percent_Workers_Having_Young_Kıls | 289750 | 721 | -490 901 | 512 | -762 300 | 324 | 578992 | 420 |
| Workplace_Average_Pay | 5025 | 000 | 1175 | 055 | 2864 | 001 | 1323 | 013 |
| Average_Family_Other_Income | -4 097 | 424 | -1570 | 202 | 2434 | 500 | -5794 | 086 |
| Average_Workforce_Tenure | 14963087 | 051 | -4860 718 | 271 | 4378061 | 425 | -1178 688 | 699 |
| Sum_HR_Practices_Compensation | 26136791 | 256 | 2933821 | 846 | -18297412 | 320 | 13493119 | 324 |
| Sum_HR_Practices_Organization_of_Work | 2718115 | 873 | 6789083 | 572 | 10548003 | 527 | 11709246 | 187 |
| Average_Workplace_Promotions | 5616437 | 867 | -4372 716 | 862 | 2891603 | 916 | -11857 740 | 278 |
| Proportion_Fulltime_HighSkilled_Workers | -14467056 | 873 | -56077 925 | 387 | -23321 171 | 713 | 61803847 | 220 |
| Proportion_Unıonızed_Workforce | 31675072 | 718 | -117413 164 | 094 | -130883 381 | 211 | -11392 352 | 876 |


| Business services |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 219 | $\mathrm{N}=$ | 216 | $\mathrm{N}=$ | 254 | $\mathrm{N}=$ | 287 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Trannıg_for_Job | 1908487 | 034 | -612 186 | 582 | -1075 936 | 327 | -964 526 | 425 |
| Percent_Workers_Claimıng_Availability_Trannng_Increased | 737117 | 430 | -293 056 | 807 | -1038995 | 264 | 111806 | 915 |
| Average_Expenditure_for_Tranıng | -32813 | 489 | -28536 | 598 | -67712 | 281 | -16393 | 768 |
| Proportion_Employees_Receiving_Classroom_Training | 62836342 | 290 | -31068 478 | 806 | 14354084 | 870 | 122691673 | 163 |
| Proportion_Employees_Receiving_OntheJob_Tramıng | -101571 506 | 107 | 51582789 | 635 | 49898572 | 546 | 36777874 | 623 |
| Sum_Courses_m_Classroom_Format | -7973 644 | 456 | -4079 209 | 822 | 3871253 | 775 | -19604761 | 258 |
| Sum_Courses_ın_OntheJob_Format | 15294419 | 198 | 1098901 | 951 | 279765 | 985 | -5578360 | 724 |
| Average_Days_of_Sick_Paid_Leave | -16889 121 | 269 | 26720305 | 023 | -14609 476 | 379 | -4632640 | 773 |
| Average_Days_of_Other_Paid_Leave | -4310875 | 720 | 738952 | 909 | -17437798 | 153 | -8992656 | 608 |
| Average_Days_of_Unpaid_Leave | -1197410 | 724 | -653186 | 959 | -3134 167 | 699 | 3873422 | 509 |
| Turnover | 81044619 | 437 | -3365 290 | 982 | -250319 472 | 160 | -154029 937 | 261 |
| Median_Overall Satıfaction | -49002 234 | 391 | 48874485 | 444 | 31257042 | 635 | 33074478 | 620 |
| Median_Compensation_Satisfaction | 48763179 | 367 | -54610 475 | 440 | 16726706 | 729 | -59222 081 | 358 |
| Organization_Age | 9394048 | 001 | 2831622 | 096 | 2917141 | 051 | 1705310 | 166 |
| Total_Number_of_Employees | 143940 | 545 | 84295 | 667 | -17780 | 923 | 97583 | 592 |
| Percentage_ExportSales | 418428 | 638 | 197624 | 884 | -347434 | 735 | 189410 | 845 |
| Proportion_Employees_Using_Computers | -20117891 | 768 | 32678933 | 748 | 69276978 | 453 | 42124380 | 706 |
| Average_Age_Workforce | -877 070 | 821 | 9791062 | 050 | -7622 700 | 106 | -2429 743 | 613 |
| Percent_Workers_Having_Young_Kids | -103003 | 926 | 1329839 | 373 | 1431398 | 218 | 110930 | 930 |
| Workplace_Average_Pay | 4271 | 000 | 3184 | 004 | 5016 | 000 | 3707 | 000 |
| Average_Family_Other_Income | 1695 | 608 | -1 309 | 744 | -4777 | 384 | -220 | 958 |
| Average_Workforce_Tenure | -7276789 | 331 | -4590 535 | 592 | 2206951 | 751 | -4500 844 | 545 |
| Sum_HR_Practices_Compensation | 45305758 | 016 | 17081079 | 479 | -4812 494 | 850 | 127779 | 996 |
| Sum_HR_Practices_Organization_of_Work | -17712 151 | 132 | -7713882 | 769 | -6998 287 | 759 | 11280306 | 519 |
| Average_Workplace_Promotions | -21005850 | 450 | 73030113 | 114 | 14147360 | 640 | 33798433 | 106 |
| Proportion_Fulltıme_HighSkilled_Workers | -258859 455 | 002 | -47703 348 | 623 | -132557 244 | 149 | -74300 575 | 452 |
| Proportion_Unionized_Workforce | -214800979 | 312 | -204450 547 | 238 | 12674998 | 917 | 36068664 | 784 |


| Education and health services |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 35 | $\mathrm{N}=$ | 38 | $\mathrm{N}=$ | 47 | $\mathrm{N}=$ | 62 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too_Little_Training_for_Job | -395 445 | 277 | -218 043 | 610 | -538459 | 028 | -311922 | 573 |
| Percent_Workers_Claımıng_Avallability_Tranning_Increased | 347836 | 244 | -46870 | 822 | -506448 | 024 | -370215 | 347 |
| Average_Expenditure_for_Traming | 41035 | 078 | 18412 | 283 | 19810 | 123 | -136886 | 027 |
| Proportion_Employees_Receiving_Classroom_Traming | 42424749 | 051 | -11374 453 | 503 | -16974 651 | 385 | 93532073 | 114 |
| Proportion_Employees_Receiving_OntheJob_Tranıng | 21370364 | 446 | 4168998 | 803 | 22271339 | 250 | 61085843 | 162 |
| Sum_Courses_in_Classroom_Format | -1711247 | 594 | 21035 | 993 | -1388887 | 673 | -8634000 | 271 |
| Sum_Courses_1n_OntheJob_Format | -3955 308 | 366 | 1943494 | 364 | 1213715 | 768 | 6772972 | 452 |
| Average_Days_of_Sick_Paid_Leave | 936277 | 305 | 2280404 | 297 | -2482 327 | 248 | -4920 787 | 462 |
| Average_Days_of_Other_Paid_Leave | 3216825 | 674 | -2106 739 | 729 | -3093 800 | 051 | 9584416 | 507 |
| Average_Days_of_Unpaid_Leave | -2026928 | 155 | -157953 | 935 | -1687814 | 299 | 3228413 | 485 |
| Turnover | -27356247 | 687 | -240358 | 996 | -83536719 | 028 | 37613629 | 701 |
| Median_Overall_Satıfaction | -24432 019 | 055 | -1325 084 | 929 | -55379 545 | 001 | 47898892 | 078 |
| Median_Compensation_Satisfaction | -5862 779 | 612 | 5608363 | 629 | 37280795 | 021 | -9052 060 | 754 |
| Organızation_Age | 890520 | 210 | -173904 | 602 | 149270 | 671 | 941436 | 286 |
| Total_Number_of_Employees | 1650 | 924 | -33 322 | 321 | 29988 | 316 | -96283 | 372 |
| Percentage ExportSales | 883558 | 853 | 9769295 | 427 | -5902 461 | 818 | 663402 | 397 |
| Proportion_Employees_Using_Computers | 65476938 | 040 | 70730005 | 000 | -95482936 | 016 | -1404235 | 977 |
| Average_Age_Workforce | -430 044 | 746 | -723 113 | 483 | -813015 | 454 | 2045592 | 318 |
| Percent_Workers_Having_Young_Kids | 323253 | 440 | 152710 | 591 | 959 | 996 | 969975 | 153 |
| Workplace_Average_Pay | -136 | 851 | 210 | 643 | 3510 | 001 | 2249 | 037 |
| Average_Family_Other_Income | 3517 | 036 | 2437 | 180 | -663 | 490 | -275 | 956 |
| Average_Workforce_Tenure | 995753 | 716 | 999737 | 612 | 1760298 | 321 | 1948037 | 644 |
| Sum_HR_Practices_Compensation | -6575 921 | 610 | -10710600 | 096 | -18788344 | 018 | 37486858 | 024 |
| Sum_HR_Practices_Organization_of_Work | 6069904 | 260 | -1852821 | 601 | 2325141 | 557 | -21697677 | 053 |
| Average_Workplace_Promotions | -1107370 | 935 | -23033 917 | 209 | 7511978 | 316 | 15867480 | 454 |
| Proportion_Fulltime_HighSkilled_Workers | -56071 580 | 083 | -972 016 | 956 | 1801957 | 931 | 83613960 | 083 |
| Proportion_Unıonized_Workforce | -35571 482 | 134 | 12721405 | 478 | -31949 690 | 169 | 371695 | 994 |


| Table C 114 - Determinants of Productivity Summary Cross-Sectional Regression Coefficients |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Information and cultural industries |  |  |  |  |  |  |  |  |
|  |  | 1999 |  | 2001 |  | 2003 |  | 2005 |
|  | $\mathrm{N}=$ | 135 | $\mathrm{N}=$ | 138 | $\mathrm{N}=$ | 139 | $\mathrm{N}=$ | 152 |
|  | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig | Coefficients | Sig |
|  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claımıng_Too_Little_Training_for _Job | -67 796 | 750 | -25 290 | 842 | 60632 | 856 | -75 670 | 848 |
| Percent_Workers_Claimıng_Availability_Trainıng_Increased | 41402 | 870 | -231 121 | 010 | 283832 | 228 | -261 737 | 403 |
| Average_Expenditure_for_Training | 28073 | 025 | -2941 | 590 | -25 169 | 408 | -55 545 | 043 |
| Proportion_Employees_Receiving_Classroom_Traning | 10061203 | 631 | 19342924 | 101 | -2184 115 | 952 | 33544825 | 337 |
| Proportion_Employees_Receiving_OntheJob_Traming | -17666609 | 416 | -12973 465 | 169 | -5770 631 | 829 | 128192160 | 000 |
| Sum_Courses_in_Classroom_Format | -867231 | 786 | -43 403 | 972 | 4561415 | 403 | 4929818 | 397 |
| Sum_Courses_1n_OntheJob_Format | 1097256 | 686 | 1314231 | 311 | 3711108 | 353 | -17843807 | 001 |
| Average_Days_of_Sck_Paid_Leave | 628033 | 850 | -3642 235 | 013 | 2948431 | 352 | 710667 | 831 |
| Average_Days_of_Other_Paid_Leave | -1494440 | 366 | 5215927 | 000 | 2990609 | 092 | -1530610 | 785 |
| Average_Days_of_Unpaid_Leave | 469400 | 638 | 862252 | 199 | -40 428 | 979 | 5402742 | 006 |
| Turnover | -95762 930 | 006 | -2458072 | 865 | -1317914 | 971 | -204986 801 | 000 |
| Median_Overall_Satisfaction | -13238 323 | 231 | -6448511 | 340 | -44257697 | 017 | -44306 603 | 064 |
| Median_Compensation_Satisfaction | -3039 457 | 820 | -8463386 | 081 | 15914324 | 481 | -23767212 | 293 |
| Organization_Age | 48979 | 906 | -462353 | 002 | -427 536 | 187 | 490407 | 222 |
| Total_Number_of_Employees | -20928 | 572 | 36137 | 019 | -49 609 | 292 | 31322 | 620 |
| Percentage_ExportSales | 474608 | 092 | -216190 | 016 | -928 574 | 017 | -558930 | 143 |
| Proportion_Employees_Using_Computers | 4954310 | 747 | -13731209 | 135 | -20596083 | 456 | -100928 269 | 002 |
| Average_Age_Workforce | -2263 286 | 095 | -398372 | 260 | -525030 | 746 | 2488986 | 117 |
| Percent_Workers_Having_Young_Kıds | 121592 | 660 | 6779 | 945 | 386866 | 299 | -640 533 | 172 |
| Workplace_Average_Pay | 1034 | 001 | 1232 | 000 | 695 | 044 | 3292 | 000 |
| Average_Family_Other_Income | 1917 | 364 | 1247 | 087 | -4991 | 018 | 6955 | 007 |
| Average_Workforce_Tenure | 1323505 | 442 | 1609486 | 002 | 1611113 | 389 | -854 266 | 762 |
| Sum_HR_Practices_Compensation | 10956578 | 039 | 5343721 | 051 | -8506219 | 319 | 8201060 | 432 |
| Sum_HR_Practices_Organzation_of_Work | 4420116 | 212 | -4143500 | 008 | 12350225 | 048 | -3370 474 | 639 |
| Average_Workplace_Promotions | -2681512 | 683 | 6422170 | 101 | 1270147 | 886 | 15313372 | 128 |
| Proportion_Fulitıme_HighSkilled_Workers | 54095099 | 001 | -10129 193 | 206 | -46452 601 | 084 | -13170 200 | 717 |
| Proportion_Unionized_Workforce | -3925 148 | 815 | 4407781 | 578 | 10268875 | 656 | -76193 396 | 039 |

D. ORGANIZATION SECTOR -Summary Longitudinal Regressions Coefficients


| Table D 11 - Determınants of Productivity Summary Longitudinal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Forestry, minıng, oil, and gas extraction |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & \hline 2001 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & \hline 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 95 | $\mathrm{N}=$ | 87 | $\mathrm{N}=$ | 89 | $\mathrm{N}=$ | 73 | $\mathrm{N}=$ | 76 | $\mathrm{N}=$ | 67 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers Claimıng_Too_Little_Training_for_Job | 6778 | 571 | -25 5 | 965 | -295 5 | 442 | -30870 | 008 | -32908 | 000 | -29466 | 137 |
| Percent Workers_Claımıng_Availability_Training_Increased | 10422 | 262 | 1466 | 758 | -992 6 | 014 | 7174 | 476 | -2208 6 | 009 | -3443 6 | 044 |
| Average Expenditure for Trainıng | 160 | 228 | 12 | 912 | -30 | 830 | 154 | 231 | -11 | 957 | 439 | 263 |
| Proportion Employees Receiving Classroom Training | -8999 4 | 848 | -5457 7 | 831 | -5422 5 | 745 | 22967 | 955 | 850427 | 113 | -1137487 | 275 |
| Proportion_Employees Receiving OntheJob Traming | -264970 | 500 | -10809 | 972 | -169332 | 363 | -51914 1 | 421 | 680780 | 051 | 397068 | 629 |
| Sum_Courses_m_Classroom_Format | 102574 | 321 | 13685 | 833 | 6056 | 899 | -63749 | 610 | -181173 | 221 | 545758 | 012 |
| Sum Courses in OntheJob_Format | -13832 3 | 122 | 22416 | 791 | -5894 1 | 266 | -65576 | 463 | -107025 | 360 | -194148 | 315 |
| Average Days of Slick Paid Leave | -45260 | 559 | -51641 | 416 | . 73569 | 027 | 45891 | 662 | -183654 | 039 | -21402 1 | 048 |
| Average_Days_of_Other_Pard_Leave | 173014 | 018 | -16238 | 418 | -31628 | 161 | 2956 | 955 | -71825 | 032 | 200029 | 023 |
| Average Days_of_Unpaid_Leave | 88004 | 169 | 10765 | 758 | -100023 | 000 | -4820 | 953 | 350223 | 000 | 52508 | 656 |
| Turnover | 369510 | 749 | -51023 0 | 621 | 1264126 | 025 | 1808504 | 517 | 651717 | 539 | -1369012 | 623 |
| Median_Overall Satisfaction | 775525 | 147 | -9662 5 | 740 | 606545 | 005 | 485186 | 488 | -94875 | 082 | 2068693 | 043 |
| Median Compensation_Satisfaction | -18943 4 | 722 | 48748 | 914 | -26595 6 | 325 | 801 | 999 | -606092 | 394 | -128776 3 | 348 |
| Total Number of Employees | -5568 | 225 | -4284 | 430 | -422 7 | 128 | 7688 | 174 | 871 | 892 | 7677 | 334 |
| Percentage ExportSales | -10072 | 171 | -340 0 | 569 | - 2900 | 522 | -1767 | 902 | -2318 | 853 | -89814 | 000 |
| Proportion Employees Using Computers | -542637 | 713 | -1374606 | 065 | -815968 | 119 | -1560016 | 263 | 3638841 | 006 | -5036147 | 065 |
| Percent_Workers Having_Young_Kids | -2700 | 802 | -441 3 | 550 | 9084 | 040 | -669 8 | 600 | 24524 | 021 | 29600 | 250 |
| Workplace_Average_Pay | 20 | 013 | 09 | 294 | 30 | 000 | 41 | 001 | -04 | 794 | 37 | 049 |
| Average_Family Other Income | 13 | 788 | 20 | 470 | -10 | 561 | 50 | 408 | -129 | 001 | -75 | 449 |
| Average_Workforce Tenure | -55632 | 372 | -17940 | 575 | -2695 5 | 243 | -110779 | 150 | -24316 | 642 | 74856 | 388 |
| Sum_HR_Practices_Compensation | -27236 | 905 | 352780 | 008 | -272278 | 001 | 215261 | 444 | 300555 | 199 | -123442 | 776 |
| Sum_HR_Practices_Organization_ of Work | -8370 | 952 | 88548 | 320 | -53346 | 397 | -364786 | 109 | -22617 | 887 | 151120 | 651 |
| Average Workplace Promotions | 68919 | 765 | -74585 | 521 | -157192 | 089 | -329039 | 283 | -68742 | 730 | -40665 9 | 358 |
| Proportion Fulltime HighSkilled_Workers | -210262 | 801 | -40224 7 | 547 | 29736 | 948 | 1864081 | 128 | 6587729 | 000 | -34543 7 | 850 |
| Proportion_Unionized_Workforce | 2062315 | 067 | -101013 0 | 160 | -255126 | 842 | -42870 0 | 706 | 152392 | 905 | 3030270 | 073 |


|  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Table D 12 - Determınants of Productivity Summary Longitudinal (Differential) Regression Coeff <br> Labour intensive tertiary manufacturing |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{array}{r} 2003 \\ 1999 \\ \hline \end{array}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 158 | $\mathrm{N}=$ | 132 | $\mathrm{N}=$ | 133 | $\mathrm{N}=$ | 130 | $\mathrm{N}=$ | 119 | $\mathrm{N}=$ | 126 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent Workers Claiming Too Little Traming for Job | 2813 | 578 | -2242 | 364 | -771 | 444 | -9199 | 038 | -1435 | 625 | -7795 | 113 |
| Percent Workers Claiming Availability Training Increased | 4215 | 373 | 1382 | 533 | 331 | 716 | -5087 | 231 | 1206 | 625 | -1269 8 | 002 |
| Average_Expenditure_for_Tramıng | 666 | 082 | -159 | 509 | -10 | 944 | -19 | 948 | 136 | 536 | -358 | 153 |
| Proportion_Employees_Receiving_Classroom_Training | -20768 | 923 | 160327 | 511 | 250748 | 094 | -665595 | 142 | -179420 | 491 | 30186 | 952 |
| Proportion_Employees_Receiving_OntheJob_Traming | -626209 | 117 | -184359 | 448 | -29206 | 773 | 474626 | 217 | -120146 | 581 | 341785 | 400 |
| Sum Courses in Classroom Format | -1400 | 981 | 3532 | 924 | 2314 | 909 | 114165 | 104 | 7759 | 764 | 22149 | 715 |
| Sum Courses in OntheJob Format | -22147 | 775 | 17569 | 601 | 37797 | 041 | -54131 | 363 | 307 | 993 | -183801 | 002 |
| Average Days of Sick Paid Leave | -1648 | 928 | -11006 | 661 | 9063 | 208 | -3591 | 864 | 3572 | 878 | 28319 | 100 |
| Average_Days_of_Other_Padd_Leave | 27005 | 395 | -354 5 | 666 | -265 | 940 | -29562 | 540 | 13556 | 469 | -449 6 | 867 |
| Average Days of Unpald Leave | -1925 4 | 623 | 8107 | 672 | 2458 | 726 | -50199 | 230 | 8927 | 649 | 391 | 987 |
| Turnover | 687894 | 201 | 35347 | 911 | -35379 4 | 067 | 59489 | 924 | 935253 | 024 | -76979 6 | 290 |
| Median Overall Satisfaction | 113465 | 770 | 50713 | 710 | 84473 | 188 | -27564 | 913 | -47395 7 | 007 | -24067 7 | 330 |
| Median_Compensation_Satisfaction | -35434 0 | 315 | 142371 | 322 | 18200 | 743 | -12468 1 | 624 | -142629 | 396 | -6802 7 | 809 |
| Total Number of Employees | -1215 | 638. | 300 | 837 | 919 | 416 | 3425 | 265 | 1514 | 359 | 6512 | 008 |
| Percentage ExportSales | -3016 | 695 | -596 | 893 | -469 1 | 012 | 8013 | 273 | 6671 | 033 | 4776 | 408 |
| Proportion Employees_Using_Computers | -589774 | 416 | 578768 | 209 | -205583 | 284 | 419636 | 552 | 608989 | 106 | 357241 | 609 |
| Percent_Workers_Having_Young_Kids | 1828 | 774 | 2850 | 329 | -1558 | 250 | 3957 | 390 | 2196 | 518 | 99 | 985 |
| Workplace_Average_Pay | -08 | 481 | 12 | 069 | 20 | 000 | 27 | 017 | 05 | 204 | -12 | 166 |
| Average Family Other Income | -58 | 252 | -23 | 370 | -34 | 002 | 28 | 454 | -01 | 961 | -11 | 730 |
| Average_Workforce_Tenure | 22501 | 521 | 36735 | 019 | 302 | 964 | -23318 | 477 | 24334 | 219 | 12804 | 621 |
| Sum_HR_Practices_Compensation | 187906 | 275 | 139205 | 057 | -24775 | 448 | 28876 | 819 | 145769 | 041 | 4516 | 968 |
| Sum_HR_Practices_Organıation_of_Work | -15534 | 904 | -425 5 | 942 | -8965 | 750 | 147574 | 112 | -123815 | 023 | 63288 | 386 |
| Average Workplace Promotions | -398079 | 090 | -158931 | 074 | -7371 3 | 002 | 109401 | 280 | 106961 | 306 | 528099 | 018 |
| Proportion_Fulltime_HighSkilled Workers | -314823 | 655 | -388186 | 495 | 27538 | 891 | -479474 | 582 | -48622 6 | 193 | -88372 9 | 058 |
| Proportion_Unionzed_Workforce | -518146 | 504 | -12529 1 | 772 | 708183 | 143 | 947396 | 261 | 195091 | 645 | -70012 | 922 |




| Table D 15 - Determmants of Productivity Summary Longitudinal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & \hline 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 172 | $\mathrm{N}=$ | 146 | $\mathrm{N}=$ | 149 | $\mathrm{N}=$ | 141 | $\mathrm{N}=$ | 139 | $\mathrm{N}=$ | 136 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent Workers_Claiming_Too_Little Traming_for_Job | 2851 | 460 | -104 | 938 | 1336 | 198 | -259 | 960 | -1114 | 503 | -3364 | 519 |
| Percent Workers Claıming_Availability_Trainng_ Increased | -96 | 979 | 3258 | 003 | 431 | 652 | -5499 | 244 | 87 | 966 | -5566 | 400 |
| Average Expenditure for Training | -238 | 303 | 04 | 975 | 124 | 273 | 07 | 986 | 171 | 182 | 381 | 332 |
| Proportion_Employees_Receiving Classroom Training | -363294 | 410 | 265099 | 027 | 76961 | 447 | 427575 | 318 | 141033 | 470 | -1181729 | 079 |
| Proportion_Employees_Receiving_OntheJob_Traming | 80337 | 789 | 125558 | 189 | -27339 1 | 001 | -56728 8 | 110 | 25600 | 860 | -227100 | 555 |
| Sum_Courses_in_Classroom_Format | 16284 | 724 | -1860 1 | 288 | -8873 | 652 | -17417 | 800 | 16156 | 410 | 91521 | 306 |
| Sum Courses in OntheJob Format | 75436 | 162 | 23777 | 192 | -1689 6 | 285 | 92188 | 242 | -8642 5 | 000 | 79714 | 268 |
| Average_Days_of Sick Pand Leave | 22455 | 485 | -17744 | 140 | 6399 | 703 | -26507 | 717 | -4504 | 738 | -2214 | 962 |
| Average_Days_of_Other_Patd_Leave | 16130 | 588 | -2750 | 632 | -8470 | 180 | -2702 | 931 | -13956 | 224 | 7348 | 831 |
| Average_Days_of_Unpald_Leave | -26623 | 404 | -26843 | 031 | 10002 | 180 | -17002 | 623 | -7792 | 530 | 5029 | 881 |
| Turnover - | -121772 | 858 | 77480 | 645 | 73793 | 788 | -423937 | 675 | -134705 | 582 | 161860 | 862 |
| Median Overall Satisfaction | -530252 | 020 | -103749 | 149 | 37079 | 559 | -15152 | 958 | -15958 | 892 | -227059 | 510 |
| Median_Compensation_Satisfaction | 81521 | 669 | 8949 | 890 | 38845 | 456 | 180378 | 542 | -7879 5 | 411 | 122547 | 656 |
| Total Number of Employees | 913 | 648 | 1028 | 095 | 147 | 808 | 576 | 804 | -612 | 506 | 268 | 916 |
| Percentage_ExportSales | -796 | 864 | -3945 | 021 | 475 | 780 | 5299 | 527 | 1546 | 555 | -6812 | 347 |
| Proportion Employees Using Computers | 346266 | 611 | -497944 | 068 | -576374 | 019 | 3559 | 996 | 109522 | 751 | 170715 | 817 |
| Percent Workers Having_Young_Kıds | -324 | 926 | $-1180$ | 221 | 1888 | 040 | 5219 | 242 | 3358 | 055 | 4113 | 418 |
| Workplace_Average_Pay | 09 | 169 | 23 | 000 | 09 | 000 | -02 | 865 | 18 | 000 | 01 | 947 |
| Average Family_Other_ Income | 16 | 098 | 06 | 454 | -10 | 332 | 16 | 188 | 33 | 007 | 27 | 020 |
| Average Workforce Tenure | 13492 | 584 | -12108 | 170 | 6454 | 350 | -33475 | 324 | -2663 1 | 015 | 802 | 978 |
| Sum HR_Practices_Compensation | -117880 | 316 | -26818 | 485 | 67632 | 049 | 13870 | 931 | 14685 | 750 | -8341 | 961 |
| Sum_HR_Practices_Organızation_of_Work | -41604 | 522 | -5760 1 | 045 | 8441 | 689 | -12122 | 878 | -18457 | 521 | -32429 | 734 |
| Average_Workplace_Promotions | 68145 | 617 | 62847 | 085 | -77525 | 012 | 203134 | 248 | 99315 | 078 | 265855 | 150 |
| Proportion_Fulltime HighSkilled Workers | -331883 | 447 | -16223 1 | 369 | 137526 | 436 | 227580 | 629 | 45871 | 823 | 284457 | 641 |
| Proportion_Unionized_Workforce | 1307595 | 016 | -398976 | 237 | 36816 | 905 | 1181125 | 082 | 252153 | 507 | 801898 | 284 |



| Table C 17 - Determinants of Productivity Summary Longitudinal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{array}{r} 2001 \\ 1999 \\ \hline \end{array}$ |  | $\begin{aligned} & 2003 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \\ & \hline \end{aligned}$ |
|  | $\mathrm{N}=$ | 329 | $\mathrm{N}=$ | 303 | $\mathrm{N}=$ | 338 | $\mathrm{N}=$ | 305 | $\mathrm{N}=$ | 281 | $\mathrm{N}=$ | 285 |
|  | Coeff | Sig | Coeff | Stg | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeft | Stg |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent Workers_Claiming_Too Little_Traming for Job | -6920 | 082 | 218 | 921 | 3317 | 006 | -4536 | 117 | -914 | 712 | -1539 4 | 000 |
| Percent Workers_Claiming_Availability_Training Increased | 7458 | 069 | -1616 | 307 | 2131 | 024 | 1888 | 505 | -5720 | 008 | 15090 | 000 |
| Average Expenditure for Traning | 250 | 202 | 227 | 002 | -241 | 047 | 378 | 011 | 235 | 003 | 719 | 001 |
| Proportion_Employees_Receiving_Classroom_Training | 384791 | 220 | -218153 | 163 | 162389 | 173 | 1369677 | 000 | -49922 1 | 004 | 249831 | 482 |
| Proportion_Employees_Receiving_OntheJob_Training | 194428 | 499 | 192945 | 169 | -143506 | 143 | -439359 | 071 | 70062 | 618 | 97254 | 779 |
| Sum_Courses_in_Classroom_Format | -2772 | 964 | -1477 7 | 588 | 16327 | 342 | 34887 | 447 | -4089 9 | 273 | -24449 | 670 |
| Sum Courses in OntheJob Format | -39736 | 400 | -14303 | 582 | -36419 | 081 | -24383 | 491 | -6798 4 | 044 | -3502 1 | 535 |
| Average_Days_of_Sick Pard_Leave | 249838 | 000 | -1560 7 | 047 | -14422 | 376 | 106098 | 028 | 29276 | 259 | 78601 | 251 |
| Average Days_of_Other Paid_Leave | -21312 | 456 | -1629 | 744 | -1836 | 405 | 1950 | 824 | 34586 | 056 | -21132 | 020 |
| Average_Days_of Unpald_Leave | 1309 | 908 | 3641 | 448 | -660 1 | 283 | 7196 | 794 | 6415 | 167 | 11358 | 595 |
| Turnover | 583599 | 420 | 135335 | 574 | 270980 | 275 | 1944685 | 000 | 590600 | 108 | 692559 | 487 |
| Median Overall_Satisfaction | -127416 | 615 | 6167 | 959 | 70674 | 272 | 563661 | 002 | -9183 3 | 491 | 78725 | 690 |
| Median_Compensation_Satisfaction | -430529 | 071 | 288079 | 018 | 2184 | 973 | 149825 | 374 | -195964 | 170 | -68892 1 | 001 |
| Total_Number_of_Employees | 3661 | 481 | 653 | 826 | -2244 | 287 | -1358 | 683 | -5524 | 029 | -1788 | 600 |
| Percentage ExportSales | 23152 | 017 | 1667 | 689 | 6979 | 014 | -8759 | 319 | 16442 | 000 | -2078 0 | 009 |
| Proportion Employees_Using_Computers | 100610 | 849 | 109974 | 658 | 139683 | 524 | 13212 | 975 | -6254 7 | 810 | -980878 | 041 |
| Percent_Workers_Having_Young_Kıds | -5530 | 310 | -1485 | 484 | -5461 | 000 | -2724 | 416 | -3476 | 268 | -7325 | 096 |
| Workplace_Average_Pay | 11 | 165 | 14 | 000 | 20 | 000 | 33 | 000 | 14 | 000 | 27 | 000 |
| Average Family Other Income | 23 | 339 | 09 | 214 | -24 | 001 | -22 | 007 | -12 | 216 | -12 | 222 |
| Average_Workforce_Tenure | -10959 | 679 | 10856 | 250 | -2134 | 746 | 56380 | 006 | 21840 | 091 | -7900 | 749 |
| Sum_HR Practices_Compensation | -66354 | 620 | -3192 1 | 576 | -10068 | 816 | 104143 | 230 | -5821 6 | 187 | 124643 | 252 |
| Sum_HR_Practices_Organization of Work | -4918 1 | 573 | 52535 | 320 | -3841 8 | 220 | -11133 1 | 103 | -86457 | 084 | 30455 | 718 |
| Average_Workplace Promotions | -100717 | 550 | -25332 | 596 | -111323 | 000 | -54268 | 589 | 44878 | 501 | 10230 | 923 |
| Proportion Fulltime_HighSkilled_Workers | 661953 | 258 | -9353 4 | 720 | -547285 | 002 | -102273 1 | 004 | -10449 | 972 | -52885 7 | 250 |
| Proportion_Unionized_Workforce | -84294 1 | 243 | 1020882 | 151 | 851131 | 089 | -507085 | 356 | 2171017 | 000 | -79456 7 | 244 |


| Table D 18 - Determmants of Productivity Summary Longitudmal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Communication and other utilities |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & \hline 2001 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 89 | $\mathrm{N}=$ | 86 | $\mathrm{N}=$ | 87 | $\mathrm{N}=$ | 69 | $\mathrm{N}=$ | 74 | $\mathrm{N}=$ | 62 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers Claiming_Too_Little Trainung_for_Job | -7538 | 558 | 3627 | 190 | -3362 | 058 | 8494 | 504 | 5017 | 093 | -2499 | 852 |
| Percent Workers_Claiming Availability_Training_Increased | -3320 | 780 | 251 | 902 | -361 | 819 | -8205 | 617 | -4770 | 123 | -6575 | 774 |
| Average Expenditure for Training | 23 | 924 | 32 | 667 | -17 | 878 | -46 | 924 | 209 | 088 | -470 | 420 |
| Proportion Employees Receiving Classroom Trainıng | -589989 | 634 | 443097 | 115 | -251815 | 213 | 910993 | 729 | -56301 0 | 017 | 1342570 | 484 |
| Proportion_Employees Receiving OntheJob Training | 168128 | 870 | -100136 | 605 | 58121 | 793 | 351575 | 835 | 1153670 | 000 | 2862822 | 212 |
| Sum_Courses_in_Classroom_Format | -123209 | 397 | -4438 4 | 136 | -744 I | 795 | -59280 | 798 | 84202 | 026 | -22833 1 | 273 |
| Sum_Courses_1n OntheJob_Format | 94657 | 483 | 26657 | 458 | 59358 | 101 | 291451 | 301 | -113954 | 005 | -32599 8 | 247 |
| Average Days of Sick Pard Leave | 128889 | 089 | 1261 | 947 | 27051 | 080 | -28278 | 763 | -4100 0 | 034 | -88823 | 340 |
| Average_Days_of_Other Pard Leave | 18804 | 711 | -5453 | 443 | 6969 | 454 | -14397 | 831 | -265 8 | 794 | 38830 | 736 |
| Average_Days_of Unpard_Leave | 14792 | 728 | 3476 | 780 | -2239 4 | 382 | 21162 | 846 | -34902 | 354 | 142681 | 262 |
| Turnover | 60656 | 975 | 645036 | 284 | 146588 | 694 | 4135085 | 446 | -28419 7 | 623 | 45130 | 986 |
| Median_Overall Satıffaction | 179515 | 729 | 104789 | 470 | -108319 | 291 | 219 | 1000 | -12939 5 | 419 | 881542 | 547 |
| Median Compensation Satisfaction | -1918 | 997 | -3645 6 | 856 | -82789 | 458 | -172638 | 770 | 344647 | 208 | -1981183 | 188 |
| Total_Number_of_Employees | 1439 | 742 | 1860 | 461 | -805 1 | 016 | 4053 | 554 | 1441 | 545 | 218 | 979 |
| Percentage_ExportSales | -1703 3 | 433 | -973 | 861 | -3413 | 435 | -16714 | 730 | 21637 | 005 | -10280 | 771 |
| Proportion Employees Using Computers | 156421 | 893 | -15870 3 | 734 | -49720 0 | 067 | 919591 | 621 | -1236300 | 010 | -1700244 | 322 |
| Percent Workers Having_Young_Kıds | 5355 | 668 | 1512 | 600 | -438 | 869 | 6762 | 667 | 3977 | 147 | 40670 | 153 |
| Workplace_Average_Pay | 14 | 640 | 18 | 029 | 20 | 001 | 42 | 291 | 38 | 000 | 48 | 133 |
| Average Family_Other Income | -5 5 | 430 | 05 | 734 | -32 | 001 | 40 | 821 | -08 | 522 | 45 | 693 |
| Average Workforce Tenure | -4964 8 | 526 | 18041 | 297 | 34627 | 002 | -12709 9 | 260 | -39193 | 039 | 46167 | 730 |
| Sum_HR Practices_Compensation | -65943 | 821 | -15565 6 | 093 | 14218 | 830 | -383101 | 540 | 319505 | 002 | 179395 | 744 |
| Sum_HR_Practices_Organızation_of_Work | -112784 | 561 | -18352 | 672 | -410 5 | 896 | 129927 | 771 | -2898 7 | 636 | 501927 | 350 |
| Average_Workplace_Promotions | 134252 | 727 | 58743 | 432 | -27265 | 632 | -12524 | 948 | -3586 | 960 | 102115 | 710 |
| Proportion Fultime HighSkilled Workers | -819884 | 533 | -364567 | 191 | -237547 | 441 | 81047 | 954 | 4345 | 992 | -11450 1 | 949 |
| Proportion_Unionized_Workforce | 826135 | 631 | -53403 | 932 | 1097246 | 177 | 794137 | 775 | 476860 | 446 | 2168872 | 387 |




| Table D 111 - Determinants of Productivity SummaryLongitudinal (Differential) Regression Coeft |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Real estate, rental and leasing operations |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & \hline 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & \hline 2003 \\ & 1999 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & \hline 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 82 | $\mathrm{N}=$ | 75 | $\mathrm{N}=$ | 76 | $\mathrm{N}=$ | 73 | $\mathrm{N}=$ | 72 | $\mathrm{N}=$ | 70 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Stg | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent Workers Claıming_Too Little_Traming for_Job | -9087 | 249 | -2344 | 541 | 2704 | 374 | -2258 | 837 | -44 8 | 886 | -11702 | 268 |
| Percent_Workers_Claiming_Availability_Trainng__Increased | 2300 | 819 | -597 | 854 | -3640 | 178 | -19447 | 065 | -1652 | 594 | 8202 | 345 |
| Average Expenditure for Traming | -123 | 439 | -222 | 604 | 212 | 408 | -4 1 | 786 | 70 | 801 | -180 | 793 |
| Proportion Employees Receiving Classroom_Training | 480688 | 370 | -21860 1 | 707 | -1232069 | 000 | -56109 | 940 | 555133 | 111 | 1311602 | 181 |
| Proportion_Employees_Receiving OntheJob Traming | 307527 | 699 | -279848 | 495 | -22453 7 | 415 | 757357 | 311 | -12006 6 | 645 | -802582 | 236 |
| Sum_Courses_in_Classroom_Format | 114867 | 299 | 105983 | 032 | 63184 | 157 | 25876 | 852 | -23904 | 615 | -297911 | 020 |
| Sum_Courses in OntheJob_Format | -38576 | 763 | -39732 | 447 | 26761 | 560 | -2445 5 | 861 | -1049 | 978 | 129145 | 295 |
| Average_Days of Sick Paid Leave | -65062 | 595 | -4964 0 | 278 | -7990 | 611 | -39232 | 712 | 12410 | 729 | -22795 1 | 005 |
| Average Days of Other Pand Leave | 189959 | 144 | -17792 | 750 | -2575 | 953 | 18652 | 922 | 1061 | 985 | 217987 | 176 |
| Average_Days of Unnpard_Leave | -16723 | 694 | 39753 | 334 | 64658 | 044 | -362 1 | 905 | 22102 | 483 | -17217 | 633 |
| Turnover | 940549 | 604 | -30972 4 | 508 | 295241 | 568 | 775852 | 663 | -117086 | 709 | 2462813 | 072 |
| Median Overall Satisfaction | -46855 | 441 | -33959 9 | 119 | 195067 | 171 | 124530 | 835 | 311447 | 044 | -477035 | 319 |
| Median_Compensation Satisfaction | -625068 | 208 | -196940 | 304 | 106904 | 505 | -616919 | 522 | -51963 | 789 | 109986 | 843 |
| Total_Number of Employees | -372 | 917 | -853 | 820 | 3228 | 308 | -1130 | 674 | -1328 | 676 | 3844 | 127 |
| Percentage_ExportSales | 67378 | 018 | -7554 | 548 | -11281 | 422 | 14329 | 547 | -2920 | 756 | -31591 | 062 |
| Proportion Employees Using Computers | 1203200 | 490 | -781608 | 076 | 606340 | 184 | 86165 | 941 | 144674 | 735 | 4823456 | 000 |
| Percent_Workers Having_Young Kılds | -3809 6 | 008 | -10684 | 002 | 598 | 831 | -439 3 | 763 | -43 1 | 910 | 5779 | 628 |
| Workplace_Average_Pay | 00 | 997 | 05 | 386 | 10 | 053 | 13 | 502 | 06 | 135 | 10 | 405 |
| Average Family_Other_ Income | -08 | 896 | 00 | 999 | -05 | 694 | -32 | 564 | -13 | 147 | -10 | 784 |
| Average Workforce Tenure | 108189 | 088 | -6209 | 790 | 6128 | 760 | -13597 | 877 | 18911 | 377 | 168342 | 006 |
| Sum HR_Practices_Compensation | 173719 | 606 | 36867 | 680 | -68527 | 478 | -342185 | 147 | -10565 5 | 202 | -90528 | 607 |
| Sum_HR_Practices_Organızation_of_Work | 289552 | 156 | 80834 | 355 | -105002 | 056 | 160430 | 421 | -86676 | 138 | -355775 | 001 |
| Average_Workplace_Promotions | -250729 | 376 | 209038 | 111 | 57708 | 600 | 47949 | 899 | -17768 | 819 | -19269 4 | 341 |
| Proportion Fulltıme HighSkilled Workers | 790849 | 569 | 292351 | 641 | 582126 | 048 | 702527 | 705 | -242671 | 550 | 1138289 | 349 |
| Proportion_Unionized Workforce | -547168 | 750 | 50960 | 959 | 15510 | 979 | 907864 | 698 | -2125373 | 012 | 18862 | 992 |


| Table D 112 - Determunants of Productivity Summary Longitudinal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & \hline 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 167 | $\mathrm{N}=$ | 156 | $\mathrm{N}=$ | 194 | $\mathrm{N}=$ | 145 | $\mathrm{N}=$ | 152 | $\mathrm{N}=$ | 149 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claiming_Too Little Training for Job | 4140 | 725 | -6572 | 019 | -3591 | 632 | -13370 | 447 | -26323 | 030 | 5527 | 731 |
| Percent Workers Claiming Avalability Tranmg_ Increased | 4437 | 661 | 247 | 935 | -2658 | 585 | -192 | 987 | -2089 | 839 | -7729 | 634 |
| Average Expenditure for Training | -730 | 233 | -332 | 272 | -731 | 191 | -98 7 | 387 | 215 | 749 | -1292 | 144 |
| Proportion_Employees_Receiving_Classroom_Tranning | -64580 0 | 426 | -7659 3 | 847 | 330508 | 652 | -563164 | 654 | -45302 1 | 695 | 60347 | 960 |
| Proportion_Employees_Receving_OntheJob__Traming | 1399941 | 119 | -204942 | 525 | -594129 | 367 | 1475890 | 258 | -815743 | 323 | 351918 | 759 |
| Sum_Courses_in_Classroom_Format | 455923 | 000 | -268 | 997 | 41428 | 715 | 274404 | 140 | -281996 | 152 | 153398 | 424 |
| Sum Courses in_OntheJob Format | -264187 | 076 | 25899 | 610 | 33277 | 718 | -38959 7 | 048 | 210663 | 143 | -16085 6 | 406 |
| Average Days of Sick Pard Leave | 2653 | 983 | -23174 | 574 | -84252 | 422 | -95262 | 668 | 180831 | 111 | 144134 | 611 |
| Average Days_of_Other Paid_Leave | 54268 | 646 | 15134 | 685 | -23688 | 420 | -47423 | 788 | -147926 | 288 | -156873 | 271 |
| Average_Days_of Unpald_Leave | -35141 | 581 | -24109 | 484 | -16044 | 793 | -95379 | 146 | -30613 | 825 | 12888 | 871 |
| Turnover - | -956336 | 510 | 390609 | 374 | 279926 | 828 | -1193414 | 565 | 2055308 | 248 | -29339 3 | 892 |
| Medıan Overall Satisfaction | -37258 1 | 575 | -2094 | 915 | 24090 | 954 | -1655 7 | 983 | 1417061 | 111 | -163033 | 867 |
| Medran_Compensation_Satisfaction | 166196 | 804 | -6579 6 | 799 | 10701 | 974 | 667971 | 345 | -727030 | 316 | 843765 | 335 |
| Total_Number_of Employees | 327 | 944 | 1301 | 489 | -4505 | 381 | 1770 | 736 | -185 | 958 | 1297 | 731 |
| Percentage ExportSales | -17528 | 328 | 15602 | 011 | -2985 | 807 | 52514 | 031 | -9653 | 467 | 6172 | 855 |
| Proportion Employees Using_Computers | -693102 | 592 | 425687 | 371 | 407632 | 675 | 1372522 | 412 | 3404752 | 055 | 3749448 | 088 |
| Percent_Workers_Having_Young_Kids | 13026 | 407 | 1863 | 760 | 838 | 901 | -9420 | 601 | -501 | 960 | -17999 | 296 |
| Workplace_Average Pay | 34 | 030 | 15 | 039 | 26 | 137 | 36 | 178 | 73 | 001 | 61 | 000 |
| Average Family Other Income | -04 | 939 | -08 | 572 | -21 | 402 | -150 | 271 | 18 | 675 | 55 | 436 |
| Average Workforce Tenure | -29133 | 758 | 10354 | 723 | -24919 | 629 | 127428 | 205 | 140563 | 142 | 12573 | 886 |
| Sum_HR_Practices_Compensation | -248123 | 406 | 107201 | 303 | 61115 | 747 | 27660 | 950 | 300085 | 441 | -185619 | 703 |
| Sum_HR Practices_Organızation of Work | -255153 | 274 | 8572 | 928 | -139073 | 344 | -5049 6 | 843 | 57973 | 841 | -170207 | 602 |
| Average_Workplace Promotions | 108705 | 802 | -9065 5 | 434 | 117789 | 451 | -41941 8 | 372 | -29500 5 | 553 | -57843 0 | 163 |
| Proportion_Fultime_HighSkilled_Workers | -342985 4 | 012 | -12283 | 979 | -1146588 | 337 | -1825573 | 331 | 707879 | 748 | -1424836 | 459 |
| Proportion Unionzed Workforce | 1942150 | 299 | -466395 | 770 | 811699 | 633 | 1039459 | 639 | 2343411 | 365 | 4839304 | 047 |


| Table D 113 - Determinants of Productivity Summary Longitudinal (Differential) Regression Coeff |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Education and health services |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 2001 |  | 2003 |  | 2005 |  | 2003 |  | 2005 |  | 2005 |
|  |  | 1999 |  | 2001 |  | 2003 |  | 1999 |  | 2001 |  | 1999 |
|  | $\mathrm{N}=$ | 18 | $\mathrm{N}=$ | 25 | $\mathrm{N}=$ | 35 | $\mathrm{N}=$ | 25 | $\mathrm{N}=$ | 22 | $\mathrm{N}=$ | 25 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers Claımıng Too Little_Tramıng for_Job | N/A |  | 5167 | 291 | 550 | 738 | -2570 7 | 204 | N/A |  | N/A |  |
| Percent_Workers_Claıming Availabılity_Traınıng_ Increased | N/A |  | 8070 | 258 | -1817 | 149 | -1049 4 | 239 | N/A |  | N/A |  |
| Average Expenditure for Trainıng | N/A |  | -13 | 896 | 108 | 266 | -204 | 505 | N/A |  | N/A |  |
| Proportion_Employees_Receiving_Classroom_Training | N/A |  | 469412 | 309 | -57949 | 670 | 967558 | 243 | N/A |  | N/A |  |
| Proportion_Employees_Receiving_OntheJob_Training | N/A |  | 127923 | 441 | 346674 | 048 | -1265437 | 198 | N/A |  | N/A |  |
| Sum_Courses_in_Classroom_Format | N/A |  | 70610 | 404 | 8450 | 664 | 52971 | 363 | N/A |  | N/A |  |
| Sum Courses in OntheJob Format | N/A |  | -115509 | 377 | -1279 3 | 624 | 76364 | 323 | N/A |  | N/A |  |
| Average Days_of_Sick Paid_Leave | N/A |  | 9923 | 663. | 15364 | 172 | -8420 8 | 259 | N/A |  | N/A |  |
| Average_Days of_Other_Paid Leave | N/A |  | 54532 | 249 | -14876 | 086 | 20374 | 310 | N/A |  | N/A |  |
| Average Days of Unpard Leave | N/A |  | -16292 | 361 | -23567 | 056 | 120238 | 286 | N/A |  | N/A |  |
| Turnover | N/A |  | -1917602 | 390 | -176678 | 609 | 3659722 | 203 | N/A |  | N/A |  |
| Median_Overall_Satıfaction | N/A |  | 555571 | 306 | -13165 7 | 037 | 917936 | 239 | N/A |  | N/A |  |
| Median Compensation Satisfaction | N/A |  | -219059 | 519 | 90090 | 276 | -955962 | 236 | N/A |  | N/A |  |
| Total Number of Employees | N/A |  | 4445 | 401 | 1187 | 273 | 1098 | 294 | N/A |  | N/A |  |
| Percentage ExportSales | N/A |  |  |  |  |  |  |  | N/A |  | N/A |  |
| Proportion_Employees_Using Computers | N/A |  | -461866 0 | 300 | 942286 | 010 | -1585570 | 233 | N/A |  | N/A |  |
| Percent_Workers_Having Young_Kıds | N/A |  | 3813 | 612 | 3128 | 035 | -6418 | 264 | N/A |  | N/A |  |
| Workplace_Average Pay | N/A |  | -5 3 | 420 | 17 | 006 | 16 | 390 | N/A |  | N/A |  |
| Average Family Other Income | N/A |  | 31 | 396 | 23 | 066 | 31 | 264 | N/A |  | N/A |  |
| Average Workforce_Tenure | N/A |  | -60549 | 274 | -10014 | 310 | -133292 | 192 | N/A |  | N/A |  |
| Sum_HR_Practices Compensation | N/A |  | 256438 | 427 | -94308 | 074 | -119474 | 320 | N/A |  | N/A |  |
| Sum HR Practices_Organization of Work | N/A |  | -151164 | 206 | 19759 | 439 | -252678 | 234 | N/A |  | N/A |  |
| Average_Workplace_Promotions | N/A |  | -503 3 | 964 | 67048 | 297 | -4840 0 | 605 | N/A |  | N/A |  |
| Proportion_Fultime_HıghSkılled_Workers | N/A |  | -69844 4 | 337 | 20323 | 869 | -428429 | 274 | N/A |  | N/A |  |
| Proportion Unionized Workforce | N/A |  | 557010 | 296 | -531237 | 474 | -3923 3 | 933 | N/A |  | N/A |  |


| Table D 114 - Determınants of Productivity Summary Longitudinal (Differential) Regression Coeff <br> Information and cultural industries |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\begin{aligned} & 2001 \\ & 1999 \end{aligned}$ |  | $\begin{array}{\|l\|} \hline 2003 \\ 2001 \end{array}$ |  | $\begin{aligned} & 2005 \\ & 2003 \end{aligned}$ |  | $\begin{aligned} & 2003 \\ & 1999 \end{aligned}$ |  | $\begin{aligned} & 2005 \\ & 2001 \end{aligned}$ |  | $\begin{aligned} & \hline 2005 \\ & 1999 \end{aligned}$ |
|  | $\mathrm{N}=$ | 120 | $\mathrm{N}=$ | 94 | $\mathrm{N}=$ | 101 | $\mathrm{N}=$ | 97 | $\mathrm{N}=$ | 89 | $\mathrm{N}=$ | 90 |
|  | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig | Coeff | Sig |
|  | B |  | B |  | B |  | B |  | B |  | B |  |
| Percent_Workers_Claıming_Too Little_Tranng__for_Job | -1766 | 283 | -5042 | 020 | 2927 | 186 | -1259 | 621 | -1481 | 557 | -1586 | 485 |
| Percent Workers Claiming Availability_Tranıng Increased | 471 | 800 | -761 | 695 | -2372 | 285 | 287 | 923 | -841 | 644 | -438 1 | 098 |
| Average Expenditure for_Training | 13 | 902 | 130 | 527 | -417 | 098 | -103 | 617 | 25 | 859 | -193 | 250 |
| Proportion_Employees_Receiving_Classroom_Training | 19329 | 912 | 957229 | 033 | -75962 | 767 | -202585 | 398 | 70585 | 743 | -583199 | 044 |
| Proportion_Employees_Receiving_OntheJob_Trainng | -20799 | 887 | -277923 | 232 | 132780 | 592 | 190552 | 429 | 226080 | 373 | 292961 | 167 |
| Sum_Courses_1n_Classroom_Format | -23760 | 364 | -47586 | 171 | 171659 | 000 | 80581 | 038 | 8695 | 740 | 97714 | 009 |
| Sum Courses in OntheJob Format | -14180 | 515 | 50496 | 137 | -119972 | 001 | -79848 | 026 | -36332 | 152 | -99602 | 001 |
| Average Days of Sick Paid Leave | 40963 | 038 | 27308 | 087 | -14823 | 531 | -5729 | 816 | 10712 | 720 | 8668 | 765 |
| Average_Days_of Other_Pad_Leave | -15511 | 189 | 5498 | 702 | 8985 | 671 | -1649 9 | 184 | 14877 | 552 | 3727 | 822 |
| Average_ Days_ of_Unpaid_Leave | 11944 | 334 | 3472 | 752 | -369 4 | 516 | 8960 | 800 | -1825 5 | 057 | 5604 | 683 |
| Turnover | -173292 | 502 | -328546 | 404 | -208569 | 491 | -160531 | 700 | -477595 | 119 | -84044 7 | 169 |
| Median Overall Satısfaction | 11080 | 916 | -57876 | 643 | 137009 | 179 | -307934 | 054 | -32620 | 815 | -52013 | 695 |
| Median_Compensation_Satisfaction | -130879 | 234 | -5434 3 | 632 | 71583 | 575 | 157356 | 328 | -232173 | 131 | 64114 | 616 |
| Total Number of Employees | -3230 | 021 | 2201 | 246 | -4249 | 025 | -2453 | 037 | -509 | 664 | -2153 | 027 |
| Percentage ExportSales | -604 6 | 052 | 3411 | 367 | 9396 | 081 | 10226 | 036 | 3091 | 228 | -2167 | 709 |
| Proportion_Employees_Using_Computers | -10602 | 960 | -257256 | 624 | -50140 | 877 | 105178 | 765 | -26990 1 | 344 | -107402 | 745 |
| Percent_Workers Having_Young_Kıds | 941 | 669 | -837 | 799 | 555 | 829 | -1858 | 644 | -1250 | 650 | 148 | 954 |
| Workplace_Average_Pay | 01 | 851 | -12 | 044 | -06 | 266 | 05 | 304 | 07 | 047 | 17 | 000 |
| Average Family Other Income | -24 | 033 | -11 | 350 | 16 | 177 | -11 | 319 | 06 | 656 | 36 | 025 |
| Average_Workforce_Tenure | -33047 | 027 | 11468 | 538 | 1774 | 872 | -1374 8 | 506 | -10224 | 528 | -2405 5 | 133 |
| Sum_HR Practices_Compensation | 43122 | 420 | -98132 | 247 | 159496 | 007 | -38517 | 553 | 31001 | 642 | 37307 | 568 |
| Sum_HR_Practices Organization_of Work | 64890 | 037 | 10806 | 835 | -101269 | 071 | -6372 6 | 270 | 12373 | 740 | -17631 | 696 |
| Average_Workplace Promotions | 100015 | 114 | -31539 | 725 | -46582 | 208 | 55197 | 517 | 47303 | 414 | 159296 | 008 |
| Proportion Fultime HighSkilled Workers | 270622 | 147 | 320356 | 430 | 160667 | 505 | 747918 | 079 | -231306 | 297 | 44347 | 904 |
| Proportion Umonized Workforce | 391905 | 044 | -131579 1 | 014 | 361742 | 504 | 144015 | 642 | -96916 5 | 066 | 494237 | 353 |


[^0]:    ${ }^{1}$ The indirect effect is clearly the results of two direct effects. The first is direct effect of training on turnover, absenteeism, and job satisfaction. The second is the direct effect of these factors on productivity. Nonetheless, in this work we used the term 'indirect' to describe the ensemble of these relations because it makes more intuitive, and therefore clearer, the distinction between the two causal relations we are really interested in: the effect of training alone on productivity (i.e., the direct effect) and the effect of training on productivity via the three intervening factors (i.e., the indirect effect).

[^1]:    ${ }^{2}$ The authors noted that the count was somewhat more complex for the manufacturing company because a high proportion of those who had been laid off in 1994 were back in March 1995.

[^2]:    ${ }^{3}$ Krueger and Rouse (1998) also addressed the relationship between training and absenteeism. As the reader might recall, they studied the effect of general training (reading, writing and math skills) in two midsized American companies, one in service and the other in manufacturing. The data were obtained from the company's administrative records, and supplemented with survey data.

[^3]:    ${ }^{4}$ The results by Pordsakof et al. contrast with the preliminary results found by Leckie et al. (2001: 36-37) which using WES data found that establishment offering variable pay as part of their compensation methods had higher turnover.

[^4]:    5 In WES, there is a variable identifying each workplace and also each employee. In the employee dataset, each employee has a workplace identifier that can be used to link it to the workplace dataset.

