The Evolution of Performance Pay: Evidence from Mexico

Michel Grosz
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Professor Smith

1. Introduction

The use of performance pay (e.g. piece-rates, bonuses, commissions, and profit sharing) as a type of compensation reflects novel approaches to human resources management and has only increased across industries recently in the United States. While perhaps not as prevalent as in the US, performance pay has also been increasing in Mexico, and was especially affected by Mexico's inclusion into the North American Free Trade Agreement (Nafta) in 1994.

The benefits of different types of incentive-payment schemes have been well documented in the growing personnel economics literature. Piece-rates, where workers receive compensation as a function of their individual productivity, has been determined to be effective only where production is observable and monitoring is feasible (Lazear, 2000; Carmichael and MacLeod, 2000). Other, more complicated forms of performance pay, such as tournament structures or profit sharing, are the optimal compensation scheme depending on the particular characteristics of the firm, industry, and product (Nalbantian and Schotter, 1997; Schotter and Weigelt, 1992; Knez and Simester, 2001; Knoeber, 2002).

Obviously, changed productivity is not the sole result of performance pay, and much has been written as well about the consequences of performance pay (and innovative human resource techniques in general) on the firm, the industry, and the individual worker (Boselie et al, 2001; Delaney and Huselid, 1996; Fernie et al, 1994; Freeman and Rogers, 2006; Kalleberg and Moody; 1994; Pil and Macduffie; 1996).

To my knowledge, there is no significant work in the related literature that gauges to what extent the theory supporting performance pay has actually affected its use. Using detailed income data on Mexican workers in the years 1994-2000, I model the impact of

specific factors on workers' likelihood of receiving particular kinds of performance pay. Particularly interesting is the seminal 1994 year in Mexican history, which not only included Nafta but also the Mexican Peso Crisis. The increased foreign investment presence in Mexico due to Nafta, and its associated innovative human resources techniques, should have increased the use of incentive-based payment. However, the detrimental economic effect of the Peso Crisis in the same year would have stymied much of the profit-sharing involved in such schemes.

When observing the Mexican economy, it is also necessary to take into account the magnitude of emigration to the United States. In the 1990s, for example, net immigration from Mexico into the United States was 400,000 individuals per year and has increased since then. I find that my results could be severely biased by the lurking nature of this missing information, as predicted by Hanson (2003), yet I did not find any satisfactory way of controlling for Mexican emigration.

The rest of this paper is organized as follows. Section 2 presents an overview of the relevant literature dealing with performance pay. Section 3 explains the nature of the ENIGH data I use in this study. Sections 4 and 5 describe the trends in the use of performance pay techniques across time and levels of income. In Sections 6 and 7 I present an economic model to predict the likelihood of receiving income from each type of performance pay and interpret the results. Section 8 concludes.

2. Literature Review

In the last few decades the budding field of personnel economics has established the extent to which new methods of human resource management (HRM) benefit workers and firms. Ichniowski and Shaw (2003) show that the most effective manner to elicit optimum performance from workers is through a diversified system of innovative human

resource techniques. Specific to performance pay, Lazear (2000) finds that a firm switching from base-pay to piece rate pay experiences drastic increases in worker productivity and quality of the workforce. This result has been empirically supported in experiments and other case-studies. Theoretical and historical evidence offered by Carmichael and MacLeod (2000) warns that this initial betterment of factor productivity is usually dampened by employers' incentives to decrease the piece rate and thus diminish their wage costs. Nalbantian and Schotter (1997) experimentally determine the relative merits of several group incentive schemes, such as profit sharing and tournaments, and conclude that these are efficient if monitoring is feasible.

Although much of the literature focuses on innovative HRM and performance pay's effect on workers, these strategies offer other advantages to the firms who provide them. A review of the state of research on the relationship between human resources management and performance is compiled by Boselie, Paauwe and Jansen (2000). Examples of these benefits include the fact that higher rewards contribute to a better social climate at the workplace and are also positively correlated with a firm's profit, product quality, market share and customer satisfaction.[1] Moreover, Knez and Schotter (2006) find that firm-wide bonuses based on overall firm performance benefit both the firm and its workforce.

Given this extensive and growing interest in gauging the influence of incentive-based compensation schemes, it is surprising that little attention has been drawn towards what determines their implementation. Whenever this issue has been dealt with in the literature, innovative compensation schemes are lumped together with other HRM techniques. Some studies focused with on-site training have correlated the use of these

[1] Fernie et al (1994), Kalleberg and Moody (1994), Delaney and Huselid (1996)

practices with firm size and the amount of physical and human capital in which the firm invests.[2] The use of these schemes is also negatively correlated with union membership, which Freeman and Rogers (1999) prescribe to the diminished role of the union as a worker's "voice" as occupational quality increases. Finally, Pil and MacDuffie (1996) report the counterintuitive finding that poorly performing firms are more likely to employ these HRM devices than others.

Although increased use of performance pay is strongly linked to better firm and worker performance, a causal relationship cannot be made perfectly. In fact, experimental evidence by Schotter and Weigelt (1992) reveals that agents faced with inherent low ability are likely to drop out of the market altogether. Thus, the fact that workers sort into occupations or positions that best suit their potential effort and ability levels always represents a significant bias to results.

3. The ENIGH

The data I will be using come from the Household Income and Expenditure Survey (ENIGH) conducted by the National Statistic Institute (INEGI) of the Mexican government. The ENIGH is a survey of all national and foreign households living in private dwellings in the national territory. It has been administered in 1984, 1989, 1992, and every two years thereafter, although the most recent year I use is 2002.

ENIGH, like other household surveys around the world, uses a multi-stage sampling procedure. In a random sample, the probability of being surveyed is the same for every household in the population irrespective of their characteristics. However, the costs associated with increasing the sample size to be large enough to obtain a representative sample of every population are too high. ENIGH attempts to have a

[2] Lynch (1994) and Lynch and Black (1998)

representative sample of rural communities with less than 2,500 inhabitants, meaning that more households in communities with less than this threshold were included in the surveys than in a purely random sample. Thus, an unweighted measure of average income will have a significant downward bias. De Hoyos (2005a) describes manners to reweight the data specific to ENIGH, as well as methods to compute inequality indices.

3.1 Earnings and Demographic Variables

To measure income, I determine a worker's hourly wage using their reported earnings in the quarter prior to being polled and their hours worked in the previous week. I define employed workers as those with positive working hours and hourly earnings. The unemployment rate for women in Mexico, especially before the 1990s, was as high as 60%, and even in 2002 was only barely under 54% for the women included in my sample. As a comparison, male figures for unemployment in this period for the data I use never exceed 18%. Since I believe that the wages of women will be affected by a whole slew of issues that would confound my results, I only observe men in the econometric sections of this paper.

In order to create a coherent variable for years of education, I designed a system similar to Jaeger (1997) for the Current Population Survey (CPS) in the United States. A detailed account of the coding for this variable can be seen in Appendix I. The measurement of potential labor market experience is in the conventional Mincer fashion, by subtracting years of education from the age less six. Table 1 shows the mean values for these demographic characteristics. While the average age of the labor force has increased in the 18 years of the study, average years of education increased only to 2000, when they spiked downwards. Potential experience, however, has not changed dramatically in either direction.

DiNardo, Fortin and Lemieux (1996) find that decreases in union membership in the United States have caused much of the changes in wage distribution between the years 1973-1992. The trend might be consistent with the Mexican pattern I find as well, where the rate of union membership has fallen consistently over the years 1984-2002 at approximately 2% per year. The fall in Mexican unionization is demonstrated in column 4 of Table 1.

3.2 Occupational and Regional Variables

The ENIGH designates 453 different industries, and there are 10 different types of jobs available in each of these industries. These are not consistent across the years I study, but I account for this potential problem by controlling for within-year industry effects.

As mentioned previously, one important reality of the Mexican labor market that is not accounted for is the mass emigration that has occurred, specifically to the United States. The ideal way to incorporate this into my models would be to examine the trends in emigration by state or geographical region. However, I have yet to find any reliable data source with this information over the time period I have specified. Indeed, since most of the emigration is illegal, any data would be based on very rough estimates. The INEGI does provide data on population by state and gender, which might serve as a convenient proxy, but these are only available once each decade for census years. Moreover, estimates of Mexican emigration to the United States are available, but are not differentiated by region of origin and thus are not useable in this paper.

As a way of at least accounting for regional differences that would affect use of performance pay, I use measures of foreign direct investment by state. Mexico has thirty one states, plus a Federal District that includes the capital Mexico City, so I utilize FDI

statistics for the years 1989-2000 from the National Institute of Geographic and Information Statistics (INEGI). As will be discussed below, this is also a useful way to determine the influence of innovative HRM techniques on use of performance pay in Mexico.

5. The Evolution of Performance Pay

5.1 Income Variables

To measure the effect of performance pay on income, the important underlying assumption is that performance pay of different types induces workers to increase their effort by presenting different incentives to work. Therefore, it is necessary to isolate only income that could possibly be affected by performance pay. Because of this, I look only at compensation through wages administered by each worker's employer, and set aside all other types of income (real estate, stocks, etc).

The primary form by which Mexican workers are paid is through a set salary, usually paid weekly or as a function of working hours. The first type of performance pay, and one that has grown in popularity in the time period studied, is the bonus. In fact, employers are required to pay by law a yearly *aguinaldo,* a mandatory annual payment equivalent to at least 15 days' wages, given in the month of December prior to the 20th, to each worker in Mexico. This includes all employees in private industry, and all government employees, although those with less than a year's experience receive less. I theoretically do not consider the *aguinaldo* as a measure of performance pay since it is a fixed, reliable, and predictable source of income and thus does not provide any incentive to work different from that of a salary. Therefore, I include the *aguinaldo* as a part of non-performance pay salary figures.

Piece rates are another important sort of performance pay. Included in the category for piece rates are not just income from per-piece production, but also commissions and tips. Although the inclusion of tips as a piece rate in the ENIGH data is somewhat problematic, as it perhaps better qualifies as a bonus, this is one case where Mexican culture has a significant role in the data coding. Tipping in Mexico is generally the norm for most services and is usually independent of satisfaction like in the United States. So, while there may be some randomness in the size of the gratuity, we can consider tip as piece rates in that they reflect the size of the service produced.

The final category of performance pay is income gleaned from company profit sharing. Although gainshares are sometimes interpreted as an overall umbrella term for performance pay, in this paper I refer to gainshares specifically as the sharing of company profits. I do not measure trends in workers receiving gainshares because of Article 117 of the Federal Labor Law, passed in 1999, which mandated that all workers be included in company profit sharing programs. Such institutionalized use of performance pay, while an important caveat to this paper, does not help describe how individual firms make decisions about compensation.

5.2 Trends in Use of Performance Pay

Table 2 shows hourly earnings from each compensation scheme for males in the sample. Trends in the Mexican economy are immediately noticeable. In particular, the aforementioned trade liberalizations and deregulation of industry of the 1980s seemed to be increasing the real wage, until the Mexican Peso Crisis of 1994. The effect of this monetary crisis is not picked up in the data from 1994, since the turmoil only happened beginning December 1 of that year. The drop from 1994 to 1996 is, however, quite notable, as evidenced in column 1 of Table 2.

Much of the evolution in the use of performance payment schemes is not visible if observing the labor force as a whole. The participation of different sectors of the labor market in the rise of performance pay is notable, especially if each type of performance pay is analyzed separately. Because industry and occupation variables are not standardized in the ENIGH across years, I merely note the differences in the percentage of workers in each quartile of earnings that have at least some amount of their wages gleaned from incentive schemes. The breakdown by income quartile is displayed in Figure 1. The overall evolution of performance pay (Figure 1a) has followed similar trends for all but the top earners in the Mexican economy. The share of top earners who received performance pay decreased in the early 1990s and has since increased, experiencing another drop by 2002. Meanwhile the share of the bottom earners of the economy earning performance pay more than doubled in the same period.

The trend for piece rates is particularly indicative of the types of changes that the Mexican economy underwent and the direct effects of foreign business influx into the country (see Figure 1b). Although piece rates are generally seen as a mode of compensation for low-earning workers, they were unpopular in the bottom half of the wage distribution relative to the top half. Instead, in the late 1980s and early 1990s between 10% and 13% of the top quartile of earners received piece rates. However, the use of piece rates in the bottom half of the wage distribution began to rise in the late 1980s and continued rising throughout most of the years covered by this project. This trend is, ostensibly, due to the rise in the percentage of low-earning workers employed by foreign companies which would be more likely to engage in innovative human resources techniques. Perhaps further research would conduct a study by quartile to investigate whether the impact of foreign investment on the incidence of piece rates has been

stronger in the bottom parts of the wage distribution. By the first years of the 21st century, though, a higher fraction of lower-wage workers earned piece rates than high-wage workers.

There is another issue at hand here that is more related to the limits of the dataset. Although grouped under a large umbrella category, there are various types of incentive payment schemes that are regarded as piece rates by the ENIGH, and which might be prevalent in different sectors of the labor market. Tipping, for example, is expected in the Mexican tourism and food service industries, which are usually concentrated in the middle of the wage distribution. Commissions, too, might be more prevalent in white-collar jobs than in blue-collar. Thus, perhaps the movement of piece rate earnings by quartile reflects the rising wage inequality Mexico continues to experience.

Similarly, the differences in how many people received bonuses, separated by earnings quartiles, shows a stark rising dispersion beginning in the early 1990s. Presumably, workers who would receive bonuses are employed in white-collar jobs of some kind, so this trend might also mirror changes in the distribution of wages and occupations in the Mexican labor market.

5.3 Trends in Magnitude of Performance Pay

The absolute use of the different performance pay techniques has followed a distinct pattern that is not necessarily similar to how important incentive payment schemes have been to wages. The shares of wages earned due to performance pay, separated by year and quartile, can be seen in Figure 2a. While a higher percentage of the top earners in the Mexican labor market receive some sort of incentive-based compensation, these same earners earn less performance pay as a share of their average wages than other workers. Overall trends in the importance of all types of performance

pay suggest that employers increasingly consider these better methods of compensation. This result is, furthermore, in line with predictions concerning the spreading of new ideas of human resources management. Beginning in the late 1980s, the magnitude of performance pay use has steadily increased, only taking a downturn in the last year of the study. Moreover, the variation in magnitude of performance pay as a percentage of income has become more compressed across quartiles, so that while the bottom quarter of earners had less than a third as much of their wages defined by incentive schemes as the top quarter, this ratio decreased to less than three fourths by 2002.

The trends in magnitude of piece rates by income quartiles is displayed in Figure 2b, which shows that piece rates echoed overall trends in performance pay, dipping in the 1980s but regaining influence in the mid-1990s on. One result predicted by the economic literature can be observed in the development of piece rates specifically. Piece rates theoretically should become more prevalent in lower-skill, and thus lower paying, sectors of the economy, since they are most suitable when individual production is best observed (Lazear 2000). The lowest earners have experienced the greatest increase in piece rates, gaining up to over 9% of their incomes from this type of payment in 2000. The highest earners, meanwhile, had their share of piece rates remain relatively stable over the same time period.

Although the share of wage income due to bonuses is quite low for the entire population, a few observations can be made as to their rise in popularity. In absolute terms, bonuses have not changed much for the bottom half of the wage distribution. For the top half, meanwhile, bonuses have increased to a larger degree, quadrupling from 1984 to 2002.

6. What Determines the Use of Performance Pay?

Although each type of performance pay has been, as noted above, changing in slightly different ways through time, what are some important factors that would affect one's likelihood of receiving each particular sort of performance pay? The first, obvious explanation is that as the field of personnel economics develops, new approaches to compensation schemes will become more popular. Since personnel economics has only been important as a branch of economics for about a quarter century, the economic effects of innovative human resource techniques, and performance pay schemes in particular, are not yet known (Lazear and Shaw 2007).

However, it is definitely true that the use of performance pay has become more pervasive worldwide in recent years. Although Bartel et al (2007) cite incentive pay plans as less common than other innovative human resource management practices, they also find that these plans have increased substantially since 1980. Therefore, the results cited in the previous section align well with the broader studies done with other, usually developed, countries. While most of the research so far has shown that performance pay strategies are growing in popularity in the United States and Western European countries, it is not necessarily true that this should not be so in developing countries like Mexico. In fact, IHLO (2007) notes that piece rates and bonuses for quota attainment are used to an abusive degree in Chinese manufacturing plants, a finding that may be true for most other countries in that region of the world.

So, although it is not necessarily true that the use of piece rates in Mexico was caused completely by exogenous events, the lively international economic circumstances in Mexico during the last couple decades have surely played a role. Specifically, I expect that use of the more innovative forms of performance pay, such as profit sharing, should

have been heavily affected by the influx of trade and international exposure in the post-Nafta Mexican economy. Without a more specific measure of profit-sharing, though, such an analysis is as yet impossible.

Another, similar contributor to increased use of performance pay techniques is foreign direct investment. Here I account for regional differences by using statistics on FDI separated into state and yearly units.[3] Given the limitations of the ENIGH dataset, controlling for state FDI is a convenient proxy for regional and rural/urban effects. FDI also serves as a measure of time-related changes, since it has been shown that overall FDI in Mexico has grown steadily since the 1980s due to specific government actions (Khawar, 2003 and Ramirez, 2000).

The literature suggests that incentive schemes cause workers to be more productive and to be paid closer to their marginal product. However, there is no mention that I have found that would suggest that workers under these schemes should earn higher absolute wages. Piece rates in particular are many times utilized as a means of deflating wages. Therefore, I will test whether total income derived from salary and performance pay has an effect on the likelihood of receiving each type of compensation.

As noted above, there is a similar trend towards deunionization in Mexico as in the United States. Given the sizeable influence of union membership on wages as determined by DiNardo, Fortin and Lemieux (1996), I also include union membership as a determining factor of performance pay. Finally, I control for the effects of industry differences on the use of performance pay based on the assumption that some sectors of the economy rely heavily on specific types of performance pay schemes.

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[3] I use statistics published by the Institutio Nacional de Estadística Geográfica e Informática (INEGI) for the years 1989-2000.

Therefore I estimate the following equation using a probit regression:

$$PerfPay_{it} = \alpha + \beta_1 FDI_{ijt} + \beta_2 Industry_{it} + \beta_3 Union_{it} + \beta_4 Income_{it} + \gamma_{it} Demographi\,c + u_{it} \quad (1)$$

where *PerfPay* records the probability that worker *i* in year *t* receives a specific form of performance pay; *FDI* represents the dollar amount of foreign direct investment in the worker's state *(j)* in year *t*, and *Demographic* is a vector of other demographic control variables.

7. Results

7.1 Within-Industry Probit Estimates

In the first iteration of my estimates I include controls for wages and industry, which will be relaxed later. My hypothesis for determinants of overall performance pay here is not supported (Table 3a). Within industry groups, education matters little, if at all. Experience, too, has little effect on receiving performance pay. Although the effect of a worker's wages on his likelihood of receiving performance pay is everywhere statistically significant, the economic significance is miniscule: raising a worker's wages by one percent raises his likelihood of receiving such payments by less than one thousandth of a percent. My indicator of innovative human resources techniques, foreign direct investment, is only statistically significant in 1989, before the huge influx of foreign funds of 1994. Finally, union membership increased the likelihood of receiving performance pay.

The results for piece rates individually (Table 3b) are somewhat different than for overall performance pay. Again, education and experience have minimal effects. Contrary to the previous section, though, state FDI had a negative influence on the likelihood of receiving piece rates. This supports the prediction that piece rates are generally utilized in undesirable occupations, since foreign investment presumably goes

to higher-paying, higher-skill sectors of the economy. Moreover, the finding that income has no measured effect on piece rate accrual further supports this claim, by suggesting that richer workers won't necessarily earn piece rates Workers in unions were less likely to receive piece rates, probably because of unions expressing their worry over the potential of worker exploitation through this technique.

To some degree, the lack of conclusive results for performance pay altogether is balanced between piece rates and bonuses. As shown in Table 3c, the incidence of bonuses was positively affected by foreign investment before 1994. Unlike piece rates, this method of compensation is advantageous for the worker and the firm alike, so unions are probably more vocal in condoning it, as supported by my estimates. Importantly, a worker's income had a positive effect on whether he received bonuses, contrary to the result on piece rates.

The second iteration of my model omits income as a covariate on the estimate of performance pay likelihood estimates. The causality between income and performance pay is dubious, and could point in both directions. While the results in Table 3 suggest that use of overall performance pay and bonuses is highly dependent on a worker's income, it is perhaps more likely the case that those earning bonuses are generally richer (as shown in Table 1). The results of this model (Table 4) which excludes income effects are much like those discussed previously. One key difference is that the effects if education and experience on bonuses (Table 4c) become significant and positive, presumably because of the positive correlation between these two measures of human capital and wages.

Overall, the relative importance of foreign direct investment on all the types of performance pay I examine does not increase over time, as I predicted. This is perhaps

because the measure of foreign involvement is too broad, and thus a more specific one would be better.

7.2 Probit Estimates without Industry Effects

So far, the effects of each covariate on whether a worker received performance pay has focused on industry-specific effects. I perform the same estimates as in Section 7.1, but not controlling for industry. For the most part, the results shown in Tables 5 and 6 suggest that variation in use of performance pay techniques varies among industries, especially if one narrows the focus to particular types of performance pay schemes. Specifically, notice that the pseudo R-Squared values when not accounting for within-industry factors are much lower than when they are accounted for, showing that the importance of the industry covariate is on explaining the randomness in the sample.

The results for overall performance pay use (Table 5a) are quite similar to those where industry is controlled for. However, FDI now has a larger effect and is positive. The effect of union membership is unchanged, presumably because unions only exist in certain industries anyway.

For piece rates (Table 5b), education and experience are significant if the effects are not narrowed down by industry, and there is a similar change for bonuses (Table 5c). When I account for neither income nor industry effects (Table 6), the explanatory power of the model decreases even more. The changes are comparable to the changes between Tables 3 and 4.

8. Conclusions

The analysis presented in this article is the first attempt to determine the evolution of performance pay techniques on a nationwide level. While other studies have gauged the effect of increasing incentive-based pay on firm and worker performance using firm-

specific evidence, no work has specifically analyzed if employers are responding to these apparently positive results on a national scale.

In this paper I find that, although each kind of performance pay is affected by distinct and sometimes completely different factors, overall trends in these types of human resources management techniques reflect an increase in their use. A key conclusion is, though, that foreign direct investment is correlated to increased use of bonuses and profit sharing, but has no clear effect on piece rates. This is probably because piece rates are generally seen by unions and scholars as inferior to other compensation schemes in terms of equity.[4] The dubious effect of total wage income on the likelihood of receiving piece rates corroborates this finding.

In particular, my results show that lower-income workers are no more likely to earn part of their income from piece rates than high-wage workers. However, this is not the case for bonuses, where high-wage workers are more likely to receive these kinds of compensation than others.

There are some areas in which this particular project could be extended in future work. Firstly, the ENIGH includes foreign and domestic households, so perhaps some of the effects recorded in this study are biased because of this. I ignore the reality of immigration and emigration in Mexico as having any bearing on compensation. This is admittedly a large assumption, yet no satisfactory data to control for population changes are available at this time. Moreover, a more detailed analysis by occupational or income categories could yield meaningful results.

Economic theory strongly suggests that, even though sometimes so-called incentive-based compensation schemes misalign specific incentives, these schemes

[4] See Jirjahn and Stephan 2002, for example.

resoundingly benefit economic measures of productivity and efficiency. Thus, it is no surprise that employers are testing these techniques and slowly increasing their confidence in them.

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Appendix I: Coding for Years of Education

The Mexican educational system is similar to the American one. There are 6 years of grade school (*primaria*), followed by three of intermediate school (*secundaria*) and then up to four years of high school in either *preparatoria, vocacional,* or *normal*. Graduates of this last schooling can then proceed to undergraduate universities and then on to higher degrees.

The ENIGH coding for education changes in 1989, again in 1996, and once more in 2002, and is not categorized in years. Following Jaeger (2001), I mimicked the system of standardization of CPS educational data:

1984	
Description	Years Assigned
No Instruction	0
Incomplete first grade	0
Incomplete primaria	3
Complete primaria	6
Incomplete Secundaria	7.5
Complete secundaria	9
Incomplete vocacional, preparatoria, or normal	11
Complete vocacional, preparatoria, or normal	12
Incomplete Undergraduate	14
Complete Undergraduate	16
Postgraduate	16

1989, 1992, 1994	
Description	Years Assigned
No Instruction	0
Incomplete primaria	3
Complete primaria	6
Incomplete Secundaria	7.5
Complete secundaria	9
Incomplete vocacional, preparatoria, or normal	11
Complete vocacional, preparatoria, or normal	12
Incomplete Undergraduate	14
Complete Undergraduate	16
Postgraduate	16

1996, 1998, 2000	
Description	Years Assigned
No Instruction	0
Pre-primaria	0
1st grade	1
2nd grade	2
3rd grade	3
4th grade	4
5th grade	5
6th grade	6
1 secundaria	7
2 secundaria	8
3 secundaria	9
Incomplete Vocacional, Preparatoria, or Normal	11
Complete Vocacional, Preparatoria, or Normal	12
Incomplete Undergraduate	14
Complete Undergraduate	16
Postgraduate	16

2002			
Description	Years Assigned	Description	Years Assigned
No Instruction	0	Incomplete preparatoria, vocacional, or normal	11
Pre-primaria	0	6 semesters of preparatoria, vocacional, or normal	12
1st grade	1	7 semesters of preparatoria, vocacional, or normal	12
2nd grade	2	8 semesters of preparatoria, vocacional, or normal	13
3rd grade	3	1 semester of undergraduate	13
4th grade	4	2 semesters of undergraduate	14
5th grade	5	3 semesters of undergraduate	14
6th grade	6	4 semesters of undergraduate	15
1 secundaria	7	5 semesters of undergraduate	15
2 secundaria	8	6 semesters of undergraduate	16
3 secundaria	9	7 semesters of undergraduate	16
1 semester of preparatoria, vocacional, or normal	9	8 semesters of undergraduate	16
2 semesters of preparatoria, vocacional, or normal	10	9 semesters of undergraduate	16
3 semesters of preparatoria, vocacional, or normal	10	Incomplete Undergraduate	16
4 semesters of preparatoria, vocacional, or normal	11	Undergraduate degree	16
5 semesters of preparatoria, vocacional, or normal	11	Masters	16
		Doctorate and other degrees	16

Tables and Figures

Table 1*: Average values(standard deviations) for demographic covariates, employed males aged 25-65, 1985-2002.*

	1	2	3	4	5
Year	**Age**	**Education**	**Potential Experience**	**Union Status**	***N***
1984	37.42	6.67	24.74	0.29	2797
1989	37.43	7.60	23.84	0.27	7760
1992	36.91	7.69	23.22	0.26	6555
1994	37.24	8.03	23.21	0.23	8196
1996	36.66	7.44	23.22	0.21	8886
1998	37.63	8.61	23.01	0.22	6988
2000	37.93	8.89	23.04	0.20	6960
2002	38.52	7.71	24.81	0.20	12449

Notes:
Data are from the Encuesta Nacional de Ingresos y Gastos de Hogares (ENIGH). Sample includes all working males aged 25-65 with positive earnings and hours worked in the quarter prior to the survey.

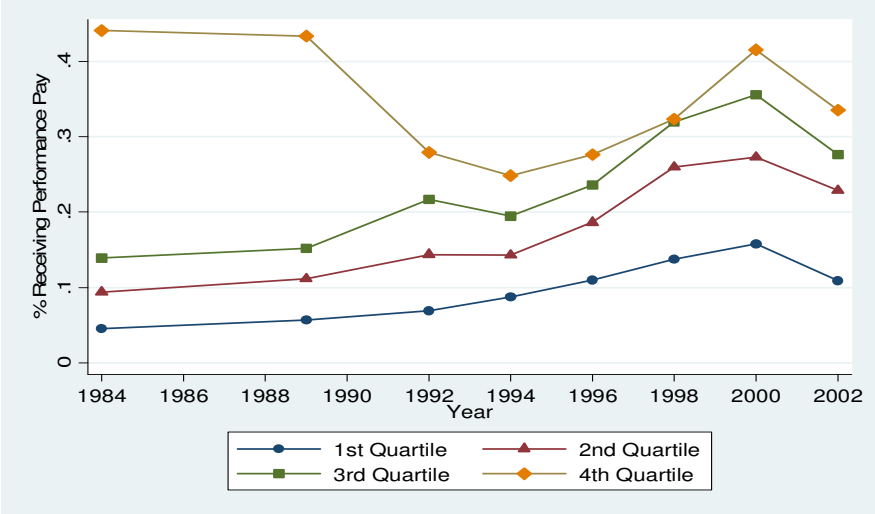
Table 2*: Average real hourly earnings for employed males aged 25-65 by compensation scheme, 1984-2002.(Measured in 2002 pesos)*

	(1)	(2)	(3)	(4)	(5)	
Year	**Total**	**Salary**	**Bonus**	**Piece Rates**	**Gainshare**	**N**
1984	5.93	5.54	0.03	0.34	0.03	2797
	(5.68)	(5.15)	(0.24)	(2.10)	(0.26)	
1989	6.56	6.10	0.05	0.34	0.06	7760
	(7.23)	(6.78)	(0.64)	(2.37)	(0.47)	
1992	7.51	6.99	0.12	0.30	0.11	6555
	(9.52)	(9.14)	(0.92)	(1.81)	(0.64)	
1994	10.01	9.26	0.10	0.59	0.06	8196
	(13.12)	(12.79)	(0.89)	(3.46)	(0.53)	
1996	5.74	5.25	0.08	0.34	0.07	8886
	(7.19)	(6.85)	(0.70)	(1.79)	(0.60)	
1998	6.30	5.73	0.10	0.37	0.10	6988
	(8.80)	(8.55)	(0.59)	(1.89)	(0.83)	
2000	6.95	6.19	0.12	0.48	0.16	6960
	(8.86)	(8.26)	(0.96)	(2.54)	(0.77)	
2002	6.98	6.51	0.11	0.27	0.09	12449
	(8.02)	(7.70)	(0.75)	(1.60)	(0.55)	

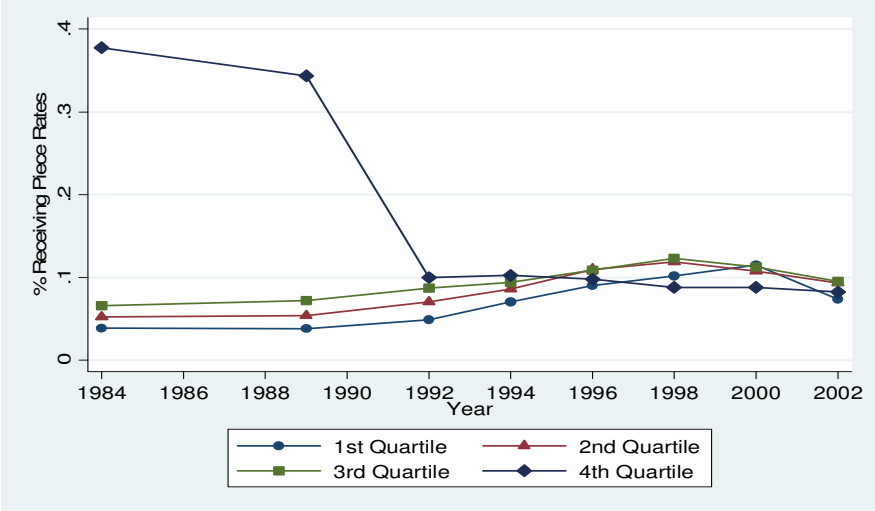
Notes:
Data are from the Encuesta Nacional de Ingresos y Gastos de Hogares (ENIGH). Sample includes all working males aged 25-65 with positive earnings and hours worked in the quarter prior to the survey.

Figure 1*: Share of employed males aged 25-65 earning each type of performance pay, by income quartile*

(a) All Performance Pay



(b) Piece Rates



(c) Bonus

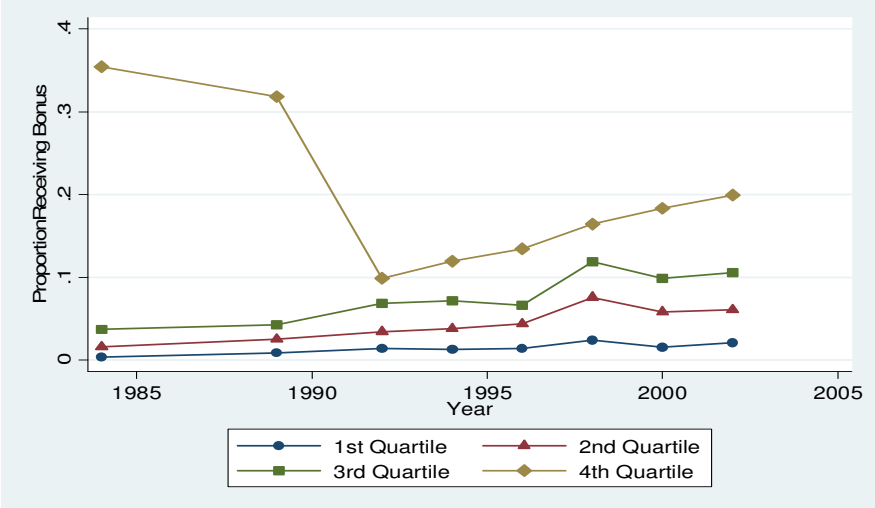
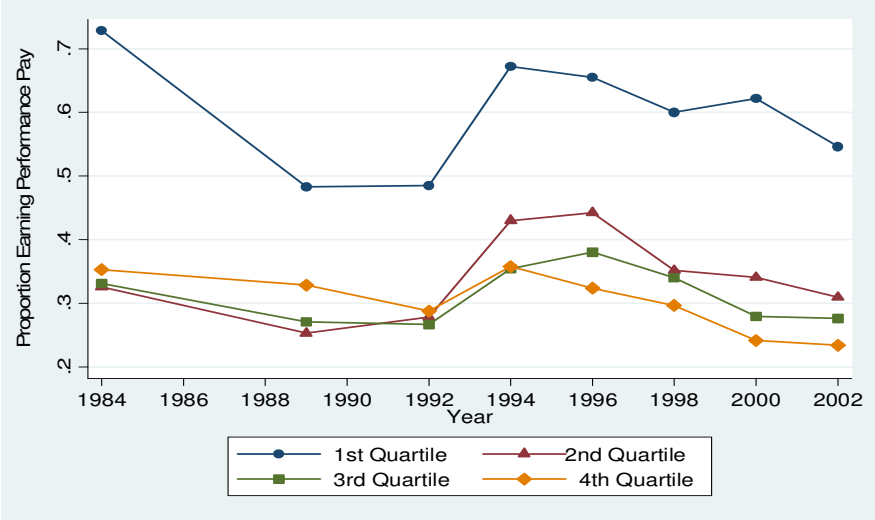
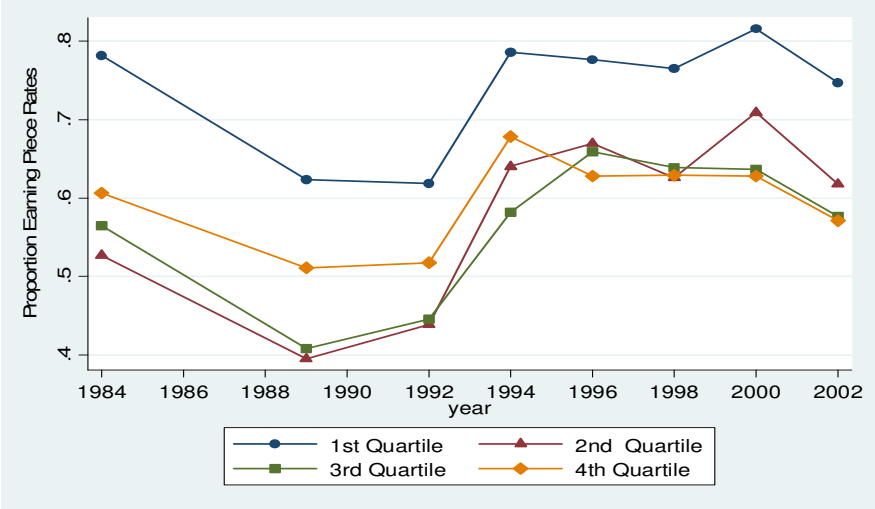


Figure 2*: Shares of wages earned due to each type of performance pay, by income quartile*

(a) All Performance Pay



(b) Piece Rates



(c) Bonus

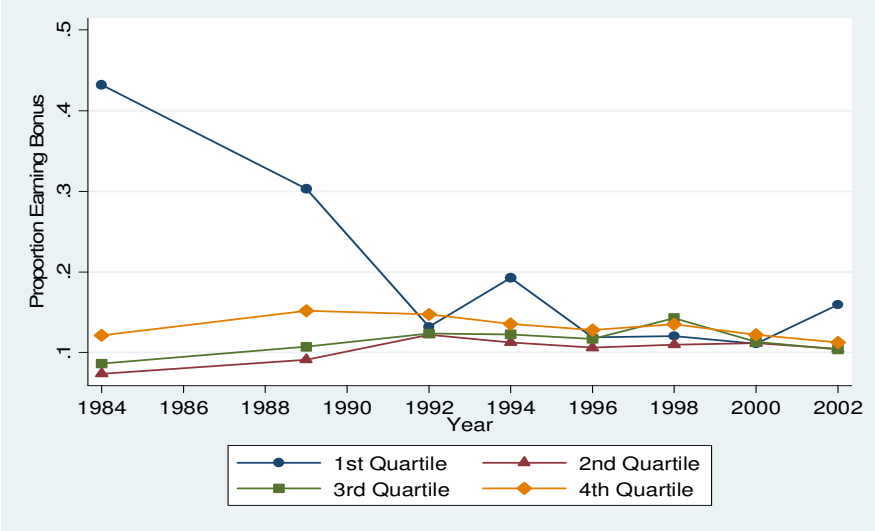
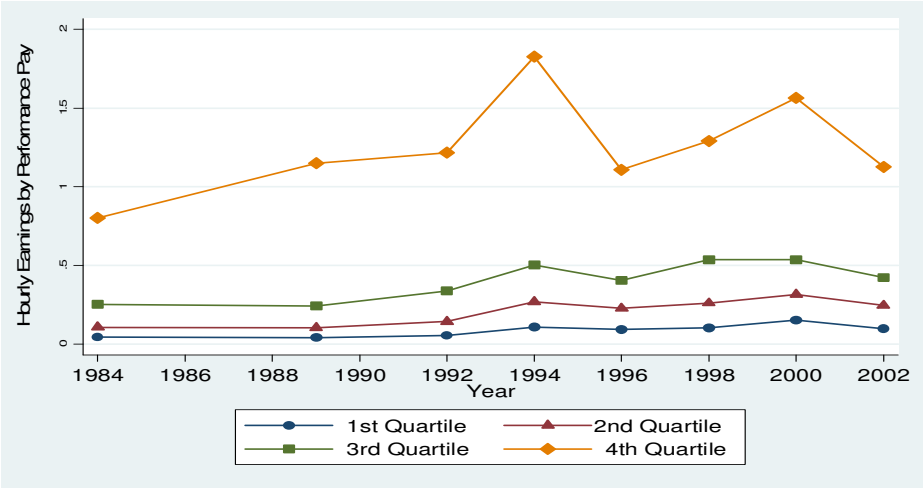
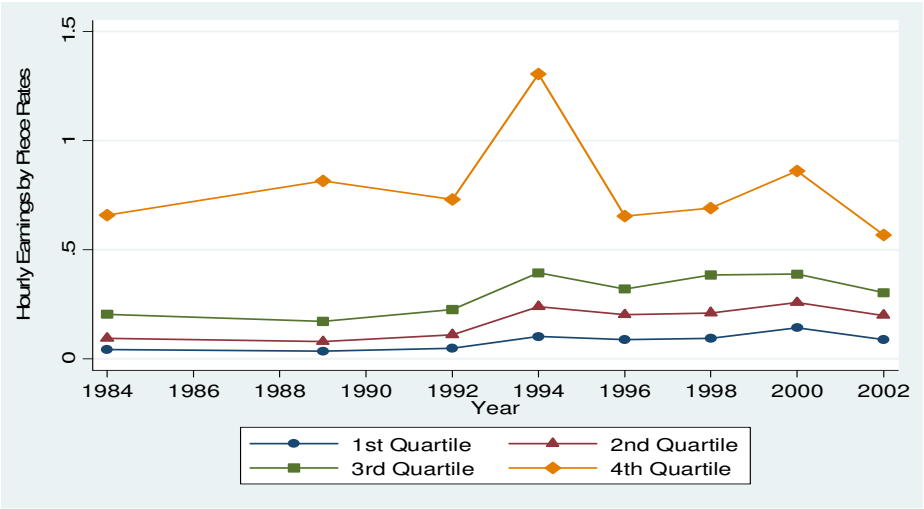


Figure 3*: Real hourly earnings for employed men aged 25-65, by type of performance pay and income quartile*

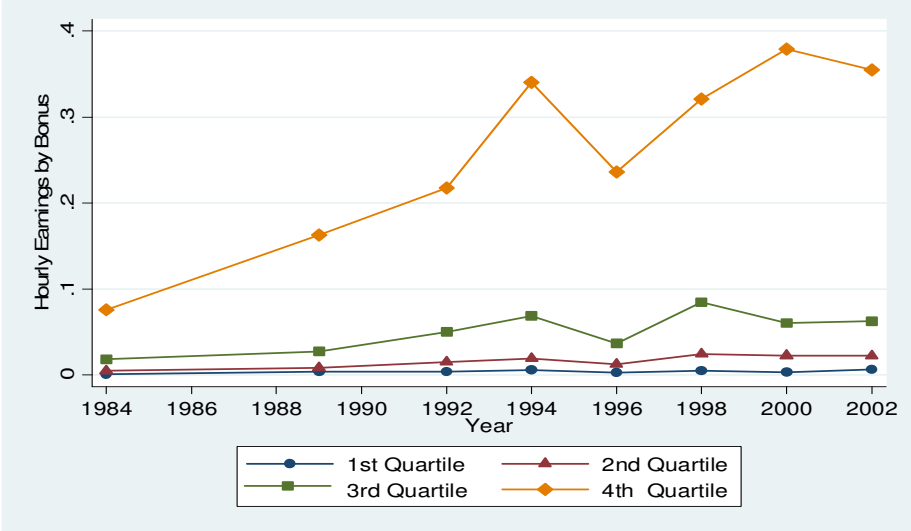
(a) All Performance Pay (b) Piece Rates



(b) Piece Rates



(c) Bonus



Probit Estimates

For Tables 3-6, starred* entries are significant at the 95% confidence level. Underlined entries are significantly different from their associated 1989 entries at the 95% confidence level, and **bold** entries are significant from their associated entry in the previous year at the 95% confidence level. Source is the Encuesta Nacional de Ingresos y Gastos de Hogares (ENIGH).

Table 3. *Probit estimates of likelihood of receiving types of performance pay, controlling for income effects, for working males aged 25-65, in years 1989-2000. Marginal effects (z-scores) for selected covariates*

	3(a) All Performance Pay					
	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	3.26* (2.117)	-0.475 (-0.240)	-0.744 (-0.462)	-1.94 (-1.071)	-1.92 (-0.936)	3.50 (1.574)
Experience (x1000)	-0.264 (-0.531)	-0.82* (-2.793)	-0.853 (-1.626)	-1.87* (-3.127)	-0.75* (-2.423)	-1.23 (-1.602)
Wages (x1000)	0.00391* (3.600)	0.00648* (4.761)	0.00198* (3.146)	0.0101* (6.847)	0.00776* (5.138)	0.00985* (4.687)
State FDI (x1000)	6.19* (3.388)	**-1.53** (-0.732)	0.497 (0.290)	-1.16 (-0.731)	-2.50 (-1.050)	0.0312 (0.00927)
Union Status	0.0251* (2.276)	**0.128*** (7.669)	0.0679* (4.661)	0.127* (7.704)	0.0919* (4.409)	0.178* (7.515)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,311	4,408	5,885	6,112	4,878	4,605
Pseudo R-Square	0.127	0.169	0.123	0.147	0.139	0.183

3(b) Piece Rates

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	0.706	0.678	-0.869	-1.41	-1.18	0.908
	(0.648)	(0.571)	(-0.735)	(-1.127)	(-0.810)	(0.652)
Experience (x1000)	-0.528	-0.215	-0.277	-0.990*	0.00954	-0.340
	(-1.480)	(-0.520)	(-0.718)	(-2.410)	(0.0192)	(-0.751)
Wages (x1000)	0.00187*	0.000922	0.000225	0.00145	-0.00119	-0.000643
	(3.061)	(1.362)	(0.496)	(1.655)	(-1.256)	(-0.606)
State FDI (x1000)	-1.27	-2.48	-1.47	-2.28*	-2.89	-5.91*
	(-0.971)	(-1.899)	(-1.178)	(-2.177)	(-1.816)	(-2.826)
Union Status	0.00528	0.00601	-0.00902	-0.00821	-0.0247	-0.0194
	(0.653)	(0.622)	(-0.879)	(-0.713)	(-1.685)	(-1.268)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,714	3,951	5,348	5,740	4,535	4,338
Pseudo R-Square	0.143	0.170	0.149	0.198	0.172	0.189

3(c) Bonus

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	2.31*	-0.678	-1.07	0.145	-0.482	0.815
	(3.327)	(-0.633)	(-1.284)	(0.162)	(-0.467)	(0.916)
Experience (x1000)	0.177	**-1.27***	-0.668*	-0.433	-1.15*	-0.598
	(0.718)	(-3.572)	(-2.447)	(-1.445)	(-2.939)	(-1.795)
Wages (x1000)	0.00000654	**0.00276***	**0.000939***	**0.00413***	0.00317*	0.00305*
	(0.0338)	(4.903)	(3.698)	(7.302)	(4.978)	(5.519)
State FDI (x1000)	3.60*	0.0888	1.10	0.871	-0.220	-0.555
	(4.111)	(0.0840)	(1.239)	(1.081)	(-0.177)	(-0.408)
Union Status	0.00497	**0.0617***	0.0540*	0.0601*	0.0746*	0.0749*
	(0.916)	(6.227)	(6.655)	(6.878)	(6.558)	(7.394)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,698	4,094	5,440	5,411	4,500	4,284
Pseudo R-Square	0.136	0.124	0.145	0.142	0.162	0.197

Table 4. *Probit estimates of likelihood of receiving types of performance pay, not controlling for income effects, for working males aged 25-65, in years 1989-2000. Marginal effects (z-scores) for selected covariates*

4(a) All Performance Pay

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	5.99* (4.310)	4.62* (2.633)	1.40 (0.950)	3.77* (2.286)	1.04 (0.522)	7.39* (3.356)
Experience (x1000)	0.271 (0.570)	-1.00 (-1.601)	-0.485 (-0.948)	-0.988 (-1.703)	-1.17 (-1.643)	-0.358 (-0.475)
Wages	No	No	No	No	No	No
State FDI (x1000)	6.54* (3.576)	-1.03 (-0.489)	0.679 (0.396)	-0.475 (-0.299)	-1.67 (-0.703)	1.75 (0.517)
Union Status	0.0246* (2.226)	**0.123*** (7.407)	0.0641* (4.425)	0.118* (7.231)	0.0865* (4.180)	0.167* (7.134)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5311	4408	5885	6112	4878	4605
Pseudo R-Square	0.122	0.162	0.121	0.138	0.134	0.173

4(b) Piece Rates

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	2.09* (2.034)	1.30 (1.221)	-0.660 (-0.617)	-0.737 (-0.630)	-1.62 (-1.154)	0.700 (0.535)
Experience (x1000)	-0.238 (-0.685)	-0.127 (-0.316)	-0.241 (-0.643)	-0.895* (-2.209)	**-0.0547** (-0.111)	-0.378 (-0.847)
Wages	No	No	No	No	No	No
State FDI (x1000)	-1.03 (-0.783)	-2.42 (-1.857)	-1.46 (-1.165)	-2.17* (-2.072)	-2.98 (-1.877)	-0.00595* (-2.859)
Union Status	0.00554 (0.683)	0.00579 (0.600)	-0.00919 (-0.897)	-0.00852 (-0.741)	-0.0247 (-1.685)	-0.0193 (-1.260)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4714	3951	5348	5740	4535	4338
Pseudo R-Square	0.137	0.169	0.149	0.198	0.172	0.188

	4(c) Bonus					
	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	0.00231*	0.00176	0.0000624	0.00317*	0.000783	0.00238*
	(3.478)	(1.768)	(0.0789)	(3.781)	(0.750)	(2.523)
Experience (x1000)	0.000179	-0.000846*	-0.000473	0.0000424	-0.000865*	-0.000186
	(0.738)	(-2.470)	(-1.748)	(0.144)	(-2.236)	(-0.568)
Wages	No	No	No	No	No	No
State FDI (x1000)	0.00361*	0.000283	0.00120	0.00113	0.000307	0.000210
	(4.119)	(0.262)	(1.340)	(1.398)	(0.245)	(0.149)
Union Status	0.00497	**0.0588***	0.0514*	0.0543*	0.0711*	0.0687*
	(0.916)	(5.970)	(6.408)	(6.282)	(6.264)	(6.885)
Industry Control	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,698	4,094	5,440	5,411	4,500	4,284
Pseudo R-Square	0.136	0.114	0.141	0.122	0.152	0.179

Table 5. *Probit estimates of likelihood of receiving types of performance pay, not controlling for industry, for working males aged 25-65, in years 1989-2000. Marginal effects (z-scores) for selected covariates*

	5(a) All Performance Pay					
	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	4.62*	1.22	2.06	-2.72	1.68	4.08*
	(3.332)	(0.663)	(1.408)	(-1.659)	(0.915)	(2.056)
Experience (x1000)	-0.741	-2.80*	-1.55*	-3.26*	-2.92*	-3.45*
	(-1.437)	(-4.214)	(-2.925)	(-5.535)	(-4.175)	(-4.597)
Wages (x1000)	0.00519*	0.00908*	0.00228*	0.0107*	0.00754*	0.0120*
	(4.232)	(6.187)	(3.406)	(7.343)	(5.236)	(5.959)
State FDI (x1000)	8.98*	3.29	4.09*	3.91*	3.35	4.49
	(4.676)	(1.479)	(2.249)	(2.540)	(1.465)	(1.398)
Union Status	0.0395*	0.125*	0.0722*	0.102*	0.0913*	0.135*
	(3.647)	(8.419)	(5.623)	(7.314)	(5.274)	(7.140)
Industry Control	No	No	No	No	No	No
Observations	5439	4482	5975	6252	4958	4626
Pseudo R-Square	0.0369	0.0538	0.0201	0.0309	0.0226	0.0493

5(b) Piece Rates

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	4.08*	0.808	2.94*	0.149	-1.50	1.07
	(2.056)	(0.841)	(2.465)	(0.135)	(-1.198)	(0.790)
Experience (x1000)	-3.45*	-0.902*	-0.492	-0.828*	-1.97*	-0.413
	(-4.597)	(-2.393)	(-1.069)	(-2.043)	(-4.344)	(-0.812)
Wages (x1000)	0.0120*	0.00247*	0.000692	-0.000116	0.000212	-0.00300*
	(5.959)	(4.012)	(0.933)	(-0.271)	(0.206)	(-2.813)
State FDI (x1000)	4.49	0.00252	-0.999	0.238	0.634	-0.310
	(1.398)	(0.00179)	(-0.651)	(0.169)	(0.557)	(-0.187)
Union Status	0.135*	-0.00767	-0.0164	-0.0272*	-0.0569*	-0.0636*
	(7.140)	(-0.993)	(-1.709)	(-2.826)	(-5.507)	(-5.146)
Industry Control	No	No	No	No	No	No
Observations	4626	5439	4482	5975	6252	4958
Pseudo R-Square	0.0493	0.0172	0.00978	0.00426	0.0141	0.0110

5(c) Bonus

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	4.22*	-0.904	0.471	1.33	0.745	2.28*
	(6.860)	(-0.943)	(0.604)	(1.698)	(0.694)	(2.318)
Experience (x1000)	0.344	-1.39*	-0.691*	-0.436	-1.32*	-0.986*
	(1.355)	(-3.812)	(-2.370)	(-1.496)	(-3.123)	(-2.613)
Wages (x1000)	0.000179	0.00299*	0.00109*	0.00413*	0.00398*	0.00412*
	(0.875)	(5.423)	(3.996)	(7.720)	(6.059)	(6.835)
State FDI (x1000)	3.26*	0.833	2.21*	0.43	1.10	0.167
	(3.549)	(0.754)	(2.297)	(1.852)	(0.856)	(0.109)
Union Status	0.0168*	0.0707*	0.0873*	0.0811*	0.130*	0.134*
	(3.126)	(7.931)	(10.80)	(10.21)	(11.27)	(11.89)
Industry Control	No	No	No	No	No	No
Observations	5439	4482	5975	6252	4958	4626
Pseudo R-Square	0.0563	0.0610	0.0701	0.0939	0.0767	0.120

Table 6. *Probit estimates of likelihood of receiving types of performance pay, not controlling for income effects, for working males aged 25-65, in years 1989-2000. Marginal effects (z-scores) for selected covariates*

6(a) All Performance Pay

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	8.13* (6.717)	8.25* (5.357)	4.68* (3.687)	3.62* (2.512)	5.12* (2.930)	9.91* (5.312)
Experience (x1000)	-0.0402 (-0.0816)	-1.71* (-2.688)	-1.12* (-2.180)	-2.33* (-4.079)	-2.30* (-3.339)	-2.34* (-3.215)
Wages	No	No	No	No	No	No
State FDI (x1000)	9.59* (4.997)	4.01 (1.799)	4.40* (2.417)	4.61* (2.988)	4.06 (1.778)	6.71* (2.096)
Union Status	0.0370* (3.425)	0.122* (8.199)	0.0687* (5.376)	0.102* (7.252)	0.0938* (5.411)	0.139* (7.304)
Industry Control	No	No	No	No	No	No
Observations	5439	4482	5975	6252	4958	4626
Pseudo R-Square	0.0281	0.0408	0.0176	0.0207	0.0168	0.0338

6(b) Piece Rates

	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	2.58* (2.915)	3.45* (3.371)	0.0302 (0.0315)	-1.38 (-1.274)	-0.135 (-0.108)	1.71 (1.419)
Experience (x1000)	-0.532 (-1.450)	-0.417 (-0.935)	-0.846* (-2.134)	-1.95* (-4.418)	-0.591 (-1.177)	-0.659 (-1.350)
Wages	No	No	No	No	No	No
State FDI (x1000)	0.341 (0.241)	-0.940 (-0.614)	0.223 (0.158)	0.648 (0.570)	-0.560 (-0.338)	-5.51* (-2.465)
Union Status	-0.00846 (-1.093)	-0.0166 (-1.729)	-0.0271* (-2.831)	-0.0568* (-5.500)	-0.0649* (-5.270)	-0.0785* (-6.463)
Industry Control	No	No	No	No	No	No
Observations	5439	4482	5975	6252	4958	4626
Pseudo R-Square	0.00920	0.00953	0.00425	0.0141	0.00938	0.0185

	6(c) Bonus					
	(1) **1989**	(2) **1992**	(3) **1994**	(4) **1996**	(5) **1998**	(6) **2000**
Education (x1000)	4.35* (7.412)	1.60 (1.838)	1.86* (2.617)	4.38* (5.946)	2.83* (2.622)	4.92* (4.762)
Experience (x1000)	0.374 (1.505)	-0.987* (-2.767)	-0.461 (-1.620)	-0.00512 (-0.0178)	-0.904* (-2.181)	-0.423 (-1.133)
Wages	No	No	No	No	No	No
State FDI (x1000)	3.29* (3.586)	1.15 (1.027)	2.40* (2.474)	1.77* (2.242)	1.55 (1.195)	1.33 (0.840)
Union Status	0.0167* (3.111)	0.0694* (7.720)	0.0840* (10.49)	0.0786* (9.791)	0.131* (11.19)	0.135* (11.53)
Industry Control	No	No	No	No	No	No
Observations	5439	4482	5975	6252	4958	4626
Pseudo R-Square	0.0561	0.0489	0.0647	0.0723	0.0634	0.0946