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Wage differentials in Mexico's urban labor market

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Abstract

We estimate wage differentials across different segments of the Mexican urban labor market. We use a panel sample of individuals which allows us to control for workers' observable and non-observable characteristics, by focusing on wage changes reported by individuals who move from one sector to another. The results suggest that the wage differential between the formal and informal sectors is positive and significant, and larger than the differential between industry and services. While we cannot distinguish formally between different hypotheses that could explain the existence of these differentials, our results seem to suggest that the main distortions in the Mexican labor market appear to be related more to labor regulations that affect the allocation of labor between the formal and informal sectors, than to differences in intrinsic characteristics of the production processes in industry and services.

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1. Introduction

Jobs in the informal sector usually represent an important proportion of the working labor force in developing countries. In the case of Mexico, depending on the criteria used to define informality, existing estimates suggest that informal workers as a proportion of the total labor force are in a range going from 30 to 70 percent (see e.g. Perry *et al.*, 2007; Gasparini and Tornarolli, 2009). Given the prevalence of informal jobs in these economies, relevant research topics are the identification of the factors that determine the size of the informal sector and the study of its possible consequences. A first step to address these issues is to study whether there are significant differences between the wages in the informal and the formal sectors of the economy.

There is currently little consensus about the direction and the size of wage differentials between these sectors in the case of Mexico. In particular, previous studies have provided mixed results. For example, Maloney (1999) finds that average wages in the informal sector are larger than formal sector wages. This result is mainly driven by the assumption that all self-employed workers (who on average earn more than formal workers) belong to the informal sector.¹ When he restricts his analysis to salaried workers, he finds that income increases significantly when an individual moves from the informal to the formal sector of the economy. Similarly, Levy (2008), who restricts his analysis to only salaried workers, finds no strong evidence of significant differentials. However, he does find a significant formal wage premium of a magnitude similar to the one we report in this study in the particular case of low-wage individuals. Finally, Gong and van Soest (2002) and Gasparini and Tornarolli (2009) find that formal wages are on average higher than their informal counterparts. It is relevant to note that, while most of these studies control for worker heterogeneity, they do not control for the productive sector (industry vs. services) where the workers are employed.

In this paper we provide further evidence that may contribute to this literature. We estimate wage differentials between the formal and informal sectors of the Mexican urban labor market, controlling both for the effects of differences in the distribution of characteristics of workers and for the productive sector of employment. The results suggest the existence of a significant wage premium in the formal sector. Controlling for individual heterogeneity and for the productive sector of employment, average monthly wages in the formal sector appear to be around 13 percent greater than in the informal sector. This result compares with an estimated differential of 4 percent between wages in the industrial and service sectors. These results may suggest that the presence of regulations that are enforced only in the formal sector may be more important determinants of wage differentials in the Mexican labor market than intrinsic characteristics of the industrial and services sectors.

¹ Some self-employed workers comply with all legal registrations and, thus, should not be assigned to the informal sector. As opposed to Maloney's (1999) assumption, in the following exercises we explicitly avoid assigning these workers to the informal sector. These considerations are not trivial, as self-employed workers represent a significant part of total employment in Mexico. In fact, according to the OECD (2006), in 2003 this group reached 37.1 percent of all workers.

2. Empirical results

2.1 Data and methodology

We use the Mexican Urban Employment Survey (ENEU), in which more than 100,000 workers are interviewed every quarter at their homes. The survey takes the form of a rotating panel, in which each quarter a fifth of the sample is dropped and another new wave of households is included. Thus, each worker is interviewed for five consecutive quarters. The period we analyze goes from the first quarter of 2001 to the last quarter of 2004.²

We follow the criteria in International Labour Organization (ILO, 2003) to identify informal workers. In particular, we assume that a worker belongs to the informal sector if he or she is a self-employed individual whose business or company is not registered with a business association, the local government, or the fiscal authority (SHCP), or if he or she is a salaried worker without any of the following mandatory benefits: IMSS (social security), ISSSTE (social security for governmental employees), Afore (retirement benefits), INFONAVIT (home loan), or a private health insurance. It should be pointed out that the results we report did not turn out to be qualitatively different from those that would be obtained if we alternatively defined the informal sector in terms of the size of the firm in which the worker is employed.

Given the panel structure of the database we use, it is possible to observe the wage earned by a specific individual in two different sectors, when that worker changes employment from one to another.³ To control for worker heterogeneity, we therefore base our estimates on the wages earned by the group of individuals who changed from the formal to the informal sector (or vice-versa) during the period of time when they were present in the sample.⁴ In particular, once individuals who move from one sector to another are identified, their average wages are computed before and after the transition.⁵ We then compare average wages of those workers who move between formal and informal employment, restricting the sample to cases where individuals

² There are two reasons why we chose this period. First, after the entry of China to the World Trade Organization (WTO), important changes in the composition of the Mexican labor market were observed. Indeed, between 2001 and 2004 the Mexican economy presented a large movement of workers from formal industries to informal services (Alcaraz, Chiquiar and Ramos-Francia, 2008). Another reason why the analysis ends in 2004 is that in the following year the ENEU was replaced by the National Survey of Occupation and Employment (Encuesta Nacional de Ocupación y Empleo, ENOE), which included substantial changes in methodological terms, the conceptual framework and the measurement of relevant concepts. See INEGI (2005).

³ For the analysis we mostly use after-tax monthly income, measured in real first-quarter 2001 pesos. There are two reasons why it may be preferable to use monthly, as opposed to hourly wages. First, in developing countries with a large rate of self-employment, the measurement of weekly working hours is prone to high measurement error. For this reason authors such as Fields (1980) recommend that in this type of economies, workers' income be measured in monthly rather than hourly wages. Secondly, at least some of the workers in the informal sector in Mexico may be limited to work fewer hours than they would be willing to. In any case, we also estimate wage differentials using hourly wages. As will be seen below, the main qualitative conclusions remain.

⁴ Within the period of study, we found 212,924 transitions between the formal and informal sectors of the economy and 126,050 transitions between the industrial and services sectors. This is the sample we use for our estimates.

⁵ Individuals who did not report income or who reported that the wages earned in one of their two jobs were zero were dropped from the sample.

remain either in services or industry. That is, we also calculate the formal wage premium controlling for *the economic activity in which individuals are employed*. Finally, using the same approach, we compute wage differentials between industry and services.⁶

2.2 Differentials between the formal and informal sectors

Table 1 shows average monthly wages earned before and after the transition by individuals who moved between the formal and informal sectors. The wage differential derived from these figures is shown in pesos and in percentage terms. For comparative purposes, the average wage for all formal and informal workers in the sample is included in the table.

Table 1

Average wages before and after transitions between the formal and informal sectors
(First-quarter 2001 pesos)

| <i>Transition</i> | <i>Wage before</i> | <i>Wage after</i> | <i>Difference</i> | <i>(%)</i> | <i>Formal workers wage (full sample)</i> | <i>Informal workers wage (full sample)</i> |
|--------------------|--------------------|-------------------|-------------------|------------|--|--|
| Formal to Informal | 3,897 | 3,491 | -406*** | -10.42 | 4,696 | 2,756 |
| Informal to Formal | 3,494 | 3,875 | 381*** | 10.90 | | |

Significant ***at 1%, **at 5%, * at 10%

Source: Compiled from ENEU data, INEGI (2001-2004).

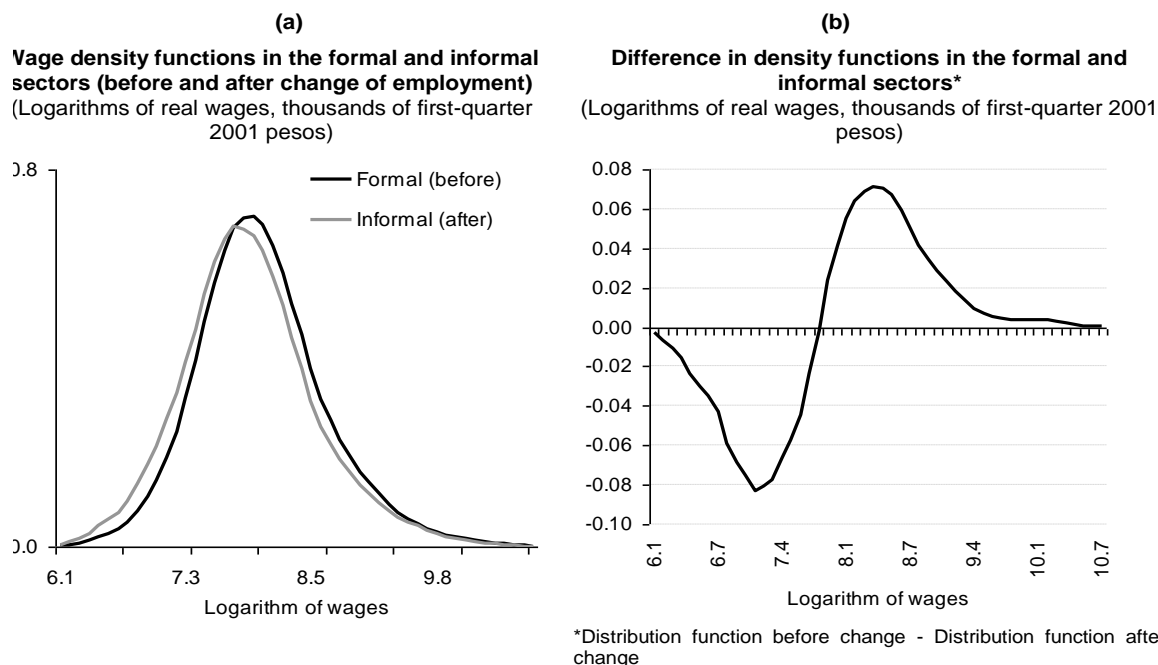
As can be seen, the results suggest the existence of a formal wage premium of slightly more than 10 percent, once controlling for worker heterogeneity. Indeed, the wage of workers who move from the formal to the informal sector decreases around 10.4 percent on average, while that of workers who move in the opposite direction increases around 10.9 percent.⁷ Based on the results of t-tests for differences in means, these differentials are statistically significant at a 1 percent level.

We can get a better view of the wage differentials between formal and informal sectors by comparing the wage distribution in each. Figure 1a presents kernel estimates of these wage distributions, using only the data of those individuals who moved from the formal to the informal sector. That is, these estimated densities again control for differences in observed and non-observed worker characteristics. Figure 1b illustrates the difference between the estimated density of formal and informal sector wages. Figures 2a and 2b are constructed in the same manner, but their calculation is based on the group of individuals who moved from the informal to the formal sector. As can be seen, the wage distribution for *the same group of individuals* is shifted to the left when they work in the informal sector. Indeed, the wage distribution in the formal sector seems to *stochastically dominate* that of the informal. The Kolmogorov-Smirnov test of equality of distributions rejects the hypothesis that the distribution functions of the formal and informal sectors are equal at a significance level of 1 percent.

⁶ In all of the analysis that follows, construction workers are assigned to the industrial sector. The estimated differentials do not differ significantly if these individuals were assigned to the service sector instead.

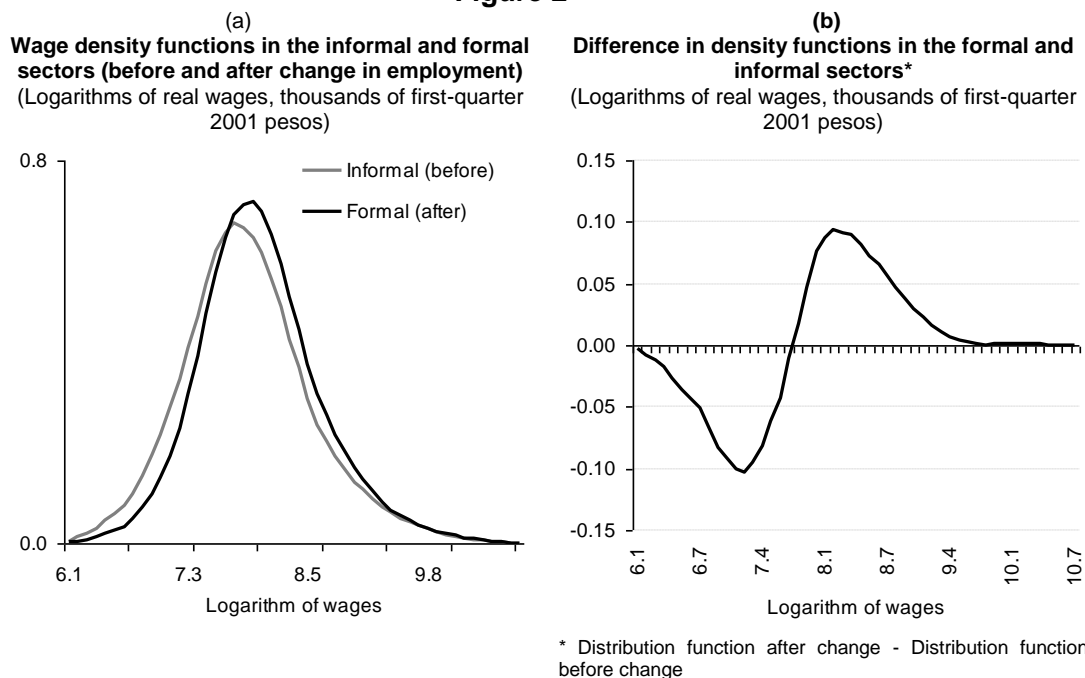
⁷ As can be seen, the average changes in wages experienced by workers who move from one sector to another tend to be of similar magnitude (but of opposite sign) to the changes that are identified from workers moving in the opposite direction. This suggests that the estimations in this study are possibly not importantly affected by self-selection.

Figure 1



Source: Compiled from ENEU data, INEGI.

Figure 2



Source: Compiled from ENEU data, INEGI.

There are other aspects of the results summarized in Table 1 that may be emphasized. According to t-tests for differences in means, the average wage earned by workers who enter the formal sector (3,875 pesos) is not statistically different from the average wage received by workers at the time they leave that sector (3,897 pesos). Similarly, the average wage workers earn on entering the informal sector (3,491 pesos) is not significantly different from that earned by workers who leave that sector (3,494

pesos). This suggests that, if the wage is taken as an indicator of the market value of the workers' characteristics, the individuals who move from the formal to the informal sector and those who move in the opposite direction are relatively homogeneous groups. Note, however, that the average wage of workers who move from the formal to the informal sector is significantly lower than the average wage of all formal sector workers (4,696 pesos). Similarly, the average wage of workers who move from the informal to the formal sector is significantly higher than the average wage of all informal sector workers (2,756 pesos). This is consistent with the implications of Albrecht, Navarro and Vroman (2009). In their model (which assumes heterogeneity in workers' productivity), three groups of workers are identified: a group of high-productivity workers that never take informal sector jobs, a group of low-productivity workers that never take formal sector jobs, and a group of intermediate-productivity workers that may shift from one sector to the other. The average wage of the workers that never take informal sector jobs is higher than the average wage of workers that may take jobs in both sectors, which in turn is higher than the wage of the workers that never take formal sector jobs.

2.3 Differentials between the formal and the informal sector, conditional on individuals' productive sector

We now compute an alternative set of wage differentials between the formal and informal sectors, using only the group of individuals who move from one of these sectors to the other but that remain in either services or in industrial activities. That is, the calculation of the differentials now controls for both worker heterogeneity and the productive sector in which individuals are employed.

Table 2 summarizes this analysis. In industry, as well as in services, workers who move from formal to informal employment tend to exhibit a significant drop in their wages. Similarly, those who move from the informal to the formal sector experience a significant increase. The weighted average of the results summarized in this figure suggests that the differential between formal and informal sector wages, *controlling for the economic activity where the individual is employed*, averages 13.4 percent.⁸ If we estimate the same wage differentials, but using hourly wages instead, the main qualitative results hold. Indeed, as can be seen in Table 3, the wage differentials per hour worked between the formal and informal sectors are statistically significant, although they average 6.4 percent. That the formal wage premium becomes lower when hourly wages is used to compute it reflects the fact that, on average, fewer hours per week are worked in the informal than in the formal sector. Note, however, that the evidence continues to be consistent with the hypothesis that there is a significantly positive formal wage premium, even after accounting for differences in average hours worked in each sector.

⁸ The number of transitions used to calculate the differentials in Table 2 is: i) 18,811 transitions from the formal to the informal sector, within industry; ii) 18,629 from the informal to the formal sector, within industry; iii) 65,299 from the formal to the informal sector, within services; and iv) 67,126 from the informal to the formal sector, within services.

Table 2

Differential between the formal and informal sectors, conditional on productive activity
(First-quarter 2001 pesos)

| <i>Sector</i> | <i>Transition</i> | <i>Wage before</i> | <i>Wage after</i> | <i>Difference</i> | <i>Change (%)</i> |
|---------------|-----------------------|--------------------|-------------------|-------------------|-------------------|
| Industry | 1) Formal to Informal | 3,935 | 3,604 | -331*** | -8.41 |
| | 2) Informal to Formal | 3,584 | 3,944 | 360*** | 10.04 |
| Services | 1) Formal to Informal | 3,862 | 3,363 | -499*** | -12.92 |
| | 2) Informal to Formal | 3,348 | 3,822 | 474*** | 14.16 |

Significant ***at 1%, **at 5%, * at 10%

Source: Compiled from ENEU data, INEGI (2001-2004).

Table 3

Differential between formal and informal sectors, conditional on productive activity
(First-quarter 2001 pesos per hour)

| <i>Sector</i> | <i>Transition</i> | <i>Wage before</i> | <i>Wage after</i> | <i>Difference</i> | <i>Change (%)</i> |
|---------------|-----------------------|--------------------|-------------------|-------------------|-------------------|
| Industry | 1) Formal to Informal | 20.71 | 19.28 | -1.42*** | -6.87 |
| | 2) Informal to Formal | 19.33 | 20.78 | 1.45*** | 7.49 |
| Services | 1) Formal to Informal | 22.55 | 21.11 | -1.45*** | -6.41 |
| | 2) Informal to Formal | 21.08 | 22.33 | 1.25*** | 5.92 |

Significant ***at 1%, **at 5%, * at 10%

Source: Compiled from ENEU data, INEGI (2001-2004).

2.4 Differentials between the industrial and service sector

For comparative purposes, we carry out an analysis similar to the previous one, except that we now compare wages in the industrial and in the service sectors. Table 4 presents average monthly wages earned before and after the transition by individuals who moved between industry and services (without controlling for the formality status of the employee), while Table 5 computes the industrial wage premium using only the group of individuals who do not change their formality status when moving from industry to services or vice-versa.⁹ According to the results, there seems to be a statistically significant wage premium of around 4 percent in the industrial sector. This differential is less than half of the previously estimated formal sector wage premium.

⁹ The number of transitions used to calculate the differentials in Table 5 is: i) 14,328 transitions from industry to services, within the formal sector; ii) 14,113 from services to industry, within the formal sector; iii) 12,625 from industry to services, within the informal sector; and, iv) 12,437 from services to industry, within the informal sector.

Table 4
Average wages before and after transitions between the industrial and service sector
(First-quarter 2001 pesos)

| <i>Transition</i> | <i>Wage before</i> | <i>Wage after</i> | <i>Difference</i> | <i>(%)</i> | <i>Industrial workers wage (full sample)</i> | <i>Services workers wage (full sample)</i> |
|----------------------|--------------------|-------------------|-------------------|------------|--|--|
| Industry to Services | 3,859 | 3,695 | -164*** | -4.25 | 3,985 | 3,905 |
| Services to Industry | 3,744 | 3,911 | 167*** | 4.46 | | |

Significant ***at 1%, **at 5%, * at 10%

Source: Compiled from ENEU data, INEGI (2001-2004).

Table 5
Differential between industry and services, conditional on formality status
(First-quarter 2001 pesos)

| <i>Type of employment</i> | <i>Transition</i> | <i>Wage before</i> | <i>Wage after</i> | <i>Difference</i> | <i>Change (%)</i> |
|---------------------------|-------------------------|--------------------|-------------------|-------------------|-------------------|
| Formal | 1) Industry to Services | 5,147 | 4,944 | -203*** | -3.94 |
| | 2) Services to Industry | 4,997 | 5,190 | 193*** | 3.86 |
| Informal | 1) Industry to Services | 2,708 | 2,627 | -81*** | -2.99 |
| | 2) Services to Industry | 2,604 | 2,736 | 132*** | 5.07 |

Significant ***at 1%, **at 5%, * at 10%

3. Conclusions

The results of this paper suggest the existence of a significant formal sector wage premium in the Mexican labor market which does not seem to be attributable to differences in the distribution of worker characteristics. This differential appears to be larger than the one obtained when industry wages are compared with service wages.

There are at least three possible explanations for the wage differentials found between the formal and informal sectors of the economy: formal labor market regulations that distort the allocation of workers (e.g. firing costs, minimum wages, restrictions to form flexible labor contracts), differences in the observability of workers' effort, or differences in compensatory wages. In this study we cannot formally distinguish the possible relevance of each of these hypotheses. However, the finding that the formal-informal wage premium is larger than the industrial-services premium, in a context where we have controlled for non-observed worker characteristics, may suggest that the most relevant distortions in the Mexican labor market could be related more to incentives and rigidities that affect the allocation of workers between sectors, than to intrinsic characteristics in industry or services that could lead to differentials related to compensatory or efficiency wages. In order to test formally these alternatives, it may be worthwhile as a next step to conduct a more structural analysis than the one presented here.

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