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ABSTRACT

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Taking advantage of a complex minimum wage structure in Honduras, this paper examines how changes in minimum wages over the 1990-2004 period affect unemployment as well as the employment and average wages of workers in different sectors of the economy: medium and large-scale firms v. small firms in the private sector (where minimum wage legislation applies) and civil servants and self-employed workers (where it does not apply). The evidence suggests that minimum wages are effectively enforced only in medium and large-scale firms, where a 1% increase in the minimum wage leads to an increase of 0.29% in the average wage and a reduction in employment of -0.46%. We find that increases in the private sector minimum wage are emulated in public sector wages, but there are no disemployment effects there. There is some evidence that a higher minimum wage may increase unemployment. There are no discernable effects of minimum wages on the wages of workers in small-firms or the self-employed. The positive impact of higher minimum wages on average wages is greatest for the primary educated in large private firms; but this group also suffers a very large disemployment effect. We conclude that, even in the sector where minimum wages are enforced and even under our upper bound estimate of the effect on the wages of workers, the welfare – the total earnings – of low-paid workers in the large-firm covered sector falls with higher minimum wages.

JEL Classification: J23, J31, J38

Keywords: minimum wage, employment, unemployment, wage, Central America, Honduras

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1. Introduction

This paper contributes to our understanding of the effect one labor market institution – the minimum wage – on the welfare of different types of workers in developing countries, where we assume workers' welfare is a function of their earnings. Although the goal of minimum wage policy is to redistribute labor income to low paid workers, its final impact is difficult to predict as it depends on a number of factors such as how competitive labor markets are, to what extent minimum wages are enforced, what its coverage is, etc.

We take advantage of Honduras' complex minimum wage structure, with its greater variation than that of the US or UK, to examine the welfare (employment and wage) effects on workers in different sectors, which are defined by where minimum wage legislation applies and does not apply, and guided by the theoretical framework of a two-sector labor market model. Since 1990, over 22 minimum wages have applied to employees in the private sector, by industry and firm size. There is a large group of workers -- civil servants and the self-employed -- for whom minimum wages do not apply directly, but whose wages and employment might be affected indirectly through the mobility of workers across sectors in response to changes in the minimum wage or because minimum wages act as a guide in wage setting.

We combine data on minimum wages from national decrees with micro data from twenty-four national household surveys conducted during 1990 to 2004 to determine employment and wage effects separately for covered workers in small and medium/large firms in the private sector as well as the self-employed and public sector workers. We then focus on workers likely to earn low wages in the absence of minimum wages, and estimate separate wage and employment effects for them. We do so with an estimation technique that carefully takes into account the multiple minimum wages set in Honduras, controls for the endogeneity of minimum wage policy to economic conditions and takes into account possible inertia in the labor market.

2. Minimum Wages as a Redistributive Tool

An effective minimum wage can shift the earnings distribution in favor of the low-paid worker and shrink the bottom tail of the income distribution. However, it can also reduce the share of total earnings going to low-paid workers by displacing many from employment. As Freeman (1996, p. 639) notes in an article with the title of this section: "The goal of the minimum wage is not, of course, to reduce employment, but to redistribute earnings to low-paid workers." However, the impact of minimum wages on the welfare of low-paid workers is indeterminate as its impact on wages and employment is a function of a host of factors.[1]

The competitive model predicts that workers whose marginal product falls below the new decreed minimum will be priced out of the market. Obviously, how high the minimum wage is set relative to the marginal product or market wage is an important factor in determining how large of an impact it will have. However, the elasticity of demand (shaped by factors such as the substitutability of unskilled for skilled labor) is also important; if it exceeds one, an increase in the wage will reduce rather than increase the share of earnings going to low-wage workers.

The models of the labor market based on some form of imperfect competition predict workers will earn a wage below their marginal product and an increase in the minimum wage can, up to a point, increase wages without reducing employment. Factors that can give rise to imperfect competition in the labor market include incomplete information, imperfectly mobile workers and monopsonistic power on the part of the employer.[2]

If minimum wage legislation does not cover 100% of the workforce, then the question arises as to its indirect impact on the uncovered sector.[3] The classical two-sector competitive

[1] See Kennen (1995) and Brown (1999) for an extensive discussion of the theoretical models of minimum wage policy and the empirical literature up through the mid-1990s and Neumark and Wascher (2006) for a review of the empirical work since the mid-1990's.

[2] See Manning (2003) for a review of this theory and the empirical literature supporting it.

[3] Of course, non-compliance with the minimum wage legislation in some sectors can effectively create a non-covered sector as well.

model predicts that workers whose marginal product falls below the new decreed minimum will be priced out of the covered sector market and will look for work in the uncovered sector, lowering wages and raising employment there. The extent to which employment rises and wages fall in the uncovered sector is a function of the size of the labor supply shift and the elasticity of demand there. It is also possible that wages will not be driven down in the uncovered sector if unemployment rises sufficiently.

Growth in the ranks of the unemployed as a result of the minimum wage increase is of course a function of many factors, including the size of the disemployment effect and institutions such as the generosity of social safety nets provided by either the government or family networks, which might give unemployed workers incentive to wait for a job in the formal sector rather than take a job in the lower-wage informal sector. However, in a developing country such as Honduras, where there is no unemployment benefit scheme provided by the government for individuals in the private sector, one would not expect to see low wage earners openly unemployed.

In addition to unemployment, other market mechanisms can lead to the outcome of higher wages in both the covered and uncovered sectors. For example, Saint-Paul (1994) shows that in response to higher wages in the urban area (triggered by higher minimum wages), capital will flow to the rural areas and increase the demand for labor there.

Hence adjustments to the minimum wage can have very different effects on the wages and employment of workers in different sectors depending on, the level of compliance, the relative level of the minimum wage to the average age, the elasticities of demand in the two sectors, and the degree to which unemployment rises. In sum, it is theoretically very difficult to predict the redistributive/welfare effects of the minimum wage on different groups of low-paid workers.

Given this theoretical ambiguity, what does the empirical literature find? Recently there has been a burgeoning empirical literature that uses data from around the world to test for the employment and wage effects of minimum wages which will eventually enrich our

understanding of this policy's effects. However, it is still too early to tell what the impacts of minimum wages are on the welfare of different low wage workers. This is in part because the heterogeneity in the structure and coverage of minimum wages is so great (see e.g., Eyraud and Saget, 2005). Clearly the impact of the policy will differ if there is one v. multiple minimum wages, if the structure of minimum wages is set by occupation v. industry v. region, if its coverage is universal v. for a small segment of the labor market, or if minimum wages are set only at the low end of the wage distribution (as in the US) v. throughout the wage distribution (as in Costa Rica). Moreover, there is large variance in compliance with minimum wages in developing countries. Finally, the indirect effects of these policies on the relatively large uncovered/non-compliant sector, which should differ from the direct effects, are far more difficult to measure given that they are driven by supply and demand shifts and hence make greater demands on data requirements. Nevertheless, we briefly review here the major findings in the most recent literature using data from Latin America with respect to the questions asked in this paper.

A large review of the literature for Latin American conducted by the World Bank (2006) concludes that a 10% increase in minimum wages: a) raises average wages from 1-6%, affecting wages throughout the distribution (based on studies of Colombia, Mexico and Brazil); b) reduces employment by 2%; and c) increases unemployment among the most vulnerable (young, women, least educated). These findings are based on studies with heterogeneous methods, e.g., some pool workers in the covered and uncovered sectors (for which the effects are likely to be opposed), most do not control for heterogeneity and there is no evidence that more than one minimum wage was used in the analysis to capture its effect, when there are multiple minimum wages in many of these countries.

On the question of the impact of minimum wages on the welfare of the low wage workers, a large number of papers find that increases in the minimum wage are not helping and may even be hurting low wage workers. For example, Arango and Pachón (2003) find, using panel data for six Colombian cities for 1984-2001, that minimum wages are regressive,

improving the earnings of families in the middle and upper part of the income distribution with net losses for those in the bottom quintile. They also find significant negative minimum wage effects on the likelihood of being employed, which were stronger for women, the young and the less educated. Montenegro and Pages (2003), using data on the level of wage v. self-employment among different demographic groups in the metropolitan area of Santiago de Chile over the 1960-1998 period, and two levels of the minimum wages (for adult v. youth), conclude that a 10% increase in minimum wages reduces the probability of employment for young unskilled male workers by 0.51 percentage points. However, they also find that a 10% increase in minimum wages raises the employment rates of women by 0.46 percentage points. Kristensen and Cunningham (2006) also conclude from their study of 19 Latin American countries that minimum wages do not uniformly benefit low-wage workers: in countries where the minimum wage is relatively low compared to the mean wage, minimum wages improve the wages of the more disadvantaged segments of the labor force; but in countries where the minimum wage is relatively high, it primarily affects wages of the high skilled.

On the question of the impact of the minimum wage on the "uncovered" sector, there is very little evidence. For the "informal" sector, there is a strand of the literature that concludes that the wages in this sector are affected by increases in the minimum wage. Much of this evidence is based on kernel density estimates. For example, Kristensen and Cunningham (2006) conclude from their own analysis of 19 Latin American countries as well as that of others (e.g., Maloney and Núñez, 2003) that minimum wages affect the wage distribution of the informal sector both at the minimum wage and at multiples of the minimum. For the public sector there is even less empirical work. Guzman, Lizardo and Lora (2003) provide some weak evidence (based on a simulation exercise) that increases in the minimum wage raise the wage bill in the public sector in five Latin American countries. We find in Gindling and Terrell (2007) that increases in the minimum wage raise the average wage and lower employment in the public sector in Costa Rica.

In this paper we contribute to the literature by providing robust empirical evidence using nationally representative data for Honduras over the 1990-2004 period on: a) the wage effects of minimum wages in four sectors, to determine to what extent there is compliance in the two covered sectors and a "numeraire" or "lighthouse" effect in the two non-covered sectors; b) the size of the disemployment effect in the sectors where legal minimum wages affect the wage structure; c) the unemployment effects; and d) the wage and employment effects for four different education groups in the compliant sectors.

3. Data: Minimum Wage Decrees and Household Surveys

The data for this study come from two principal sources: 1) the Minimum Wage Decrees and 2) the Permanent Household Surveys for Multiple Purposes.[4]

Honduras' first Minimum Wage Decree appeared in 1974. In the ensuing 30 years the minimum wage (MW) was adjusted 30 times, with a higher frequency in 1990-2004. It was changed two times in the 1970s and again two times in the 1980s but 17 times in the 1990s and nine times in the first four and a half years of 2000s.[5] Half of these adjustments were made through a Tripartite Commission composed of representatives of unions, businesses and the government, and the other half by an Executive Decree from the President's office. In most of the period under study (1990-2004), the decision has come from the President's office since the members of the Commission could not agree.[6]

The MW applies to all salaried employees in the private sector. A separate wage grid (set by statutes and by the Law for Civil Service) applies to public sector employees who are not covered by union agreements. However, among the unionized civil servants, private sector minimum wages may act as a guide. For example, there are two groups of civil servants whose base wage has at times been adjusted with a formula explicitly tied to MW

[4] Encuesta Permanentes de Hogares de Propósitos Múltiples
[5] See appendix Table A1 for the dates of each of the Minimum Wage Decrees.
[6] The information on the structure of minimum wages was gathered from interviews in January 2005 with staff at the Ministry of Labor and Social Security in Honduras and from a report by the Secretaria de Trabajo y Seguridad Social (2003).

adjustments during the period under study: medical staff and teachers. Medical staff has had their base wage set as a multiple of the private sector's MW since 1997 (article 34 of decree 161-97). For example, general doctors' base wage is 12 times the MW whereas the specialized doctors' base wage is 14 times the MW. Teachers' wages have also been adjusted since 1997 according to a formula based on the MW: Their wages have been raised by 0.7132 times the average of the lowest and the highest minimum wage raise.

Honduras has always had more than one minimum wage. During the period under study, there were more than 22 categories of minimum wages defined by the firm's size, economic activity and, for some years, location. The industry grouping is similar to the one-digit ISIC classification, but there are also special MWs for the exporting sector.[7] During the 1990-95 period MWs were set for three firm sizes (1-5, 6-15, and 16+ employees) but since then they have only been set for two firm sizes (1-15 and 16+ employees). From 1990-1995 there were also different MWs for each of three regions: one for the two largest cities (Tegucigalpa and San Pedro Sula) and the department of the Islands of Bahia; one for medium-sized cities; and one for the rest of the country. This was reduced to two regions in 1995-96 (largest cities and other) but has been dropped as a dimension of minimum wages since then.

Appendix Figure A1 plots the data on MWs that we use in our empirical analysis. These are the daily minimum wages provided by the decrees which we have deflated to December 1999 prices using the monthly Consumer Price Index provided by the Bank of Honduras. We use 22 minimum wage categories each year: for small (1-15 employees) v. medium/large (16+) firms in each of eleven industries.[8] We note that the MWs for medium/large (henceforth, large) firms was on average 18% higher than the MWs for small

[7] Until 1996 there was a minimum wage for exporters of specific products (e.g., tobacco, coffee, shellfish, and certain fruits) as well as service related to the transportation and export of these goods (e.g., shipping, docking, railway repair). Since 1996 there has been an additional MW for those who temporarily import without a tariff and who export less than 80% of their production (the RIT – Régimen de Importación Temporal).

[8] During 1990-1995, when there were different MWs for firms with 1-5 and 6-15 employees, we chose to use the MW decreed for the 6-15 employees as the minimum wage for 'small firms.'

firms during 1990-2004 and that MWs for the two firm sizes follow a broadly similar trend with relatively high wages in the early 1990s, a fall in real minimum wages in the middle of the period and a rising trend from 1999 to 2004. We also note that not all of the industry minimums follow the same trend; and there is a considerable range of MWs among them, with larger gaps in the early 1990s than in recent years. Three industries demonstrate persistently high minimum wages – non-metallic mining, electricity and the financial services – while three industries – construction, manufacturing, commerce and hotels – have persistently low minimum wages.

The second data set we use is the Permanent Household Surveys for Multiple Purposes (PHSMP), which has been a nationally representative survey of households since 1990.[9] Over the period under study, the survey was carried out one to two times a year.[10] The basic survey instrument did not change appreciably during 1990-2004; hence we have comparable data on a large sample (an average of 13,400 workers) at each point in time. We lament however that these are not panel data on the same workers.

We show in appendix Table A1 the dates the PHSMPs were carried out over 1990-2004 and the MW decree that was in effect at each date. We use data from only 22 of the 24 surveys since we are not able to use the October 1993 and September 1996 PHSMPs because the former does not contain data on the earnings of self-employed workers and the latter does not have data on workers in the rural areas.

Given that the PHSMP provides information on the industry, firm size, and location of each person's job, we are able to append to each worker, and to each unemployed person who has worked before, the minimum wage that corresponds to his/her job in a given month and year.[11] Melding the industrial structure from the decrees to the structure presented by the

[9] The exception is that the survey taken in September 1996 only covers the urban population.
[10] However, in 2000 no surveys were taken because of the turmoil created from Hurricane Mitch in December 1999.
[11] We are unable to make use of the MWs decreed for the three firm size categories in 1990-1995 because the PHSMP only shows two firm size categories in those years (and up to 1999): i.e., 1-9 employees and 10+ employees. For those years, the MW that was assigned to workers in firms with 10+ employees corresponds to

PHSMP was fairly straightforward, although we had to drop the "export sector" minimum wage since we do not know from the PHSMP if the worker's firm is export oriented or not.

The daily MWs were converted into monthly MWs in order to have them in the same units as the salary data in the PHSMP. According to the Directorate of Salaries in the Ministry of Labor, employers are required to pay 30 daily MWs in a month. We also calculated an hourly minimum wage = Monthly MW/(4.3 x 44), which assumes an average of 4.3 weeks a month and that full time work is 44 hours a week.[12] In the regression analysis, we compare hourly minimum wages to the hourly wages earned by workers. The hourly wage was calculated by dividing the monthly salary (provided in the PHSMP) by the number of hours the worker indicated he/she had worked per week times 4.3 (weeks/month).[13]

In order to get a sense of the variation in the real MW over time in relation to the real wage, we plot in the first graph of Figure 1 the average real hourly MWs and wages (in Lempiras, December 1999 prices) of all private sector salaried workers for each survey date during 1990-2004.[14] The second graph contains the plots of the ratio of the average minimum wage to the average wage. These graphs show that the minimum wage was high relative to the average wage at the beginning of the period, March 1990, when the minimum wage-wage ratio was approximately 0.65. This ratio fell from March 1990 to 1995, remained fairly constant from 1995 until September 1999 (with an average of 0.49), and then rose from September 1999 (when it was at its lowest rate of 0.43) until May 2004 (when it reached 0.56).

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the MW decreed for large firms of 15+ employees. We are able to distinguish firm size of 1-15 and 16+ employees for the 2000-2004 period.

[12] In Honduras, full-time work for private sector employees is defined in the labor code as 8 hours a day for five days plus one half-day on Saturday.

[13] Observations with missing data on any of the key variables (labor earnings, hours worked, sector, etc.) were deleted. Observations with hours worked coded as zero were also dropped. If hours worked is coded as > 96, we set it to 96.

[14] These MWs are averaged over all full-time workers, hence over large and small firms and all eleven industries, with a weight determined by the distribution of jobs in the PHSMP. In all of these figures there are no minimum wage data for October 1993, September 1996 and 2000, given the lack of proper data or existence of a survey, as noted earlier.

4. Compliance with the Minimum Wage

Before examining the impact of minimum wage legislation, it is important to detect the sectors of the labor market where there is compliance with minimum wage legislation in Honduras. We begin by noting that as in most countries, including the US, there are relatively few resources devoted to monitoring compliance by employers in Honduras.[15] The Directorate of Salaries in the Ministry of Labor, which is in charge of ensuring that compliance, has only four inspectors available to follow up on complaints and carry out random inspections for the entire country. Fines to employers can be stiff: a) up to two years back pay of the difference between the salary of the worker and the minimum wage and b) 100-600 Lempiras (which is approximately $5-$32, using 2006 exchange rates), depending on the characteristics of the employer. However, it is unlikely that very small employers are able to pay these fines. Not surprisingly, and given scarce resources, the Ministry of Labor inspectors focus enforcement efforts almost entirely on larger firms.

There are several ways to check for compliance in the data. A straightforward method is to look for spikes in the wage distribution at or around the minimum wage. Studies of the US have generally found such a spike (e.g., Dinardo et al., 1996; Neumark et al., 2000) but the evidence of spikes is mixed for developing countries (see e.g., Maloney and Núñez, 2003 for evidence for Argentina, Brazil, Chile, Colombia, Mexico and Uruguay; and Lemos, 2006 for Brazil, and Gindling and Terrell, 2005 and 2007 for Costa Rica). Given the number of minimum wages in Honduras, we simplify the graphical analysis by plotting the kernel density estimate of the log wage minus log minimum wage for each worker. A zero indicates that the worker is earning the legal minimum wage. In Figure 2 we plot these kernel density estimates separately for the: large firm covered sector, small firm covered sector, self-employed and public sector.[16] If legal minimum wages are enforced in a particular sector, we

[15] Freeman (1996, p. 647) notes that in 1993 the US Department of Labor had 804 inspectors to handle monitoring of the Fair Labor Standards Act, which includes regulations of hours worked and overtime pay, as well as the minimum wage.

[16] As noted in a previous footnote, in some years for which we have data firm size is coded as 1, 2, …9, and 10+ workers. To be consistent across all years of data, in our tables and figures we define small firms as those with

would expect to see the distribution of wages censored from below at the level of the minimum wage, with no (or very few) workers earning below the minimum wage. We might also expect to see a spike in the distribution at zero (at the minimum wage) that is higher in the covered sector than in the uncovered sector. Indeed, this is what we see in the kernel density estimates in the top left panel of Figure 2 for covered workers in large firms. On the other hand, the kernel density estimates for the small firm covered sector, self-employed workers and the public sector are not censored at the minimum wage and look very close to a normal distribution. While there is a small spike in the distribution of public sector workers at the level of the minimum wage, there is no spike at all in either the small-firm covered sector or among the self-employed workers.

Another way to summarize the information presented in Figure 2 is to calculate the average share of workers earning less than the MW, at the MW, or more than the MW within each of these four sectors, as we do in Table 1.[17] We find the share of workers earning at the MW is substantially higher among private sector employees in large firms (12.4%) than among private sector employees in small firms (9.7%), the self employed (7.1%) or in the public sector (5.3%), again pointing to higher compliance in the large firm private sector. Similarly, we find relatively fewer workers earn less than 90% of the minimum wage in the large firm covered sector (16.9%) than in the other private sectors (39.8% of the small firm and 43.2% of self-employed workers).[18] The share of workers earning less than the minimum wage is smallest in the public sector -- 6.0% -- indicating that the wage grid used there has a higher minimum. Hence the combined evidence of the wage distribution and the average share earning below and at the minimum wage point to better enforcement of minimum wages

fewer than 10 employees, and large firms as those with 10 or more employees (rather than defining large firms as the minimum wage legislation does, i.e., firms with 16 or more employees).

[17] We use a bound of 10% to allow for measurement error so that we are actually measuring the share earning less than 0.9 of the MW, within 0.9 and 1.1 of the MW and more than 1.1 of the MW.

[18] The share of the individuals who earn the minimum wage or less is very similar in Argentina (in 1999), Brazil (in 1996-2000) and Colombia (1984-2001), according to the World Bank (2006) study.

in the large firm covered sector than in small firms, where we conjecture there is little to no enforcement.

It may be argued that finding as many as 17% of the workers in the large firm covered sector earning below the minimum is an indicator of poor enforcement. There are many reasons to believe that our calculations of the share of workers earning below the MW is overestimated here and in the small firm sector. For one, we do not take into account the fact that apprentices are allowed to earn less than the MW for the first six months of their training. Moreover, we know some people earn part of their salary in commission (as in commerce) or in tips (as in services) and we do not have record of this. Persons paid in a piece rate (as in manufacturing) may have difficulty calculating their monthly salary and the errors could go either way. However, an important reason that we may be overestimating the number earning less than the legal MW is that we have not taken into account the fact that the law stipulates that an employer has the right to pay as little as 70% of the MW to a worker provided with food and housing; 80% of the MW if only food or housing is provided.

We have information available in the PHSMP on who is receiving in-kind payments for food and housing, but unfortunately, this information is only available from June 1997 to May 2004. Using the 1997-2004 data, we have recalculated the share earning below the MW with the correction that assumes that anyone who received either food or clothing could be paid 80% of the minimum wage in effect at that time and be considered as earning the minimum. Similarly, anyone who received both food and housing could be paid 70% of the minimum and be considered in compliance with the legislation. Whereas this adjustment lowers the share earning below the legal minimum wage in the large firm private sector by 3 percentage points (to 14.1%) and in the small firm private sector by 5 percentage points (to 34.7%), it does not change the story significantly.

We showed evidence of effective enforced only in the large firm covered sector and that MW legislation potentially impacts public sector wage setting as well. How do the characteristics of workers in these two sectors compare with those in the small firm covered

(but not enforced) sector and the self employed? We show in Table 2 that compared to workers in the other two private sectors, workers in the large firm covered sector and in the public sector are: better educated; more likely to work in the relatively higher-paying urban area, more likely to work in the relatively high-paying sectors of industry and financial services and less likely to work in the relatively low-paying sectors of agriculture, construction and services. This suggests that legal minimum wage legislation is enforced and disproportionately affects the wages of workers whose wages would be relatively high even in the absence of legal minimum wages.

5. Econometric Methodology

Given our understanding of how the MW policy is implemented and enforced and guided by the predictions of the two-sector competitive model, we follow a strategy of estimating the impact of MWs separately for workers in large- and small-firms in the private sector, enterprises in the public sector, and self-employment; as well as its impact on the level of unemployment. To estimate the wage and employment effects, we construct panels of average wages and employment levels, legal minimum wages, and other control variables by industry and firm size for each survey from 1990 to 2004. Using this industry/firm size panel data set we first estimate, separately for each of the four sectors defined above, an equation of the form:

$$lnW_{Ift} = \alpha_o + \alpha_1 lnMW_{Ift} + \alpha_2 lnW_{Ift-1} + \overline{X_{Ift}}\gamma + \mu_{Ift}, \qquad (1)$$

where lnW_{Ift} is the log of the mean hourly wage in industry I and firm size f at time t.[19] The explanatory variables include the log of the real hourly minimum wage (in 1999 Lempiras) that applies to that firm size and industry at time t, $lnMW_{Ift}$. We also include the lagged value of the dependent variable as an explanatory variable to account for inertia in the labor market that can result in partial adjustment over time to changes in the labor market (such as a change in the minimum wage). The vector X_{Ift} includes a set of control variables: the average values

[19] In the estimation of the wage equations, each cell is weighted by the average (over all years) number of workers for that industry/firm size category.

of human capital variables for each industry (years of education, experience, experience squared), the proportion male, and the proportion living in urban areas, the log of real GDP (value added) in each industry, and fixed effects for firm size, industry and the dates of the survey. We include dummy variables for the month and date of the survey to control for changes in the survey design and any time-specific factors such as aggregate supply and aggregate demand shifts or changes in the timing of the surveys. We find that also controlling for changes in demand at the level of each industry (with the log of real value added) proves to be important for the estimated minimum wage effect.

The coefficient α_1 is an estimate of the effect of changes within industries in the legal minimum wage on changes in average wages in that industry. If minimum wages are complied with in the covered sectors, then we would expect the coefficient α_1 to be positive and statistically significant. Therefore, the wage equations provide another test of whether sectors are complying with minimum wage legislation. However, we cannot interpret α_1 as the elasticity of the wage with respect to minimum wages. This is because changes in average wages could be positively and significantly correlated with increases in minimum wages for two reasons: (i) because some workers see their wages increase to the new, higher, minimum wage, and/or (ii) because some workers (presumably those earning less than or at the minimum wage before the minimum wage increase) lose their jobs, and are therefore no longer included in the sample used to calculate the average wage in each industry. Either reason indicates that there is compliance with minimum wage legislation, but should only (ii) be true, no workers would see their wages rise because of a minimum wage increase and α_1 is an overestimate of the elasticity of the wage with respect to minimum wages. Thus, α_1 is, at best, an upper bound on the elasticity of the wage with respect to minimum wages.

In order to estimate the effect of the MW on employment, we use the industry/firm size panel data to estimate an equation of the form:

$$lnEMP_{Ift} = \beta_o + \beta_1 lnMW_{Ift} + \beta_2 EMP_{Ift-1} + \overline{X_{Ift}}\gamma + \varepsilon_{Ift}, \qquad (2)$$

where $lnEMP_{Ift}$ is the log of the level of employment in industry I, firm size f at time t and the other explanatory variables are the same as in equation (1). For the covered sectors, the coefficient β_1 is an estimate of the elasticity of employment with respect to changes in the legal minimum wage.

For a robustness check, we also estimate Equation (2) using "fraction at the minimum wage" (within 10%) rather than the log of the real minimum wage. This has been used in the literature as an alternative measure when there is little variation in the minimum wage (e.g., Brown, 1999; Card and Kruger, 1995). The idea is that different proportions of the working population will be affected depending on the wage distribution in that labor market and the impact of minimum wage can be identified by this variation. However, the coefficient β_1 in this equation estimates the impact of the change in the fraction on employment and cannot be interpreted as an elasticity.

Equation (2) is also estimated with log of the level of unemployment as the dependent variable. This variable is the sum of all unemployed at time t who had been previously employed in industry I and firm size f.[20] The coefficient β_1 in this equation is hence an estimate of the elasticity of unemployment with respect to changes in the minimum wage.

Estimating the effect of minimum wages on employment is fraught with econometric issues, including the pervasive problem of endogeneity. That is, it is possible that minimum wages within an industry and firm size category are set endogenously from year to year. For example, the minimum wage for workers in manufacturing may increase (faster than for other industries) because the demand for manufacturing workers is increasing. In this case, the endogenous positive correlation between minimum wages and employment will create a positive bias in the estimate of the coefficient β_1. It is therefore imperative to use a method that controls for this problem. Industry- and firm-size specific fixed effects in equations (1)

[20] For the unemployed who have worked before, we assign the legal minimum wage that applies to the industry and firm size where they worked before becoming unemployed. We cannot assign a minimum wage to the unemployed who have never worked; therefore they are not part of the sample that we use to estimate the unemployment equation.

and (2) control for the endogenous correlation of employment and minimum wages across industry and firm size categories. However, standard fixed effects cannot control for endogeneity that may arise from changes over time within an industry, such as different rates of change in demand. Fixed effect estimates may result in inconsistent coefficient estimates not only because minimum wages, average wages and employment may be endogenously determined but also because the lagged dependent variable is correlated with the error term, creating bias.[21] We address both of these issues by using the dynamic panel data model developed by Arellano and Bond (1991). The Arellano and Bond estimator is a first-difference GMM estimator of a simple AR(1) model. It also addresses the issue of endogeneity by using lagged values of the predetermined variables as instruments for the endogenous minimum wage and lagged dependent variable. We estimate the one-step GMM Arellano and Bond (1991) estimator using up to three lags of the predetermined variables as instruments.[22] The estimated standard errors we report are robust to the presence of heteroskedasticity.

The empirical specification is designed to test the hypothesis that higher legal minimum wages in the covered sector will cause employers to reduce employment in that sector. Workers who lose their jobs may leave the labor force, become unemployed or move into one of the uncovered sectors.[23] Hence an indirect effect of minimum wages may be increased labor supply to the uncovered sectors, which will raise employment and lower wages there. However, we note that since we do not have panel data on individuals, we

[21] The bias in the estimate of the coefficient on the lagged dependent variable in the fixed effects (within groups) estimator will be negative (Arellano and Bond, 1991).

[22] Blundell and Bond (2000) point out that the lagged values of the first differences of the explanatory variables used as instruments in the Arellano and Bond (1991) estimator will be weak if the data are "highly persistent" – that is, if the individual data series have near unit root properties. To examine whether this could be a problem in our estimates, we regressed the log of employment on the lagged value of log employment (controlling for industry and firm size fixed effects). The coefficient on the lagged variable in this regression was 0.50. We also regressed the log of minimum wage on its lagged value and found that the coefficient on the lagged value was 0.45. Therefore, we find no evidence that our data are highly persistent, nor that the Arellano and Bond (1991) estimator is biased.

[23] Unfortunately we cannot test if workers who lose their jobs in the large-firm covered sector leave the labor force since we do not have data on the industry where those individuals worked before leaving the labor force. Without this information, we cannot assign a minimum wage to these individuals.

cannot observe where the individual who loses his/her job in the covered sector goes. Given this limitation, we have constructed panel data on the number employed and average wage for each of the four sectors by industry and we regress each of these variables on the minimum wage that applies to that sector and industry. That is, all workers in large firms (in both the public and private sectors) are assigned the minimum wage that applies to large firms in the industry in which they work; while the self-employed and workers in small firms are assigned the minimum wage for small firms in the industry in which they work.

This framework raises an issue with the interpretation of the coefficient on the minimum wage for the sectors where minimum wages do not apply or are not complied with. The interpretation of this coefficient is not an issue for the sector(s) that comply with minimum wages because it estimates the direct effect of an increase in the minimum wage that applies to a specific industry on the level of employment or wage in that industry. However, employment/wage effects in the other sectors will be indirect – i.e., higher minimum wages may cause workers who lose their jobs in the compliant sector to move to one of these other sectors. An estimation problem occurs because changes in the number employed or the wage level in these sectors are not necessarily the result of changes in the minimum wage in that industry, but may be the response to a higher minimum wage in another industry.[24] This problem also exists if a worker moves from a large-firm to a small firm.

Hence, while we are confident that the results of the estimation of the employment and wage equations in the compliant sector provide good estimates of the direct employment/wage effects of a change in the legal minimum wage, we are less confident that the employment equations capture the indirect effect of a shift in workers from the compliant sector into the other sectors. On the other hand, we are confident that the estimates of the

[24] If we could observe the person's job characteristics (e.g., wage, industry, firm size) in the previous period, this problem would not exist.

effect of changes in the minimum wage on unemployment are capturing the intended effect since the minimum wage assigned to these workers is the one that applied to their prior job.

6. Findings

6.1. *Impact on Wage and Employment for All Workers in Each of the Four Sectors*

Table 3 presents fixed effects and the Arellano and Bond (1991) GMM one step (henceforth, Arellano-Bond) estimates of the coefficients on the log of MW in equations (1) and (2), using the industry/firm-level panel data:[25] Panel A contains the coefficients for the wage equation and Panel B the coefficients for the employment equation. We show at the bottom of each panel the probability values (p-values) for some diagnostic statistics to test whether the data is consistent with the assumptions of the Arellano-Bond estimator. The Sargan statistic tests the over identification restrictions, and is a test of whether the instruments are uncorrelated with the error terms in the estimated equation. Since the p-values for the Sargan statistic are large (above 0.10) for both the wage and employment equations, we can reject the hypothesis that the instruments are correlated with the error terms, and we can conclude that that the instruments are well specified. We also present two tests derived by Arellano-Bond of whether the data are consistent with an AR(1) and/or AR(2) structure. If the p-values for these statistics is large (above 0.10), then we can reject the hypothesis that the data is not autoregressive of order 1 or 2. Since the Arellano-Bond estimator assumes that the data is autoregressive of order 1 and not of order 2), the small p-value for AR(1) and a large p-value for AR(2) implies that there is no evidence that the Arellano-Bond simple AR(1) model is mis-specified. We hence rely on the Arellano-Bond estimates in our analysis.

[25] Appendix Tables A2 and A3 contain the full set of estimates. The parameter on lagged employment (in the employment equation) measures the speed of the adjustment process. For the large firm covered sector, this parameter (0.626) implies a half life of the adjustment process of approximately 1.5 years (=$ln(0.5)/\ln\beta_2$). This is within the range of the adjustment parameters reported by Fajnzylber and Maloney (2001) in their estimates using dynamic panel data estimators on firm-level data for blue collar manufacturing workers Colombia, Chile and Mexico.

Beginning with the large-firm covered sector (column 1 in Table 3), we find that the estimated wage effects are robust to the two estimation methods and suggest that higher minimum wages increase average wages in the large-firm covered sector. Specifically, an increase of 10% in minimum wages increases average wages in the large-firm covered sector by about 2.9%. We also find, with the Arellano-Bond estimates, that the immediate employment impact is negative: a 10% increase in minimum wages lowers employment in the large-firm covered sector by about 4.6%.[26] These results combined with those of the kernel density estimates lead us to conclude that this sector is complying with minimum wage legislation. However, the overall welfare (earnings) of these workers is not necessarily improved, judging from the fact that the employment losses are greater than the wage gains (as noted in the previous section, our estimate of the wage effect is an upper bound--an overestimate--of the elasticity of wages with respect to minimum wages).

We note that in the small-firm sector the wage effects of the minimum wage are not significant for either estimation technique and the point estimate is very small. On the other hand, the employment effects are significantly positive and large. We conclude from this result, and those of the kernel density estimates, that the small firms are not complying with the minimum wage legislation. Whereas the evidence that employment in this sector is rising as minimum wages rise would be consistent with the story that workers who lose there jobs in the large-firm sector are finding jobs in the small firms, we do not feel our estimation technique is able to provide strong enough evidence of this indirect effect. Our identification of the employment effect of minimum wages in the uncovered sectors assumes that workers who lose their jobs in the covered sector look for work in the same industries in the uncovered sectors, since we compare the increase in minimum wages in an industry with employment in

[26] For the large-firm covered sector, the long-term employment impact multiplier (elasticity) is -1.22. This is at the upper end of the range of the estimates of the long run own wage elasticity for blue collar manufacturing workers in Latin America reported in Fanzylber and Maloney (2001) and Roberts and Skoufias (1997). The finding of a negative and significant employment effect in the firm covered sector is not sensitive to the specification; the result is the same when we use different subsets and different functional forms for the control variables (the Xs).

that industry in the uncovered sectors. If workers who lose their jobs in the covered sector change industries when they go to work in the uncovered sectors, we cannot capture those movements within our framework.

Turning to civil servants, in Column 3 of Table 3, we find evidence that the public sector is adjusting its salary structure over time with changes in the minimum wage, despite the fact that this sector is not formally covered by minimum wage legislation. In fact, the impact of the minimum wage on the average wage in the public sector is similar to its effect in the covered large-firm sector. However, in keeping with the notion that employment in the public sector is not driven closely by the market, we do not find a significant negative employment effect.

The results of the wage equation estimates presented in Column 4 of Table 3 provide no evidence that legal minimum wages are being used as a numeraire among self-employed workers; the coefficient on minimum wages in the wage equation is not significantly different from zero. This is consistent with the evidence we presented earlier on the distribution of wages within the self-employed sector and the proportion of workers earning at or below the minimum wage in that sector. The self-employed are a very diverse group of individuals ranging from shoe-shine boys to professionals contracting their services with various employers simultaneously to owners of small firms. Theoretically one can envision the movement of disemployed workers from the large-firm covered sector (or public sector) to the self-employed sector. For example, a person at the old minimum wage that is fired at the new minimum wage either starts a small business or is hired (by the same or another firm) on an independent contractual basis that is less expensive to the firm. However, capturing this effect in a segment of the labor market that is as diverse and fluid as the self-employed sector is difficult. Moreover, as we noted earlier, we do not expect our method to be able to capture the indirect effects of the minimum wage. Hence, we interpret our estimate of a non-significant positive impact of increases of the minimum wage on earnings as indicating that this sector's hourly earnings are not being affected by minimum wages; and do not assign any

meaning to the minimum wage's insignificant negative impact on employment, given the structure of our estimating framework.

We also estimate the impact of minimum wages on unemployment, where we are confident that our framework is able to estimate the effect unambiguously given that it relies on information on the job held prior to being unemployed.[27] We find that the fixed effect estimate is positive and significant but that the Arellano-Bond estimate is positive but not significant. However, if we estimate equation (2) excluding the value added by industry, we find that the Arellano-Bond estimate of the minimum wage coefficient is positive and significant (0.843, with a standard error of 0.504). Hence we find some evidence that increases in the minimum wage lead to increased unemployment, but this conclusion is sensitive to the choice of econometric technique and control variables.

Finally, we re-estimate equation (2) substituting the *lnMW* with *Fraction at MW* (i.e., within 10% of the MW) for each firm-size and industry category. The coefficients from this regression, presented in Appendix Table A4, are similar to those in Table 3 in terms of sign and significance; i.e., there are significantly negative employment effects in the large firm sector and significant positive effects in the small firm and the coefficients for the public sector and self-employed are also not significant. A comparison of our estimates with those of Lemos (2007) for Brazil indicates that the negative employment effects are much larger in Honduras' compliant sector compared to Brazil's formal sector; and both find some evidence for positive employment effects in the informal sector, where informal is small private firms in Honduras.

6.2. *Wage and Employment Effects of Minimum Wages on Workers by Education*

Changes in wages and employment for all workers in the compliant sector reflect the balance of losses and gains to different subgroups. Do minimum wages in that sector have larger effects on workers who are likely to be at the bottom of the wage distribution? To

[27] We note that the coefficient on log of MW in this regression is averaging the effect of minimum wages in large and small firms.

examine this possibility we examine the impact of legal minimum wages on wages and employment in the two sectors where minimum wages affect wages (the private large firm and public) separately for workers in each of four education groups: incomplete primary (including those with no education); completed primary; some and completed secondary; and some university and higher.

We present in Figure 4 kernel density estimates of the distribution of the log wage minus the log minimum wage for individuals in each of these education levels working in the large covered sector over 1990-2004. The figure indicates that there is much more of an effect of minimum wages on workers who have completed primary school and have some or complete secondary education than on workers with only an incomplete primary education or with some university education. For workers with a primary complete and secondary education there is a censoring of the distribution below the minimum wage, and a spike in the distribution at the minimum wage. For workers with an incomplete primary education there is no evidence of either censoring or a spike. Nor is there evidence that minimum wages affect the distribution of the wages of those with a university education; almost all university-educated workers earn more than the minimum wage.

We then estimate equations (1) and (2) for workers in the two compliant sectors using the Arellano-Bond technique.[28] The coefficients for the minimum wage are presented in Table 4, where each cell represents the coefficient from a separate regression. If minimum wages are to redistribute income to the low wage earner, then we would expect to see workers with a primary education experiencing significant wage increases with small employment losses. This expectation is not met in the large-firm covered sector but it is perhaps experienced by workers with incomplete primary education in the public sector.

In the large-firm covered sector, minimum wages appear to have a positive effect on the wages of workers in all education groups, but they are only significant at conventional

[28] Given that the diagnostic tests for the structure of the error term and the identification of the instrumental variable conclude that the Arellano-Bond model is correctly specified we proceed with this estimator only.

levels for the middle two education groups (primary complete and secondary) when using estimates of standard errors robust to heteroskedasticity. However, when we use an estimate of the standard errors that are not robust to heteroskedasticity (which are more efficient if heteroskedasticity is not present), the minimum wages have a positive and significant effect on the wages of workers in the two lowest education groups (incomplete primary and complete primary) and not for workers with a secondary education. The largest positive wage impact of higher minimum wages is on workers with a completed primary education. The employment effect in the covered sector, which appears to be negative for all for education groups, is only significant and quite large for the workers with some or completed primary education. (The significance is robust to both estimates of the standard errors.) The negative employment effect of higher minimum wages is much larger for the least-educated group (those with less than a completed primary education) than for any other education group. Hence the least educated workers are experiencing a large disemployment effect from minimum wage increases and a small positive wage effect.

In the public sector, the only group that experiences a significant increase in their wages is civil servants with the least education (primary incomplete); and this group does not suffer a significant disemployment effect. The wage and employment effects for all other education groups in the public sector are not significant.

Finally, we note that the only group that experiences a significant unemployment effect from minimum wages is workers with some or completed secondary education. Given the structure of education in Honduras, these workers are likely to be in the middle class and can afford to be openly unemployed, unlike workers with a primary or less education.

7. **Conclusion and Discussion**

Almost every country in the world has a minimum wage policy intended to improve the welfare of the low-wage workers, and yet it is not clear that this policy achieves its intended goal. This paper extends the literature by examining the wage and employment effects of Honduras' minimum wage policy during 1990-2004 for workers in different sectors

and at different skill levels. It does so with a careful methodological approach that takes into account the twenty-two legislated minimum wages and controls for endogeneity and demand conditions.

The fact that minimum wages in Honduras are set differently and at a lower rate for small firms (with less than 16 employees) v. for medium and large firms in an industry might lead one to believe that there would be compliance and positive wage effects in both sectors as we found in a similar study in Costa Rica, which does not have a lower wage for the small firm sector (Gindling and Terrell, 2005). However, we find only medium and large firms comply with minimum wage laws in Honduras. This result is robust to empirical technique and specification of the regressions. We find in this sector that: i) the bottom tale of the wage distribution is truncated at the minimum wage, ii) there is a spike in the wage distribution at the minimum wage; and iii) higher minimum wages result in higher average wages. We also find that a large significantly negative employment effect (-0.458), which dominates our upper bound estimate of the positive wage effect (0.293), such that total earnings of workers in medium and large firms falls with minimum wage increases. We find that the largest impact of minimum wages on the wages of workers is in the middle of the distribution (workers with a completed primary education), while the negative employment effects are largest for the least educated workers (those with less than a completed primary education) in this sector.

Non-compliance in the small scale sector effectively means it behaves as an uncovered/informal sector. We do not find evidence that minimum wages affect the distribution of wages in either segment of the uncovered/informal sector: small firms or self employed, counter to the findings of Maloney and Núñez (2003) and Kristensen and Cunningham (2006) for other countries in Latin America. We find the wage distributions of both sectors are not censored at the minimum wage and that a large percentage (40% of the small firm workers and 43% of the self-employed) are earning below the minimum wage.

Further, our regression results show that changes in minimum wages do not have a significant effect on average wages in either of these sectors.

The differences in our findings for Honduras and those of Maloney and Núñez (2003) and Kristensen and Cunningham (2006) for the wage effects in the "informal sector" may be driven largely by different definitions/measures of this sector. One view is that the informal sector consists of salaried workers in small firms (none of whom receive social benefits and whose wages are generally low because of low productivity) plus those who are carrying out some activity truly on their own (e.g., self-employed street vendors, taxi drivers, subsistence level farmers). Another view is that a large component of the informal sector is comprised individuals that are actually working in large-firms for employers who are trying to escape the high costs of regulation by hiring some of their workers without "the registration card." The first view is consistent with the traditional two-sector models in development (e.g., Lewis, 1954; Fields, 1990) and more recent models such as Kugler (1999) where firms sort themselves into formal or informal sectors depending on their productivity levels; whereas the second view is better characterized by recent models developed by McIntyre (2004) and Bosch (2007), where a firm decides between two types of contracts (formal and informal) In actuality, the formal sector is probably comprised of both in many countries, but data are not often available on who is being hired with a 'formal contract' or 'registration card' or not and depending on which measure one uses, one will probably get different effects of the minimum wage on wages in the informal sector. We do find evidence of some absorption of labor in the small-firm sector as a result of an increase in minimum wages; however the coefficient is only significant at the 10% level and given the limitation of our data and methodology, we cannot interpret this finding as an indirect effect of minimum wages and evidence for the two-sector competitive model. To capture that effect we would need panel data on individuals – to follow workers as they lose their jobs in the covered sector and search for jobs in the uncovered sectors – which is not available in Honduras.

On the other hand, we find evidence that the other uncovered sector -- the public sector -- is using increases in the minimum wage as a guide to adjust the wages of civil servants. Whereas the bell-shaped distribution of wages of public sector workers sits to the right of the minimum wages (only 6% of the workers earn less than the minimum), we do find that a 10% increase in the minimum wage raises the average wage in the public sector by about 2.5% (similar to the estimate for the medium and large firms in the private sector). The positive effect of higher minimum wages on wages paid in the public sector is statistically significant only for the least educated workers. On the other hand, no significantly negative employment effect is found in this sector. This is counter to our finding in Costa Rica, where an increase in the minimum wage has similar disemployment effects in both the private covered sector and the public sector (Gindling and Terrell, 2007).

Finally, there is some evidence that unemployment is positively correlated with minimum wages; however this effect is sensitive to specification. The one group for whom unemployment increases are robust are individuals with a secondary education, which is consistent with our understanding of which education group (class) is most likely to be able to afford to be openly unemployed.

The evidence we present here leads to the conclusion that minimum wage policy in Honduras has not improved the welfare of workers (especially low-wage workers) in the covered sector and may have led to the creation of additional unemployment. This supports the traditional view for which Neumark and Wascher (2006) cite an enormous amount of evidence. By being used as a guide to set wages in the public sector, minimum wage legislation may have improved the well-being of the lowest wage civil servants. However this group comprises less than one percent of all workers in Honduras.

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Table 1: Share of Workers in Each Sector Earning Less than, At, and More than the Minimum Wage (Average for 1990-2004)

	Less Than[1]	At[2]	More Than[3]
Private Salaried Employees	30.6%	11.1%	58.3%
Large	16.9%	12.4%	70.7%
Small	39.8%	9.7%	50.4%
Self-Employed	43.2%	7.1%	49.7%
Public	6.0%	5.3%	88.7%
Total	32.4%	9.3%	58.2%

[1]Less than 90% of the Minimum Wage
[2]Within 10% of the Minimum Wage
[3]110% or more than the Minimum Wage

Table 2: Characteristics of Workers in Each Sector, Average Share for 1990-2004

	Covered Sector		Uncovered Sector	
	Large Firms	Small Firms	Self-Employed	Public
Gender				
Male	67.7	73.1	59.2	49.9
Female	32.3	26.9	40.8	50.1
Age				
10-20	15.6	19.7	5.1	2.3
20-30	39.5	25.5	20.7	25.9
30-40	23.4	20.0	25.6	31.7
40-50	13.0	16.4	20.4	25.4
50 +	8.6	18.5	28.2	14.7
Education				
Primary Incomplete	28.9	55.3	59.8	10.8
Primary Complete	31.8	28.4	26.4	14.5
Secondary	29.9	13.8	12.2	51.7
Higher	9.4	2.7	1.6	23.0
Region				
urban	67.6	45.2	40.2	72.7
rural	32.5	54.8	59.8	27.3
Industrial Sector				
Agriculture and Mining	21.5	39.9	36.2	0.8
Industry	37.1	10.6	16.0	0.0
Electricity	0.4	0.1	0.0	3.8
construcion	5.6	9.0	3.5	1.7
Commerce and Hotels	14.7	18.3	30.9	0.1
Transportation	3.1	3.2	2.9	5.0
Financial Services	6.8	1.5	0.8	1.0
Other Servics	10.9	17.5	9.7	87.7
% of Total Employees	**24.0**	**36.3**	**31.2**	**8.6**

Table 3: Minimum Wage Effects on Wage and Employment of All Workers in each Sector

Panel A: Wage Equation[1]

	Covered Sectors		Uncovered Sectors		
	Large	Small	Public	Self-emp	Unemp
Fixed-effects	0.261***	-0.015	0.368**	0.259	-
	(0.083)	(0.186)	(0.184)	(0.352)	
Arellano and Bond	0.293***	0.004	0.245*	0.371	-
	(0.106)	(0.078)	(0.143)	(0.278)	
Diagnostic Statistics	P-Values	P-Values	P-Values	P-Values	-
Sargan statistic	*0.9873*	*0.9988*	*0.9988*	*1*	
AR(1) test statistic	*0.0078*	*0.012*	*0.0236*	*0.0175*	
AR(2) test statistic	*0.5314*	*0.2781*	*0.1461*	*0.1999*	

Panel B: Employment Equation[2]

	Covered Sectors		Uncovered Sectors		
	Large	Small	Public	Self-emp	Unemp
Fixed-effects	0.143	0.508*	-0.096	-0.334	0.957*
	(0.359)	(0.286)	(0.751)	(0.283)	(0.553)
Arellano and Bond	-0.458***	0.392*	-0.491	-0.400	0.704
	(0.178)	(0.213)	(0.815)	(0.286)	(0.571)
Diagnostic Statistics	P-Values	P-Values	P-Values	P-Values	P-Values
Sargan statistic	*0.9993*	*1*	*1*	*1*	*0.9994*
AR(1) test statistic	*0.0232*	*0.0499*	*0.0191*	*0.041*	*0.0039*
AR(2) test statistic	*0.03851*	*0.1631*	*0.5807*	*0.6645*	*0.6975*

Notes:

*significant at the 10% level; **significant at the 5% level; *significant at the 1% level.

[1]coefficient on the log of real minimum wages from estimating equation (1)

[2]coefficieint on the log of real minimum wages from estimating equation (2)

All reported standard errors (in parentheses) are robust to heteroskedasticity.

Table 4: Arrellano-Bond Estimates of the Coefficients on the Minimum wage for Workers at Different Education Levels in each Sector

	Wage Effect[1]		Employment Effect[2]		Unemp. Effect
Skill Level	Large	Public	Large	Public	
Primary Incomplete	0.246	0.899***	-1.846***	1.293	-0.474
	(0.188)	(0.235)	(0.491)	(1.019)	(0.623)
Primary Complete	0.526***	0.267	-0.861**	-1.486	-1.363
	(0.075)	(0.411)	(0.397)	(1.256)	(0.533)
Secondary	0.205***	0.277	-0.395	-1.981	2.513***
	(0.067)	(0.277)	(0.290)	(1.941)	(0.875)
University	0.247	-0.524	-0.263	0.712	1.529
	(0.194)	(0.458)	(0.932)	(0.854)	(1.819)

Notes:

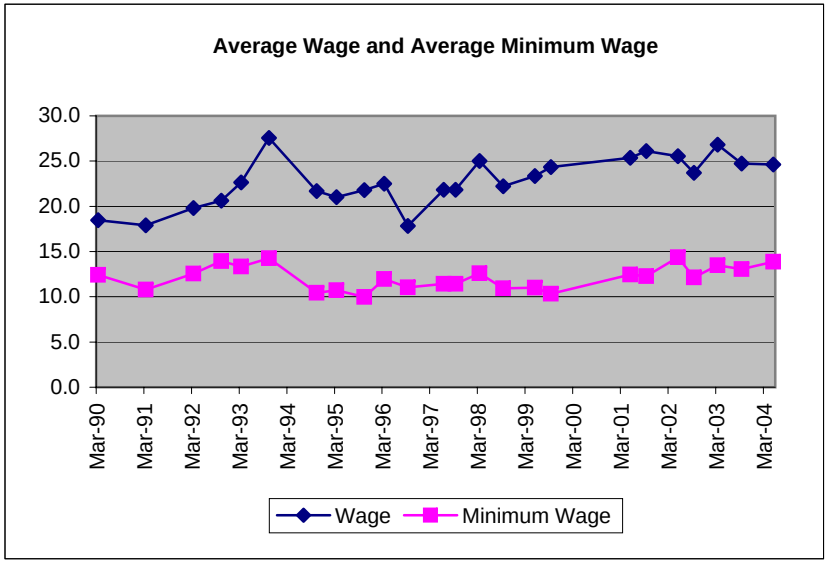
*significant at the 0.10% level; **significant at the 0.05% level; ***significant at the 0.01% level.

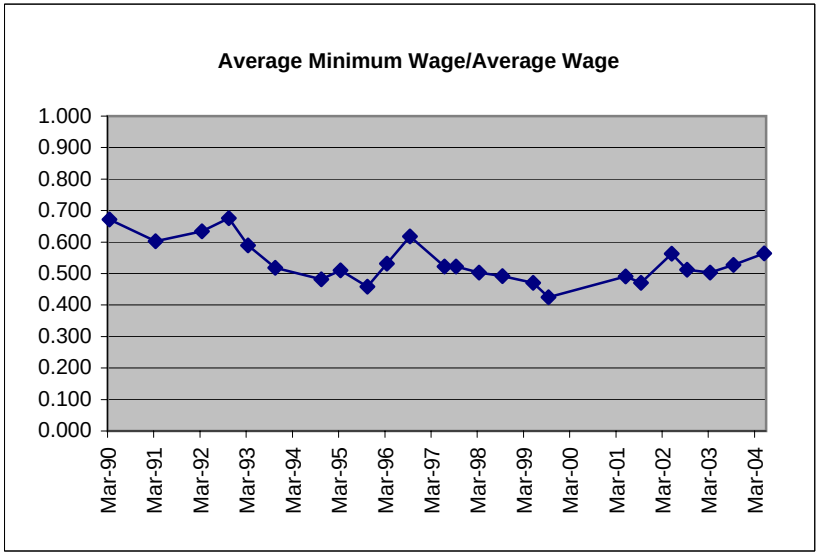
[1]coefficient on the log of real minimum wages from estimating eqn (1) with Arellano and Bond (1991) separately for workers at different education levels.

[2]coefficient on the log of real minimum wages from estimating eqn (2) with Arellano and Bond (1991) separately for workers at different education levels.

All reported standard errors (in parentheses) are robust to heteroskedasticity.

Figure 1: Average Hourly Wage, Average Hourly Minimum Wage in Lempiras (Dec. 1999 prices) and their Ratio over Time for Salaried Workers in the Private Sector





Source: Authors' calculations from the Honduran Household Surveys.

Figure 2: Kernel Density Distribution of the Log Wage Minus the Log Minimum Wage in Each Sector (1990-2004)

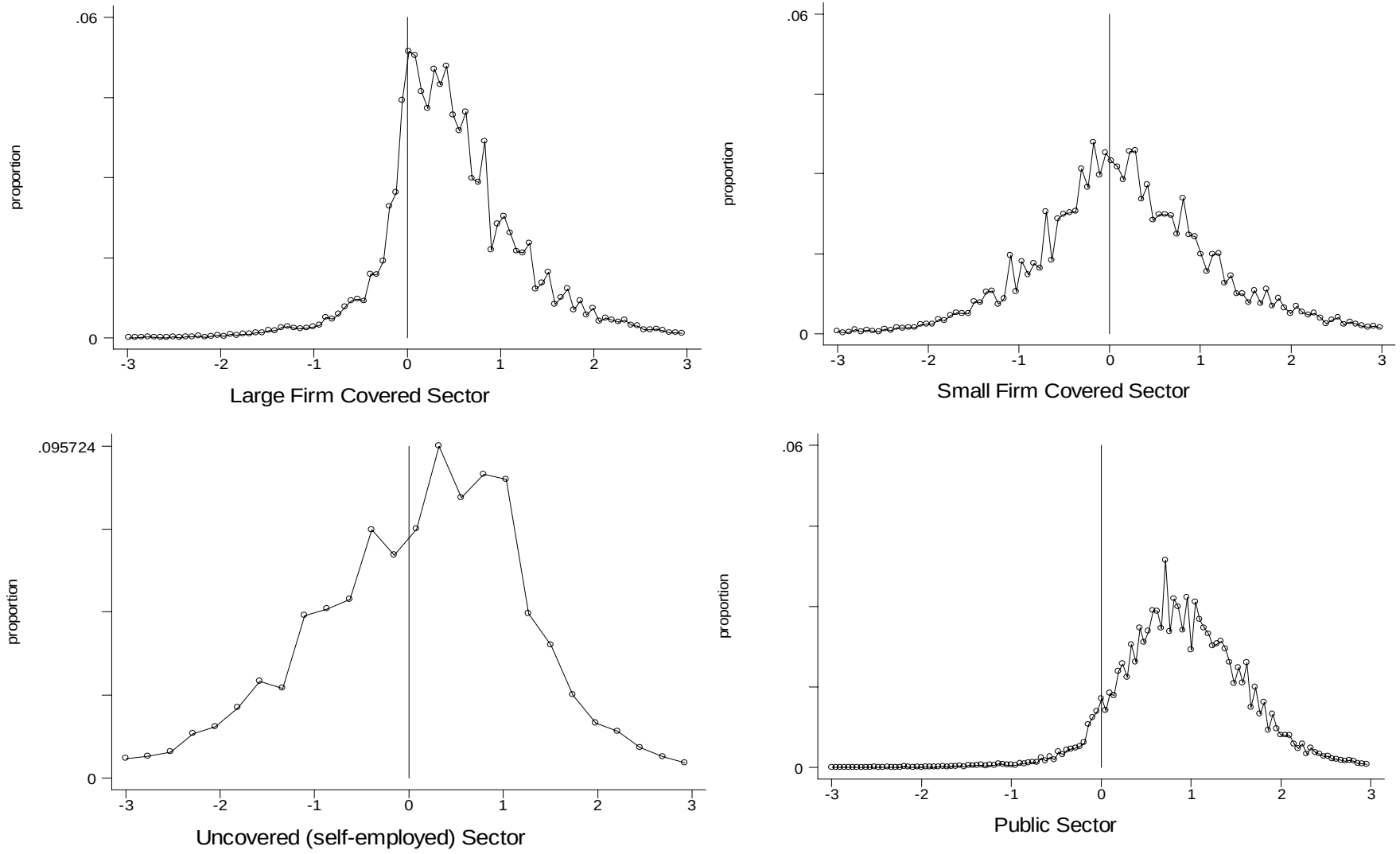


Figure 3: Kernel Density Distribution of the Log Wage Minus the Log Minimum Wage in the Large Covered Sector, by Education Level (1990-2004)

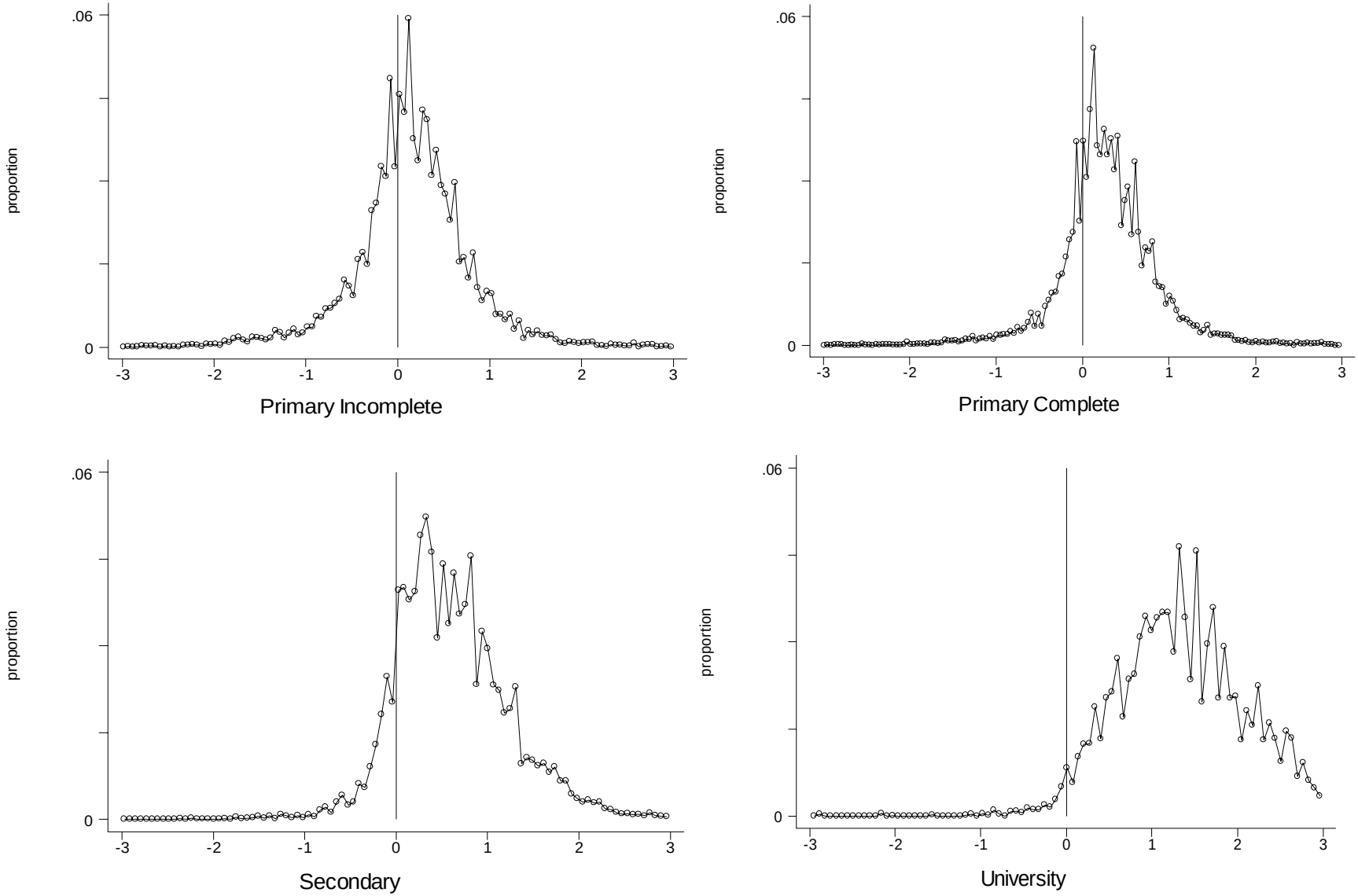


Table A1: Dates of the Household Surveys (PHSMP) and Minimum Wage Decrees

Dates of the Household Surveys	Period in which each Minimum Wage Decree is in effect*	No. of the Minimum Wage Decree*
1990 March	Jan 1990-Sep. '90	40-89
1991 March	Oct '90-July 14, '91	19-90
1992 March	July 15, '91-May '92	28-91
1992 Oct.	June '92-May' 93	25-92
1993 March	June '92-May' 93	25-92
1993 Oct.	June '93-Dec '94	30-93
1994 Oct	June '93-Dec '94	30-93
1995 March	Jan. '95-Feb '96	001-94
1995 Oct	Jan. '95-Feb '96	001-94
1996 March	March 1996-Jan 15, '97	005-96
1996 Sept	March 1996-Jan 15, '97	005-97
1997 June	Jan 16, '97- Dec '97	001-97
1997 Sept	Jan 16, '97- Dec '97	001-97
1998 March	Jan '98-June '99	001-98
1998 Sept	Jan '98-June '99	001-98
1999 May	Jan '98-June '99	001-98
1999 Sept	July '99-Dec '99	004-99
--	Jan '00-Sept '00	004-99
--	Oct '00-Jan '01	180-2000
2001 May	Feb '01-April '02	180-2000
2001 Sept	Feb '01-April '02	180-2001
2002 May	May '02-Dec '02	011
2002 Sept	May '02-Dec '02	011
2003 May	Jan '03-March '04	021-03
2003 Sept	Jan '03-March '04	021-03
2004 May	April '04-present	012-04

*Source: Secretaria de Trabajo y Seguridad Social, direccion General de Salarios, *Estudio Socio-Economico para la Revision del Slario Minimo, Ano 2004* , p. 53

Table A2: Wage Equations Estimated Using Arellano and Bond GMM Method

	Covered Sectors		Uncovered Sectors	
	Large	Small	Public	Self-emp
lagged wage	0.124	0.502**	0.039	0.465**
	(0.068)	(0.063)	(0.105)	(0.073)
log(minimum wage)	0.293**	0.004	0.245	0.371
	(0.106)	(0.078)	(0.143)	(0.278)
urban	0.224	0.326	-0.162	0.661
	(0.173)	(0.183)	(0.135)	(0.423)
log(GDP by industry)	0.213	0.258*	0.343*	0.670*
	(0.137)	(0.102)	(0.161)	(0.320)
Education	0.117**	0.126**	0.123**	0.099*
	(0.021)	(0.022)	(0.022)	(0.048)
Experience	0.009	-0.010	-0.004	-0.027
	(0.021)	(0.023)	(0.010)	(0.072)
Experience Squared	0.001	0.001	0.000	0.001
	(0.000)	(0.001)	(0.000)	(0.001)
Gender	-0.093	-0.245	0.113	0.591**
	(0.128)	(0.252)	(0.117)	(0.223)
Constant	0.000	0.000	-0.001**	0.001
	(0.000)	(0.000)	(0.000)	(0.000)
year dummies	Yes	Yes	Yes	Yes
Observations	184	168	103	152

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

Table A3: Employment Equations Estimated Using Arellano and Bond GMM Method

	Covered Sectors		Uncovered Sectors		
	Large	Small	Public	Self-emp	Unemp
lagged employment	0.626**	0.220*	0.223**	-0.313	0.219**
	(0.037)	(0.087)	(0.075)	(0.085)	(0.072)
log(minimum wage)	-0.458**	0.392	-0.491	-0.400	0.704
	(0.178)	(0.213)	(0.815)	(0.286)	(0.572)
urban	0.512	-0.402	-0.079	-0.997**	0.192
	(0.536)	(0.207)	(0.166)	(0.299)	(0.268)
log(GDP by industry)	0.371*	-0.234	-2.222*	-0.002*	-0.545*
	(0.188)	(0.198)	(0.917)	(0.000)	(0.247)
Education	-0.120**	-0.113**	-0.044	0.025	-0.010
	(0.045)	(0.038)	(0.029)	(0.019)	(0.023)
Experience	-0.024	0.108**	0.203**	0.209**	0.067**
	(0.066)	(0.026)	(0.035)	(0.020)	(0.021)
Experience Squared	0.000	-0.002**	-0.004**	-0.004**	-0.001**
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Gender	-1.107**	0.049	0.306	-0.277	-0.408
	(0.323)	(0.241)	(0.327)	(0.354)	(0.220)
Constant	-0.040	0.027**	0.076*	0.092**	0.325**
	(0.022)	(0.008)	(0.038)	(0.020)	(0.084)
year dummies	Yes	Yes	Yes	Yes	Yes
Observations	184	168	103	155	210

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%

Table A4: Minimum Wage Effects on Employment of All Workers in each Sector, Using "Fraction at the Minimum Wage" (plus or minus 10%) as the Measure of the Minimum Wage[1]

	Covered Sectors		Uncovered Sectors		
	Large	Small	Public	Self-emp	Unemp
Fixed-effects	-0.586	0.931*	-0.367	0.348	-0.283
	(0.479)	(0.474)	(0.423)	(0.729)	(0.320)
Arellano and Bond	-1.22*	0.676	-0.510	0.411	.359
	(0.745)	(0.676)	(0.766)	(1.107)	(0.571)
Diagnostic Statistics	P-Values	P-Values	P-Values	P-Values	P-Values
AR(1) test statistic	*0.0139*	*0.053*	*0.025*	*0.0401*	*0.0028*
AR(2) test statistic	*0.7528*	*0.2046*	*0.8984*	*0.707*	*0.5598*

Notes:

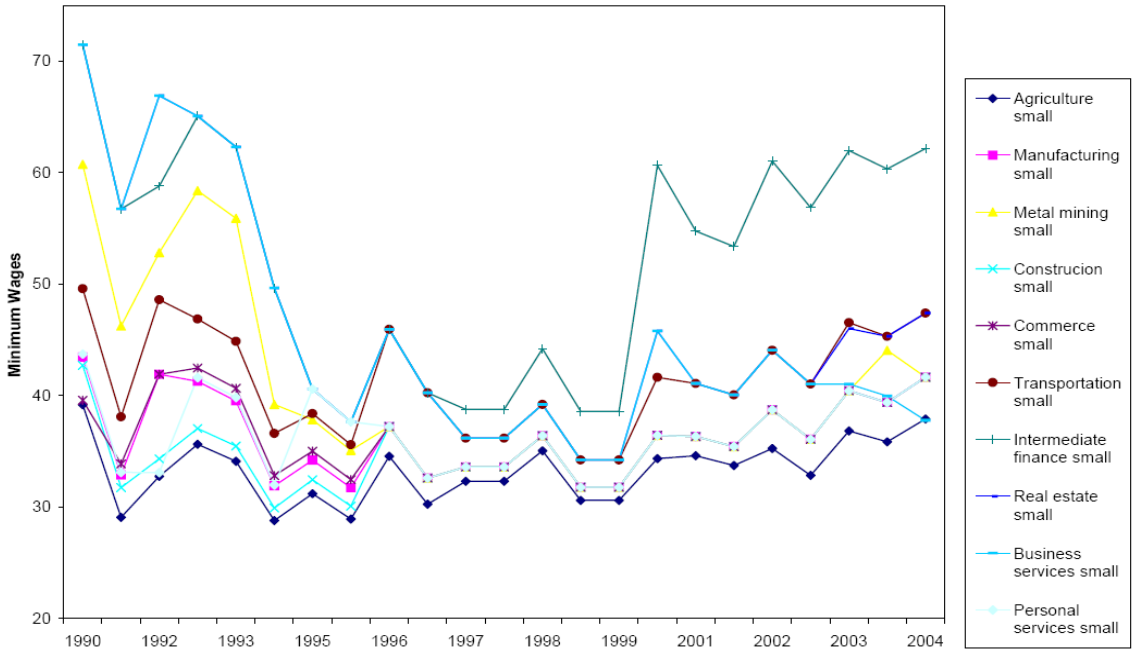
*significant at the 10% level

[1]coefficients on "fraction at the minimum wage" from estimating equation (2) with each sub-sample.

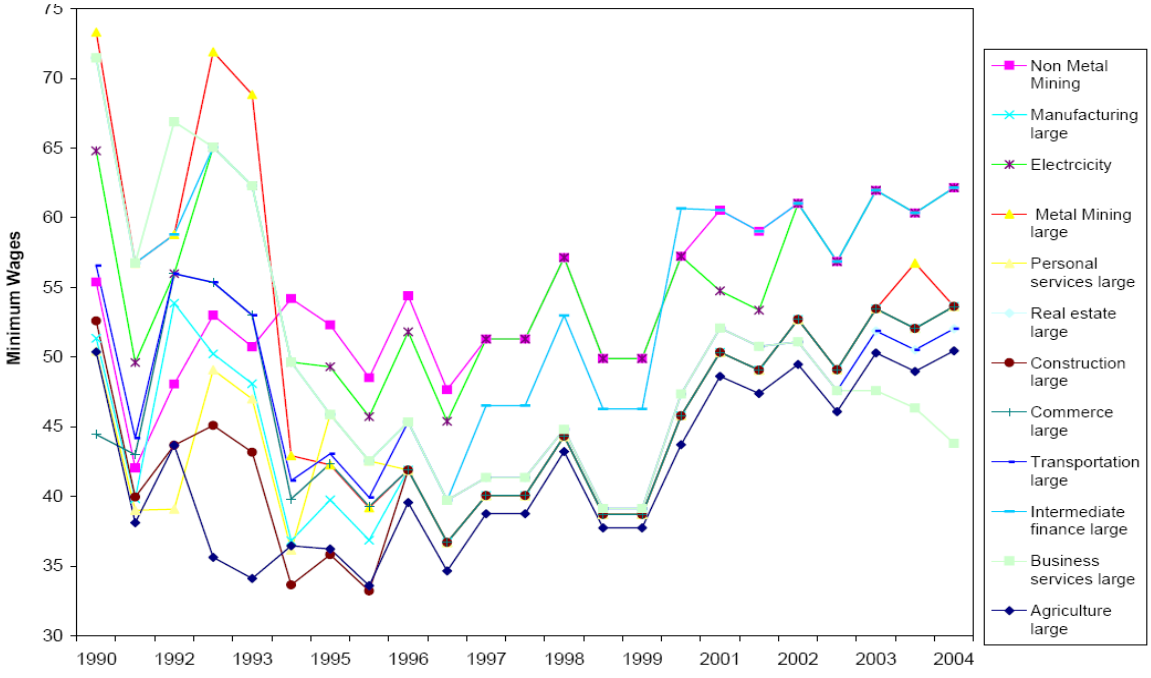
All reported standard errors (in parentheses) are robust to heteroskedasticity.

Figure A1: Daily Minimum Wages by Industry in Lempiras (1999 prices)

A. Small Firms (less than 16 employees)



B. Large Firms (16 or more employees)



Source: Minimum Wage Decrees in Honduras