Legal Minimum Wages and the Wages of
Formal and Informal Sector Workers in Costa Rica

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Abstract

The classic dual economy models of developing countries hold minimum wages (among other institutions) accountable for persistent dualism. They note that applying or enforcing minimum wage laws in only one sector of the economy will create wage differentials which will not be eroded with labor mobility to the high wage sector. In this paper we use 12 years of micro data on thousands workers living in Costa Rica to test whether legal minimum wages have a differential impact on the wages of workers in the formal sector vs. informal sector, defined in various ways in accordance with the dual development models. The evidence from Costa Rica is contrary to the assumptions of these models. We find that increases in minimum wages not only raise the wages of workers in the urban formal sector (large urban enterprises) who are covered by minimum wage law, but they also increase the wages of all other workers covered by minimum wage legislation in what are traditionally regarded as informal sectors and where the legislation is often considered not to be enforced. Specifically, we provide evidence that minimum wages increase the wages of workers in small urban enterprises, large rural enterprises and small rural enterprises. Further, our results suggest that higher legal minimum wages raise the average wage of workers in these "informal" sectors more than in the urban formal sector. We concluded that in Costa Rica minimum wages are being enforced in the rural and small scale sectors and may actually work to reduce average wage differentials between these sectors and the urban formal sector. On the other hand, minimum wages have no significant impact on the wages of workers in another sector that is regarded as informal but which is not covered by minimum wage legislation: the self-employed workers (both urban and rural). Thus, one could argue that minimum wages may contribute to dualism between the formal and informal, defined as self-employed vs. salaried workers. However, we find no evidence of the bleaker scenario, that self-employed earnings are being lowered by minimum wages.

I. Introduction

The degree to which legal minimum wages in developing countries have a real impact on the wages of workers in those countries is of substantial interest to policy analysts and policy makers in both developing and developed countries. Legal minimum wages have the potential to reduce the level of poverty within developing countries (Freeman, 1993; McLeod and Lustig, 1997). However, if minimum wages are enforced only in the relatively high-wage urban formal sector, they are unlikely to help workers in the parts of the economy where most of the poor are found (the rural and urban informal sectors). Compared to the developed economies, minimum wages in developing economies tend to be set at higher levels relative to the average wages. Some have worried that these high minimum wages may result in substantial disemployment effects in the formal sector, pushing workers into lower-paid informal sectors and suppressing wages further in that sector (World Bank, 1990, p.63). From the point of view of unions in the developed economies, the low level of legal minimum wages in developing countries compared to those in the developed economies constitutes an unfair advantage in international trade. This has led these groups to push for including legal minimum wage targets in bilateral and multilateral trade agreements (Harrison and Leamer, 1997). The degree to which all of these points of view are good representations of reality depends, in part, on the degree to which legal minimum wages have a real impact on the wages of workers, and on which sectors of the labor market are likely to be affected by legal minimum wages.[1] We address these issues in this paper.

The literature on legal minimum wages in developing economies generally assumes that minimum wages are likely to be enforced only in larger firms and among unionized workers in the urban formal sector, and enforced weakly or not at all in the rural or urban informal sectors.[2] Indeed, this differential enforcement of legal minimum wages is often cited as a key reason for the existence of dualistic or segmented labor markets in developing economies. The classic articles on the dualistic nature of developing economies cite differential enforcement of minimum wages as a reason for this dualism. For example, Lewis (1954) divides developing economies into a rural informal sector and an urban formal sector. The structure of the labor

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[1] For example, Harrison and Leamer (1997) present a general equilibrium model of the impact of minimum wages in developing economies which includes the possibility of non-compliance with minimum wages. In this model an increase in minimum wages in developing economies may not improve the competitiveness of developed economy industries if developing country firms can shift employment to uncovered sector (informal sector) workers.

[2] See Watanabe, 1976 for an early discussion of this issue and Maloney and Nunez (2002) for a more recent paper with the same assumption.

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market is crucial to the dualistic nature of developing economies in the Lewis model and a key characteristic of the Lewis model is that wages in the urban formal sector are higher than in the rural informal sector. Ranis and Fei (1961) note that the persistence of an urban/rural wage gap as assumed by Lewis must be "sustained by institutional or nonmarket forces since under competitive assumptions real wages [in the formal sector] would fall to zero, at equality with the MPP [the marginal physical product in agriculture]" (p.536.) Harris and Todaro (1970) also ascribe the urban/rural wage gap to "the existence of a politically determined minimum urban wage at levels substantially higher than agricultural earnings" (p.126.) Fields (1975) extends the concept of economic dualism to the urban sector, arguing that differential enforcement of legal minimum wages can lead to an institutionally-determined high wage in the urban formal sector and a lower competitive wage in the urban informal sector. As Ranis and Stewart (1999, p. 260) put it, "In most less developed countries (LDCs), governments with limited administrative resources tend to focus on large-scale operations when trying to collect taxes or enforcement of minimum wage legislation."

In this paper, we first ask whether legal minimum wages have a significant impact on the wages paid to workers in the developing economy of Costa Rica and then we examine the relationship between the legal minimum wage and economic dualism. In particular, we examine whether the evidence is consistent with the hypothesis that legal minimum wages are enforced in the formal sector but not in the informal sectors in Costa Rica. We divide the labor market into five sectors: an urban formal sector (urban employees in large firms), three sectors often considered "informal" but where legal minimum wages are legally applicable in Costa Rica (urban employees in small firms, rural employees in large enterprises and rural employees in small enterprises), and an informal sector where legal minimum wages are not legally applicable (self-employed workers.) If legal minimum wages are enforced only in the urban formal sector and hence are a cause of dualism between urban and rural sectors, or between large and small firms, we would expect to find that higher minimum wages result in higher wages in the urban formal sector but do not raise the wages of workers in the rural sector or in small firms (even though legal minimum wages are legally applicable to these workers). On the other hand, if legal minimum wages are enforced in all sectors where they are legally applicable, we would expect to find that higher legal minimum wages result in higher wages for all types of employees covered by minimum wage law, whether they work in large firms, small firms or in rural areas. Furthermore, in this case we would expect higher minimum wages to have a larger impact on the wages of workers in those sectors with lower average wages and more workers earning near the

minimum wage. That is, we would expect higher minimum wages to have a larger effect on the wages of workers in the rural sector and in small firms than in the urban formal sector. Finally, the minimum wage could also cause dualism between the sector that is covered by minimum wage law and the informal sector where the minimum wage is not legally applicable (the self-employed).

Our paper contributes to the literature that examines the indirect impact of institutions and regulations in the formal labor market on the informal labor market, a topic that Harrison and Leamer (1997) have identified as a gap in the literature. To examine these issues, we use data from Costa Rica, a developing economy with a complex legal minimum wage structure. In Costa Rica legal minimum wages are set separately for a large number of occupations, although within occupations legal minimum wages apply to all employees irrespective of whether they work in a rural or urban area, in large or small firms, part-time, or full-time. There were important changes in the structure of minimum wages in Costa Rica during the period that we study. Whereas at one point there were over 500 wages set by industry and occupational categories, from 1988 to 1999 the structure of minimum wages was greatly simplified such that today there are only 19 minimum wages, set by skill level. An aspect of the Costa Rica minimum wage structure which makes it valuable for research is that these changes in the structure of minimum wages over the 1988-1999 period resulted in variation over time and within occupations in the minimum wages that were exogenous to changes in the labor market. Because we use these frequent (at least once a year) exogenous variations to estimate the impact of minimum wages on wages, unlike most previous studies, our results do not suffer from potential endogeneity bias.

In this paper, we make use of the entire set of multiple legal minimum wages at each point to estimate the impact of legal minimum wages on the wages of workers. Multiple minimum wages are not uncommon in Latin America. In Mexico, for example, legal minimum wages are set separately for three regions and 88 occupations. It is surprising, therefore, that our work (this paper and Gindling and Terrell, 2004) are the only studies that we know of that fully take into account this complex minimum wage structure in examining the impact of minimum wages on wages and employment in Latin America. Most published empirical analyses of the impact of legal minimum wages in Latin America make the simplifying assumption that the only one minimum wage (generally the lowest legal minimum wage for all regions and occupations) applies to all workers, regardless of occupation.

Using annual data from Costa Rican Household Surveys for the 1988-1999 period, we find that increases in minimum wages not only raise the wages of workers in the urban formal sector (large urban enterprises) who are covered by minimum wage law, but they also increase the wages of all other workers covered by minimum wage legislation in what are traditionally regarded as informal sectors and where the legislation is often considered not to be enforced.

Specifically, we provide evidence that minimum wages increase the wages of workers in small urban enterprises, large rural enterprises and small rural enterprises. Further, our results suggest that higher legal minimum wages raise the average wage of workers in these "informal" sectors more than in the urban formal sector. We concluded that in Costa Rica minimum wages are being enforced in the rural and small scale sectors and may actually work to reduce wage differentials between these sectors and the urban formal sector. On the other hand, minimum wages have no significant impact on the wages of workers in another sector that is regarded as informal but which is not covered by minimum wage legislation: the self-employed workers (both urban and rural). Thus, one could argue that minimum wages may contribute to dualism between the formal and informal, defined as self-employed vs. salaried workers. However, we find no evidence of the bleaker scenario, that self-employed earnings are being lowered by minimum wages.

II. Literature Review

The literature on the on the impact of legal minimum wages on the wages of workers in developing countries is sparse and the evidence is almost entirely on the effect for workers in the formal sector.[3] Recently a number of studies have appeared, many using data for Latin American countries. Collectively they indicate that although enforcement is not stringent, minimum wages are having a positive effect on wages of workers in the formal sector.

Several studies examine this issue by looking for spikes in the distribution of wages at or near the legal minimum wage. Here the evidence is mixed for studies of Latin American countries. Bell (1997) finds a spike in the distribution of wages that corresponds to the minimum wage in Colombia but not in Mexico. She concludes that minimum wages have "virtually no impact on the distribution of average wages reported by firms in Mexico" (p.S109) but do have an effect on the wages of workers in Colombia. Fajnzylber (2001) and Lemos (2002) find spikes in the distribution of wages near the minimum wage in Brazil. Maloney, et al. (2002)

find spikes at the minimum wage for workers in the formal sector in Brazil, Chile, Colombia, Brazil, and Honduras but not in Argentina, Mexico or Uruguay. Castillo-Freeman and Freeman (1992) find a significant spike in the distribution of wages at the minimum wage in Puerto Rico. Strobl and Walsh (2003) also find some evidence that with the introduction of the minimum wage the largest spike in the distribution of wages moved up the distribution towards the minimum wage in Trinidad and Tobago.

The evidence using more traditional econometric techniques is also mixed. Bell (1997) uses time-series data to regress the log of manufacturing wages on the log of minimum wages, the log of real GNP for Mexico and Colombia. She finds that minimum wages do not have a significant impact on wages in Mexico, but do have a significant impact (with an elasticity of 0.37) in Colombia.[4]   Rama (2001), who examines the consequences of doubling the minimum wage in Indonesia, finds that this 100% change in the minimum wage increased average wages by 5-15%.

Neither Bell nor Rama estimate the impact of legal minimum wages on the wages of workers separately for the formal the informal sectors, whereas Maloney and Nunez (2002) and Fajnzylber (2001) use panel data from Colombia and Brazil (respectively) to estimate the impact of legal minimum wages on the wages of workers in both the formal and informal sectors. Maloney and Nunez (2002) define the informal sector as the self-employed while Fajnzylber (2001) presents estimates for two definitions of the informal sector: self-employed and unregistered employees.   Both of these studies find large significant effects of minimum wages on wages of formal sector employees initially earning within 10% above or below the minimum wage: Maloney and Nunez (2002) report an elasticity of 0.6 for workers with initial wages near the minimum wage in Colombia, while Fajnzylber (2001) report an elasticity of 1.08 in Brazil.[5] With respect to the impact on workers in the informal sector, Maloney and Nunez find that minimum wages do not have a significant effect on the wages of self-employed workers near the minimum wage. Fajnzylber finds that the impact on the wages of informal sector workers is not only significant, but also larger than the impact on formal sector workers: he estimate an elasticity of 1.03 for unregistered paid employees and 1.32 for self-employed workers.

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[3] In this section we review the literature on the impact of legal minimum wages on wages. We do not review articles that only estimate the impact of legal minimum wages on employment without first estimating the impact on wages
[4] Bell (1997) also estimates time-series equations that include lagged wages as an independent variable. In this specification, minimum wages do not have a significant effect on wages in either Colombia or Mexico.
[5] This implies that a 1% increase in minimum wages raises the wages of paid employees by more than 1%., which strikes us as large and makes us question whether the minimum wage variable is not picking up other factors which affect both minimum wages and wages.

Fajnzylber argues that even though it is assumed that legal minimum wages are not applicable to the informal sector, the positive wage effect represents a "lighthouse effect" whereby informal sector workers set their wages by referring to the legal minimum wage. An alternative explanation for the large wage effects in the formal and informal sector found by Maloney and Nunez and Fajnzylber is that the changes in legal minimum wages and changes in wages over time may both be driven by the same unmeasured phenomenon.

Strobl and Walsh (2003) use panel data to estimate whether the minimum wage affected the probability that a worker initially earning below the minimum wage earned above the minimum wage after the introduction of the national minimum wage in Trinidad and Tobago in 1998. They argue that the introduction of a national minimum wage in Trinidad and Tobago was largely unanticipated, and "can be argued to be at least weakly exogenous" (p. 428). They find that the minimum wage increased the probability that a low-wage worker earns at least the minimum wage by about 20%. They also find this effect is bigger for workers in large firms (10 or more employees) compared to small firms.

We will argue below that changes in the structure of minimum wages in Costa Rica result in variation in the minimum wages, over time and within occupations, that were exogenous to changes in the labor market. Therefore, the results presented in our present paper do not suffer from the potential endogeneity bias that may be driving the results in the Maloney and Nunez and Fajnzylber and other papers in this literature.

III. Methodology

In this paper, we will examine the effect of changes in legal minimum wages on the wages of workers in both the formal and several informal sectors in Costa Rica.

As we indicated earlier, the original development models of dual sectors of Lewis (1954) and Harris and Todaro (1970) assumed that minimum wage laws were an important factor contributing to the wage differentials in the formal and informal sector and the urban and rural sectors. Following the literature on economic dualism in developing economies, we present results for workers in the urban formal sector and for several different types of "informal" sectors. The urban formal sector is defined as all employees in large urban firms plus all those urban workers with a university education or who are classified as professional or technical employees (no matter where they work). We classify all workers in rural areas as part of the

informal sector. To identify the urban informal sector, we use the most common definition used in studies by the International Labor Office (ILO) and the U. N. Regional Employment Program for Latin America and the Caribbean (known by the its Spanish acronym PREALC). Specifically, we define the urban informal sector as those who work in firms with 5 or fewer employees who do not have a university education and are not classified as professional or technical employees.[7] We also divide the informal sector into those informal sector workers legally covered by minimum wages (the rural large-scale and small-scale enterprises and urban small firms) and the part of the informal sector not explicitly covered by minimum wages (self-employed workers in rural and urban areas). In summary, this breakdown leaves us with six sectors: the urban formal sector, three informal sectors where minimum wages are legally applicable to workers (the urban informal small firm sector, the rural large enterprise sector, the rural informal small enterprise sector) and two informal sectors where workers are not covered by minimum wages (urban self-employed and rural self-employed).

Our analysis of the impact of minimum wages on the wages of workers in the formal and informal sectors is based on two methods: first comparing the distribution of minimum wages and wages and then an econometric analysis of minimum wages changes and wage changes. We begin by comparing kernel density functions of the wages of workers with kernel density functions of the distribution of minimum wages. If minimum wages are having an effect, then we should see spikes in the wage distribution around the minimum wages. However, evidence of spikes cannot be interpreted as being caused by minimum wages since there are other possible reasons why minimum wages and actual wage spikes may coincide. For example, both minimum wages and the wages reported by survey recipients may cluster at round numbers, wages may be standardized for sizeable trade or occupation groups, or actual wages and minimum wages may cluster around discrete levels of human capital. To provide additional evidence of the impact of minimum wages on actual wages in each sector we estimate the extent to which changes in the minimum wage affect wages, holding constant other factors that might affect wages, by using individual-level pooled cross-section/time-series data (1988-1999). Specifically, we estimate separately for each sector an equation of the form:

$$ lnW_{it} = \alpha_o + a_1 lnMW_{it} + X'_{it}\beta + \delta Z_{it} + \sum_{j=1}^{J} \lambda_j OCC_{itj} + \sum_{t=1}^{T} \gamma_t YR_t + \mu_{it,} \qquad (1) $$

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[7] Other ways besides firm size of identifying the informal sector are possible. However, as Ranis and Stewart (1999) write "there is a strong correlation between smaller size enterprises and other criteria of informality" (p. 259).

where the dependent variable, lnW_{it}, is the log of the real hourly wage (in 1999 colones) of individual i at time t (1988…1999). The explanatory variables include the log of the real minimum wage (in 1999 colones) that applies to that worker's occupation category in each year, $ln\ MW_{it}$. The coefficient α_l is an estimate of the impact on average actual wages of changes in the legal minimum wage. Other explanatory variables include the vector X_{it}, of individual specific human capital variables (years of education, a quadratic in experience, gender, and full interactions among these variables), and Z_{it}, the value-added in the industry of the individual's job in year t.[8] We also include dummy variables for each occupation categories, OCC_{itj} (j = 1…350), in order to control for occupation-specific fixed effects and for the endogenous correlation of wages and minimum wages across occupation categories.[9] Finally, to control for endogenous changes in yearly average minimum wages (as well as other year-specific factors such as aggregate supply and aggregate demand changes, the timing of minimum wage changes,[10] or design changes in the household surveys) we include a dummy variable for each year, YR_t (t=1989-1999). After including these two sets of dummy variables (for occupation and years), our resulting estimates of the impact of legal minimum wages on wages are based only on deviations of each minimum wage from the average minimum wage change within occupation categories over time. We next argue that these changes can reasonably be thought of as exogenous.

A major problem plaguing the empirical minimum wage literature is one of endogeneity bias that arises if minimum wages are set according to changes in demand and supply conditions, which also affect wages. This occurs, for example, when the level of minimum wages is adjusted by the amount of inflation in the previous period, a practice followed in Costa Rica and common in many countries. However, we argue that a special feature of Costa Rica's minimum wage policy over this period assures us that we do not have a simultaneity problem in our estimations. During the period under study, the government of Costa Rica implemented a policy of gradually reducing the number of minimum wages from over 500 categories (set by the industry and occupation of the worker) in 1988 to 19 categories (set by skill only) in 1997. The process of simplification made changes in the relative minimum wage within occupational categories exogenous over this period. The reason for this is that relative changes in minimum wages within

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[8] We use the ISIC at the one digit level.
[9] These occupation categories correspond, as best as we can make them, to the categories in the 1988 minimum wage legislation.
[10] Minimum wages were set typically in January and July of each year, but sometimes they were set a little earlier or later. See Appendix Table A.1 for the exact timing minimum wage setting over this period.

occupations occurred solely in order to harmonize wages within an occupation category across industries. The Ministry identified broadly-defined occupation categories to be harmonized across industries and proceeded, gradually over a period of several years, to increase the lower(est) minimum wage by a greater amount than the higher(est) minimum wage within each broadly-defined occupational category. Over a period of several years, one minimum wage emerged for each broadly-defined occupation, irrespective of industry. Effectively, this increased the amount of exogenous year-to-year variation in minimum wages because the minimum wages for different occupation categories in each year were increased by different amounts.

Another source of exogenous variation in minimum wages was that, at the same time the industrial dimension of the minimum wage was being eliminated, the number of minimum wages for workers with higher education became more numerous. In 1988, a minimum wage was set for all workers with a five-year university degree (*licenciado)*, irrespective of occupation. In 1993 a new minimum wage was set for individuals with two to three years of university education (*diplomados*) and for graduates of five-year technical highs schools (*técnicos*). In 1997, another new minimum wage was added for workers with a four-year university degree. By 1997 there were 19 minimum wages, one each for unskilled workers, semi-skilled workers, skilled workers, specialized workers (supervisors) and domestic servants, and several for professionals (without any industrial dimension). [11]

Appendix Table A.1 summarizes the changes in the level of minimum wages from 1987 to 1999 and it is clear that there is a range of rate changes every six months. Whereas, an underlying criteria for setting wages was the rate of inflation (measured by the consumer price index) in the preceding six months, the minimum wage for each occupation/skill category were increased at different rates around this average and these rates did not depend on demand conditions for that specific occupation.[12] Therefore, we argue that after controlling for the average change in the minimum wage by year (which we do in the regressions with a set of year-specific dummy variables), any remaining variation in legal minimum wages is exogenous to demand and supply conditions in the labor market, and therefore exogenous to actual wage

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[11] Our description of the process of simplification of minimum wages in Costa Rica summarizes interviews with José Pablo Carvajal (Director, National Salaries Council,) July 14, 2003, Yabera Alvarado (Planning Directorate, Ministry of Labor,) July 15, 2003 and Pablo Sauma, July 9, 2003. Ms. Alvarado is writing a detailed history of the minimum wage simplification project, which she hopes to publish in 2004.

[12] Interviews with José Pablo Carvajal (Director, National Salaries Council,) July 14 2003, Orlando Garcia (Planning Directorate, Ministry of Labor,) July 15 2003 and Pablo Sauma, July 9 2003. Mr. Carvajal, who was part

changes. This implies that our results will not suffer from endogeneity/simultaneity bias that exist in many studies which compare changes in a single minimum wage to changes in actual wages.

IV. Data

For our analysis we combine information on legal minimum wages from the decrees, published by the Ministry of Labor, with data on individuals from the annual *Household Surveys for Multiple Purposes*, carried out by the Costa Rican Institute of Statistics and Census. The household surveys have been conducted in July of every year since 1976 on approximately 1% of the population. They include questions on earnings, employment, hours worked, job characteristics such as industry, occupation, sector and firm size, as well as education, age and many other personal characteristics of the individual in the household. We create a cross-section/time-series data set for all individuals who worked in the private sector.[13] In this paper we use only data from 1988 and later because it is only in these years that the occupation categories in the household surveys are sufficiently detailed to be able to adequately match with the detailed occupation /skill/industry categories in the minimum wage decrees.[14] We use data on an average of approximately 10,000 workers in each year for twelve years (1988-1999).

Table 1 presents macroeconomic statistics on the mean real hourly wage and the mean real hourly minimum wage from the Costa Rican Household Surveys (weighted by the number of workers in each minimum wage category), the annual rates of GDP growth and inflation for each year from 1988 to 1999. We point out that mean real wages closely follow macroeconomic conditions in Costa Rica, increasing in every year except for two recessions in 1990-91 and 1995-96. Real minimum wages do not vary as much as actual wages, and are not as closely tied to the business cycle. We also note that the average real minimum wages are relatively stable from 1988 to 1994 and then increase each year from 1994 to 1999 (including the recession years of 1995-96).

Figure 1 illustrates the structure of legal minimum wages in Costa Rica with histograms of the minimum wage distribution. Specifically, the figure presents the distribution of real

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of the National Salaries Council for the entire period that we study, stated that inflation was the "only" factor considered in setting the average minimum wage increase.

[13] Public sector workers are excluded from the analysis since their wages are governed by a different set of decrees. Unfortunately, it is not possible to match individual observations in the Costa Rican household surveys across years to create panel data.

minimum wages (in 1999 colons) among private sector workers who report positive earnings in 1988 (at the beginning of the simplification process and the first year of data we use), 1993 (the middle year in our data set) and 1999 (at the end of the simplification process and the last year in our data set). Spikes in the distribution of minimum wages represent legal minimum wages that apply to a large proportion of workers. Starting from the left (the lowest minimum wage) in the 1988 graphs, the first spike is at the minimum wage for domestic servants, who represent approximately 7% of all workers and to whom applies a legal minimum wage of 123 colones (1999 prices), or $0.43 (1999 U.S. dollars), per hour. There are no minimum wages over a large range of possible wages between the minimum wage for domestic servants and the next minimum wage, which is around the minimum wage for unskilled workers (*peones* and other production workers) in most industries. The second spike (at 231 1999 colones or $0.81 per hour) represents over 20% of all workers in 1988. Following this spike at the minimum wage for unskilled workers there is a cluster of many minimum wages that surround two smaller spikes at the minimum wages for operators of machinery (skilled workers) and specialized workers (supervisors) in most industries. The applicable minimum wage for most Costa Rican workers is in this cluster. Finally, at the very right of the distribution of minimum wages (after numerous very small spikes) is a spike at the minimum wage for *licenciados,* who represent approximately 2% of all workers with a legal minimum wage at 578 colones or $2.00 per hour.

A comparison of the graphs for 1988, 1993 and 1999 illustrates the changes in the structure of legal minimum wages. The gradual simplification of minimum wages is shown clearly by the reduction in the number of minimum wages from 1988 to 1993, and then again from 1993 to 1999. We can describe this simplification in more detail by focusing on comparing the last year for in our data set, 1999, with the first year, 1988. As in 1988, the spike at the far left of the 1999 distribution of wages is at the minimum wage for domestic servants, which represent approximately 7% of workers. As in 1988, the second spike occurs at the minimum wage for unskilled workers. The simplification and consolidation process between 1988 and 1999 compressed the distribution of minimum wages around the unskilled wage. While in 1988 the spike at the unskilled minimum wage represented 20% of workers, in 1999 the minimum wage for unskilled workers (at 279 colones or 0.96 dollars per hour) applies to 45% of workers. In addition, the number of minimum wages applicable to workers in Costa Rica has clearly been reduced. At the same time that legal minimum wages for workers without higher education were

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[14] Although we use a 3-digit occupational classification, we present in appendix Table A.2 the two-digit occupational classification in the Household Survey.

being simplified and compressed, the addition of new minimum wage categories for workers with higher education resulted in several new spikes in the distribution of minimum wages at higher wage levels, including three noticeable spikes in the right-hand tail of the distribution at the minimum wages for workers with 2-4 years of university education (associates degrees), 4-year university graduates and *licenciados*.

Table 2 presents some descriptive statistics on the average wages and distribution of workers in the six formal/informal sectors we define above. Over 50% of workers in Costa Rica live in rural areas, although the proportion of workers in rural areas declines over time. This decline is especially pronounced for the rural large enterprise sector, which falls from almost 28% of employees in 1988 to 24% in 1999. At the same time, all urban sectors are growing, but especially the urban formal sector, which increases from 23% to over 26% of workers from 1988 to 1999. On average, 74% of workers are legally covered by minimum wage legislation, while 26% are uncovered self-employed workers. Average wages are highest for workers in the urban formal sector, followed closely by those of self-employed workers in urban areas. Average wages are lowest for employees of small enterprises in urban and rural areas and for employees in the rural formal (large enterprise) sector. These statistics suggest that, if legal minimum wages disproportionately affect the wages of low-wage workers, we would expect to find a bigger impact of minimum wages on the wages of workers in small enterprises and rural areas than in the urban formal sector.

V. Findings

Spikes in the distribution of wages

Figure 2 overlays the distribution of wages on the distribution of minimum wages for three years: 1988, 1993 and 1999 (similar graphs for all other years are presented in the appendix). Several important points are immediately clear from observing these graphs. First, legal minimum wages in Costa Rica are applicable to workers across the wage distribution; they are set for workers in each decile from the 3rd to the 10th. However, in most years the majority of the minimum wages fall near the middle, in the 4th to 6th deciles of the distribution of wages.[15] Second, there are a significant number of workers who earn below the minimum wage.

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[15]Graphs of the distribution of the log of wages and the log of minimum wages for the covered and uncovered sectors for the other years for which we have data are presented in appendix Figure A1. In some years the spikes in the distribution of minimum wages and actual wages are not as closely correlated as they are in 1988 and 1997, although in other years the correlations are even closer.

Minimum wages in Costa Rica clearly do not act as a wage floor for all workers.[16] Nevertheless, Figure 2 does present evidence that minimum wages affect the wages of some workers in Costa Rica as there are spikes in the distribution of wages at many of the same locations as the spikes in the distribution of minimum wages. In 1988 and 1993, there are two clear spikes in the distribution of wages that correspond to the minimum wages that apply to the largest proportion of workers: one at the level of minimum wages for unskilled workers and another at the level of minimum wages for unskilled/semi-skilled workers. The distribution of hourly wages for 1999 also exhibits two spikes near these two sets of minimum wages, although the matching is not as clear as for the other two years. Further, in all three years there is a spike in the upper end of the distribution that corresponds to the legal minimum wage for *licenciados*.

Figure 3 presents overlays of the distribution of minimum wages onto the distribution of actual hourly wages in 1993 for the urban formal sector and the five informal sectors defined previously. (Similar graphs for 1988 and 1999 are presented in appendix Figures A2 and A3). To facilitate the comparison between sectors, we use the same x and y scales to draw the kernel density functions for each sector. The urban formal sector has the smallest proportion of workers earning below the minimum wage, while the urban informal small firm and rural informal small enterprise sectors have the largest proportion of workers earning below the minimum wage. Nevertheless, an examination of the graphs presented in figure 3 also provides evidence that minimum wages do affect the wages of a paid employees in all covered sectors, but do not affect the wages of self-employed workers (the uncovered sector). Again, if legal minimum wages affect the actual wages of workers, then spikes in the distribution of minimum wages should be reflected with similarly located spikes in the distribution of wages. This appears to be the case in all sectors where workers are legally covered by minimum wages: the urban formal, rural formal, urban informal small firm, and rural informal small enterprise sectors. Indeed, the spikes are

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[16] This results is consistent with a previous study examining enforcement of minimum wages in Costa Rica, Gindling and Terrell (1995) use 1976-1991 data to compare the proportions of workers earning below the legal minimum wage in the covered and uncovered sectors. They find that over one-third of workers in Costa Rica earned less than the lowest minimum wage for the industry of their job in both the sector covered by minimum wage legislation and the uncovered sector. Workers earning less than the minimum disproportionately are female, very young (less than 19 years old), very old (more than 60 years old), less educated, living in rural areas, and working in agriculture or personal services. Gindling and Terrell (1995) speculate from the finding that the proportion of workers earning less than the minimum wage was the same in both the covered and uncovered sectors that minimum wages were not an important determinant of wages in the covered sector in Costa Rica. However, in our current paper, which uses econometric techniques on more recent and more detailed data that matches legal minimum wages to workers, we find that although minimum wages do not affect a large group at the bottom of the wage distribution, they do affect wages of approximately two-thirds of the workers who earn at or above the minimum wage for their occupation category.

more marked among workers in small firms than in the large firm sectors. It is interesting to note that in both the rural and urban small firm sectors there is even a spike at the minimum wage for domestic servants.   On the other hand, Figure 3 also provides evidence that minimum wages do not affect the wages of self-employed workers (the uncovered sector) since there are no noticeable spikes in the distribution of self-employed earnings around the minimum wages. Thus, unlike Fajnzylber (2001), we find no evidence of a "lighthouse effect" on the wages of uncovered self-employed workers.

Wage regression results

The coefficients on the minimum wage from the estimation of equation (1) for each sector are reported in Table 3.[17] They provide strong evidence that increases in the minimum wage cause an increase in the wages of workers in the urban formal and both the rural large and small firm sectors. The coefficient on the minimum wage variable is significant at the 1% level in the equations for each of these sectors. Among these sectors, the impact of minimum wages on average wages is lowest in the urban formal sector (0.103).   The impact of minimum wages on average wages is largest in the rural informal small enterprise sector (an elasticity of average wages to minimum wages of 0.396), followed by the rural large enterprise sector (0.164). This is what we would expect if minimum wages are enforced similarly in all three sectors because there are more workers with wages near the minimum wage in the low-wage rural sectors. There is weak evidence that minimum wages affect the wages of workers in the urban informal small firm sector. The coefficient on the minimum wage variable in the urban informal small firm sector (0.149) is not significantly different from zero at the 10% level, but is significant at 12%. We find no evidence that legal minimum wages affect the wages of workers in the two self-employed (uncovered) sectors.   The coefficient on the minimum wage variable in the two equations for self-employed workers is not significantly different from zero for any reasonable level of significance.

VI. Conclusions

The evidence presented in this paper suggests that, although legal minimum wages do not act as a wage floor for all workers in Costa Rica, legal minimum wages are enforced for many of the workers who are covered by the legislation, paid employees. The evidence presented in this

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[17] The full set of coefficient estimates are reported in Table A3. We do not interpret any of the coefficients on human capital since they are there only as control variables.

paper suggests that in Costa Rica minimum wages are enforced, and do affect the wages of workers, for all types of paid employees no matter whether they work in the traditionally-defined formal sector or in a sector that is traditionally considered to be informal. Further, the estimated impact of changes in legal minimum wages on average wages is larger for workers in rural and small enterprises than in the urban large firm formal sector.   This suggests that, at least in Costa Rica, minimum wages do not cause labor market segmentation or dualism between the rural and urban sectors nor between large and small firms. Rather, the evidence is consistent with the view that legal minimum wages affect workers in the covered sector and, within that, in sectors where more workers are likely to earn low wages, and therefore are more likely have market wages below the institutionally-determined minimum wages. Thus, minimum wages may contribute to reducing the wage gap between the urban formal sector and the informal sectors.   Legal minimum wages cannot be enforced among self-employed workers (over 20% of workers in Costa Rica), and we find no evidence that minimum wages affect the wages of the self-employed either positively or negatively. Thus, the evidence does provide support for the hypothesis that minimum wages may play a role in segmenting the labor market between employees and the self-employed.

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Table 1: Macroeconomic Statistics, Costa Rica 1988-1999

Year	Mean Real Hourly Minimum Wage[1] (1999 CR colones)	Mean Real Hourly Wage[1] (1999 CR colones)	Real GDP Growth Rate[2]	Inflation Rate (% change in CPI July to July)[2]
1988	248	359	3.4	20.7
1989	254	368	5.7	16.9
1990	249	360	3.6	19.8
1991	254	349	2.3	29.7
1992	263	351	7.7	21.1
1993	259	408	6.3	9.9
1994	249	434	4.9	11.8
1995	258	417	4.0	23.2
1996	282	401	0.3	18.7
1997	300	412	5.8	13.3
1998	309	430	8.0	11.7
1999	320	461	8.0	9.1

[1] Source: *Costa Rican Household Survey*, using sample weights.

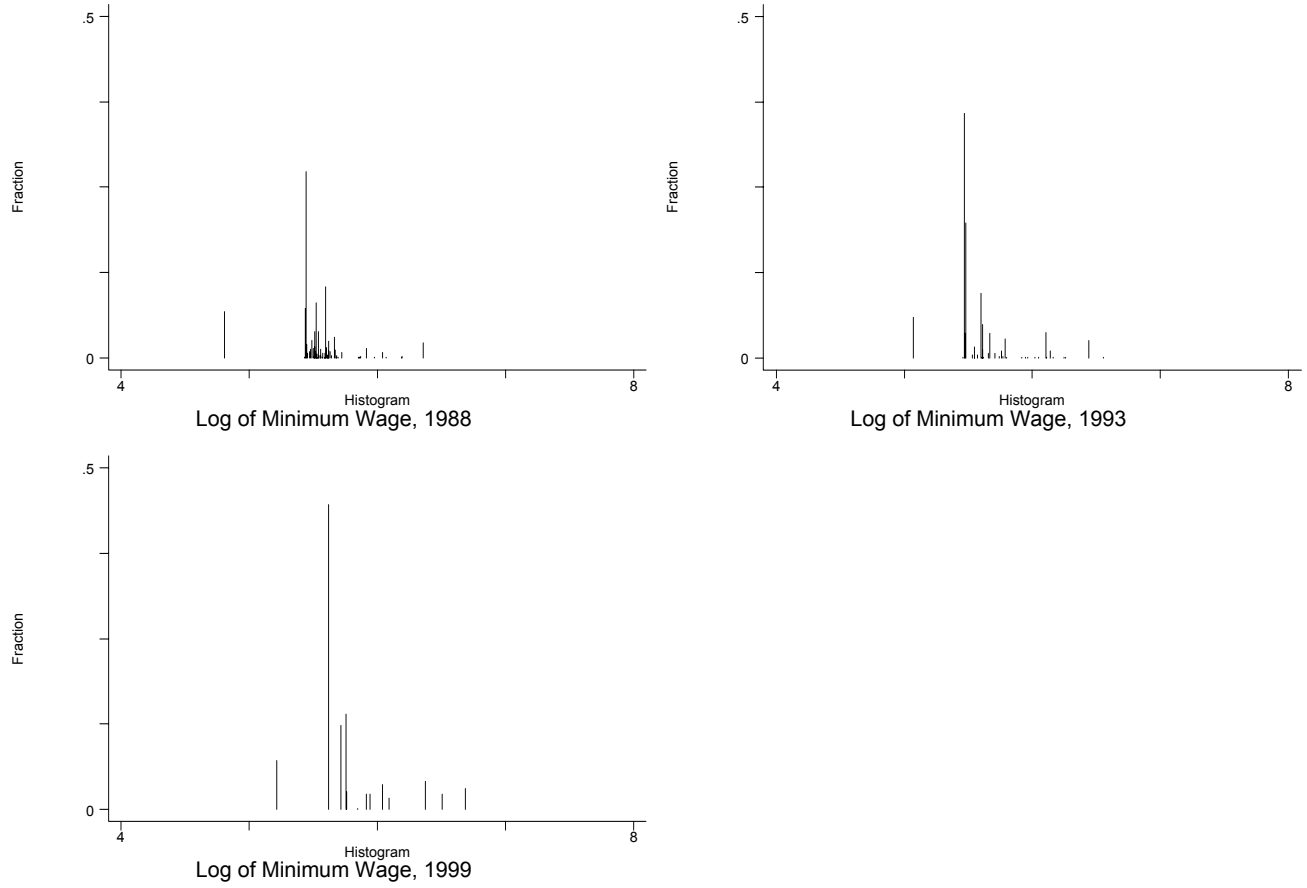[2] Source: the Costa Rican National Income Accounts.

Figure 1: The Distribution of Legal Minimum Wages in Costa Rica, 1988, 1993 and 1999

Table 2: Distribution of Workers and Real Hourly Wages (1999 colones) by Sector

Sector	Percent of Workers in Each Sector				Real Hourly Wage (1999 Colones)			
	1988-1999	1988	1993	1999	1988-1999	1988	1993	1999
Covered Sectors								
Urban Formal : large enterprises	24.59	23.14	24.13	26.64	582 (660)	535 (703)	620 (797)	633 (629)
Urban Informal 1: small enterprises	7.46	7.78	7.12	8.83	310 (323)	274 (294)	333 (431)	334 (319)
Rural Informal 1: large enterprise	26.77	27.75	29.08	24.07	368 (423)	348 (811)	362 (280)	445 (693)
Rural Informal 2: small enterprises	15.2	15.92	14.99	14.78	254 (250)	210 (453)	269 (281)	396 (291)
Uncovered Sectors								
Urban Informal 2: self-employed	10.03	9.48	9.85	11.09	561 (929)	471 (494)	537 (632)	640 (1909)
Rural Informal 3: self-employed	15.94	15.94	14.83	14.59	428 (697)	363 (484)	440 (580)	491 (824)

Notes: Calculated with data from the *Costa Rican Household Survey*, using sample weights. Standard deviations in parentheses.
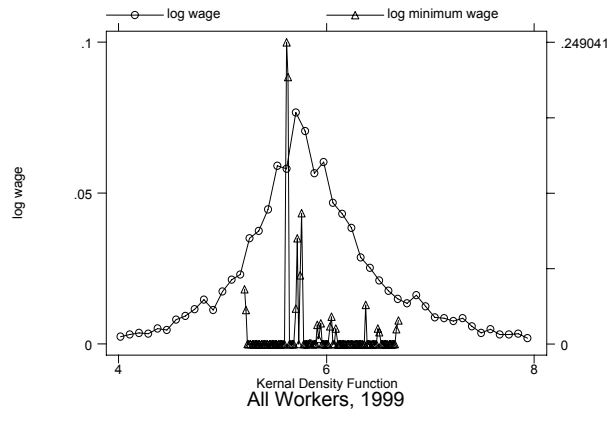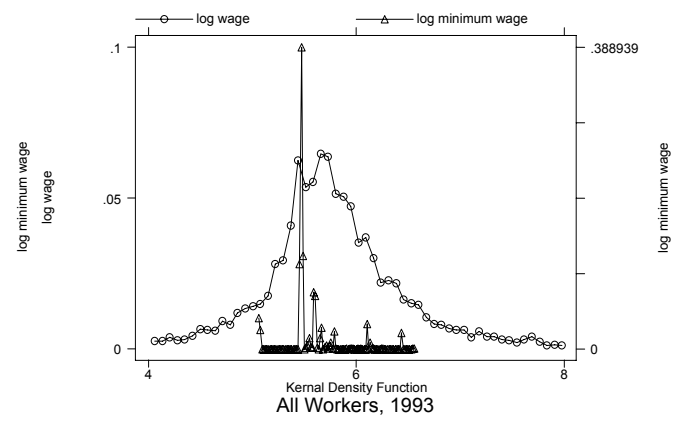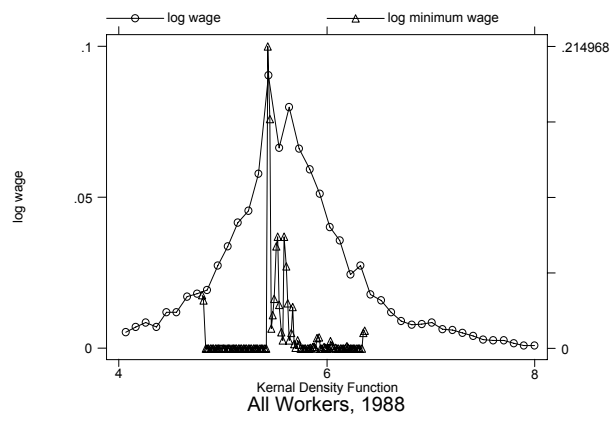
Figure 2: Comparing the Distribution of Legal Minimum Wages to the Distribution of Hourly Wages, 1988, 1993 and 1999
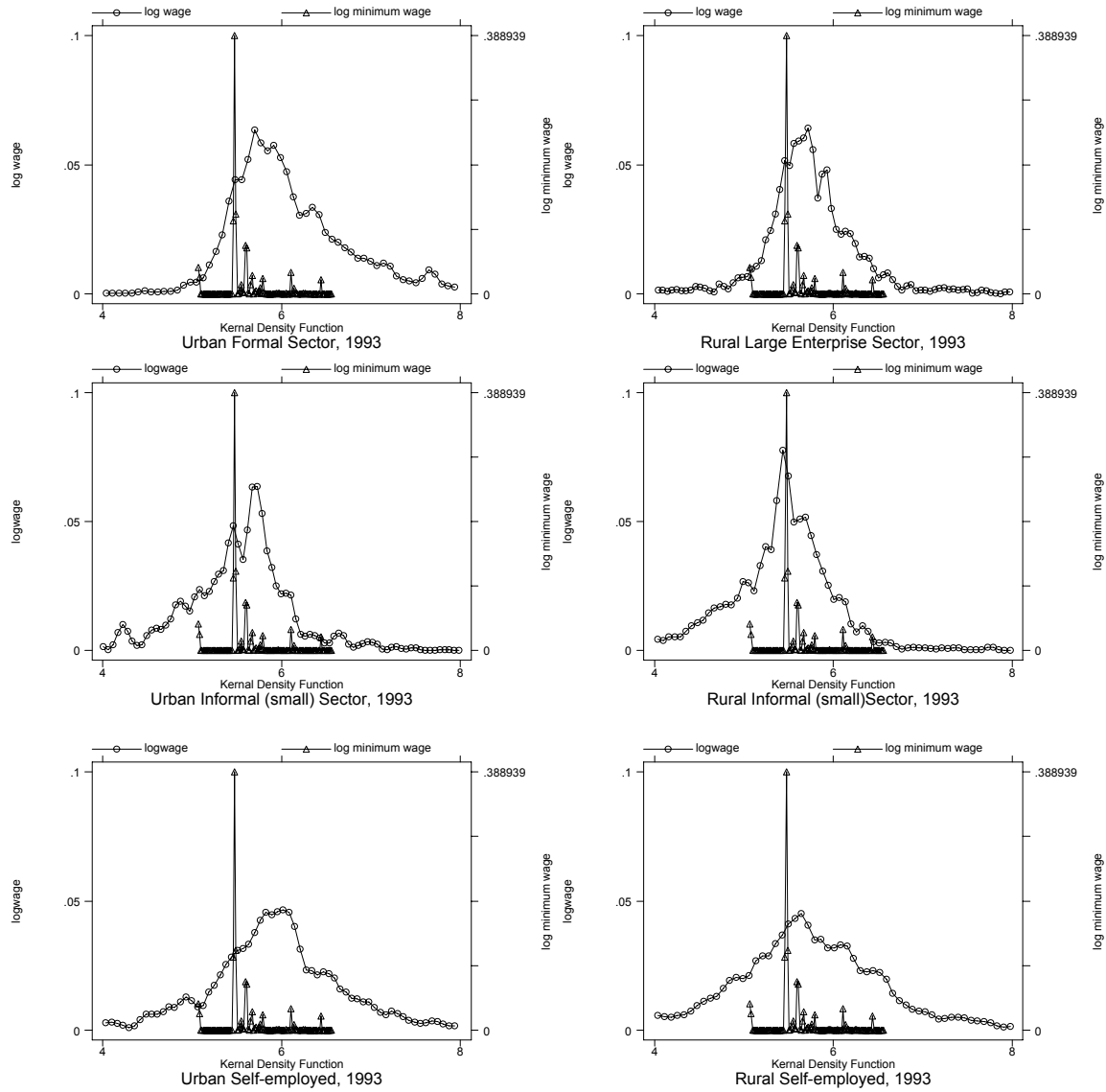
Figure 3: Comparing the Distribution of Legal Minimum Wages to the Distribution of Hourly Wages, by Sector 1993

Table 3: Estimating the Effects of Minimum Wages on Wages, by Sector
(Dependent Variable: Log of Hourly Wage)

	Coefficient on the Log of Real Minimum Wage (elasticity of wage to minimum wage)			
	B	SE	N	R-squared
Covered Sectors				
Urban Formal : large enterprises	0.103[a]	*0.031*	20,240	0.4354
Urban Informal 1: small enterprises	0.149	*0.096*	7,211	0.2008
Rural Informal 1: large enterprise	0.164[a]	*0.038*	33,538	0.3515
Rural Informal 2: small enterprises	0.396[a]	*0.111*	20,300	0.1832
Uncovered Sectors				
Urban Informal 2: self-employed	0.193	*0.145*	9,560	0.1393
Rural Informal 3: self-employed	-0.047	*0.138*	21,775	0.1551

a = significant at 1%
b = significant at 5%

Notes:

[1]The data used in all regressions are weighted using the sample weights. Explanatory variables in the regressions also include: dummy variables for each year, dummy variables for each industry, occupation and skill category in the minimum wage legislation, value-added by industry, and several individual-level variables including years of education, potential experience, experience squared, experience cubed and gender along with full interactions among these individual-level variables and the year dummies. See Table A2 for full results.

[2]Reported significance levels are based on estimates of the standard errors that are robust to heteroskedasticity and serial correlation and are corrected for clustering caused by including both micro-level data and a more aggregated variable (the minimum wage variable) in the regressions.

Table A1: Summary of Changes in Legal Minimum Wages, Costa Rica 1987 - 1999

	M.W. From	To	Raise
1987	Over 500 different minimum wage categories within 10 major industry categories (agriculture, mining, manufacturing, construction, electricity, commerce, transportation, communications, services, and professionals.) The professional category includes a minimum wage for anyone with a "licenciado," a 5-year university degree (more common that a 4-year bachelors degree.) The other professional minimum wages are for specific professions (and not for anyone with a 2-year or 4-year degree).		

	M.W. From	To	Raise
January 1 - August 29	¢0.00	¢267.00	9.00%
	¢267.05	¢307.80	7.50%
	¢307.85	¢344.50	5.50%
	More than ¢344.5		3.50%
August 30 - December 31	¢312.80	¢0.00	4.00%
	¢312.85	¢322.90	3.00%
	More than ¢322.95		2.50%

1988	Beginning in 1988 the Ministry of Labor began a gradual process of reducing the number of minimum wage categories. To do this, the Ministry identified two or more categories that were to be combined and increased the minimum wage in the category with the lowest minimum wage by a greater amount than the minimum wage in the higher wage category. In this way, over a period of several years, the minimum wage for these categories would become the same. Therefore, for each category in each year minimum wages are increased by different amounts.
January 1 - August 15	As part of the process of gradually consolidating minimum wage categories, for each category minimum wages were increased by different <u>absolute</u> amounts: the range is 3.5-15.0%. The average increase was 11.0%
August 16 - December 31	Increases of 8.85% for the lowest salaries down to 2.3% for the highest salaries, with exception for domestic servants (9.16%). Average increase 5.64%.

1989	
January 1 - September 16	Increases from 4.76% to 16.81%. Average increase was 12.16%.
September 17 - December 31	Increases from 3.41% to 8.88%. Average increase was 6.41%

1990	The major industry categories of manufacturing, mining, electricity and construction were combined. The number of minimum wage categories is reduced to 60-70. Consolidation of categories continues.
January 1 - July 31	Increases from 3.14% to 25.29%. Average increase was 9.91%.
August 1 - December 31	Increases from 9.79% to 16.35%. Average increase was 13.47%

1991	
January 1 - June 23	Increases from 2.11% to 15.67%. Average increase was 9.86%.
June 23 - December 31	Increases from 5.03% to 17.3%. Average increase was 10.51%

1992	
January 1 - July 1	Increases from 4% to 26.69%. Average increase was 11.38%.
July 2 - December 31	Increases from 12.02% to 13.89%. Average increase was 13.73%. Exceptions: Domestic Servants, 18.72%, Private Accountants, 37.38% and Journalists, 39.58%.

1993	Several categories are added for those with higher education. In addition to the already existing minimum wage for "licenciados," legal minimum wages are now set for those with 2-3 years of university education ("diplomados" or "tecnicos") and for graduates of 5-year technical high schools.
January 1 - July 26	Increases from 4.88% to 14.58%. Average increase was 5.07%.
July 27 - December 31	Increases from 4.65% to 6.37%. Average increase was 5.02%

1994			
January 1 - July 30	Increases of	8.00%	Agriculture
		9.00%	Other Activities
July 31 - December 31	Increases of	9.00%	Unskilled ag. labor in Palm Oil
		10.00%	Bus Drivers
		42.86%	"Coyol" harvesters
		8.00%	All other activities

1995

January 1 - August 9	Increases of	5.71%	"Coyol" harvesters
		10.00%	all other activities
August 10 - December 31	Increases from 5.70% to 12.83%. Average increase was 9.69%		

1996

January 1 - July 4	Increases from 38.08% to 17.78%. Average increase was 8.35%.
July 5 - December 31	Increases from 8.54% to 7.95%. Average increase was 8.05%

1997

The major industry categories were combined into one that specifically includes agriculture, mining, manufacturing, construction, commerce, tourism, services, transport, and warehousing. Within this combined category four minimum wages are set, for unskilled workers, semi-skilled workers, skilled workers and specialized workers (supervisors.)   Two other major categories remained: professionals and "specials." "Specials" included a minimum wage for domestic servants. Within the professionals category a minimum wage was added for workers with a 4-year university degree. These changes resulted in only 19 different minimum wages being set in 1997.

January 1 - July 4	Increases from 38.08% to 17.78%. Average increase was 8.35%.
July 5 - December 31	Increases from 8.54% to 7.95%. Average increase was 8.05%

1998

January 1 - June 30	Increases from 7.00% to 7.14%. Average increase was 7.02%.
July 1 - December 31	Increases from 6.52% to 6.67%. Average increase was 6.52%

1999

January 1 - June 30	Increases from 6.49% to 6.58%. Average increase was 6.43%.
July 1 - December 31	Increases from 4.57% to 4.59%. Average increase was 4.58%

Table A2: Occupation Codes used by the Costa Rica's National Statistic and Census Institute for the Multi-purpose Housing Surveys, from 1987 to 2000.

Groups	Description
0	**Professionals and technicians**
00	Professionals and technicians in: architecture, urbanism, technical drawing, engineering and industrial engineering technology.
01	Professionals and technicians in: chemistry, physic, astronomy, geology, bacteriology and industrial laboratories.
02	Professionals and technicians in: agronomy and veterinary medicine, biology, natural sciences, and agricultural technology.
03	Professionals and technicians in: medicine, surgery, dentistry, pharmacy, medic technology, and paramedic and health activities.
04	Professionals and technicians in: arts, literature, sports, recreation, communication, advertising, organization and social welfare.
05	Professionals and technicians in: religious and cult activities.
06	Professionals and technicians in: teaching and research.
07	Professionals and technicians in: mathematics and statistics, economics, business, accounting and social sciences.
08	Professionals and technicians in: law and jurisprudence.
09	Professionals and technicians in: maritime, fluvial and air transport and communications.
1	**Directors and general managers**
10	Directors and senior managers in the public administration (executive, legislative and judicial powers).
11	Directors and managers in government institutions with total or partial administrative independency and private enterprises: in agricultural and industrial production and trade.
12	Directors and general managers in government institutions with total or partial administrative independency and private enterprises in the service industries.
2	**Office clerks in the government and private enterprises**
20	Office clerks and financial accountant employees in the government (central, regional, local levels) and private enterprises.
21	Accounting and budget employees.
22	Employees in secretarial activities and transcription and reproduction of texts.
23	Operators of computers and accounting equipments.
24	Employees in supervision, delivery and control of transport and communication services.
25	Employees in mail and message distribution
26	Employees in the operation of radiotelephony, radiotelegraphy, and telecommunication equipment.
27	Administrative employees in other services.
3	**Traders, retailers, wholesalers and salespersons**
30	Retailers and wholesalers.
31	Retail salespersons and salesmen on the streets.
32	Sale representatives – wholesale and manufacturing.
33	Other salespersons and sale agents, traders and commission agents
4	**Crop and animal farmers, and agricultural workers.**
40	Agricultural Overseers
41	Crop and animal farmers (owners)
42	Agricultural workers
43	Fishers
44	Hunters and other workers in hunting.

45	Forestry workers
5	**Occupations related to driving, operating and controlling of transportation vehicles.**
50	Drivers of terrestrial transport vehicles.
51	Railway conductor and stokers.
52	Conductors and crew of ships and others.
53	Operators of equipment of transit signals and controls.
6	**Occupations in craft and manufacturing production of textiles and clothing. Also, occupations in carpentry, bricklaying, painting, plumbing, mechanic, and electricity.**
60	Textile workers.
61	Clothing production workers (except footwear, leather articles and related goods).
62	Shoemakers, saddlers and related footwear workers
63	Carpenters, cabinetmakers and related wood workers.
64	Bricklayers, ceiling installers and other construction workers.
65	Painters of construction, vehicles, machinery, etc. (except painters and decorators of glass and ceramic).
66	Plumbers or other installers of pipes and metallic structures and welders in general.
67	Electricians. Operators and repairers of electric and electronic installations and equipment.
68	Mechanics and repairers of machinery in different sectors: agriculture, manufacture, construction and transport.
69	Watchmakers, opticians, mechanics of precision; jewelers, silversmiths and related workers of jewels and objects made of precious metals.
7	**Occupations in craft and manufacturing production in graphic, chemical, mining, metal smelting, food product and beverage, ceramic, leather, tobacco and other product industries.**
70	Crafts persons and operators of graphic machines.
71	Miners, mining stonecutters, and operators of mining extraction machinery
72	Smelters, rolling mill operators and workers related to metal treatments.
73	Ceramists, potters and glass object producers.
74	Workers and operators of machinery in chemical, wood, paperboard and corrugated paper industries.
75	Workers and operators of machinery in food product and beverage industries.
76	Workers in tobacco transformation and cigarette production.
77	Workers in tanneries and workers related to transformation of skins and leathers.
78	Other crafts persons and machine operators.
8	**Occupations in packing, loading, and storage**
80	Workers in packing, loading and storage
9	**Personal services and related services.**
90	Workers in vigilance, protection and security.
91	Cooks, maids, cleaners and occupations in food and beverage service.
92	Workers in laundry and ironing.
93	Doormen and building cleaners and managers.
94	Estheticians
95	Other workers in personal services.
98	People working in unidentified occupations.

Table A3: OLS Regressions, Dependent Variable: Ln wage

	Formal	Informal Sector				
	Urban Large Scale	Urban Small Scale	Rural Large Scale	Rural Small Scale	Urban Self-Emp.	Rural Self-Emp.
Ln Min. Wage	0.103[a]	0.149	0.164[a]	0.396[a]	0.193	-0.047
	(0.031)	(0.096)	(0.038)	(0.111)	(0.145)	(0.138)
Schooling	0.044[a]	0.083[a]	0.039[a]	0.062[a]	0.010	0.045[b]
	(0.005)	(0.010)	(0.005)	(0.010)	(0.024)	(0.019)
Experience	0.019[b]	0.071[a]	0.016[a]	0.051[a]	-0.019	0.022
	(0.009)	(0.011)	(0.007)	(0.010)	(0.023)	(0.015)
Experience^2	0.000	-0.001[a]	0.000	-0.001[a]	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Experience^3	2.78e-06	9.07e-06[b]	-3.26e-06	4.08e-06	-6.31e-06	1.17e-06
	(4.04e-06)	(3.71e-06)	(3.78e-06)	(3.58e-06)	(0.000)	(3.93e-06)
Gender	-0.057	0.038	0.026	0.195[b]	-0.499[a]	-0.176
	(0.052)	(0.088)	(0.048)	(0.085)	(0.176)	(0.127)
School • Exp.	0.001[c]	-0.004[a]	0.001[b]	-0.001	0.002	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
School • Exp^2	0.000[b]	0.000	0.000[a]	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
School • Exp^3	6.97e-07[b]	-1.94e-07	1.21e-06[a]	9.46e-07[b]	6.29e-07	5.10e-07
	(2.91e-07)	(5.81e-07)	(2.91e-07)	(4.23e-07)	(6.20e-07)	(5.15e-07)
Exp • Gender	0.007	0.008	0.017[a]	0.003	0.029[c]	0.012
	(0.006)	(0.009)	(0.005)	(0.008)	(0.017)	(0.011)
Exp^2 • Gender	0.000	0.000	-0.001[b]	0.000	-0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Exp^3 • Gender	-2.57e-06	2.93e-06	5.48e-06	1.18e-06	4.87e-06	4.55e-07
	(3.31e-06)	(3.56e-06)	(3.57e-06)	(3.18e-06)	(5.54e-06)	(3.54e-06)
School • Gender	0.005	0.004	-0.003	-0.013[b]	0.060[c]	0.077
	(0.003)	(0.007)	(0.004)	(0.005)	(0.010)	(0.008)
YR 88		-0.039	-0.038[a]	-0.003		0.078[c]
		(0.051)	(0.015)	(0.034)		(0.045)
YR 89	0.015	0.013		-0.022	0.108	0.152[a]
	(0.022)	(0.045)		(0.030)	(0.068)	(0.049)
YR 90	0.022	-0.002	-0.037[c]	0.055[c]	-0.004	
	(0.022)	(0.047)	(0.020)	(0.033)	(0.043)	
YR 91	-0.039	-0.092[b]	-0.015	0.022	-0.003	-0.009
	(0.024)	(0.043)	(0.016)	(0.037)	(0.045)	(0.052)
YR 92	-0.021		-0.056[a]		-0.022	-0.015
	(0.022)		(0.015)		(0.040)	(0.040)
YR 93	0.076[a]	0.114[a]	0.043[b]	0.157[a]	0.106[a]	0.168[a]
	(0.025)	(0.046)	(0.018)	(0.029)	(0.037)	(0.041)
YR 94	0.122[a]	0.115[a]	0.047[a]	0.127[a]	0.192[a]	0.157[a]
	(0.024)	(0.042)	(0.015)	(0.030)	(0.055)	(0.053)
YR 95	0.086[a]	0.125[b]	0.046[a]	0.145[a]	0.148[a]	0.140[a]
	(0.023)	(0.052)	(0.016)	(0.028)	(0.046)	(0.048)
YR 96	0.050[c]	0.107[a]	-0.024[c]	0.099[a]	0.141[a]	0.070
	(0.027)	(0.042)	(0.014)	(0.034)	(0.049)	(0.048)
YR 97	0.044[c]	0.074[c]	0.002	0.024	0.098[b]	0.171[a]
	(0.024)	(0.043)	(0.016)	(0.033)	(0.048)	(0.051)
YR 98	0.093[a]	0.147[a]	0.029[c]	0.141[a]	0.119[b]	0.191[a]
	(0.025)	(0.046)	(0.016)	(0.027)	(0.050)	(0.058)
YR 99	0.103[a]	0.141[a]	0.066[a]	0.163[a]	0.029	0.173[a]
	(0.025)	(0.044)	(0.016)	(0.029)	(0.050)	(0.058)
Sectorial Value added	-6.60e-08[c]	-1.39e-07	1.23e-08	7.08e-08	1.36e-07	2.89e-08
	(3.93e-08)	(1.16e-07)	(3.41e-08)	(6.80e-08)	(1.21e-07)	(1.28e-07)
Constant	4.171	4.171	4.617	1.449	4.666	5.833
	(0.557)	(0.557)	(0.827)	(0.635)	(0.334)	(0.782)
No of Observations	20240	7211	33538	20300	9560	21775
No. of Clusters	2415	972	2231	1129	1122	1195
R^2	0.435	0.201	0.352	0.183	0.139	0.155

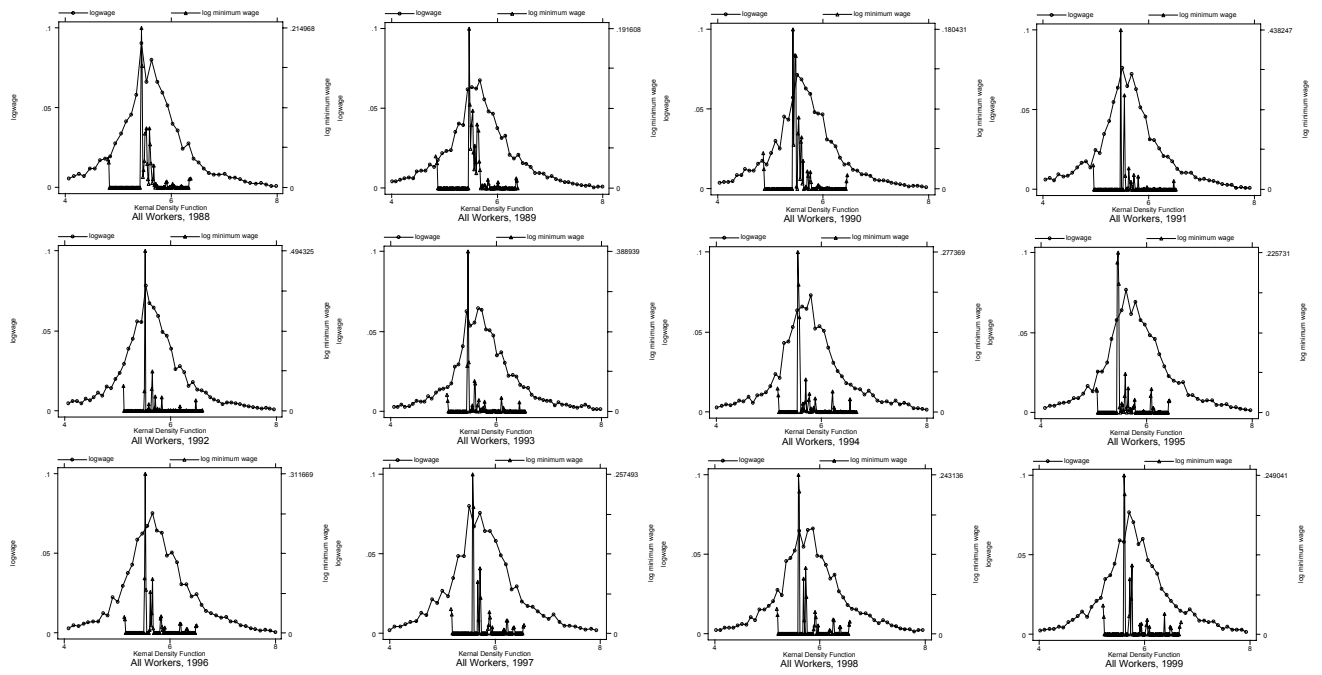a = significant at 1%; b = significant at 5%.

Figure A1: Comparing the Distribution of Legal Minimum Wages to the Distribution of Hourly Wages, 1988-1999
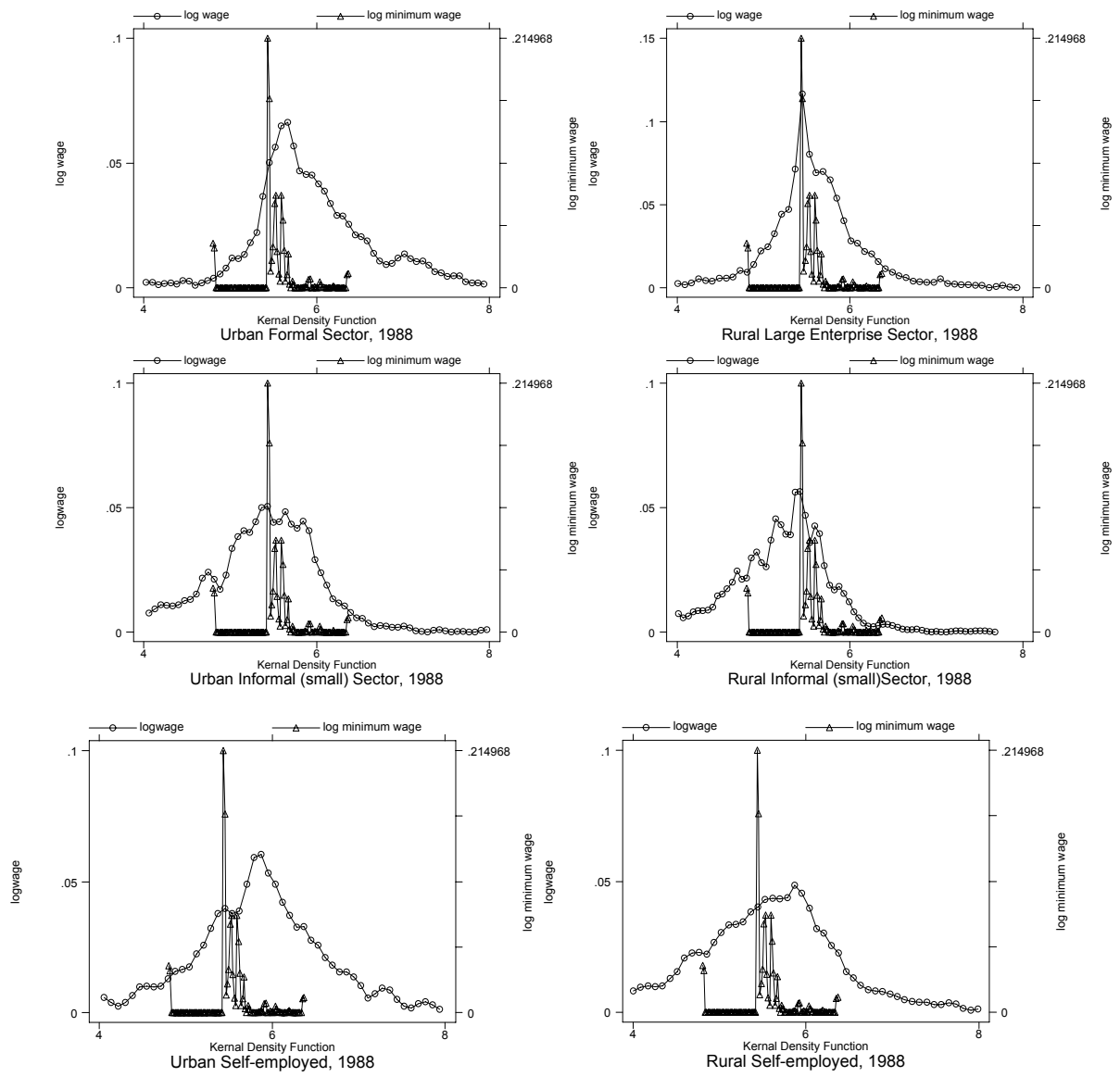
Figure A2: Comparing the Distribution of Legal Minimum Wages to the Distribution of Hourly Wages, by Sector 1988

Urban Formal Sector, 1999

Rural Large Enterprise Sector, 1999

Urban Informal (small) Sector, 1999

Rural Informal (small)Sector, 1999

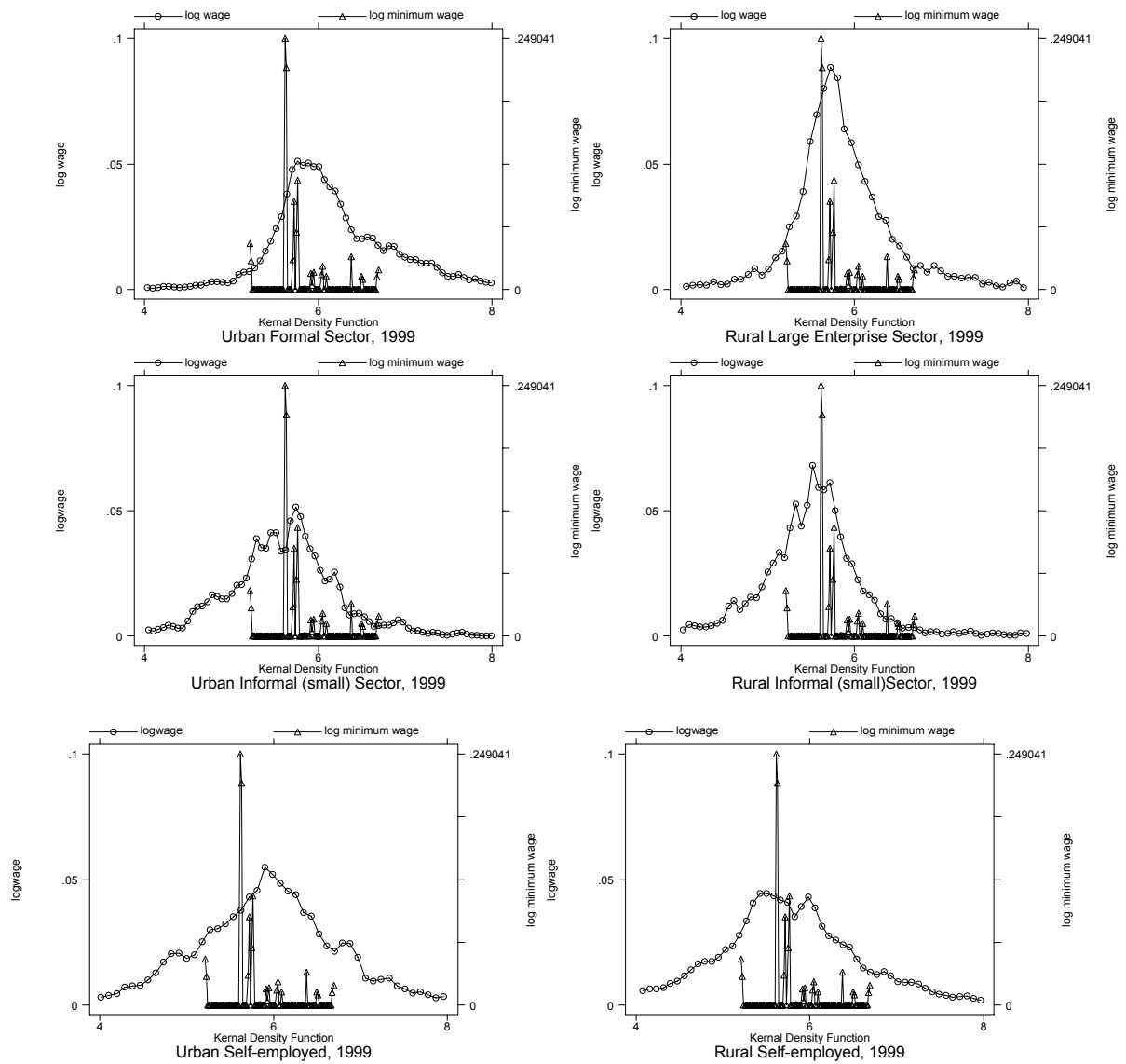Urban Self-employed, 1999

Rural Self-employed, 1999

Figure A3: Comparing the Distribution of Legal Minimum Wages to the Distribution of Hourly Wages, by Sector 1999