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Minimum Wage and Job Mobility in Peru

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Abstract

We study the effects of the minimum wage over employment and income in Peru by considering a monthly database that captures seven minimum wage changes registered between 2002 and 2011. We estimate that about 1 million workers earn an income by main occupation in the neighborhood of the minimum wage. Findings show that the minimum wage-income elasticity is statistically significant; the evidence also suggests that those who receive low incomes and those working in small businesses are the most affected by increases in the minimum wage. Employment effects are monotonically decreasing in absolute terms by firm size: they are moderate in large firms and higher in small firms. Results are robust when assessing the job-to-job transitions. Finally, we present evidence that supports the hypothesis that the minimum wage in Peru is correlated with income. The movement of income distribution in the context of changes in the minimum wage and the results provided by a model that captures the drivers of income justify this finding.

Keywords: Minimum wage, labor mobility, income dynamics, informality

JEL Classification codes: E24, E26, J20, J21, J61

http://dx.doi.org/10.7835/jcc-berj-2014-0094

The minimum wage in Peru was first introduced in 1962.[1] Over time, it has gone under different names. Currently, it is called minimal vital remuneration (*remuneración mínima vital* - RMV). The study of the dynamic effects of the minimum wage in the context of the Peruvian economy is of great interest since this country has experienced a remarkable transformation over the last two decades, including a period of persistent economic growth (5.5% of average yearly GDP growth during the first decade of 2000) and of labor productivity growth (Tello, 2012). The minimum wage has been raised several times in the last 10 years. It is difficult to assess what the effect of the minimum wage policies has been for two reasons. First, the bonanza experienced by the country might have facilitated the absorption of increases in the minimum wage; second, a labor market that is still predominantly informal renders difficult the enforcement of regulatory changes.

In this paper, we revisit the effect of the minimum wage on the Peruvian labor market. Our study differs from previous similar studies (Céspedes, 2006; Chacaltana, 2006; Del Valle, 2009; Jaramillo, 2012; Jaramillo & López, 2006) in three ways. First, we tracked all the modifications in the minimum wage observed throughout the last decade. Second, we examined the effect of the minimum wage on a range of outcomes, including employment status, job mobility, informality, and workers' income. Job mobility is an important aspect to

Electronic copy available at: http://ssrn.com/abstract=2456270

consider, given that it tends to be high in countries with a large proportion of low-skilled workers such as Peru (Romero & Cruthirds, 2009). Third, we calculated both short- and long-run effects.

In particular, we analyzed seven changes in the minimum wage from 2003 to 2011 by using a comparable database that records the working status of workers as well as the duration of employment and unemployment in the context of changes in the minimum wage. Our identification strategy enabled us to capture the changes in the employment status as well as the income of workers who are directly affected by changes in the minimum wage. This identification was based on the employment status of a panel of workers and their duration of employment and unemployment.[2] This method also provided some evidence of the indirect effects of the minimum wage on both employment status and income. Hence, our comparable database and our identification strategy enabled us to perform a comprehensive evaluation of the various effects of the changes in minimum wage over employment, informality, and the workers' income.

Our purpose was to provide answers to the following relevant questions: Are changes in the minimum wage important in the job market (in terms of employment and income)? Has the importance of the minimum wage changed over the last decade? How significant is the minimum wage in terms of job mobility? Does the minimum wage foster informality? As mentioned earlier, the available studies cover specific periods over one decade. They also cover a relevant database to identify the effects of the minimum wage and determine whether their importance has changed over the last decade.

According to the Permanent Employment Survey (*Encuesta Permanente de Empleo* - EPE), about 20% of employed workers register job-to-job transitions towards a quarter, after having experienced short spells of unemployment or short spells of inactivity (out of the labor market) within a quarter. Therefore, we identified the effects of the minimum wage on employment status (or income) within a quarter when we took job mobility into account. One issue that is of interest in the context of the Peruvian economy concerns the relationship between the minimum wage and labor informality. Our procedure enabled us to capture this: those who change jobs induced by the change in the minimum wage can move from a formal to an informal job within a quarter. If this change is statistically significant, we can then suggest that the minimum wage fosters informality in the labor market. Similarly, we considered the heterogeneous effects of the changes in the minimum wage according to the size of companies and different categories in the job market.

We estimated that about 1 million workers earn an income by main occupation in the neighborhood of the minimum wage, with a greater participation in some sectors and/or job categories (textiles, manufacturing, construction, trade, house workers, etc.). Findings show that minimum wage changes have statistically significant effects on employment and income. These results are robust after controlling for observable micro heterogeneity, aggregate macro variables, and seasonality of employment and income. Our procedure also enabled us to identify the heterogeneous effect of minimum wage changes according to firm size, employment status, and income ranges.

This paper is organized as follow. First, we briefly discuss the international evidence and the evidence available for Peru. Second, we present the data used in the study and provide a profile of those individuals who earn around the minimum wage in Peru. Third, we illustrate the effects of the minimum wage over income and/or salaries. Fourth, we study the effects of the minimum wage on employment. Finally, we draw conclusions regarding the effects of the minimum wage over employment and income in Peru.

Literature Review

The minimum wage literature is abundant worldwide. One of the first studies is that by Stigler (1946), who discussed the potential effect of increasing the post war U.S. minimum wage on labor market outcomes and on welfare measures. Brown, Gilroy, and Kohen (1982) provided a survey of the early literature. Flinn (2011) presented a synthesis of more recent contributions from a methodological perspective. Among the most representative empirical studies are those of Bell (1997), Brown, Gilroy, and Kohen (1982, 1983), Campolieti, Fang, and Gunderson (2005), Card and Krueger (1994), DiNardo, Fortin, and Lemieux (1996), Eckstein and Wolpin (1990), Meyer and Wise (1983a, 1983b), Neumark, Schweitzer, and Wascher (1999), Pereira (2003), and Van den Berg and Ridder (1998).

Prior to the 1990s, most of the empirical evidence suggested that increases in the minimum wage were harmful for employment. This was the expected outcome of such measures in a competitive labor market. Brown, Gilroy, and Kohen (1982) focused on the U.S. segment of the population earning the minimum wage

(teenagers and young adults) and presented a synthesis of early studies based on a time-series analysis. They concluded that for workers 16-19 years of age, a 10% increase in the minimum wage tends to reduce employment by 1% to 3% (elasticity between -0.1 and -0.3). The elasticity for workers 20-24 years of age was found to be considerably smaller. Meyer and Wise (1983b) reached a similar conclusion using micro-level data. In the early 1990s, this evidence was contested in a series of studies summarized in Card and Krueger (1997) and best exemplified in the case study of the fast-food industry in New Jersey and Pennsylvania (Card & Krueger, 1994). In this case, the authors were not able to detect a negative effect on employment of a marginal increase in minimum wages. Earlier, Katz and Krueger (1992) had detected a positive effect on employment for this industry. Studies by Card (1991, 1992) showed similar findings.

A positive effect or a non-effect of a minimum wage increase on employment is theoretically possible in the context of firms with monopsony power. For instance, Van den Berg (2003) argued that if firms have monopsony power and there are job search frictions, firms can pay wages that are below the productivity level of the workers because it takes time for them to find a better paying job. Under those circumstances, the adoption of a (or an increase in the) minimum wage reduces the degree to which employers can exploit their monopsony power without necessarily harming employment. Flinn (2006) reached a similar conclusion. The evidence collected by Card and Krueger (1997) has been influential, and their results can be reconciled with theory. However, in a review of 102 studies published between 1990 and 2006 collectively known as the "new minimum wage research," Neumark and Wascher (2006) noted that in about two thirds of the studies, the traditional result of a negative effect on employment was still found. For instance, Neumark and Wascher (1991, 1992) exploited variation across states and over time in the United States to find elasticities that corroborate the findings obtained by Brown, Gilroy, and Kohen (1982). Pereira (2003) used microlevel data and a quasi-experimental setting for Portugal and found that, for workers 18-19 years of age, the elasticity is between -0.2 and -0.4. Also exploiting a quasi-experimental setting, Orazem and Mattila (2002) obtained elasticities between -0.06 and -0.12 for all workers and much larger (between -0.31 and -0.85) for low-wage employees.

Overall, two features emerge from consideration of the international literature. First, most of the evidence seems to be consistent with the prediction that increases in minimum wages lead to reductions in employment among the segment of the population that earns a salary close to the minimum wage. Second, there is awareness that the specific effect of an increase in the minimum wage depends on the context. For instance, the magnitude of the elasticity might vary according to the point in the economic cycle that the country is facing or according to the proportion of the labor force population that earns an income close to the minimum wage.

The effects of the minimum wage in the Peruvian labor market have been analyzed using a variety of empirical methods. A key aspect to bear in mind is that in Peru, there is a high concentration of workers whose earnings are located in the neighborhood of the minimum wage; hence, studies do not need to focus exclusively on the population of teenagers and young adults.[3] Chacaltana (2006) provided a survey of the studies by Céspedes (2006), Jaramillo and López (2006), and Del Valle (2009). Céspedes used aggregated monthly employment data from the EPE and applied dynamic panel data techniques to calculate the average impact of the minimum wage over employment, exploiting the changes observed between 1997 and 2003. Jaramillo and Lopez used individual-level data from the EPE to study the impact of the change in the minimum wage observed in 2003. They estimated a probability linear model of employment status conditional on having been employed three months previously. The estimation controlled for individual characteristics, firm characteristics, month-fixed effects, and quarterly GDP growth. Del Valle used the same database and implemented a difference-in-difference analysis of the changes observed in the minimum wage in 2003 and 2006, using the changes observed in the year of no change as counterfactual.

Although the authors of the three studies mentioned above used different techniques, they reached a qualitatively similar result: increases in the minimum wage lead to reductions in average employment levels. Céspedes (2006) estimated an average elasticity of -0.13, whereas Del Valle (2009) and Jaramillo and Lopez (2006) obtained a larger average elasticity (around -0.75 in both cases). Both Del Valle and Jaramillo and Lopez allowed in their estimation for heterogeneous effects according to the position of the individual in the wage distribution prior to the policy change. Del Valle found that the increase in the minimum wage has a larger effect on those earning below or around the minimum wage, whereas in Jaramillo and Lopez, the effect is larger on those that earn around or above the minimum wage.

One limitation of the studies by Del Valle (2009) and Jaramillo and Lopez (2006) is that in both cases, the empirical identification relied on only one change in the minimum wage.[4] However, there have been several changes in the minimum wage in the last decade. Since there has also been a persistent economic growth

during the same time period, it is unclear whether the previous result ought to hold. Another aspect to bear in mind is that these studies examined only the short-run effect of the change in the minimum wage. Specifically, they considered as treated (i.e., affected by the policy change) only those individuals observed one or two months after the change. However, it is possible to be affected beyond this time horizon. For instance, people working under temporary contracts cannot be fired in the very short run, but eventually might not have their contracts renewed.

Jaramillo (2012) updated Jaramillo and Lopez (2006) to account simultaneously for the changes observed in 2003, 2006, 2007, and 2010. Interestingly, in this case, the nature of the conclusions changed. According to Jaramillo, increases in the minimum wage are found to increase employment for a segment of the informal workers (those earning slightly above the minimum wage) and to have no effect on formal workers. Given that the sample was composed of workers who were employed the previous quarter, what this suggests is that those who had an informal job in one quarter were less likely to lose this employment status in the next quarter if an increase in the minimum wage was observed. One possibility is that these results could be significant regarding the effect of changes in the minimum wage on job mobility (transitions from the formal to the informal sector and vice versa).

The literature in Peru has also provided evidence of the effects of the changes in minimum wage on earnings outcomes. Minimum wage changes can affect the income distribution by directly affecting the income of formal workers and by indirectly affecting the income of informal workers. This is the so-called lighthouse effect, which several studies worldwide have shown to be relevant. Kristensen and Cunningham (2006) investigated the situation in Latin America. For Peru, the relationship between income and minimum wage was studied by Yamada and Bazán (1994), Jaramillo and López (2006), Jaramillo (2012), Céspedes (2006), among others. However, as in the previous case, these studies based their identification on one specific increase in the minimum wage observed in 2003. The exception was Yamada and Bazan (1994) and Céspedes (2006), who used a time-series econometric approach. However, time-series analyses performed at the macro level may not capture the distributional effects of minimum wage changes.

The Data

The data source for the study is the EPE; the survey is performed on a monthly basis by the Peruvian National Bureau of Statistics (*Instituto Nacional de Estadística e Informática* - INEI). The EPE is a survey specially conceived to trace labor market-related aspects in the Lima Metropolitan Area. This geographic area includes 43 districts in the Province of Lima and six districts in the Constitutional Province of Callao.

One of the main characteristics of this survey is that the individuals who are interviewed each month include a share of the sample of people who were interviewed three months previously. The panel sample rotates partially each quarter in such a way that individuals in the panel sample are interviewed twice in two consecutive quarters. In this study, we built a sequence of the quarterly unbalanced panel samples, from the first quarter of 2003 to the first quarter of 2012. For the analysis, we considered only individuals who had reported having a job in the previous interview. After missing values in some demographic and labor market-related variables, the panel sample built in this way showed a total of 97 547 individuals, of whom 82 552 (84.6%) were employed at the time of the most recent interview. The rest were unemployed or inactive workers. For the income analysis, in some instances, we focused on those individuals for whom an income different from zero was observed in both occasions the individuals were interviewed. In this case, the sample size reduces to 76 282 people.

The level of inference of the quarter panel data is statistically significant, since approximately 30% of the total sample was part of the panel. For example, the size of the quarter sample in the EPE was 4 800 households in the year 2011 and 1 500 households in 2001. Hence, the total quarter sample was of about 18 500 people in 2011. Additionally, the size of the quarter sample of the EPE has being increasing over time. As a result, the estimates obtained from EPE are currently more precise than they were at the beginning of the survey.

Descriptive Statistics and the Profile of Workers Earning Around the Minimum Wage

The data from the EPE was used to characterize those individuals with an income around the minimum wage in the Lima Metropolitan Area. Table 1 shows that all workers, whether in the formal or the informal sectors, were included. Hence, were considered not only those workers earning the minimum wage, but also

those earning about the same level of monthly income by informal arrangement. As an operational definition, workers who earn a monthly income that is between above and below the minimum wage (+/- 100 Nuevos Soles, the currency of Peru) are considered as "workers around the minimum wage" and shown as Group B in Table 1.[5] We used data from a pooled sample of EPE surveys (from the first quarter of 2007 to the fourth quarter of 2009) in order to increase the sample size.[6]

Table 1
Employed Population by Income Range

	Number of individuals (in thousands)	%
Group A:		
Below the minimum wage (wage earners and independents)	1495.3	26
Group B:		
Around the minimum wage (wage earners and independents)	997.9	18
Group C:		
Above the minimum wage (wage earners and independents)	3194.7	56
Group D:		
Total (wage earners and independents)	5687.9	100

Source: EPE 2007-2009, INEI.

Note. Results correspond to the Lima Metropolitan Area. The population of reference is the average population extrapolated from the EPE for the years 2007, 2008, and 2009. We used data from a pooled sample of years to produce these statistics in order to increase the sample size. This is important for the analysis because the sample is divided into a large number of cells.

Table 2 shows the demographic profile of workers and the type of economic activities in which individuals earning an income close to the minimum wage are involved.

Table 2
Profile of Workers

	Group A	Group B	Group C	Group D
Age (in years)				
Average	34.9	34.0	36.7	36.1
Standard deviation	15.9	13.0	12.1	17.0
Gender (in %)				
Male	35.6	53.7	65.3	55.4
Female	64.4	46.3	34.7	44.6
Access to health insurance				
Has health insurance	21.8	27.6	52.5	40.1
No health insurance	78.2	72.4	47.5	59.9
Firm size (in %)				
n < 100	95.0	81.7	64.2	75.3
n > = 100	5.0	18.3	35.8	24.7
Type of occupation (in %)				
Independent	44.6	34.7	27.0	
Blue-collar	13.2	24.6	19.1	
White-collar	17.1	34.6	44.9	
House worker	5.3	6.1	5.4	
Others	19.7	0.0	3.7	

Source: EPE 2007, 2008, and 2009, INEI.

Note. Results correspond to the Lima Metropolitan Area. We used data from a pooled sample of years to produce these statistics in order to increase the sample size.

Findings for Group B show that approximately 18% of the employed population (around 1 million people) earns an income within the minimum wage of +/- 100 Nuevos Soles (see Table 1). Table 2 shows that these individuals, on average, are younger compared to the population of reference (34 versus 36 years of age); 53.7% are men; most of them (81%) work in relatively small firms and lack health insurance (72%). In terms of job categories, 35% self-report as white-collar workers, 32% as independents, and 25% as blue-collar workers.

Table 3 indicates the economic sectors in which those earning around the minimum wage work. Group B is well diversified within occupations, including independent workers in the retail sector, blue-collar workers in the manufacturing sector, house workers, among others.

Table 3
Workers Around the Minimum Wage (Group B) by Type of Occupation and Economic Sector

	Independent	White-collar worker	Blue-collar worker	House-worker
Primary	0.1	0.1	0.6	0.0
Manufacture	3.3	2.9	12.7	0.0
Electricity	0.0	0.0	0.0	0.0
Construction	2.0	0.2	2.7	0.0
Retail and wholesale	13.5	10.8	2.5	0.0
Hotels / restaurants	2.7	2.1	1.6	0.0
Transportation	5.8	2.8	1.5	0.0
Other services	4.8	16.8	3.8	6.3
Sub-total	32.3	35.8	25.5	6.3

Source: EPE, INEI.

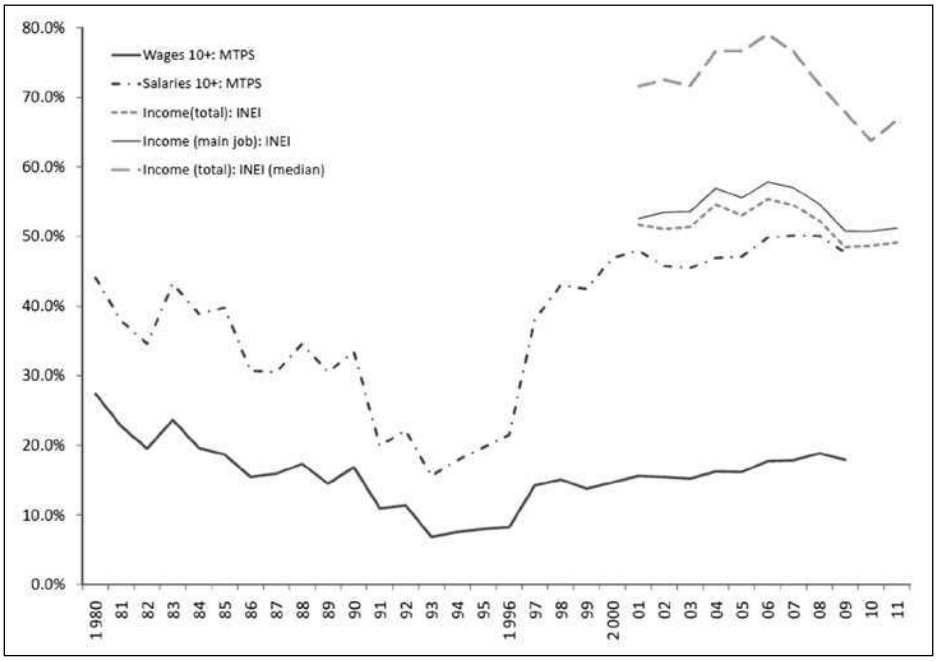
Note. Results correspond to the Lima Metropolitan Area. We use data from a pooled sample of years to produce these statistics in order to increase sample size.

Minimum Wage and Income

We used recent information that allowed us to identify some of the regularities of the effects of the minimum wage over workers' income, which helped to complement current knowledge regarding the effects of the minimum wage in Peru. We also examined the lighthouse effect of the minimum wage, namely, the hypothesis that the minimum wage in Peru is a benchmark in determining the income of individuals. The Peruvian data suggests that the changes in minimum wage are related to future movements or adjustments in the workers' monthly income. This could suggest that there is a statistical correlation linking the minimum wage to the income of workers.

Minimum Wage and Mean Income

The minimum wage imposes a friction in the labor market and becomes a relevant variable when the equilibrium wage and the minimum wage are close enough. This would be a particular case to bear in mind for Peru where the value of the minimum wage represents 60% of the average income, or alternatively, 70% of the median income (see Figure 1). This ratio has shown an upward trend during most of the 2000s. Data from the Peruvian Ministry of Labor (*Ministerio de Trabajo y Promocion Social* - MTPS) shows that this tendency has been registered since 1993. Nevertheless, at the end of the 2000s and at the beginning of 2010, we find a slight reduction in this ratio, such that the levels are similar to those at the beginning of the 2000 decade. This characteristic is evident with different indicators of the salary such as the estimated income by the EPE, or the gross domestic product (GDP) per capita, or the income and salaries estimated by the MTPS for workers employed in companies of 10 or more workers.



Note. INEI, Central Bank of Peru (Banco Central de Reserva del Peru, BCRP).

Figure 1. Ratio minimum wage - income.

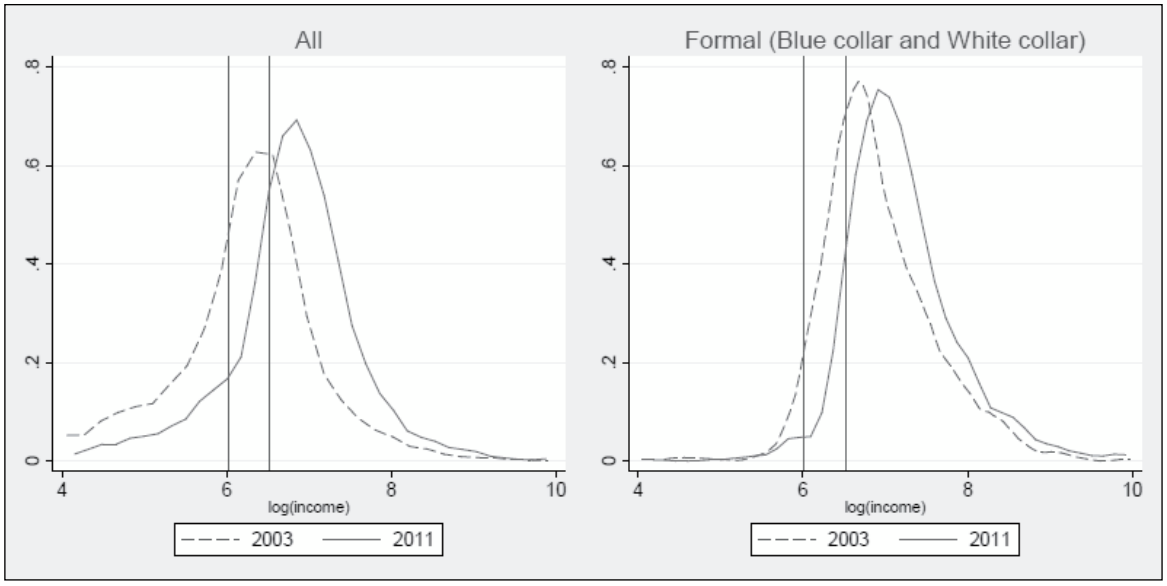
This regularity can be explained as follows: during the first seven years of the 2000s, the minimum wage policy was very active, and the changes were proportional to the average income increases. Between 2008 and 2010, no changes in the minimum wage were registered, and the significant growth in average income drove the negative trend of this ratio. After two changes in minimum wage (2010 and 2011), there was a slight growth in this ratio. On average, the ratio minimum wage/income in 2011 was similar to the ratio at the beginning of the 2000s.

In what follows, we provide microeconomic evidence that comes from the last seven changes in the minimum wage in Peru that suggest a significant correlation between minimum wage and the average income in the economy. Even though the evidence comes from Lima, we claim that the minimum wage works as an important benchmark in the determination of salaries because most individuals with formal jobs seem to earn around the minimum wage.

At the end of the 2000s, the concentration of workers earning an income close to the minimum wage is higher than that at the beginning of the 2000s. This increase implies that at the end of the decade, the changes in the minimum wage had a larger effect on income, and this is particularly true for the formal workers. INEI data show that these regularities are related to the increase of the number of salaried workers and to the reduction of informality in the labor market during the 2000s (Rodriguez & Higa, 2010). Figure 2 compares the income distribution around the minimum wage in 2003 and 2011. The distribution is narrower near the neighborhood of the minimum wage in 2011, which may suggest that there is a tendency to earn salaries closer to the minimum wage.

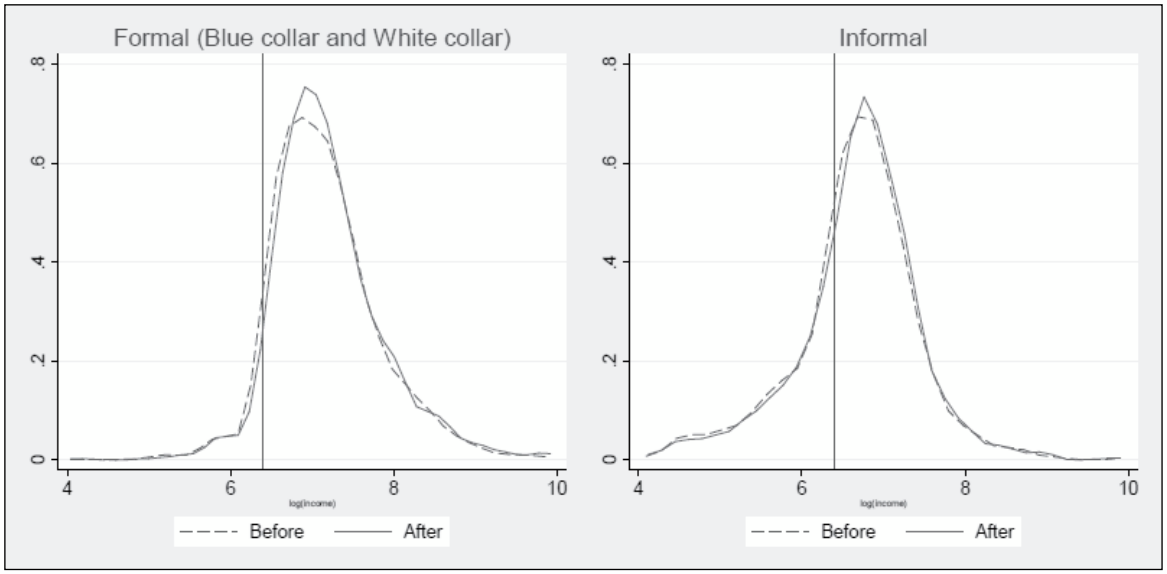
An additional element which illustrates the direct and/or indirect short-run effects of changes in the minimum wage is measured by comparing the distribution of income before and after the changes in the minimum wage. The panel sample from the EPE enabled us to identify the employment status and the income of workers before and after the changes in the minimum wage. This procedure, however, helps to capture only the short-run distributive effects of the minimum wage since only the income of two consecutive quarters are being compared. For example, Figure 3 illustrates this comparison for the change in minimum wage in August 2011 and shows a displacement towards higher salaries in the neighborhood of the minimum wage, while the rest of the distribution does not experience significant changes. The lack of changes is more pronounced amongst formal workers while informal workers experience marginal changes. This analysis was repeated for the last seven changes in the minimum wage, and similar results are found in six out of seven of the cases, as Figures 6 and 7 indicate (see Appendix A).

The Peruvian labor market regulation allows a certain degree of indexation in the minimum wage with some components in the salary, in such a way that the increases in the minimum wage have direct effects over some workers, mainly workers in the formal sector, even if we consider that in the aggregate they earn more than the current minimum wage.[7] Among these salary components, the one which would have a larger cover would be family compensation because it is not proportional to the income.



Note. Income frequencies (EPE, Lima Metropolitan Area). The vertical lines represent the minimum wage in 2003 or 2011, respectively. Kernel Epanechnikov function.

Figure 2. Main job income, frequencies 2003 and 2011b.



Note. Frequencies before and after the current minimum wage rise (EPE, Lima Metropolitan Area). The vertical line represents the minimum wage in 2011. Kernel Epanechnikov function.

Figure 3. Main job income, frequencies 2011b.

According to the characterization of workers by income around the minimum wage, approximately 18% of workers would be directly affected by changes in the minimum wage, while the rest of the workers, mostly in the informal sector, would be indirectly affected. Figure 3 shows that there is no clear clustering of salaries around the minimum wage in the informal market. The average informal income is close to the minimum

wage, and the distribution of informal salaries is displaced in a similar proportion to the changes in the minimum wage (see Figure 7 in Appendix A). This would alter the effects of the minimum wage in the long run.

Minimum Wage and Income: A Formal Model

In order to assess the relationship between minimum wage and income in a more robust way, an equation of income determinants at the level of the workers was estimated. This equation includes several controls to capture demographic characteristics, income heterogeneity of workers, income seasonality, and the business cycle. In the EPE, a share of the individuals being surveyed is interviewed twice to condition the analysis on some characteristics from the first interview. The specification is as follows:

$$log\, Y_{i,y,m} | (E_{i,y,m-3} = 1) = \alpha_y + \alpha_m + \beta log RMV_{y,m} + X_i \Omega + \mu_{i,y,m}, \quad (1)$$

where $log\, Y_{i,y,m}$ is the log of monthly income of individual i interviewed in year m, month m; $E_{i,y,m-3}$ is the employment status of the individual three months ago (1 if employed, 0 otherwise); $logRMV_{y,m}$ is the log of the minimum wage prevalent in the same time period; X_i is a vector of controls that include gender, educational attainment, years of experience (including a quadratic term), a dummy for whether the individual is the head of the household, and the following characteristics, observed three months previously: job category (independent, white-collar worker, blue-collar worker, house worker, and other categories), number of employees in the firm, and individual income divided by the minimum wage. The last two variables and educational attainment are included by categories. The model is estimated conditional if the individual reports having a job in an interview three months previously. The model also includes yearly and monthly fixed effects (α_y and α_m, respectively), which allowed us to control for trends in income over time (possibly associated with business cycles) and for the seasonality of economic activities. The coefficient of interest is β, which reflects the overall effect of a change in the minimum wage over average income, not just the short-run effect.

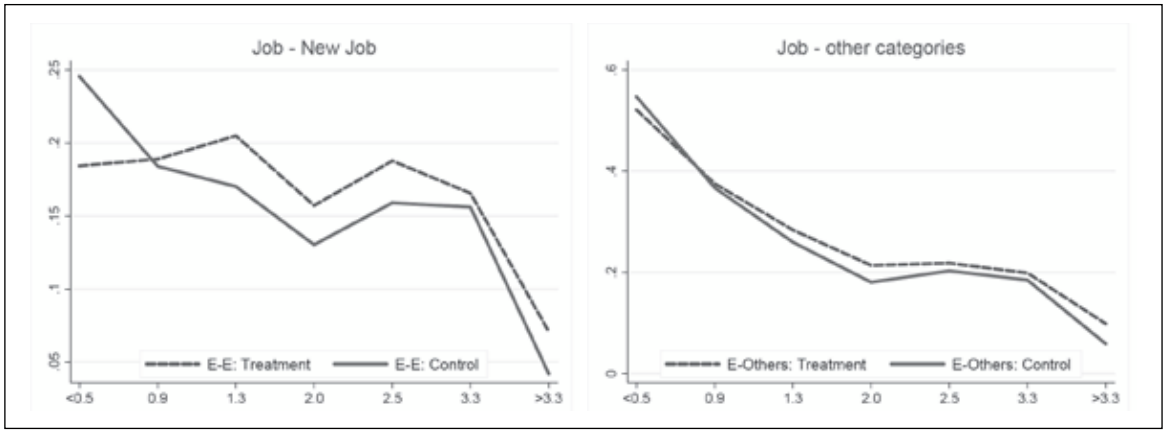
Based on this specification, we estimated Equation 1 for all individuals reporting an income in both periods; in other words, these individuals belong to Group D in both periods.[8] The sample size was 76 282. We obtained a statistically significant minimum wage to income elasticity with a point estimate of 0.25 (see Table 8, Appendix B). In other words, a 10% increase in the minimum wage increases income by 2.5%. This figure, however, reflects an average effect. Those individuals who earn significantly more than the minimum wage are less likely to be affected by the increase. Similarly, informal workers might not benefit or might benefit only partially from the increase.

Minimum Wage and Employment

In this section, we examine the relationship between minimum wage and employment. As mentioned before, the general conclusion for the Peruvian case is that the minimum wage has a negative effect on employment. In order to examine this relationship, we used the information provided by the EPE, which enabled us to track labor transitions in the context of changes in the minimum wage. We were able to capture not only the transitions from employment to unemployment and/or to inactivity but also those from employment to another job, namely job-to-job transitions. We used the job duration data to estimate the short-term job-to-job transitions in the context of a changing minimum wage.

The previous point is particularly important in Peru because the employment aggregate statistics cannot capture adequately the short-term job mobility which may be driven by changes in the minimum wage. The employment status of the same worker is observed with a lag of three months. These two observations of the same worker do not allow us to determine whether this worker has experienced a short spell of unemployment. In a context of changes in the minimum wage, it is possible to observe the same individual working before and after the change in minimum wage, and if we do not control for this short-term unemployment spell, we cannot observe the job lost due to rise of the minimum wage. Given that the unemployment duration in Peru is short, between 12-15 weeks (Céspedes, Belapatiño, & Gutiérrez, 2013; Chacaltana, 2000; Díaz & Eduardo, 2000),[9] the quarterly separation between two consecutive observations of the employment status does not enable us to identify the likely destruction (or not) of jobs due to a change in minimum wage. An estimate of estimate job-to-job transitions is necessary in order to determine the role of the minimum wage in employment transitions.

The importance of job-to-job transitions to determine the short-run effects of the minimum wage on employment is indicated in Figure 4, which shows the impact of the increase in the minimum wage in 2011. This graphical analysis compares the transition of those individuals who are observed before and after the change in the minimum wage (the treatment group shown by a dashed line) with the same transition observed for a control group (shown by a continuous line) the previous year.[10] Only the short-run transition of 1-2 months after the policy change is captured because individuals are interviewed in two consecutive quarters. The second graph of this figure shows the job-to-others category of transitions (unemployment, inactivity, or other jobs) across the income range.[11] This figure shows that the job-to-others category of mobility induced by changes in the minimum wage does not seem to be significant for this indicator, as the difference between both groups is small. Results are markedly different when considering only job-to-job transitions induced by the change in the minimum wage in 2011. This situation is shown in the first graph of Figure 4, where higher job mobility is observed in the treatment group compared to the control group across most of the income range. It is worth noting that in the extremes of the income distribution, job mobility is similar for both the treatment and the control group.



Source: EPE, INEI.

Note. The figure represents the proportion of employed workers who change to another labor category by income range (panel a) and job-to-job transitions by income range (panel b) (EPE, Lima Metropolitan Area). The x axis shows fractions of the current minimum wage. The dashed line represents the quarterly job mobility indicator of the treatment group, before and after the current minimum wage increase, while the continuous line denotes the control group, which is the quarterly job mobility indicator in the same months a year previously.

Figure 4. Job transitions, 2011b.

The procedure depicted in Figure 4 is applied to all the registered changes in the minimum wage during the 2000s, and the results are consistent with the ones previously mentioned in the majority of the cases, with the exception of 2008 as is shown in Figure 8 (see Appendix B). This reinforces the argument that the short-run effects of the minimum wage over job mobility are registered mostly in the neighborhood of the current minimum wage.

This analysis can be extended to other indicators of transitions of the labor market. For instance, in the case of unemployment-to-employment transitions, an increase in the minimum wage may reduce the job creation for those workers expecting to receive an income close to the minimum wage. There is no support for this hypothesis, however. As shown in Figure 12 (see Appendix B), there is no strong movement in the neighborhood of the minimum wage. Similarly, Figures 10, 11, and 13 (see Appendix B) show that minimum wage changes may not have a clear effect in other employment transitions.

While the results of the graphical analysis are suggestive, they capture only the short-run impact of the policy change, namely the impact of the increase in the minimum wage after one or two months. However, it is possible that an increase in the minimum wage might affect employment or job mobility beyond this horizon. Hence, the next step was to calculate the overall impact of changes in the minimum wage over employment and job mobility in a more formal framework.

Minimum Wage and Employment: A Formal Model

Using the previous results as motivation, we estimated a discrete response Probit model to capture the relationship between the minimum wage and the employment status. We considered the following functional form:

$$Pr(E_{i,y,m} = 1 | E_{i,y,m-3} = 1) = G(\alpha_y + \alpha_m + \ldots + \rho RMV_{y,m} + X_i\Omega + \mu_{i,y,m}), \quad (2)$$

where $Pr(E_{i,y,m})$ takes the value of 1 if individual i is employed in month m of year y. $G(.)$ is the cumulative distribution function of the standard normal distribution. $RMV_{y,m}$ is the prevalent minimum wage in the same time period; X_i is a vector that contains the same control variables used in Equation 2. As in the model reported in Equation 1, this model also includes yearly and monthly fixed effects (α_y and α_m, respectively) and is estimated conditional on the individual having had a job as reported in an interview three months previously. The result of interest is the elasticity of the minimum wage to the probability of being employed, conditional on having a job three months previously.[12]

Based on this specification, Equation 2 was estimated for all individuals fulfilling the condition of having a job three months previously, namely those who belong to Group D in the first interview. The sample size was 97 547. In Table 9, Column 1 (see Appendix B), the coefficients associated with the model described in Equation 2 are shown using data from EPE (Lima Metropolitan Area). These results imply a negative, statistically significant relationship between minimum wage and employment. In Column 2, the model allows for differential effects according to job category: independent, blue-collar, white-collar, house workers, and other categories. In this case, results suggest that the relationship initially found also holds for independent workers.

Table 4 shows the elasticities derived from these two models. The minimum wage- employment elasticity for the average individual in the sample is -0.25. In other words, a 10% increase in the minimum wage reduces employment by 2.5%. The highest values of elasticity are observed for those individuals who self-reported as blue-collar and white-collar workers, whereas those who self-reported as independent workers are the ones least affected by changes in the minimum wage.

Table 4
Minimum Wage and Employment Status: *Elasticities (Lima Metropolitan Area)*

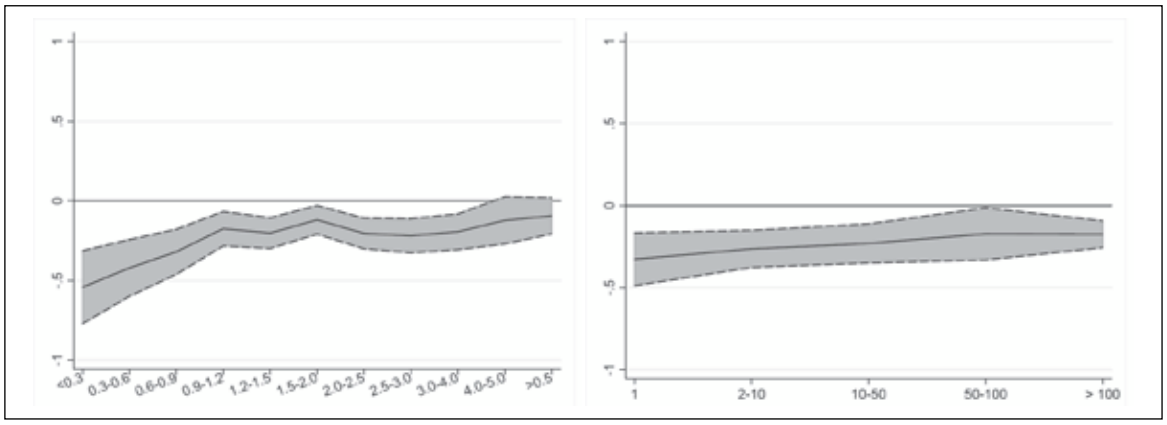
	Coef.	Std. Err.	*t*-stat	*p*-value
Model 1				
Average	-0.256	0.057	-4.430	0.000
Model 2				
By type of occupation (3 months previously):				
Independent worker	-0.199	0.049	-4.010	0.000
White-collar worker	-0.317	0.068	-4.610	0.000
Blue-collar worker	-0.332	0.082	-4.040	0.000
House worker	-0.247	0.072	-3.430	0.001
Other categories	-0.227	0.057	-3.970	0.000

Note. The coefficients from which these elasticities were estimated are reported in Table 9 (Column 1 for Model 1 and Column 2 for Model 2). All the control variables are kept at their average levels. The sample size is 97 547. The data come from the EPE (January 2003 to March 2012). The sample consists of all individuals who are observed twice in the EPE and who were employed the first time they were observed.

The average effect of the minimum wage on employment is likely to mask some heterogeneity. A priori, those individuals with a formal job are more likely to be affected because formal firms are required by law to conform to minimum wage policies. Similarly, people who earn the minimum wage, or around it, are likely to be the target of job cuts. To take into account these possibilities, we reestimated our employment model, allowing for heterogeneous minimum wage effects according to the following characteristics three months previously: (a) whether or not the individuals had health insurance in their job (a proxy of formal employment), (b) the position of the individuals in the income/minimum wage ratio distribution, and (c) the size of

the firm. Results for (b) and (c) are shown graphically in Figure 5. Full results are reported in Table 10 (see Appendix B).[13] Findings show that workers without health insurance, with lower income levels, and who work in small firms are the ones most affected by increases in the minimum wage. Both those individuals earning around the minimum wage and those earning less than the minimum wage are affected. In fact, results suggest that those individuals earning less than the minimum wage are the ones most affected. In contrast, those earning more than four times the minimum wage are not affected.

To check whether a similar relationship between increases in the minimum wage and changes in employment is found at the national level, we used data from the Peruvian National Household Survey (*Encuesta Nacional de Hogares* - ENAHO) to produce estimates of this elasticity, distinguishing between rural areas, urban areas (excluding Lima), and the Lima Metropolitan Area. For this exercise, we could not replicate the model specified in Equation 2. The ENAHO provided only one observation for each individual; hence, it was not possible to condition the analysis on individuals' having been employed *t* months before, nor to control for the characteristics of the occupation (firm size, income earned) at that moment in time. Thus, results are not entirely comparable due to differences in the population of reference. Additionally, the data used for this estimation was a pooled sample from ENAHO corresponding to the years 2003 to 2010,[14] so two of the seven changes in the minimum wage observed over the last 10 years were not included in the calculations. With these caveats in mind, it is worth noting that we obtained qualitatively similar findings in this case. Results are reported in Table 5. For the Lima Metropolitan Area, we obtained a negative and statistically significant elasticity, albeit slightly smaller than that obtained using data from EPE: -0.16. An almost identical result was obtained for urban areas (excluding the Lima area). In contrast, an elasticity not statistically different from zero at standard confidence levels was obtained for rural areas. This result was expected since labor markets are less formalized in those areas of the country.



a) By income range b) By firm size

Note. Both graphs show minimum wage-employment elasticities. In the graph on the left, elasticities are reported by relative income groups (the relative income is the individual income reported three months before the interview divided by the minimum wage prevalent then). In the graph on the right, individuals are classified according to the size of the firm where they worked three months previously.

Figure 5. Heterogeneity of elasticities by firm size and relative income (Lima Metropolitan Area).

Table 5
Minimum Wage and Employment Status: *Main Elasticities at the National Level*

	Coef.	Std. Err.	*t*-stat	*p*-value
Lima Metropolitan Area (Lima)	-0.162	0.099	-1.630	0.103
Urban areas (excluding Lima)	-0.155	0.085	-1.810	0.070
Rural areas	-0.066	0.051	1.280	0.202

Note. The coefficients from which these elasticities were estimated are shown in Table 11. All the control variables are kept at their average levels. The ENAHO is the source of the data.

Our methodology is not directly comparable with that used by Del Valle (2009), Jaramillo and Lopez (2006), and Jaramillo (2012). In those studies, a treatment group was defined that included individuals observed before and after the policy change. A characteristic of that strategy is that only the short-run impact of the policy change is captured, since those who are treated are observed one to two months after the increase in the minimum wage. However, the effects of the policy change are not necessarily restricted to the following one to two months after the event.

In our estimations, we followed a different route to estimate how employment status changes as the minimum wage increases for all individuals who had a job three months previously. Since no specific treatment group was defined, findings show the overall impact of the policy change, not just the short-run impact. This has consequences for the interpretation of the results. If jobs that are destroyed by the increase in the minimum wage can be recovered relatively quickly, the short-run elasticity will be larger than our estimates (in absolute terms). Conversely, if the increase in the minimum wage makes workers more likely to lose their job a few months after the policy change, the short-run elasticity will be smaller than our estimates (in absolute terms).

To check whether the short-run elasticity is smaller or larger than our overall elasticity, we reestimated our main specification, defining a treatment variable that takes the value of 1 for those individuals who are observed one or two months after a change in the minimum wage and 0 otherwise (see Table 6). In so doing, we obtained an average elasticity of -0.13. The point estimate is not statistically different from zero. When we calculated the elasticity, allowing for heterogeneity by type of occupation, an average elasticity of -0.46 was obtained for white-collar workers, a result that is statistically significant. For the other groups (independent workers, blue-collar workers, and house workers), the elasticities obtained are not statistically significant. This finding is markedly different from previous results, which showed a larger average elasticity as well as elasticities that were statistically significant for all the subgroups by type of occupation. The difference between the two sets of results suggests that an increase in the minimum wage has wider implications on employment status that are not necessarily apparent in the short-run.

Table 6
Minimum Wage and Employment Status: *Short-Term Elasticities (Lima Metropolitan Area)*

	Coef.	Std. Err.	*t*-stat	*p*-value
Model 1				
Average	-0.129	0.096	-1.330	0.184
Model 2				
By type of occupation (three months before):				
Independent worker	0.092	0.117	0.780	0.437
White-collar worker	-0.465	0.159	-2.920	0.004
Blue-collar worker	0.075	0.214	0.350	0.725
House worker	-0.535	0.351	-1.520	0.128
Other categories	-0.203	0.203	-1.000	0.318

Note. Elasticities are estimated from the following Probit model:

$$Pr(E_{i,y,m} = 1 | E_{i,y,m-3} = 1) = G(\alpha_y + \alpha_m + \ldots + \rho\, CHANGE_{y,m} + X_i\Omega + \mu_{i,y,m}),$$

where CHANGE takes the value of 1 for those individuals who are observed before and after a change in the minimum wage and 0 otherwise; all the other variables are defined as before. The sample size is 97 547. The data come from the EPE (January 2003 to March 2012). The sample consists of all individuals who are observed twice in the EPE and who were employed the first time they were observed.

Minimum Wage and Labor Mobility

A change in the minimum wage might affect employment in ways that are not captured by the previous definition of employment status (1 if employed at the time of the interview, 0 otherwise, conditional on having had a job three months previously). People who lose their job could find a new one quickly. Depending on the exact timing of the household survey interviews and the changes in the minimum wage, it is possible that people

who lost their job because of the increase in the minimum wage could have found a new one by the time of the interview. If this is the case, the previous results would be a lower bound of the true minimum wage - employment elasticity. To take this possibility into account, we estimated the change in the probability of retaining the same job compared to the alternative of having a new job.[15] Because this is a selected sample composed of individuals who have a job in both periods, we also show results comparing the probability of retaining the same job versus either having a new job, being unemployed, or being inactive. This second definition of employment status makes comparison with previous results possible. These elasticities are reported in Table 7.

Table 7
Minimum Wage and Job Transitions: *Elasticities Using Alternative Definitions of Employment Status (Lima Metropolitan Area)*

	Coef.	Std. Err.	*t*-stat	*p*-value
Dependent variable, alternative 1:				
1 if retained the same job (compared to 3 months before), 0 if in a different job.	-0.071	0.061	-1.160	0.245
Dependent variable, alternative 2:				
1 if retained the same job (compared to three months before), 0 if in a different job, unemployed or inactive.	-0.304	0.084	-3.590	0.000

Note. Each elasticity is estimated from a different model where the definition of employment status changes slightly.

As expected, when using a definition similar to that presented in Equation 2, we obtained a larger elasticity (in absolute value). In contrast, when restricting the comparison to those individuals who had a job in both periods, the elasticity is smaller and becomes statistically insignificant. This difference might stem from the fact that this is a selected sample of workers with higher job stability.

Minimum Wage and Informality

The previous model was modified to capture the transition from formal to informal employment. The dependent variable was defined as the probability of maintaining a formal job compared to having an informal job, being unemployed, or being inactive at the moment of the interview. The model was estimated conditional on people having a formal job before the change in the minimum wage. The explanatory variables are the same as before.

Lacking additional information about the type of contract a worker has, for practical purposes, we defined formality as having health insurance (public or private). This is only a proxy for formality: Indeed, it is possible for a worker with health insurance to work in the informal sector (e.g., a worker can buy health insurance). When estimating the model using access to health insurance as a proxy for working in the formal sector, no evidence was found to support the claim that an increase in the minimum wage leads to a reduction in the average proportion of the population with formal jobs. In fact, the elasticity has a positive sign; however, it is statistically insignificant.[16] In other words, it does not seem to be the case that an increase in the minimum wage leads to more informality. Given that our informal employment indicator is weak due to data limitations, we treat this result with caution.

Conclusions

We have examined the effects of the minimum wage over income and employment in Peru by considering the seven changes registered between 2002 and 2011. The source of the data comes was the EPE for the Lima Metropolitan Area and the ENAHO for the national analysis. We merged the information provided by the monthly household survey and were able to measure the job-to-job transitions as well as the income dynamics due to minimum wage changes. We estimated that about 1 million workers have an income by main occupation in the neighborhood of the minimum wage, with a greater participation in some sectors and/or job categories (textiles, manufacturing, construction, trade, house workers, etc.).

Using a model that explains the probability of being employed, we estimated statistically significant minimum wage-employment elasticity for the average worker. Although on average, both formal and informal workers are affected by minimum wage increases, those individuals seemingly engaged in formal activities are hit harder. The evidence also suggests that those who receive low incomes and those working in small businesses are the most affected by increases in the minimum wage. Effects are monotonic, decreasing in absolute terms by firm size; the effects of minimum wage changes are moderate in big firms and higher in small firms.

The minimum wage - employment elasticity is larger in absolute value (more negative) when assessing the probability that individuals are working in the same job in both periods. This finding suggests that part of the effect of the minimum wage changes on employment is cleared due to the ability of individuals to reinsert quickly in a dynamic labor market; it is worth remembering the persistent economic growth during the decade under consideration. When considering informality, findings show that the increases in the minimum wage do not appear to reduce the probability of people being formally employed. However, this result needs to be revisited with proper data, given that our informal employment indicator is weak due to data limitations. Finally, we have presented evidence for the hypothesis that the minimum wage in Peru is a benchmark for determining the income of individuals (i.e., the lighthouse effect). The movement of income distribution in the context of changes in the minimum wage and the results provided by a model that captures the drivers of income justify this result.

Endnotes

1 Source: Peru National Bureau of Statistics.

2 In order to identify the effects of the minimum wage on employment, we need to observe whether the employed workers are still employed after the change in the minimum wage. The database that captures this effect is the EPE (*Encuesta Permanente de Empleo*). This survey registers the employment status of a group of workers twice, two monthly based observations with a 3-month lag. By using the duration of employment, we can determine whether the workers do not experience job-to-job transitions. By using this database, once the minimum wage changes, we can observe the employment status of the workers after three months. The data cover only the Lima Metropolitan Area, which can be a limitation since this area represents only 30% of the population. The data covering Peru are found in the ENAHO (*Encuesta Nacional de Hogares*). However, this database has yearly base panel observations only; these may not be adequate to capture the short-term effects of minimum wage changes. The EPE allowed us to capture both short- and long-term effects of the minimum wage changes.

3 Approximately 1 million workers may be exposed to minimum wage changes in the Lima Metropolitan Area, in the sense that their income is in the neighborhood of the minimum wage.

4 Del Valle (2009) performed separate estimations for 2003 and 2006.

5 We used this approach to deal with measurement error. The question about income in EPE does not distinguish between gross income and income after taxes and other deductions.

6 Although data from other years are available, only from to 2007 to 2009 can we observe a harmonic International Standard Industrial Classification of All Economic Activities (ISIC); hence, we used data for these years only to produce these descriptive statistics.

7 Among these concepts, we find family compensation (10% of minimum wage), intern minimum wage (25% above the current minimum wage), journalist minimum wage (three minimum wages), minimum wage for night (30% above minimum wage), and *Essalud* payments (9% of minimum wage).

8 In practice, some workers reporting zero income also have to be excluded.

9 The duration of unemployment estimated from the EPE has similar values with a decreasing trend during most of the decade (Céspedes, Belapatiño, & Gutiérrez, 2013).

10 This controls for the seasonality of job mobility in a simple manner.

11 The income range is defined according to the income prevalent prior to the change in the minimum wage.

12 In this set of estimations, the nonemployed status includes the unemployed as well as those individuals who self-report as inactive (out of the economically active population). We considered both categories because we were already conditioning the analysis to having had a job three months previously, which already excludes the structural proportion of the population that is not actively looking for a job.

13 See coefficients of the Probit model in Table 10, Appendix B.

14 The data from ENAHO 2011 were not available at the time this analysis was produced.

[15] In the dataset, it is possible to know for how long individuals have been in their current job and whether they had a job three months previously. If they had a job three months previously but have worked less than three months in their current position, we assumed there was a job transition.

[16] We obtained elasticity for the average worker of 0.07 with a standard error of 0.06.

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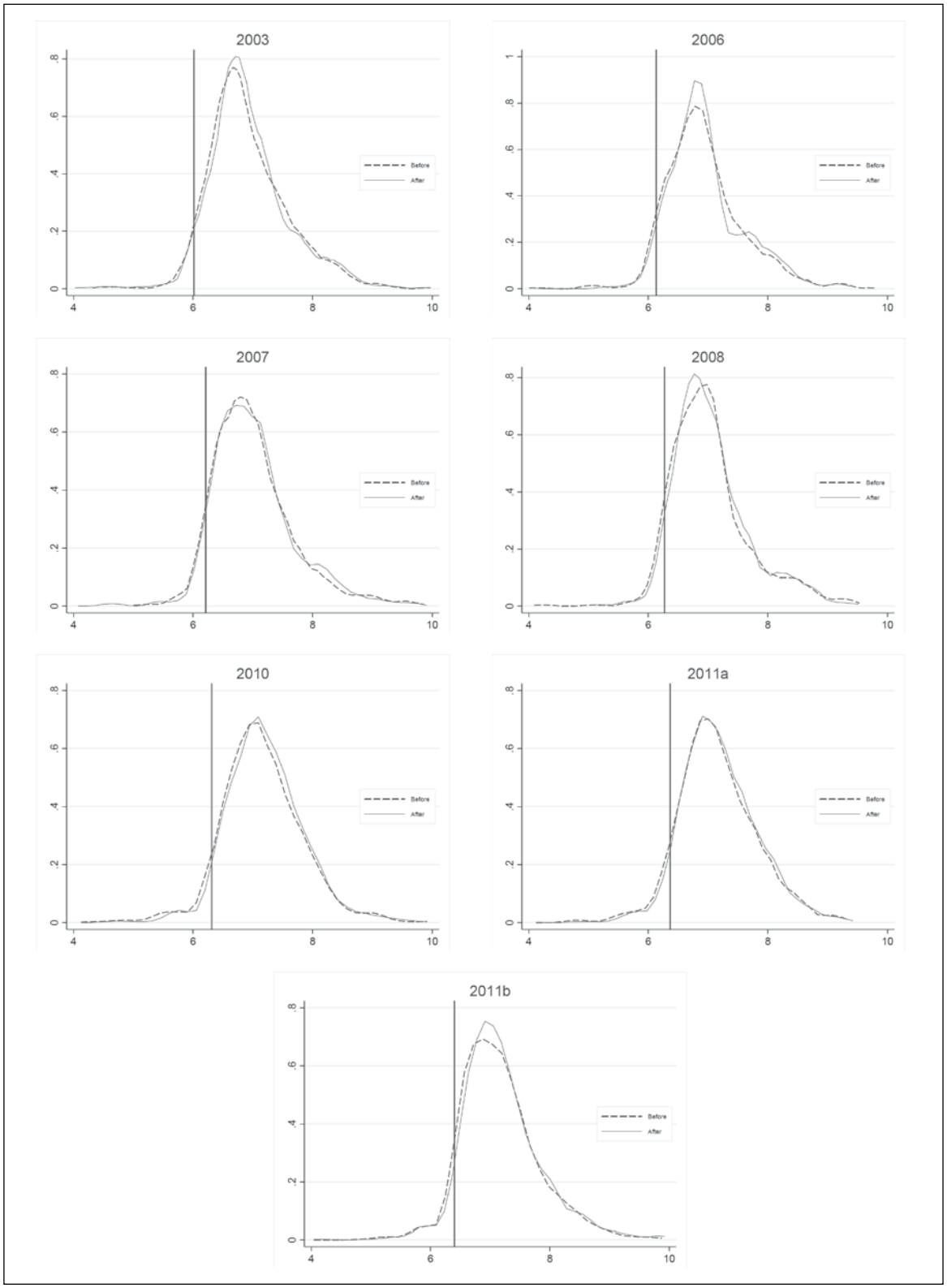
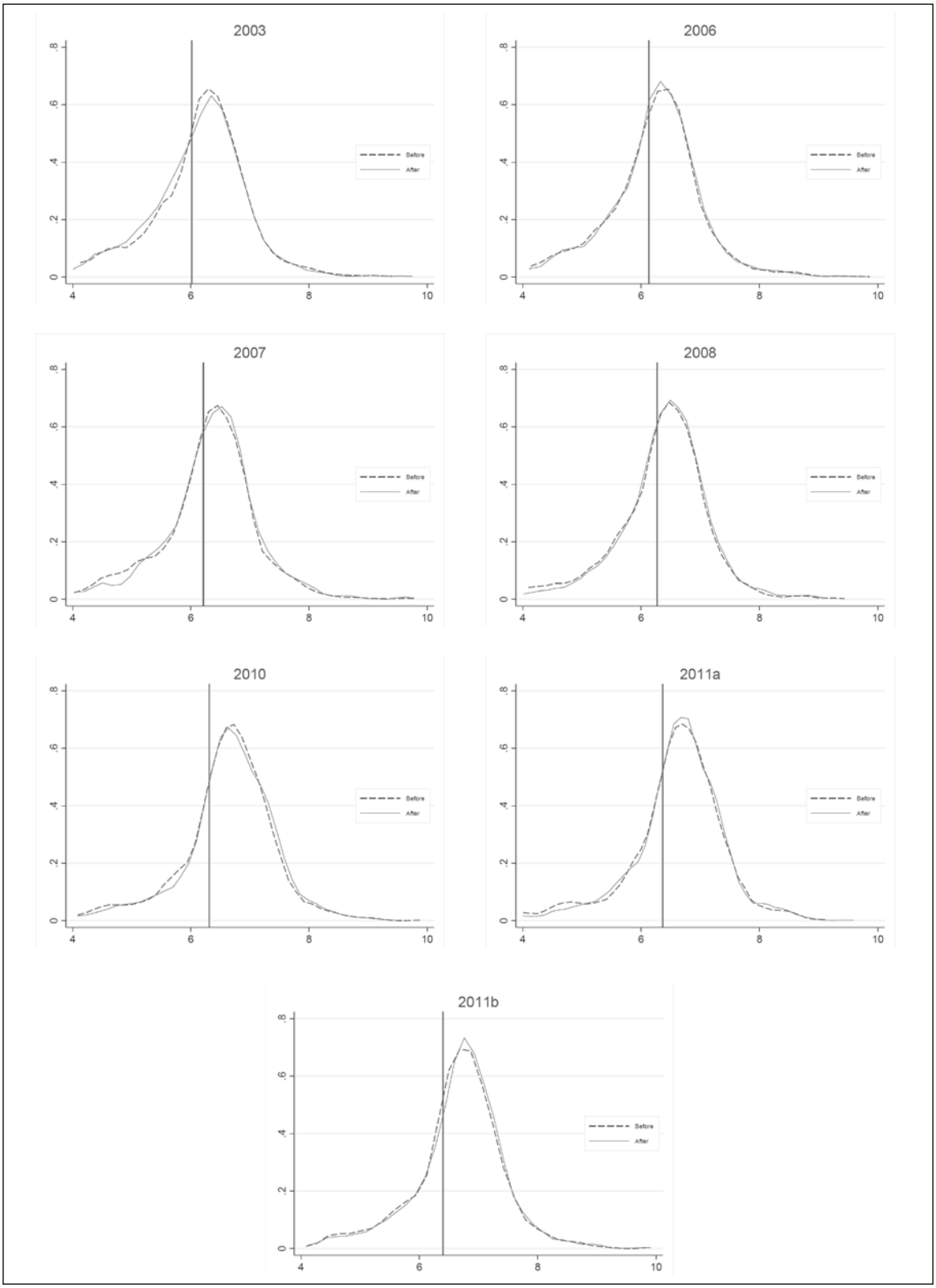
We thank Marcos Agurto, Juan Chacaltana, the editor, and numerous seminar participants for comments that are incorporated throughout the paper. We are grateful to Jorge Luis Guzmán Correa for excellent research assistance and to participants to the Research Seminar at the Central Bank of Peru. The views expressed in this paper are those of the authors and do not necessarily represent those of the Central Bank of Peru. All remaining errors are our own.

Appendix A: Minimum Wage and Income



Note. Income frequencies before and after the current minimum wage rise (EPE, Lima Metropolitan Area). The X axis represents the Logarithm of income. The vertical line represents the minimum wage before the current minimum wage increase. Kernel Epanechnikov function.

Figure 6. Main job income, formal salaried workers: frequency 2003-2011b.



Note. Income frequencies before and after the current minimum wage rise (EPE, Lima Metropolitan Area). The X axis represents the Logarithm of income. The vertical line represents the minimum wage before the current minimum wage increase. Kernel Epanechnikov function.

Figure 7. Main job income, informal workers: frequency 2003-2011b.

Appendix B: Results of Model Regressions

Table 8
Minimum Wage and Income, Main Results (Lima Metropolitan Area)

	Coef.	Std. Err.
Log minimum wage	0.252000***	0.083000
Job category in t-3		
Independent		
Blue collar	0.010000	0.009000
White collar	-0.041000***	0.009000
House worker	0.053000***	0.011000
Other categories	0.227000***	0.010000
Relative income in t-3		
Below or equal to 0.3		
< 0.3; 0.6]	0.321000***	0.010000
< 0.6; 0.9]	0.623000***	0.010000
< 0.9; 1.2]	0.833000***	0.009000
< 1.2; 1.5]	0.978000***	0.009000
< 1.5; 2.0]	1.139000***	0.009000
< 2.0; 2.5]	1.290000***	0.010000
< 2.5; 3.0]	1.436000***	0.012000
< 3.0; 4.0]	1.609000***	0.012000
< 4.0; 5.0]	1.844000***	0.015000
Above 0.5	2.327000***	0.013000
Education level		
No education		
Kinder	-0.302000	0.261000
Incomplete primary	0.003000	0.021000
Complete primary	0.029000	0.021000
Incomplete secondary	0.005000	0.021000
Complete secondary	0.057000***	0.021000
Incomplete technical college	0.069000***	0.022000
Complete technical college	0.138000***	0.021000
Incomplete university	0.125000***	0.022000
Complete university	0.294000***	0.022000
Firm size in t-3 (n. of employees)		
One employee		
Between 2 and 10	0.086000***	0.008000
Between 10 and 50	0.138000***	0.011000
Between 50 and 100	0.212000***	0.017000
More than 100	0.182000***	0.010000

Note. Dependent variable: log monthly income.

The method of estimation is ordinary least squares. The sample size is 76 282. The data come from the EPE (January 2003 to March 2012) and includes all individuals who are observed twice and who are employed in both periods. Robust standard errors reported; *, **, *** denote significance at 10%, 5%, and 1% levels. Estimations include year of interview and month of interview fixed effects and the following control variables: access to health insurance in t-3, dummy that takes the value of 1 if head of the household and 0 otherwise, dummy that takes the value of 1 if male and 0 otherwise, years of experience and years of experience squared.

Table 9
Minimum Wage and Employment, Main Results (Lima Metropolitan Area)

	(1)		(2)	
	Coef.	Std. Err.	Coef.	Std. Err.
Minimum wage (in Soles)	-0.003240***	0.000729	-0.003030***	0.000752
Employee x minimum wage			-0.000486	0.000332
Worker x minimum wage			-0.000116	0.000372
House worker x minimum wage			-0.000180	0.000623
Other categories x minimum wage			-0.000256	0.000450
Job category in t-3				
Independent				
Blue collar	-0.405000***	0.046700	-0.155000	0.177000
White collar	-0.621000***	0.046400	-0.562000***	0.196000
House worker	-0.202000***	0.044900	-0.109000	0.324000
Other categories	-0.062200	0.048900	0.068700	0.236000
Relative income in t-3				
Below or equal to 0.3				
< 0.3; 0.6]	0.408000***	0.035100	0.408000***	0.035100
< 0.6; 0.9]	0.692000***	0.035400	0.692000***	0.035500
< 0.9; 1.2]	0.981000***	0.035300	0.981000***	0.035300
< 1.2; 1.5]	1.139000***	0.038000	1.139000***	0.038000
< 1.5; 2.0]	1.221000***	0.038500	1.219000***	0.038500
< 2.0; 2.5]	1.246000***	0.049100	1.245000***	0.049100
< 2.5; 3.0]	1.276000***	0.060500	1.275000***	0.060500
< 3.0; 4.0]	1.286000***	0.064100	1.285000***	0.064100
< 4.0; 5.0]	1.158000***	0.086800	1.159000***	0.086800
Above 5.0	1.320000***	0.070300	1.319000***	0.070300
Education level				
No education				
Kinder	-0.553000	0.870000	-0.548000	0.871000
Incomplete primary	-0.237000***	0.083700	-0.238000***	0.083700
Complete primary	-0.368000***	0.082300	-0.370000***	0.082300
Incomplete secondary	-0.459000***	0.083800	-0.461000***	0.083800
Complete secondary	-0.435000***	0.082500	-0.436000***	0.082500
Incomplete technical college	-0.356000***	0.092200	-0.358000***	0.092200
Complete technical college	-0.319000***	0.087600	-0.320000***	0.087600
Incomplete university	-0.615000***	0.091000	-0.616000***	0.091000
Complete university	-0.438000***	0.088900	-0.439000***	0.088900
Firm size in t-3 (n. of employees)				
One employee				
Between 2 and 10	0.450000***	0.040300	0.451000***	0.040300
Between 10 and 50	0.532000***	0.055100	0.534000***	0.055100
Between 50 and 100	0.775000***	0.093400	0.776000***	0.093400
More than 100	0.892000***	0.053600	0.894000***	0.053600

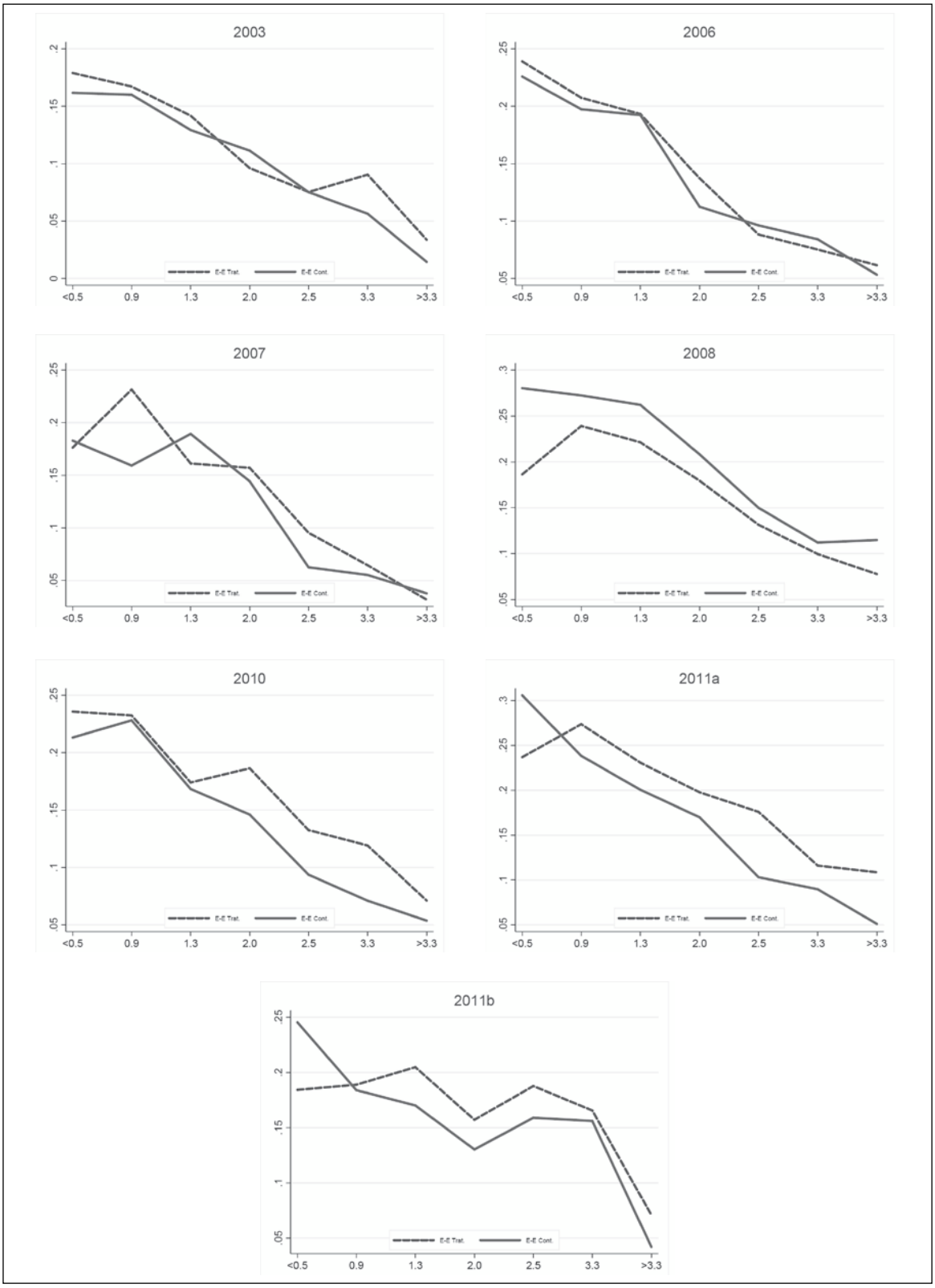
Note. Dependent variable: employment status.

Coefficients of a Probit model for employment. The sample size is 97 547. The data come from the EPE (January 2003 to March 2012) and includes all individuals who are observed twice and who are employed the first time they were observed. Robust standard errors reported; *, **, *** denote significance at 10%, 5%, and 1% levels. Estimations include year of interview and month of interview fixed effects and the following control variables: access to health insurance in t-3, dummy that takes the value of 1 if head of the household and 0 otherwise, dummy that takes the value of 1 if male and 0 otherwise, years of experience and years of experience squared.

Table 10
Minimum Wage and Employment: Additional Estimations

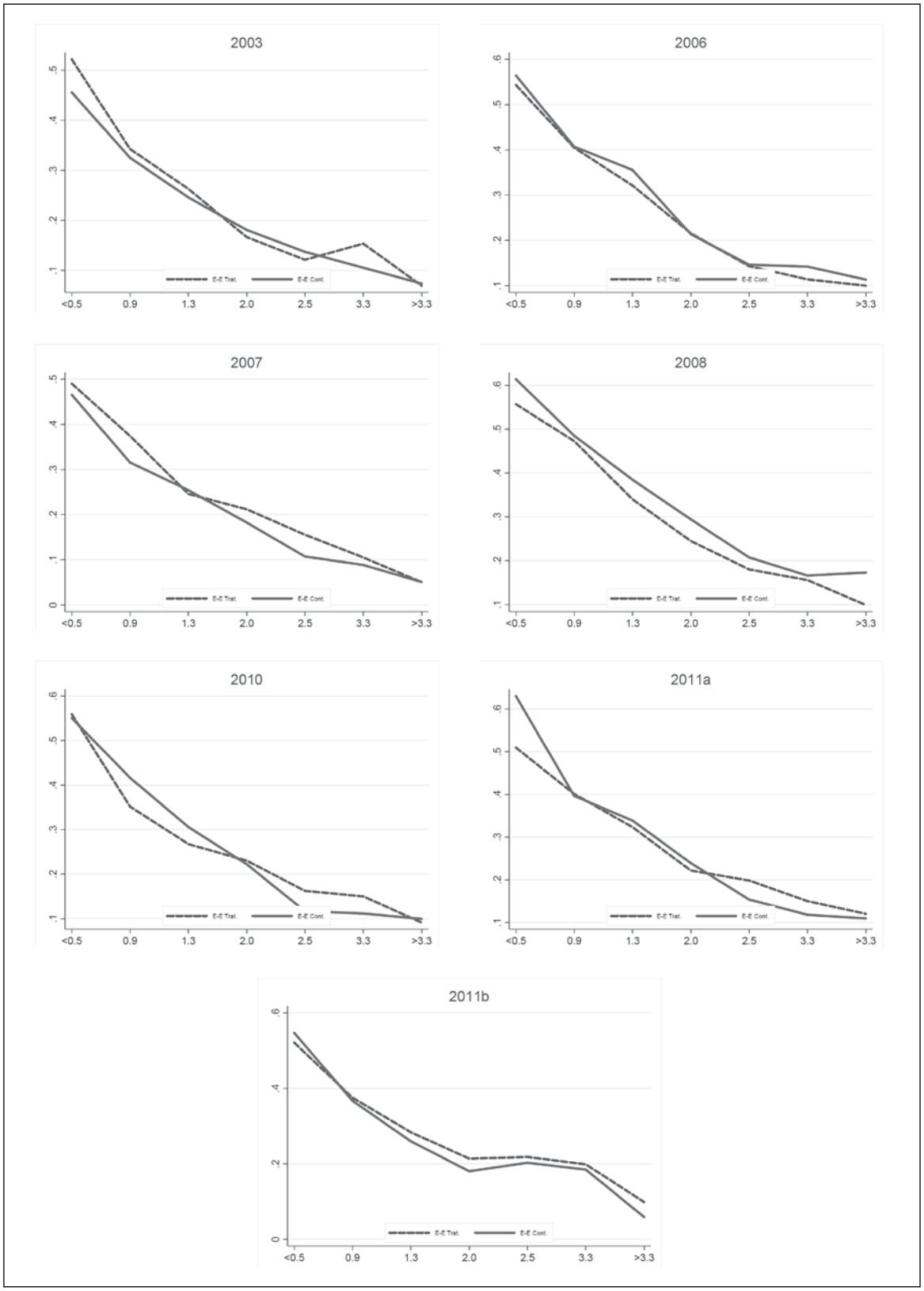
PART A		
Lima Metropolitan Area: Heterogeneity of Elasticities by Individual Characteristics		
	Coef.	Std. Err.
Estimation A: Heterogeneity by health insurance:		
Did not have health insurance three months previously	-0.234000***	0.061000
Had health insuranve three months previously	-0.276000***	0.058000
Estimation B: Heterogeneity by firm size:		
One employee	-0.327000***	0.082000
Between 2 and 10	-0.264000***	0.058000
Between 10 and 50	-0.230000***	0.061000
Between 50 and 100	-0.172000**	0.081000
Above 100	-0.174000***	0.042000
Estimation C: Heterogeneity by location in the income distribution (relative to minimum wage; three months previously):		
< 0.3; 0.6]	-0.543000***	0.117000
< 0.3; 0.6]	-0.421000***	0.091000
< 0.6; 0.9]	-0.320000***	0.072000
< 0.9; 1.2]	-0.174781	0.055000
< 1.2; 1.5]	-0.202000***	0.049000
< 1.5; 2.0]	-0.119000***	0.046000
< 2.0; 2.5]	-0.204500	0.049000
< 2.5; 3.0]	-0.219000***	0.055000
< 3.0; 4.0]	-0.194000***	0.057000
< 4.0; 5.0]	-0.122000	0.076000
Above 5.0	-0.094000	0.058000
PART B		
National Level Elasticities		
	Coef.	Std. Err.
Estimation D: Heterogeneity by type of location		
Minimum wage	0.000600	0.000000
Minimum wage*urban	-0.001520***	0.000000
Minimum wage*Lima	-0.001470***	0.000000

Note. Elasticities for the Lima Metropolitan Area and National Level were obtained from Probit models where the dependent variable is whether the individual is employed. Part A presents the results of three different models. Control variables included are the same as those reported in Table 9 (including year of interview and month of interview). In Part B, the model controls for the level of education of the individuals, whether the individuals are the head of the household, their gender, age, age squared, year of interview, and month of interview. Robust standard errors are reported; *, **, *** denote significance at 10%, 5%, and 1% levels.



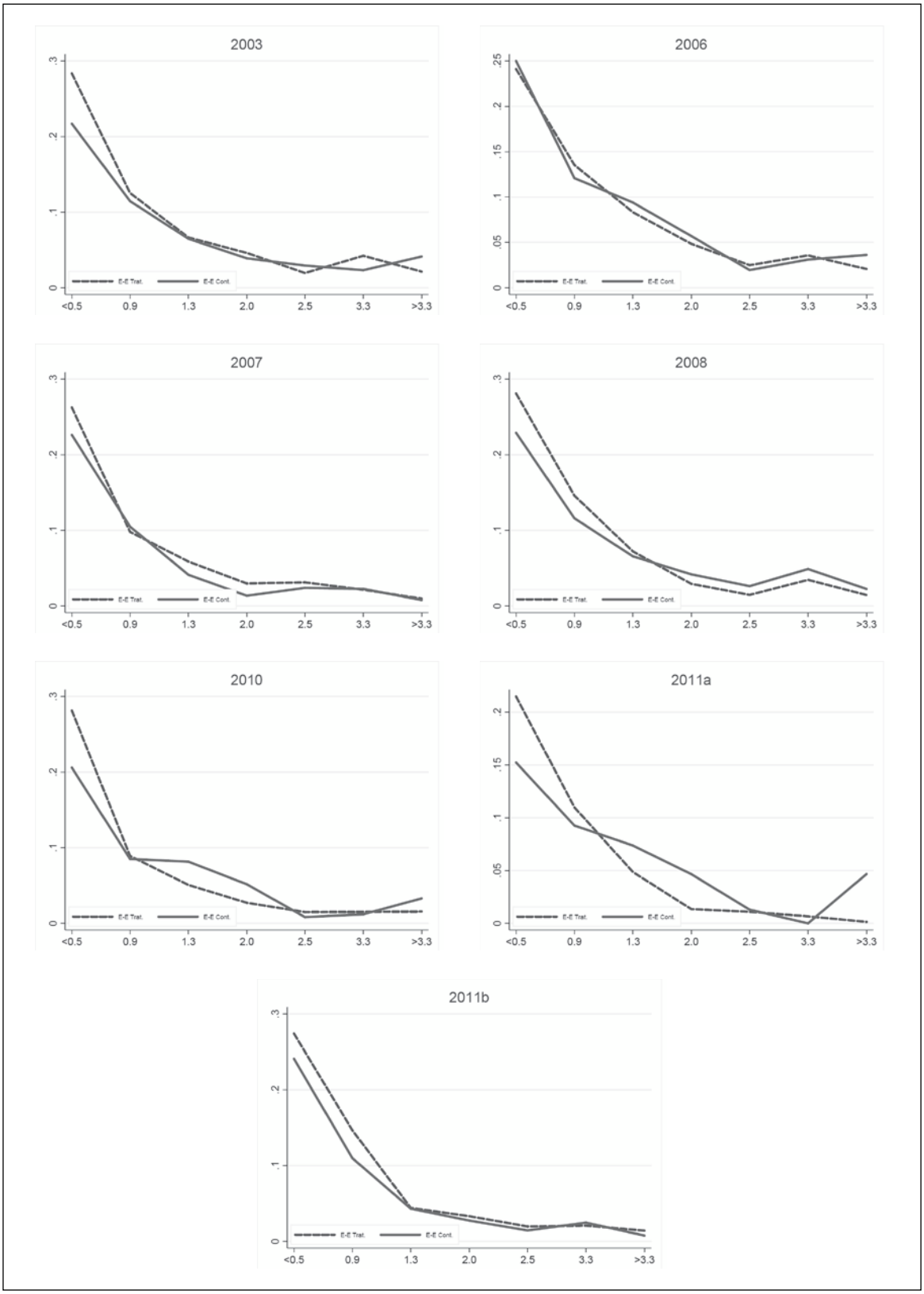
Note. The graphs represent the proportion of employed people who change to another job by income range (EPE, Lima Metropolitan Area). The X axis represents the income in fractions of the current minimum wage.

Figure 8. Job-to-job transitions by income ranges, 2003-2011.



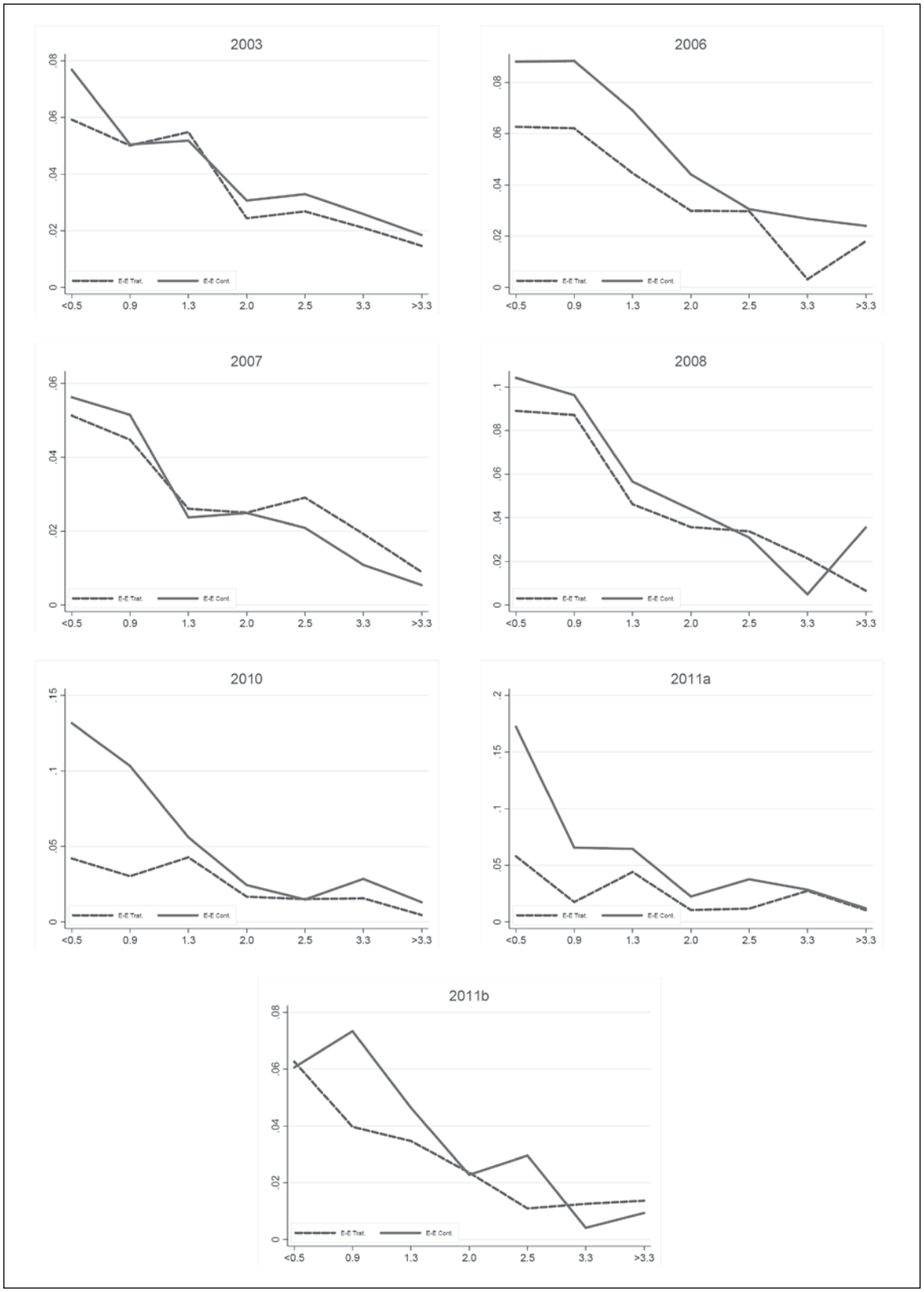
Note. The graphs represent the proportion of employed people who change to another labor category by income range (EPE, Lima Metropolitan Area). The X axis represents the income in fractions of the current minimum wage.

Figure 9. Employment-to-other categories transitions by income ranges, 2003-2011.



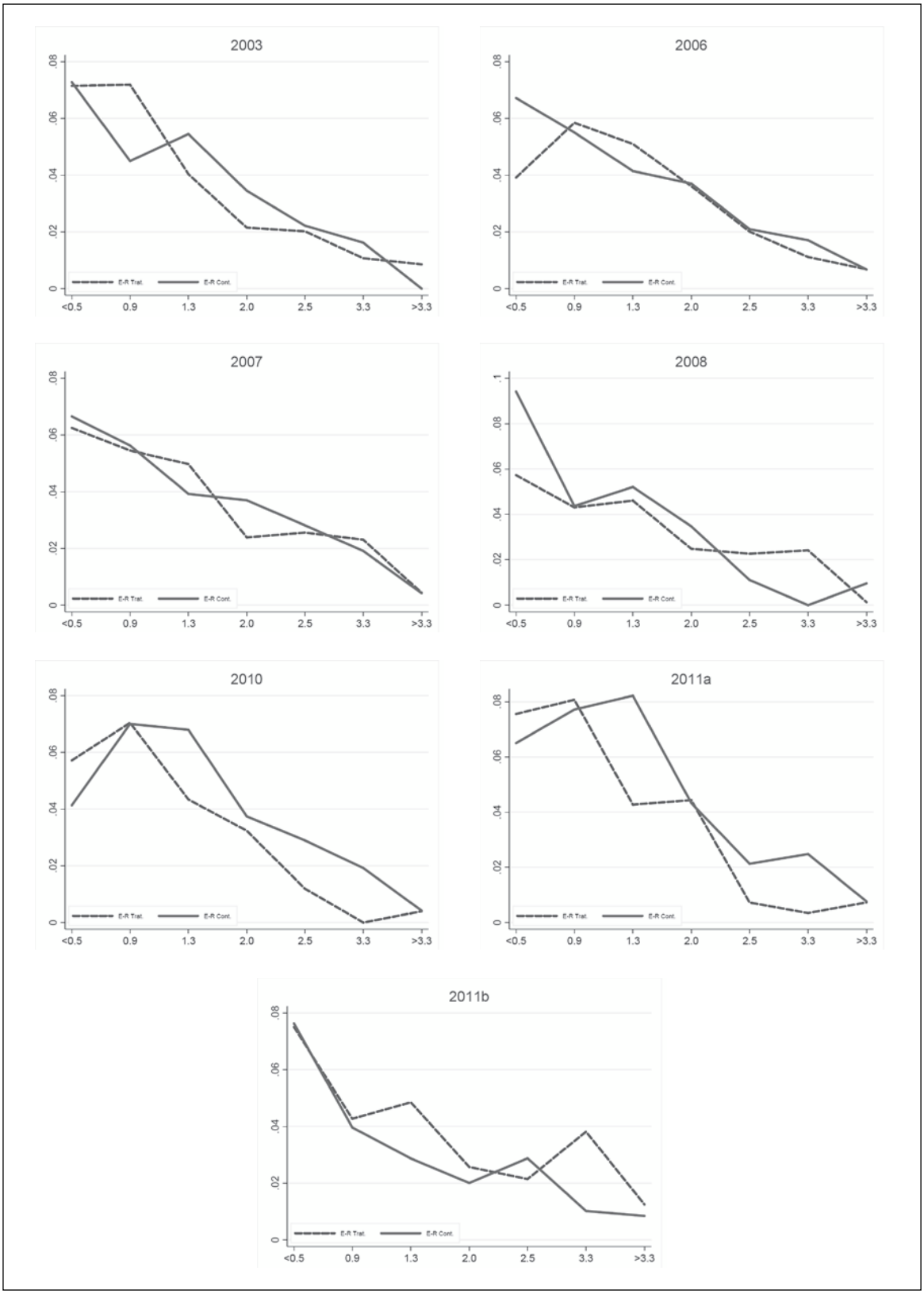
Note. The graphs represent the proportion of employed people who change to inactivity by income range (EPE, Lima Metropolitan Area). The X axis r epresents the income in fractions of the current minimum wage.

Figure 10. Employment-to-inactivity transitions by income ranges, 2003-2011.



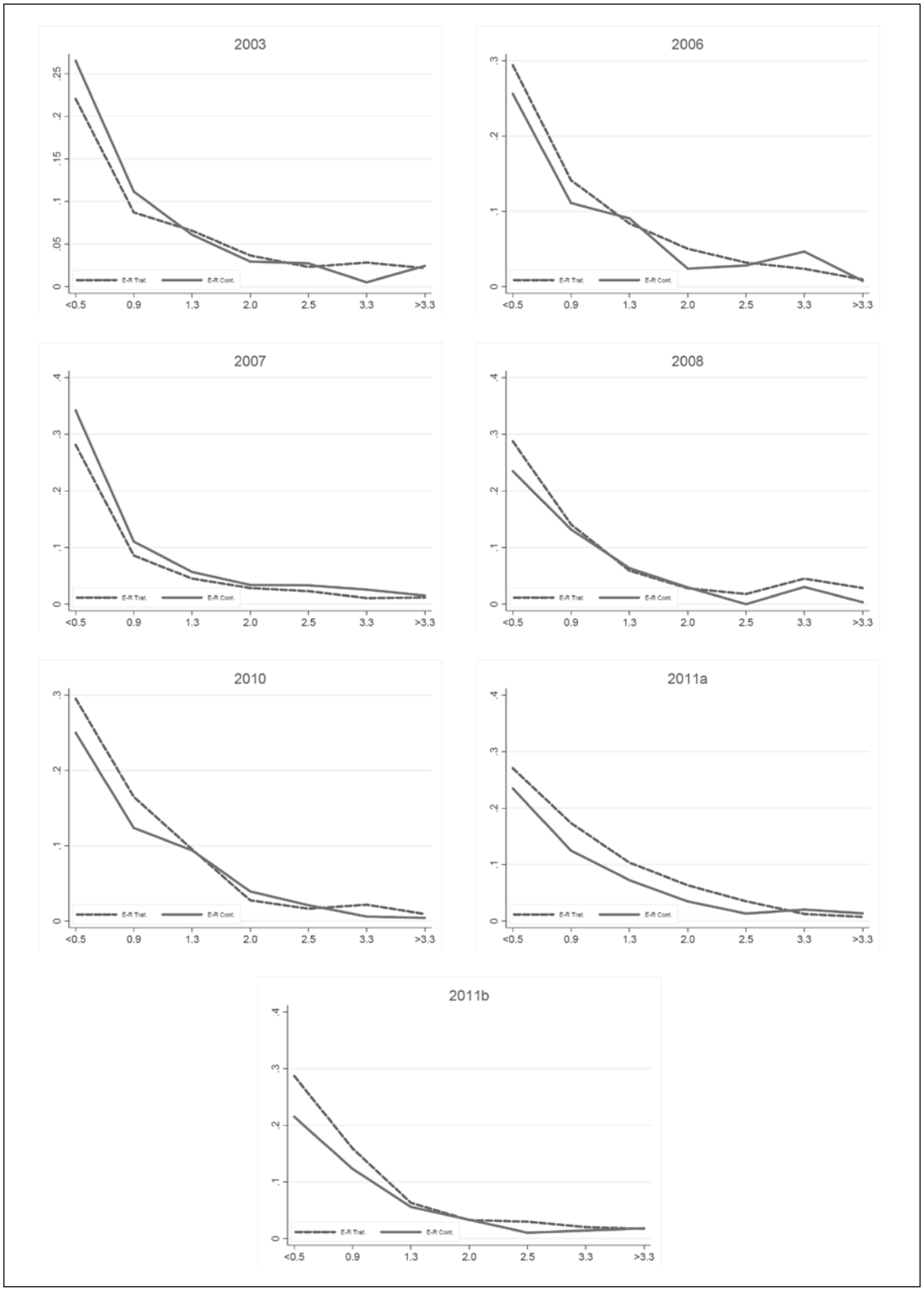
Note. The graphs represent the proportion of employed people who change to unemployment by income range (EPE, Lima Metropolitan Area). The X axis represents the income in fractions of the current minimum wage.

Figure 11. Employment-to-unemployment transitions by income ranges, 2003-2011.



Note. The graphs represent the proportion of unemployed people who change to employment by income range (EPE, Lima Metropolitan area). The X axis is income in fractions of the current minimum wage.

Figure 12. Unemployment-to-employment transitions by income ranges, 2003-2011.



Note. The graphs represent the proportion of inactive people who change to employment by income range (EPE, Lima Metropolitan Area). The X axis represents the income in fractions of the current minimum wage.

Figure 13. Inactivity-to-employment transitions by income ranges, 2003-2011.