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# Effect of Minimum Wage on Changes in the Thai Labor Market

by

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#### Abstract

This paper estimates the effect of real minimum wage on wage, labor income, total compensation, overtime income, working hours and dis-employment using individual level panel data, created from the matched-outgoing rotation group (matched-ORG) of the Labor Force Survey of Thailand between 2002 to 2013. We found that a hike in real minimum wage was accompanied by an increase in real wage and real total compensation. During the gradual-decline period (2002-2011), the effect of real minimum wage on real labor income, real overtime income, working hours and dis-employment are not significant, negatively significant and positively significant, respectively. On the other hand, during the big-jump period (2012-2013), the effect of real minimum wage on real labor income, real overtime income, working hours and dis-employment are positive significant, not significant, positively significant and negatively significant, respectively.

Keyword: Minimum Wage; Earnings; Dis-employment; Matched-ORG

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#### **1** Introduction

Minimum wage has been one of the most debated issue in labor economics. One group argues that labor markets are sufficiently competitive (competitive equilibrium model), and, therefore, raising minimum wage would reduce employment (e.g., Stigler, 1946; Machlup, 1946; Neumark and Wascher, 1992, 1994; Neumark et al., 2004). On the other hand, the other group argues that employers hold market power regarding employment and wage issues (monopsony model), and, therefore, raising minimum wage could potentially increase employment (e.g., Lester, 1946; Card, 1992; Katz and Krueger, 1992; Card and Krueger, 2015; Dickens et al., 1999; Okudaira et al., 2019).

For Thailand, the existing literature mostly support the monopsony model (e.g, Ariga, 2015; Strobl and Walsh, 2016; Lathapipat and Poggi, 2016; Del Carpio et al., 2014). Most of them found a small (and sometimes positive) effect of minimum wage on employment. Importantly, their empirical estimations rely on either cross-sectional or provincial-level panel data.

This paper contributes to the existing studies by re-examining the empirical evidence on the effect of minimum wages on changes in labor market using individual-level panel data. Specifically, we use the matched-outgoing rotation group (matched-ORG) constructed from the Thai Labor Force Survey (LFS). From the year 2002 onward, the survey has implemented the outgoing rotation group (ORG) sampling procedure. This procedure allows researchers to match individuals in the Outgoing Rotation Group (ORG) between the two consecutive years. This matching produces longitudinal data where an individual appears for two years. The panel data allow researchers to perform fixed-effect estimations to account for individual-level, timeinvariant unobserved heterogeneity.

This paper evaluates several dimensions of labor market outcomes, including wage, labor income, total compensation, overtime income, working hours and dis-employment. By considering a wide range of labor market outcomes, we should be able to understand better how Thai labor market responded to changes in minimum wage. One possibility is that firms may respond to an increase in real minimum wage by reducing demand for overtime works instead of laying off workers, if that is still possible. Another possibility is that firms may choose to keep (relatively) high-skilled workers but lay off low-skilled workers. This potential channel guides us to consider the effect of real minimum wage on dis-employment for foreign workers, as most of them may be endowed with low skills.

This study covers two distinct periods. The first one is a period when the real minimum wage

gradually decreased from 2002 to 2011 while the second one is a period when the minimum wage substantially increased from 2012 to 2013 (see Figure 1). Considering the effect from both periods is critical for the interpretation of the results. In fact, some estimation results from both periods are similar while some are totally different.

The remainder of the paper is organized as follows. Section 2 presents the data sources and historical data of minimum wage in Thailand. Empirical specifications are explained in section 3 while empirical results are presented in section 4. Section 5 concludes and discusses the paper. Tables and figures are in the appendix.

#### 2 Matched-ORG Data and Minimum Wage in Thailand

This paper uses the matched-outgoing rotation group data (matched-ORG), which are part of the Labor Force Survey (LFS). The National Statistical Office (NSO) initially designed the LFS data as cross-sectional data. From the year 2002 onward, the survey has implemented an outgoing rotation group (ORG) sampling procedure for a subset of the sample. It first repeats the survey on the same household for two consecutive quarters. It then pauses for the next two consecutive quarters before comes back to re-interview the same household again for two consecutive quarters. This procedure is called a 2-2-2 pattern. So far, there are two distinct sample sets. The first one is for 2002 to 2010 and the second one is for 2011 to 2021.

The ORG procedure provides an opportunity to match the same individuals across time and create individual-level panel data. To do so, we first link the same household across survey rounds using household identification number. However, the same individual may be mistakenly assigned different member IDs in different rounds. Therefore, we also use some individual characteristics, gender, age, years of schooling, and marital status, to identify individuals across rounds.<sup>1</sup> The ORG procedure generally allows us to link each individual up to two years only. The number of ORG samples started in odd years (e.g., 2003) is much smaller than the one started in even years. Therefore, we keep only samples, who were first interviewed in even years. Therefore, our panel data set consist of the following pairs of years: 2002-2003, 2004-2005, 2006-2007, 2008-2009, 2010-2011, and 2012-2013. Recall that each individual in the ORG was interviewed at most four times resulting in two pairs of two-year panel. To utilize all

<sup>&</sup>lt;sup>1</sup>We would like to thank Wasinee Juntorn and her team at RIPED, who were tirelessly create this matched-ORG data set.

data available, we treat each two-year panel as a separate observation. In the analysis below, we denote the first year interviewed as year t = 1 and the latter year as year t = 2 regardless of the calendar year.

The matched-ORG data include foreigners who worked in the country during the first round. We identify foreigners from the question asking whether workers who were employed during the first round of the survey had registered for a working permit. Unfortunately, we cannot identify foreign workers who were currently unemployed during the first round. This question is available only from 2010 onward. As a result, we cannot perform an analysis on foreign workers separately in earlier periods.

All nominal variables, minimum wage included, are transformed into real ones using the regional consumer price index (CPI) with 2015 as a base year.

The minimum wage in Thailand is officially set as a daily rate.<sup>2</sup> We transform the daily rate into an hourly rate by dividing it with 8 hours. Figure 1 presents the average of real hourly minimum wage by region in Thailand from 1976 to 2017. There are three distinguishable periods. The first period is when the average real minimum wage has steadily increased between 1976 to 1994. The second period is between 1994 to 2011 when the average real minimum wage has gradually declined. The last one is between 2011 to 2013 when the average real minimum wage has dramatically increased. This is the product of the 300 Baht policy, under which the nominal minimum wage in each and every province was raised to 300 baht nationwide eventually in 2013. Due to the availability of the matched-ORG data, this paper cannot estimate the effect of minimum wage for the first period (1976-1994). It focuses on two separate periods, gradual-decline period (2002 to 2011) and big-jump period (2012 to 2013).

This paper takes advantage of the big-jump in minimum wage. This is the largest increase in minimum wage in the history of Thailand. Some province has maximum increased by 86%. The average increase of minimum wage across all provinces during 2011 to 2013 was about 62%. It would be ideal if we could utilize all the changes occurred since 2011. Unfortunately,

<sup>&</sup>lt;sup>2</sup>Thailand has implemented a minimum wage policy since 1973. The minimum wage (daily rate) is determined by a ``wage committee", consisting of representatives from three parties including the government, employers, and employees. The committee takes socio-economic factors into account in order to determine the minimum wage rate. These include national and regional indicators for cost of living, workers' standard of living, labor productivity, prices of goods and services, cost of production, business capacity, socio-economic conditions, inflation, and gross domestic product. The minimum wage applies to all workers except government employees, government enterprise employees, part-time employees, and agricultural workers.

the first matched-ORG data ended in 2011 and the new one began in 2012. Therefore, this paper can only utilize the change in minimum wage between 2012 and 2013. The average increase of minimum wage across all provinces during 2012 to 2013 was about 29%, which is still considerably large.

#### **3** Empirical Models

Following Neumark et al. (2004), the main empirical specification in this paper is as follows.

$$\frac{Y_{i,s,2} - Y_{i,s,1}}{Y_{i,s,1}} = \alpha + \sum_{j=1}^{11} \left( \frac{MW_{s,2} - MW_{s,1}}{MW_{s,1}} \right) R_j \beta_j + \sum_{j=1}^{11} \left( \frac{MW_{s,1} - MW_{s,0}}{MW_{s,0}} \right) R_j \psi_j + \sum_{j=1}^{11} \frac{W_{i,s,1}}{MW_{s,1}} R_j \phi_j + \sum_{j=1}^{11} R_j \gamma_j + \boldsymbol{X}_{i,s,1} \boldsymbol{\delta} + \left( \boldsymbol{D}_{i,1}^s \times \boldsymbol{D}_{i,1}^y \right) \boldsymbol{\pi} + \boldsymbol{D}_{i,1}^m \boldsymbol{\lambda} + \epsilon_{i,s,t} \boldsymbol{\kappa}$$
(1)

where  $MW_{s,t}$  is real hourly minimum wage for province s in year t = 0, 1, 2;  $W_{i,s,1}$  is real hourly wage of individual i for province s in year t = 1;  $X_{i,s,1}$  is the vector of control variables including a dummy for being female, years of schooling, years of potential working experience and its square;  $D_{i,1}^s \times D_{i,1}^y$  and  $D_{i,1}^m$  are province-surveyed-year and surveyed-month dummies.

This specification represents wage distribution by 11 ranges of wage position relative to minimum wage,  $\frac{W}{MW}$  (see table 1). We define  $R_j$  as a dummy variable indicating if an individual wage position is in the  $j^{th}$  range. For example, an individual whose real hourly wage is equal to real hourly minimum wage will have  $R_2 = 1$  and  $R_j = 0$  for all  $j \neq 2$ . Key parameters of interest in this paper are  $\beta_j$  for j = 1, ..., 11.

Another key variable is the outcome  $Y_{i,s,t}$ . This specification is applied to five outcome variables, including wage, overtime income, labor income, total compensation and working hours. Wage is measured using wage rate in the data while overtime income includes overtime income only. Labor income represents all monetary compensations, including wage, overtime income and bonuses. Total compensation is the sum of labor earnings and all in-kind compensations.<sup>3</sup> Working hours in this paper is the number hours per week that a worker spent on his/her main job.<sup>4</sup>

<sup>&</sup>lt;sup>3</sup>In-kind compensations include food, clothing, housing, other goods and other money income.

<sup>&</sup>lt;sup>4</sup>We decided not to use total working hours per week because all compensations are from the main job only.

Therefore, it is possible that our compensations and working hours are underestimated at least for workers with multiple jobs.

All five variables are transformed into weekly variables using the following convention. A variable with the original unit as per annual will be divided by  $12 \times 4.3$  while a monthly one will be divided by 4.3. On the other hand, for a daily rate, we need to assume that those workers worked 6 days a week, and, therefore, we will multiply by 6.

Another important outcome variable is dis-employment. Dis-employment is defined using an employment status of an individual. An individual i is dis-employed in year t = 2 if he/she was employed in year t = 1 but is unemployed in year t = 2.5 As in earlier cases (wage, labor income, total compensation and working hours), we can define dis-employment status for workers who were employed in year t = 1 only. Therefore, we can use the same specification to estimate the effect of minimum wage by replacing the growth of outcome variable by the dis-employment defined here.

In addition, we also estimate a similar specification to (1) but without wage position dummies. This overall effect estimation is applied to all variables, including wage, overtime income, labor income, total compensation, working hours and dis-employment.

#### **4** Empirical Results

This section presents and discusses the estimation results in two separate periods, period of gradual-decline real minimum wage (2002 to 2011) and the big-jump period (2012 to 2013). See figure 2. We mainly focus on the effect of minimum wage,  $\beta_i$  in specification (1).

#### 4.1 Period of Gradual-Decline of Real Minimum Wage (2002-2011)

The distributional effect of real minimum wage on real weekly wage is presented in the second column of table 2 and the top left panel of figure 3. Estimated coefficients for real weekly wage are positive and significant up to 1.5 times of the minimum wage level. This implies that changes in minimum wage affect workers whose wages are around the minimum mostly. The similar pattern can be observed for the effect of minimum wage on real weekly total compensation, as shown in the fifth column of the table and the top right panel of the figure. However, the results are noticeably different for total labor income, which include wages, overtime income and bonuses. The results in the third column of the table indicate that total labor income

<sup>&</sup>lt;sup>5</sup>This paper uses the standard definition of unemployment. That is, a worker is considered unemployed if the person is without work while actively searching for employment or in the labor force.

increases at few wage positions only. In fact, the overall effect of minimum wage on labor income is not statistically significant at all. See the third column of table 3. These results together imply that even though real wage positively responds to changes in real minimum wage but overall monetary income that workers received does not seem to respond much.

To put in the context of this period, we discuss the results in case of gradually declining real minimum wage. With lower real minimum wage (still higher nominal minimum wage, of course), firms would comply with the law by paying labor at the lower real wage. With a lower labor price, a competitive firm would increase labor demand through overtime and extra works that reflected in bonuses. We, therefore, should observe a negative relationship between real overtime income and real minimum wage. That prediction is confirmed in the fourth column of table 2 and 3, where all significant estimated coefficients are negative.<sup>6</sup> The negative relationship is evident throughout the wage distribution (except at the very top). This finding is inline with the effect on weekly working hours, where all significant estimations are negative. See table 2 for a distributional effect and table 3 for an overall effect. Put differently, labor demand (including overtime) has been increasing (on the intensive margin at least) during the period of gradual-decline real minimum wage.

The empirical results so far seem to support a simple model of a competitive firm. This conclusion is also consistent with the effect of minimum wage on dis-employment. The estimated coefficients, shown in the second column of table 6, are all positive and significant at some wage positions. The same pattern can be observed from the overall effect of minimum wage on dis-employment, shown in table 7. Recall that a worker is dis-employed if he/she who was employed in the earlier period is now unemployed. We can therefore conclude that workers are more likely to loose their jobs when real minimum wage are raised.

To sum up, the estimation results in this section are consistent with competitive labor markets, i.e., higher labor cost leads to lower labor demand. However, changes of real minimum wage during this period were minuscule. But, it is possible to observe different behaviors of firms when the changes are large, as happened in Thailand under the 300 Baht minimum wage policy during 2011-2013, when real minimum wage dramatically jumped by 29% on average.

<sup>&</sup>lt;sup>6</sup>This estimation is for workers who received an overtime income at the base year only. That is the reason why the number of observation is much smaller in this case.

#### 4.2 Period of Big-Jump of Real Minimum Wage (2012-2013)

The distributional effect of real minimum wage on real weekly wage in this period is similar to the one in the preceding section. See the second column of table 4 and the top left panel of figure 4. The result is noticeably stronger than the previous one. Estimated coefficients for real weekly wage are positive and significant at every wage positions. This implies that changes in minimum wage affected all workers, with a slightly stronger effect for workers whose wages are around the minimum mostly. Again, the similar pattern can be observed for the effect of minimum wage on real weekly total compensation, as shown in the fifth column of the table and the top right panel of the figure.

The first distinct pattern can be seen in the effect of real minimum wage on real labor income. During this big-jump period, real total labor income co-moved with real minimum wage, as shown in table 4 for a distributional effect and table 5 for an overall effect. The distributional effect is significant throughout the wage distribution (except one position). This may result from the fact that the changes in this period is so large that firms can not simply adjust by reducing overtime works. In fact, the distributional effect of real minimum wage on real overtime income is not statistically significant except at a few wage positions only. See table 4. The same conclusion is confirmed with the overall effect in table 5. In words, an increase of real minimum wage in this big-jump period did not affect overtime income (at least it is not statistically significant). One might imagine that firms would do business as usual except paying higher wage. But, that is not totally true either. The distributional effect of real minimum wage on working hours is positive and significant at all wage positions, and the overall effect also shows the positive and significant effect. That is, workers supplied more labor (at least on the intensive margin) but did not receive more overtime income or bonuses. This suggests that firms may comply with the law by paying the new minimum wage rate as if workers worked for 8 hours a day. On the other hand, firms may negotiate with workers to work for extra hours without receiving an overtime income. This mechanism should help firms reduce labor cost to some degree.

We now turn to dis-employment effect. The estimation result is clearly different from the previous one. The distributional effect of real minimum wage on dis-employment is now negative and significant throughout the wage distribution, as shown in the third column of table 6. The similar conclusion can be drawn from the overall effect, presented in the third column of table 7. A big-jump in real minimum wage does not seem to cause unemployment. This

is clearly inconsistent with competitive labor markets. However, the analysis so far applied to all sample in the data, both Thais and foreigners. Would there be different effects on different groups of workers? The answer is yes. The estimation result for Thai workers only is similar to the one with whole sample. That is, estimated coefficients are all negative and significant (except at a few wage positions). See the fourth columns of table 6 and 7. However, the estimation result for foreigners only reveals a different picture. Estimated coefficients are all positive and significant at all wage positions. See the fifth columns of table 6 and 7. In words, a large jump in real minimum wage during this period caused foreign workers to loose their jobs. This suggests that, a hike in real minimum wage discouraged firms from employing foreign workers since they may be endowed with lower skills relative to Thai workers (at least in Thai language and literacy skills). On the other hand, to compensate for losses of foreign workers, firms kept and perhaps hired more Thai workers and requested them to work for longer hours, as discussed earlier.

To sum up, the empirical results for wage and total compensation are similar to the ones in the preceding section while the others are the opposite. First, a large jump in real minimum wage had a positive effect on labor income but no impact on overtime income. Second, it had a positive impact on working hours. Third, it did not cause dis-employment for Thai workers. The last two results suggest that a simple economic model with competitive labor markets may not be sufficient to explain the effect of a large jump in real minimum wage in Thailand. On the other hand, a positive dis-employment effect for foreign workers suggests that a simple monopsony model would not do it either.

#### 5 Conclusion and Discussion

This paper estimates the effect of real minimum wage on wage, labor income, total compensation, overtime income, working hours and dis-employment using individual level panel data, created from the matched-outgoing rotation group (matched-ORG) of the Labor Force Survey of Thailand. The data span from 2002 to 2013, covering a period of gradual-decline (2002-2011) and big-jump (2012-2013) of real minimum wage.

The estimation results for wage and total compensation from both periods are qualitatively similar. That is, a hike in real minimum wage was accompanied by an increase in real wage and total compensation. The effect on the other variables are different across periods, however. During the gradual-decline period, the effect of real minimum wage on real labor income, real overtime income, working hours and dis-employment are not significant, negatively significant, negatively significant and positively significant, respectively. On the other hand, during the big-jump period, the effect of real minimum wage on real labor income, real overtime income, working hours and dis-employment are positively significant, not significant, positively significant and negatively significant, respectively.

The empirical results indicate that firms responded differently to a gradual change and a large jump in minimum wage. During the period of gradual-decline real minimum wage, firms reduced their labor demand both at the intensive (working hours) and extensive margins (disemployment). On the other hand, during the big-jump period, firms demanded less foreign workers and requested workers to work for longer hours. Dis-employment effect for foreign workers could result from the fact that foreign workers have lower skills and, therefore, more dispensable. This result is consistent with recent literature that found an adverse effect of the minimum wage on low-skilled groups (e.g., Lordan and Neumark, 2018; Clemens and Wither, 2019).

Compensation and labor demand adjustments are not the only ways firms can respond to a hike in minimum wage. In fact, many studies found that firms may employ both internal and external adjustments to combat with a surge in labor costs, such as cutting non-labor costs, improving productivity, substituting labor with capital (e.g., Bodnár et al., 2018; Caliendo et al., 2018; Harasztosi and Lindner, 2019; Hirsch et al., 2015). Unfortunately, we have no data regarding all these interesting mechanisms. We have to leave these issues to future research.

For the debate between competitive and monopsony camps, this paper provides a mixed message. The empirical results from the gradual-decline period consistently support that Thai labor markets are sufficiently competitive. On the other hand, most of relevant empirical evidences from the big-jump period point to the monopsony model. However, a positive disemployment effect for foreign workers makes it difficult to be conclusive.

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## **A** Tables and Figures

Index of wage position	Range of ratio of real hourly wage compared
j	to real hourly minimum wage
1	$W/MW \le 0.9$
2	$0.9 \le W/MW \le 1.1$
3	$1.1 \le W/MW \le 1.2$
4	$1.2 \le W/MW \le 1.3$
5	$1.3 \le W/MW \le 1.5$
6	$1.5 \le W/MW \le 2$
7	$2 \le W/MW \le 3$
8	$3 \le W/MW \le 4$
9	$4 \le W/MW \le 5$
10	$5 \le W/MW \le 6$
11	$6 \le W/MW \le 8$

Table 1: Wage position of an individual described by the ratio between an individual's real hourly wage and real hourly minimum wage

Note: W/MW is the ratio between real hourly wage and real hour minimum wage. Real hour wage is calculated by dividing real weekly wage by working hours per week while real hour minimum wage is calculated by dividing real daily minimum wage by 8.

Wage Position	Effect of minimum wage on				
	Wages	Labor	Overtime	Total	Working
		Income	Income	Compensation	Hour
W/MW ≤ 0.9	1.108*	0.828	12.62	1.064*	-0.960***
	(0.601)	(0.620)	(17.15)	(0.628)	(0.324)
$0.9 < W/MW \le 1.1$	0.998**	0.772*	-6.404***	0.930**	-0.434*
	(0.436)	(0.454)	(2.077)	(0.463)	(0.241)
$1.1 < W/MW \le 1.2$	1.081**	0.565	-7.364***	0.603	-0.225
	(0.420)	(0.437)	(2.050)	(0.428)	(0.314)
$1.2 < W/MW \le 1.3$	1.167**	0.960*	-4.120*	1.181**	0.425
	(0.531)	(0.544)	(2.316)	(0.554)	(0.841)
$1.3 < W/MW \leq 1.5$	0.918**	0.599	-6.370***	0.881**	-0.618**
	(0.364)	(0.378)	(1.936)	(0.377)	(0.283)
$1.5 < W/MW \le 2$	-0.115	-0.367	-6.938**	-0.117	-0.848***
	(0.366)	(0.373)	(3.071)	(0.375)	(0.224)
$2 < W/MW \le 3$	-0.00155	-0.140	-8.647***	0.0718	-1.225***
	(0.302)	(0.312)	(2.496)	(0.314)	(0.282)
$3 < W/MW \le 4$	0.962**	0.766*	-10.80*	1.085**	-0.164
	(0.402)	(0.416)	(6.186)	(0.423)	(0.461)
$4 < W/MW \le 5$	1.002*	0.851	-12.30	0.995*	-2.152***
	(0.520)	(0.538)	(9.743)	(0.542)	(0.624)
$5 < W/MW \le 6$	0.377	0.161	-5.162	0.165	-1.451***
	(0.563)	(0.628)	(14.25)	(0.696)	(0.533)
$6 < W/MW \le 8$	-0.693	-0.539	1.503	-0.231	0.949
	(0.679)	(0.674)	(9.572)	(0.669)	(0.759)
Number of observations	115,515	115,515	13,404	115,515	115,515
Adjusted R-Square	0.101	0.097	0.011	0.084	0.033

Table 2: Distributional effect of minimum wage on real weekly wages, real weekly labor income, real weekly overtime income, real weekly total compensation and weekly working hours during period 2002-2011

	Effect of minimum wage on				
	Wages	Labor	Overtime	Total	Working
		Income	Income	Compensation	Hour
Min. Wage	0.689***	0.440	-6.205***	0.647**	-0.645***
	(0.266)	(0.277)	(1.719)	(0.276)	(0.187)
Female	-0.0665***	-0.0651***	-0.0175	-0.0566***	0.0212***
	(0.00733)	(0.00764)	(0.0480)	(0.00758)	(0.00463)
Years of Sch.	0.0267***	0.0256***	0.00107	0.0232***	-0.0143***
	(0.00180)	(0.00184)	(0.00867)	(0.00185)	(0.00112)
Experience	0.0107***	0.0101***	0.00249	0.00879***	-0.00366***
	(0.00112)	(0.00119)	(0.00831)	(0.00117)	(0.000691)
Exp. Sq.	-0.000140***	-0.000134***	-0.000152	-0.000113***	3.95e-05***
	(2.01e-05)	(2.13e-05)	(0.000197)	(2.10e-05)	(1.30e-05)
Ν	115,515	115,515	13,404	115,515	115,515
Adj. $R^2$	0.101	0.097	0.011	0.083	0.032

Table 3: Overall effect of minimum wage on real weekly wages, real weekly labor income, real weekly overtime income, real weekly total compensation and weekly working hours during period 2002-2011

Wage Position	Effect of minimum wage on				
	Wages	Labor	Overtime	Total	Working
		Income	Income	Compensation	Hour
$W/MW \le 0.9$	0.983***	0.862***	-1.774	0.850**	0.712***
	(0.354)	(0.331)	(1.466)	(0.343)	(0.200)
$0.9 < W/MW \le 1.1$	1.115***	0.959***	-1.085	0.956***	0.732***
	(0.307)	(0.292)	(1.364)	(0.300)	(0.192)
$1.1 < W/MW \leq 1.2$	1.112***	0.944***	-1.780	0.957***	0.783***
	(0.301)	(0.290)	(1.301)	(0.296)	(0.190)
$1.2 < W/MW \le 1.3$	1.001***	0.840***	-1.117	0.794***	0.799***
	(0.319)	(0.307)	(1.507)	(0.306)	(0.215)
$1.3 < W/MW \le 1.5$	0.905***	0.757***	-0.823	0.760**	0.735***
	(0.302)	(0.291)	(1.480)	(0.298)	(0.196)
$1.5 < W/MW \le 2$	0.924***	0.755**	-2.114*	0.758**	0.755***
	(0.312)	(0.300)	(1.112)	(0.307)	(0.197)
$2 < W/MW \le 3$	0.663**	0.509*	-0.758	0.576*	0.756***
	(0.305)	(0.296)	(1.343)	(0.305)	(0.199)
$3 < W/MW \le 4$	0.649**	0.493	-1.339	0.548*	0.874***
	(0.320)	(0.308)	(1.471)	(0.317)	(0.212)
$4 < W/MW \le 5$	0.709**	0.593*	-1.030	0.619*	0.633***
	(0.346)	(0.334)	(1.391)	(0.342)	(0.241)
$5 < W/MW \le 6$	0.894***	0.723**	-3.892**	0.730**	1.019***
	(0.338)	(0.328)	(1.824)	(0.335)	(0.346)
$6 < W/MW \le 8$	0.756**	0.673**	0.817	0.704**	1.293***
	(0.324)	(0.317)	(1.619)	(0.323)	(0.274)
Number of observations	13,307	13,307	1,717	13,307	13,307
Adjusted R-Square	0.141	0.133	0.075	0.115	0.042

Table 4: Distributional effect of minimum wage on real weekly wages, real weekly labor income, real weekly overtime income, real weekly total compensation and weekly working hours during period 2012-2013

	Effect of minimum wage on				
	Wages	Labor	Overtime	Total	Working
		Income	Income	Compensation	Hour
Min. Wage	1.137***	0.977***	-1.275	0.941***	0.685***
	(0.304)	(0.289)	(1.204)	(0.295)	(0.189)
Female	-0.0247	-0.0230	0.000463	-0.0150	0.0112
	(0.0153)	(0.0152)	(0.0736)	(0.0153)	(0.00894)
Years of Sch.	0.0256***	0.0248***	-0.0136	0.0235***	-0.00888***
	(0.00306)	(0.00303)	(0.0166)	(0.00305)	(0.00178)
Experience	0.00386	0.00342	0.000561	0.00227	-0.00112
	(0.00241)	(0.00237)	(0.0121)	(0.00232)	(0.00153)
Exp. Sq.	-1.36e-05	-8.69e-06	-2.82e-05	1.75e-05	1.24e-05
	(4.73e-05)	(4.51e-05)	(0.000270)	(4.48e-05)	(2.86e-05)
Ν	13,307	13,307	1,717	13,307	13,307
Adj. $R^2$	0.139	0.131	0.070	0.113	0.040

Table 5: Overall effect of minimum wage on real weekly wages, real weekly labor income, real weekly overtime income, real weekly total compensation and weekly working hours during period 2012-2013

Wage Position	employment eff	nt effect of minimum wage		
	2002-2011	2012-2013		
		Overall	Thais	Foreigners
$W/MW \le 0.9$	0.149	-0.141	-0.157	5.964**
	(0.0954)	(0.0971)	(0.102)	(3.029)
$0.9 < W/MW \leq 1.1$	0.116	-0.202**	-0.213**	5.880*
	(0.0839)	(0.0876)	(0.0910)	(3.033)
$1.1 < W/MW \leq 1.2$	0.0776	-0.205**	-0.219**	5.841*
	(0.133)	(0.0833)	(0.0852)	(3.024)
$1.2 < W/MW \leq 1.3$	0.265**	-0.224**	-0.244***	5.782*
	(0.105)	(0.0872)	(0.0908)	(3.020)
$1.3 < W/MW \leq 1.5$	0.00204	-0.194**	-0.202**	5.744*
	(0.0670)	(0.0866)	(0.0890)	(3.001)
$1.5 < W/MW \le 2$	0.0626	-0.186**	-0.207***	5.857*
	(0.0616)	(0.0752)	(0.0789)	(3.026)
$2 < W/MW \le 3$	0.0770	-0.218**	-0.228**	5.773*
	(0.0798)	(0.0877)	(0.0904)	(2.989)
$3 < W/MW \le 4$	0.150*	-0.231**	-0.247**	5.805*
	(0.0782)	(0.0946)	(0.0980)	(3.009)
$4 < W/MW \le 5$	0.221**	-0.130	-0.139	5.837*
	(0.110)	(0.117)	(0.123)	(3.016)
$5 < W/MW \le 6$	0.138	-0.211**	-0.229**	5.804*
	(0.151)	(0.0932)	(0.0959)	(3.021)
$6 < W/MW \le 8$	0.267**	-0.184*	-0.200*	5.855*
	(0.117)	(0.103)	(0.106)	(3.034)
Number of observations	151,446	13,432	10,208	3,224
Adjusted R-Square	0.067	0.062	0.081	0.123

Table 6: Distributional effect of minimum wage on dis-employment

Wage Position	D	s-employment effect of minimum wage			
	2002-2011		2012-2013		
		Overall	Thais	Foreigners	
Min. Wage	0.108**	-0.183**	-0.198**	5.901*	
	(0.0513)	(0.0806)	(0.0852)	(3.026)	
Female	-0.00607***	-0.00148	-0.00213	0.00226	
	(0.00129)	(0.00317)	(0.00361)	(0.00595)	
Years of Sch.	-0.00226***	-0.00223***	-0.00256***	-0.000337	
	(0.000256)	(0.000680)	(0.000811)	(0.000807)	
Experience	-0.00168***	-0.00197***	-0.00209***	-0.00166*	
	(0.000211)	(0.000591)	(0.000685)	(0.000914)	
Exp. Sq.	2.23e-05***	2.68e-05**	2.82e-05**	2.78e-05*	
	(3.89e-06)	(1.06e-05)	(1.24e-05)	(1.57e-05)	
Ν	151,446	13,432	10,208	3,224	
Adj. $R^2$	0.067	0.060	0.079	0.122	

### Table 7: Overall effect of minimum wage on dis-employment



Figure 1: Average real hourly minimum wage by region in Thailand from 1994 to 2017



Figure 2: Average nominal and real hourly minimum wage in Thailand for the whole country from 1994 to 2017







