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Do Minimum Wages Reduce Employment? Some Empirical Evidence from Bangladesh

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Minimum wage policy is practiced in many countries with the intention of establishing a wage floor for low-wage workers having less bargaining power in the labour market. However, there is some evidence that such well-intended policy might have adverse effects on employment. This study employs a basic model where firm level employment data for a sample of 27 firms for the period 2000-2015 is used to analyse the effects of changes in minimum wage on employment in the readymade garments industry in Bangladesh. The main results suggest that higher minimum wages result in higher formal employment, particularly female employment, in these firms. The major policy implication of the study is to support the enforcement of suitable regulation to ensure competitive and fair wages as well as workers welfare.

Keywords: Labour, Minimum Wage, Employment, Readymade Garment, Bangladesh, Panel Data

JEL Classification: C23, J08, J21

I. INTRODUCTION

How labour regulation such as setting of minimum wages effects employment has been a major concern among academics and policy makers. Labour market regulations are intended to improve workers' welfare by protecting their rights but the general perception, in line with the conventional economic theory, is that such regulation could potentially create rigidity in the labour market and act as obstacle for formal job creation thus resulting in further unemployment and poverty. Hence, in order to increase flexibility and competitiveness in the labour market, dwindling of minimum wages and other regulations are often suggested (Heckman and Pages 2000). The existing literature primarily focused on employment effects of labour regulations such as employment protection, firing stringencies, role of unions, dispute resolution, and minimum wages (Besley and Burgess 2004, Botero,

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Djankov, Porta, Lopez-de-Silanes and Shliefer 2004). However, the efficacy of labour market regulation as a policy tool is still debatable. The most discussed in this context is perhaps minimum wages and its impact on employment, income distribution, unemployment and poverty. The policy is advocated in many countries with the objective of establishing a wage floor for the low-wage workers who have less bargaining power in the labour market. However, there is apprehension that such regulation might also result in lower employment. Existing studies focusing on developed as well as developing countries documented disemployment effects of minimum wage increase (Nataraj, Perez-Arce, Kumar and Srinivasan 2014, Neumark and Wascher 1992, 2007).

The minimum wage debate becomes more relevant for developing countries where labour markets are structurally different. Most developing countries, including Bangladesh, have a large informal sector. Neither formal nor informal workers receive unemployment benefits, implying that workers have less bargaining power. Hence, it is not difficult for producers to replace formal workers with informal ones, when facing such regulation, implying that an increase in minimum wage may reduce employment in the formal sector but expand employment in the informal sector at the same time (Comola and de Mello 2011).Again, as labour laws are often weakly enforced in such a context, binding minimum wages may not have impact on formal employment due to lack of compliance. Understanding the overall effect of changes in minimum wages on employment will therefore depend on several factors such as the degree of competitiveness in labour market, compliance of regulations, and formal informal labour nexus. Therefore, empirical verification regarding the efficacy of minimum wage enforcement can inform policymakers to design and enforce suitable minimum wage policy. There is still gap in the literature that rigorously analyse employment effects of minimum wage regulation in the context of developing countries such as Bangladesh.

In this paper, we explore the effects of changes in minimum wages on employment in one of the largest manufacturing sectors in Bangladesh: the readymade Garment (RMG) industry. The RMG is the biggest export-earning industry and showed tremendous growth potential in terms of employment generation as well as backward and forward linkage effects. Minimum wages are binding upon the employers in this industry and raising minimum wage has always

been a central issue in subsequent labour policies.[1] It is also argued that the existing real level of minimum wages is generally below subsistence level, particularly for the workers in the capital city.[2] All these make RMG an ideal case to investigate minimum wages impact on employment. We utilize the available administrative data from some RMG firms operating within the jurisdiction of the Bangladesh Export Processing Zones Authority (BEPZA). The minimum wage for the firms operating under BEPZA was fixed in 1989. After a decade with no changes, legislation increased it in 2010, and thereafter in 2013.The empirical analysis is done by creating a panel of 27 firms for the period 2000-2015. Contrary to previous findings on developing countries, including Bangladesh, we have found positive effects of increasing minimum wages on formal employment in the RMG firms. Our results also suggest a significant increase in female employment resulting from the implementation of new (higher) minimum wages. We believe the study contributes to the existing literature by doing an empirical analysis based on firms complying with minimum wages and other labour regulations. Notwithstanding our analysis of a basic model based on limited set of observations, the findings provide useful policy insights in the context of labour markets in Bangladesh and similar developing countries.

II. LITERATURE REVIEW

Here we first briefly discuss the conceptual issues related to our research question and then provide a review of relevant literature justifying this study's contribution to the former. Examining the effects of minimum wages on employment and other labour market outcomes depends on the labour market situation. Existing literature considers two types of labour market situation: the competitive model and the monopsony model (see Rama 2001). In the competitive

[1]The Bangladesh Labour Law was published in 2006 which was followed by amendments in 2010 and 2013, leading to the Bangladesh Labour Rules 2015.The objective of these laws is to better protect workers' rights. After the Rana Plaza incident, substantial revisions were made in the recent policies to ensure occupational safety and health for workers and their better access to freedom of association.

[2]Living Wage Report Dhaka, Bangladesh. Inclusive of Satellite cities Context: The Garment Industry. The report can be accessed at https://www.isealalliance.org/sites/default/files/Dhaka_Living_Wage_Benchmark_Report.pdf

model, workers are employed until their marginal productivity equates their wages. In this case, a rise in the minimum wage above the market-clearing wage increases average and marginal cost of labor. Firms respond to this by firing some workers, which increase their capital-labour ratio and hence marginal productivity of labour. In the monopsony model, on the other hand, firms use their power to decide wages, which is lower than the marginal productivity of labour. In this case, a rise in the minimum wage can have seemingly opposite effect on employment, even when the firms are large in numbers. Rebitzer and Taylor (1995) derived a theoretical model to formalize this argument whereby increase in the minimum wage functions as efficiency wages, which allows monopsony-like firms to hire more workers.

A large body of empirical literature examines minimum wages impact on employment in the higher and middle-income countries (Neumark and Wascher 2007, Dickens *et al.* 1999, Katz and Krueger 1992). Different types of data and methodology are used in these studies and the estimated effect of the minimum wage on employment went on both directions. The studies based on time series analysis found negative employment effect of minimum wages, as predicted by the Neoclassical theory.[3] The weaker negative effects were found in studies based on survey data and insignificant effect or positive effects were found in studies based on cross-sectional data (Card 1992, Card and Krueger 1995, Neumark and Wascher 1992).

The evidence from developing countries is somewhat limited, mostly due to lack of reliable data. Available evidence provides mixed results, as observed above in the case of developed countries, although labour markets function differently in developing countries due to the presence of huge informal sector and non-compliance issue. These two factors, in addition to lack of reliable data, constraint rigourous analysis of the effects of minimum wages on employment in developing countries.

The dual economy framework, comprised both formal and informal sectors, is used in some studies to examine the effects of the minimum wage on employment. Following this framework, the formal sector, which is covered by minimum wage and other labour market regulations, may have a decline in employment for a rise in minimum wage. The informal sector, on the other hand, is not covered by the minimum wage and consitutes the majority of the labour force, expands, as many

[3]See Brown, Gilroy and Kohen (1982) for a review on this.

displaced formal sector workers take refuge in this sector.Comola and de Mello (2011) used such framework with Indonesian survey data from three different sources – the labour market survey, the household income and expenditure survey, and the industrial sector survey – to construct a dataset which covers the period 1996-2004. The authors found that a rise in the 'minimum wage to mean wage ratio' is correlated with a decline in formal but a rise in informal emplyment, and the overall effect was an increase in employment. Alatas and Cameron (2008) performed a quasi-natural experiment using household-level labour market data of medium and large enterprises including textile, leather, footwear and clothing industries. The authors also found disemployment effects of (higher) minimum wage in smaller domestic firms but not in larger domestic or foreign firms. Rama (2001) assessed the impact of the minimum wage increase in Indonesia using the 1993 labour force survey data. The author found that, the three times increase in minimum wages during the early 1990s had impact on the average wages (which increased from 5 per cent to 15 per cent) and on urban wage employment (which decreased from 0 per cent to 5 per cent). The employment effects were significantly different depending on the size of the firms; the small firms recorded considerable reduction in employment, while some large firms experienced higher employment. Alaniz *et al.* (2011), using individual-level panel data from Nicaragua, examined the effects of changes in the minimum wage legislation on wages, on workers transition between the covered and uncovered sector and into and out of poverty, and on employment status. The study finds that an increase in minimum wage signficantly increased the workers wages but had disemployment effects on those workers whose initial wages were close to the minimum wage before the legislation change. For Kenya, Andalon and Pages (2008) investigated the degree of enforcement and coverage of minimum wage legislation in addition to minimum wages' impact on employment using labour force survey data. In terms of compliance, the authors found that minimum wages had greater impacts on the non-agricultural sector than in the agricultural sector. Furthermore, the authors provided evidence that a 10 per cent increase in the "ratio of minimum to median wages" lead to a fall in the proportion of workers employed in the formal sector by 1.2 per cent to 5.6 per cent, while the proportion of those self-employed rise by 2.7 per cent to 5.9 per cent. Gindling and Terrell (2009) examined how employment, unemployment and average wages of small, medium and large scale private sector workers changed during 1990-2004, due to changes in minimum

wages, in Honduras. The authors also looked into the data of civil servants and self-employed workers who are not bound by minimum wage legislation. Their analysis indicates that the size of the firm has a bearing on the efficacy of the minimum wage legislation; the legislation is better implemented in the medium and large-scale firms, where a 1 per cent rise in the minimum brings about a 0.29 per cent rise in average wage while employment falls by 0.46 per cent.

Bell (1997) postulates that minimum wages in Columbia decreased employment, whereas not having any significant effect in Mexico in the 1980s. In a recent study by Meer and West (2016) it is claimed that increase in minimum wages reduces employment level not immidiately but over time through adjustments on employment growth. The authors indicated that the decline in job growth is significantly higher in the lower-wage worker intensive industries and among the young and lower-educated workers.

To our knowledge, the only study on Bangladesh is conducted by Anderson *et al.* (1991), where they analysed the impact of labour laws and labour practices on employment and industrialisation. Using cross-sectional observations, the authors found a negative correlation between the demand for labour and employment level in the formal sector in Bangladesh. The authors also found negative impacts of unionisation on the employment of the skilled workers.

This study uses a panel data of formal employment within firms in more compliance with labour regulations, thus can be considered as the the first attempt to provide emprical evidence on employment effects of minimum wages in Bangladesh RMG industry.

III. DATA AND EMPIRICAL STRATEGY

We used administrative data from some of the RMG firms operating under Bangladesh Export Processing Zones Authority (BEPZA). It should be mentioned here that BEPZA has somewhat different labour policy for its firms operating within it compared to the firms' outside-BEPZA. First, imposition year and revision year of minimum wages for the firms within BEPZA is different than outside. Second, BEPZA categorises workers into five groups, as opposed to the seven categories of workers outside-BEPZA, which is done by the Minimum Wage Board of Bangladesh. Third and most importantly, firms within BEPZA usually

offer formal employment and compliant with labour regulations.[4]All these constitute a unique setting for studying the employment effects of changes in minimum wages in the formal sector. We focus on the employment records of all the five categories of workers of 27 firms for the period under investigation (i.e., 2000-2015). The number of firms and the time period of analysis is somewhat limited by the availability of data. As the firms were established in different years, we have an unbalanced panel. The studied firms produce different types of RMG products including Garments (16 firms), Woven Garments (1 firm), Sportswear (3 firms), Garments-top (2 firms), garments-babywear (1 firm), garments-upper/ bottom (2 firms), garments-kid item (1 firm), and ladies undergarment (1 firm).

The workers in these 27 firms are divided into five categories – helper, junior operator, operator, senior operator and skilled worker. The minimum wages in these and all the other firms under BEPZA were initially fixed in 1989 and revised twice since then, first in November 2010 and then again in December 2013.[5] BEPZA used to fix the wages in US dollar. Thus, while the dollar amounts of the minimum wages remained the same, the monthly minimum wages varied according to the fluctuations in the exchange rate of Bangladeshi Taka (BDT) against the US dollar. To avoid this fluctuation in monthly wages BEPZA fixed the wages in Bangladeshi Taka since 2013.

Figure 1 and Figure 2 show the nominal and real minimum wages for each of the five categories of workers during the period 2000-2015, with the wages varying over the years until 2014, when they become constant in both the cases.

[4]Labour regulations including minimum wages are applicable only in the formal sector which employs currently 13.1 per cent of the labour force in Bangladesh (BBS 2015). Overall, the compliance with labour regulation is somewhat questionable making it difficult for this kind of study.

[5]On the other hand, minimum wages for RMG industry outside BEPZA were set in1994, and revised in 2006, 2010 and 2013 as per the recommendation of the Minimum Wage Board.

FIGURE 1: **Worker Category-wise Nominal Minimum Wages (Bangladesh Taka): 2000-2015**

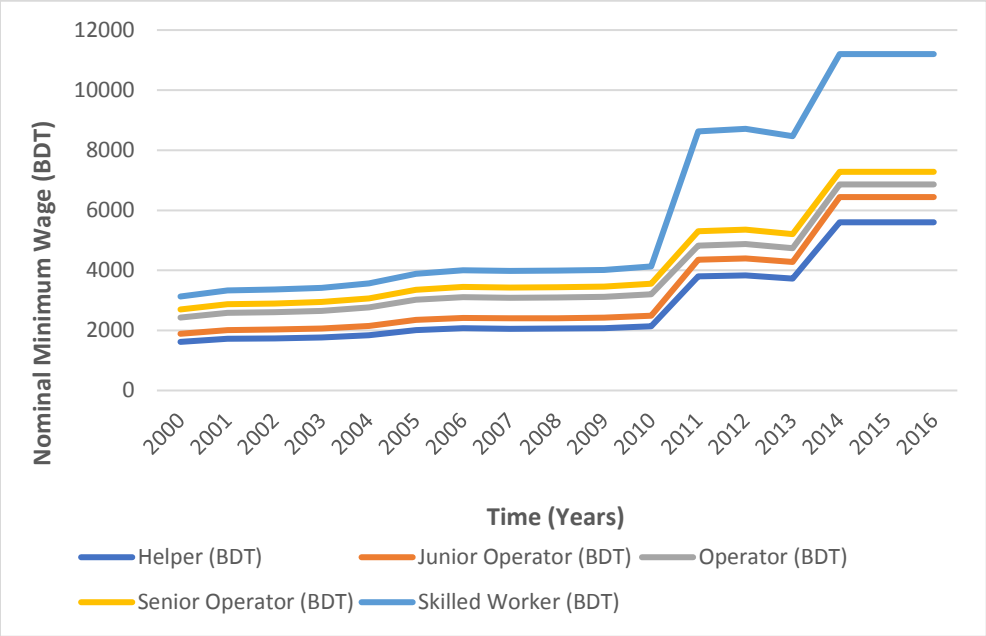
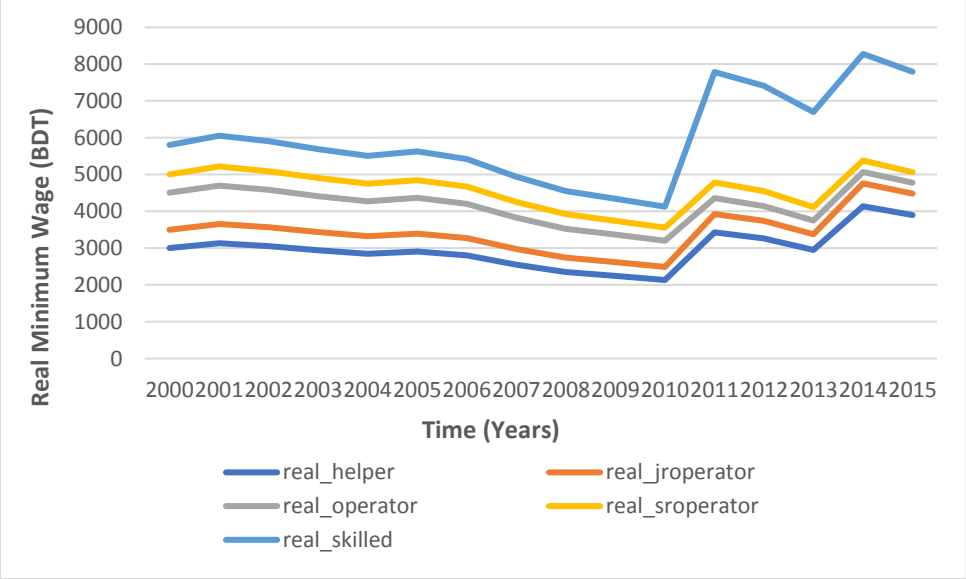


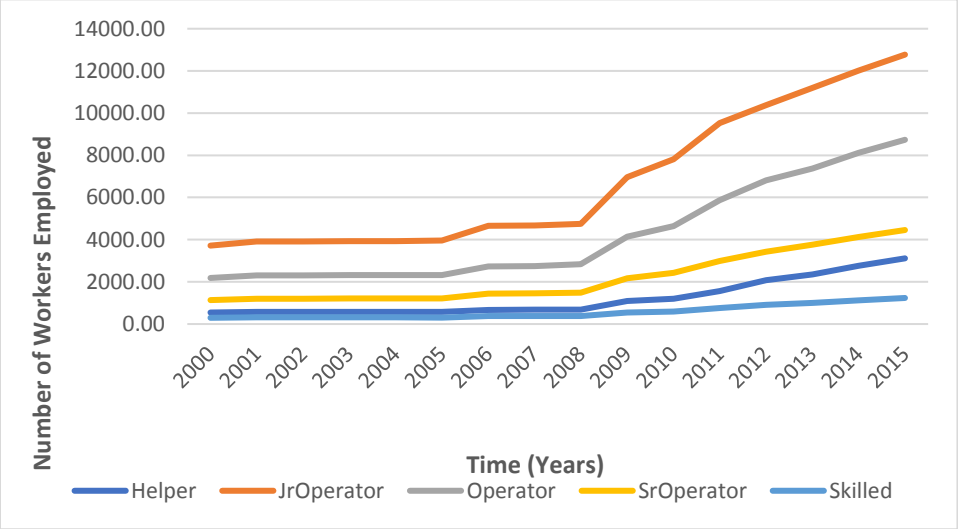
FIGURE 2: **Worker Category-wise Real Minimum Wages (Bangladesh Taka) : 2000-2015**



The firms included in the analysis are relatively larger manufacturing firms; firm size has been calculated by taking the mean of the annual average of the total number of workers in each of the 27 firms over the period 2000 to 2015.About 19 per cent of the firms have on an average 250 to 500 workers, about 48 per cent of the firms have 500 to 1,000 workers on an average, and about 33 per cent of the firms have over 1,000 workers employed on an average. Hence, the majority of the firms in the study have 500 to 1,000 workers (42 per cent) per year over the period 2000-2015.

Employment data for the five categories of workers' have been collected from the payroll records of the firms. We were able to collect such data only from 27 firms in two EPZs located in Dhaka and Chittagong. Figure 3 shows the employment trend during the period 2000-2015.

FIGURE 3. **Worker Category-wise Employment Trend in Firms : 2000-2015**



The employment data have then been used to compute the average number of workers per year in each category, which serves as dependent variable. The independent variable, the real minimum wages for these five categories of workers have been calculated using the Consumer Price Index (CPI).The firms have average 94 helpers, 515 junior operators, 315 operators, 164 senior operators, and 44 skilled workers. Hence, the majority of the employment in the firms is composed of junior operators and operators. Table I presents the summary statistics for the data used in the analysis.

TABLE I
SUMMARY STATISTICS

Variable	Obs.	Mean	Std. Dev.
Helpers			
Average number of workers	218	94.31	84.47
Real minimum wage	218	3167.93	602.13
Junior Operator			
Average number of workers	218	514.62	523.81
Real minimum wage	218	3657.01	677.93
Operator			
Average number of workers	218	315.29	304.58
Real minimum wage	218	4234.25	550.54
Senior Operator			
Average number of workers	218	164.16	156.43
Real minimum wage	218	4627.39	545.05
Skilled Worker			
Average number of Workers	218	44.06	41.00
Real minimum wage	218	6556.26	1364.73

Source: Author's calculation based on administrative data.

IV. ECONOMETRIC STRATEGY

While competitive models predict that minimum wages would have a negative impact on formal employment, such models also assume that the effects of all other factors affecting employment are held constant. But, minimum wages are not exogenous. It is important to control for other observables that might be correlated with the minimum wages and might also affect the employment levels. Previous studies have included a host of control variables: GDP per capita, inflation, unemployment rate and their lags (Pratomo 2014, Gindling and Terrell 2009, Lemos 2004). Sugiyarto and Endriga (2008) controlled type and size of firms. Feliciano (1998) controlled for business cycle, and state and year fixed effects.

Yet there is no consensus within the literature on the form of the minimum wage variable to be used for empirical analysis. Katz and Krueger (1992) used the log of minimum wage gap before and after of an increase in minimum wage in the fast-food industry of the United States. Dickens *et al.* (1999) used the ratio of the minimum wage to the average wage, termed as the Kaitz index (Kaitz 1970). Andalón and Pagés (2008), on the other hand, used ratio of minimum wage to

median wage. However, some studies have used the log of real minimum wages (deflated by CPI or the GDP deflator) (Meer and West 2016, Pratomo 2014, Gindling and Terrell 2009).

Limitations of data permit us to estimate only a basic model where number of workers in the firm is regressed on the real minimum wage. The real minimum wage has been calculated as the minimum wage for each category of workers deflated by the CPI.[6]

A basic log-log model has then been estimated, as shown below:

(1) $emp_{ijt} = \alpha_i + \beta_j + \gamma_t + \mu minwage_{jt} + \varepsilon_{ijt}$

The dependent variable emp_{ijt} is the log of the number of workers in each category *j* of firm *i* and year *t*, while the independent variables are the log of real minimum wage $minwage_{jt}$ for each worker category *j* in year *t*. μ indicate constant elasticity of employment with respect to minimum wage. Thus, the coefficient of the independent variable can be interpreted as the percentage changes in employment of each category of workers due to a 1% change in their corresponding real wages. Coefficients α_i, β_j, and γ_t denote the firm fixed effects, worker category fixed effects and time fixed effects, respectively.

V. EMPIRICAL RESULTS

To study whether the changes in minimum wages affect employment levels, we then estimate equation (1) using data for the 27 firms over the period 2000-2015. We regress employment on real minimum wages. Firm fixed effects serve as controls for the firm-specific factors. The worker category fixed effects serve as a control for the variations in the categories of workers. Time fixed effects allow for a more precise estimation capturing the common shocks, such as varying government policies over the years, if any.

Table II reports the estimates of the impact of minimum wages on employment. Column 1 of Table II shows pooled OLS regression results for different worker categories. We also ran separate regressions for female and male workers, and the results are presented in Columns 2 and 3 of Table II.

[6]Meer and West (2016), Pratomo (2014), Gindling and Terrell (2009) and Lemos (2004) used similar measure.

TABLE II

IMPACT OF MINIMUM WAGES ON EMPLOYMENT

Log of Number of Workers	(Total) (1)	(Female) (2)	(Male) (3)
Log of Real Minimum Wage	0.40**	0.59*	-0.03
	(2.08)	(2.99)	(-0.16)
Constant	0.39	-1.41	2.36
	(0.25)	(-0.89)	(1.45)
Firm Fixed Effects	Yes	Yes	Yes
Worker Category Fixed Effects	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes
R Squared	0.90	0.89	0.90
Observations	1,090	1,090	1,078

Note. t-statistics are in parentheses. *and ** denote statistical significance at the 1% and 5% level respectively.

As shown in Table II, the coefficient of real minimum wage is positive and significant. The positive coefficient can be interpreted as evidence of increased employment; an increase in real minimum wage of 1 per cent is associated with an increase in the total number of workers employed by 0.4 per cent. The result is similar to Comola and de Mello (2011) and El-Hamidi and Terrell (2002). However, there are methodological differences; Comola and de Mello (2011) included both formal and informal sector in their analysis and found an increse in aggregate employment. El-Hamidi and Terrell (2002) also included self-employment in addition to formal sector employment and found positive formal employment, which is explained by using firms monopsony-like behaviour. One possible interpretation of the positive employment effect we found here is the monopsony-like behaviour of the firms. RMG firms are mostly labour intensive, consequently having low capital-labour ratio and low marginal productivity of labour. Increase in minimum wages might have worked like efficiency wages; hence monopsony-like firms maximized profit by hiring more workers (Rebitzer and Taylor 1995). Second, the rise in employment levels in the firms might also have happened due to shift in their labour demand curves caused by the expansion of the RMG industry at the same time of the increase in the minimum (Ehrenberg and Smith 2015).

We also look for heterogeneous impact on employment on the basis of gender of workers. Our results show no significant impact of minimum wages on male employment; the estimated coefficient is negative but not statistically significant at the conventional level. This result is similar to Feliciano's (1998) findings in Mexico. However, female employment shows a substantial increase during the

period; the estimated elasticity is 0.59 per cent. This implies that employment of female workers has increased significantly following the up-ward revision of minimum wages. This result seems plausible for two reasons. First, RMG employers likely to have a much higher share of female minimum wage workers as they are known to be more productive in RMG related tasks and second, as female workers have relatively less negotiation power they are mostly employed in low-wage worker intensive RMG industry.

VI. CONCLUSIONS

Minimum wages and other regulations are advocated in order to improve workers welfare but the apprehension of employment reduction as evidenced in many studies, created major disagreements among economists on the former and therefore calls for more empirical verification of the impact of such regulation on workers welfare, particularly in developing countries. The policy is encouraged to empower workers, particularly female workers. Increase in minimum wage increases workers' purchasing power, allowing them to spend more on nutrition and human development, which is expected to contribute to higher labour productivity. Acemoglu (2001) developed a theoretical model where minimum wages and unemployment insurance encourage firms to generate more high paying jobs.

The evidence of positive employment effect as found in this study indicates that increase in minimum wages might have improved welfare of the minimum wage workers in the industry. The major policy implication of this study is, hence, to support the enforcement of minimum wage policy in Bangladesh and in similar countries. However, regular revision of minimum wage is recommended to ensure fair and competitive wage.

Although the empirical result in our case is quite intuitive, the limitations of data must also be acknowledged. Other economic conditions, not captured in this study, might have affected employment and minimum wages during the period under study. For instance, the impact of changes in minimum wages on aggregate employment will depend on both formal and informal sector analysis. Since our analysis does not include the informal sector, we cannot comment on this. Also, compliance of labour regulation is a major issue in studying the impact of minimum wages on employment. Our evidence is based on a dataset covering some RMG firms within BEPZA where compliance is not problematic compared to the case of RMG firms outside BEPZA, where regulations regarding minimum

wages and other working conditions, such as working hours, occupational safety etc., are often not enforced. Future research should focus directly on the compliance issues, working conditions as well as informal sector.

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