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Abstract

This paper provides preliminary evidence on the impact of the Better Work programme on firm performance in Vietnam. We construct a panel data using the Vietnam Enterprise Censuses for the years 2009 and 2011. Using firm fixed-effect regressions, we find that the factories enrolled in the Better Work programme tend to be larger, pay higher wages for workers, and employ more capital compared to other factories. However, we do not find that significant effects of the Better Work programme on factories' sale and profit.

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1. Introduction

In the past two decades, Vietnam has witnessed high economic growth: During this period, the average annual growth rate of GDP was about 7 percent. Together with economic growth, the industrial sector has been expanding. The share of the industrial sector in total GDP increased from 25 percent in 1991 to 42 percent in 2011(GSO, 2012). During the 2005-2011 period, the number of registered firms increased from 112,950 to339,287 (GSO, 2012). In 2011, the labor force participation rate was about 80 percent and the total employment level was about 51.4 million. This represents an increase compared to 2001, when total employment was about 38.5 million.

Although there is a rapid process of urbanization and industrialization, Vietnam is still an agricultural and rural country. Around 70 percent of the population is living in rural areas, and nearly 50 percent of labor force works in the agricultural sector. Similarly, while the share of formal workers is increasing, informal workers still account for a large proportion of the labor force. For example, according the 2011 Labor Force Survey, about 52 percent of workers were employed in the formal sector – that is by registered firms and organizations. Among these workers, about80 percent had health and social insurance.

Garment and textile represents a vital sector of the economy. In 2012, garment and textile exports accounted for 15 percent of total exports. Garment and textile also play a large role in the generation of employment. The sectors employ about two millions of workers.[2] Compared to the average of the economy, the garment sector is characterized by a larger share workers covered by health and social insurance. However, garment workers appear to be more likely to receive short term contracts and to be paid at piece rate.

In an attempt to increase the competitiveness and working conditions of the garment sector, in 2009, the government together with ILO and IFC introduced the Better Work (BW) Vietnam programme. The program aims at improving the competitiveness in the apparel industry by enhancing economic performance at the enterprise level and by

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[2] This figure is estimate from the 2011 Vietnam Enterprise Census. Other documents also report a similar estimate.

improving the compliance of apparel factories with the Vietnamese labour laws. The latter objective is also achieved by a capacity building component. For example, Better Work Vietnam has been introducing Learning Seminars that focus on issues prominent across the garment industry and that include technical inputs as well as an opportunity for factories to share both challenges and best practices.

Although initial assessments suggest a positive impact of the BW in Vietnam, (see http://betterwork.org/vietnam/), there has not been a quantitative impact assessment yet. Using a baseline survey, ILO and IFC (2012) examines demographic characteristics and working conditions of workers in participating Better Work Vietnam factories. In other countries with Better Work Programme, quantitative evaluations of the programme are also limited and mainly focus on the stage of collecting and analyzing the baseline survey. To our knowledge, Robertson (2011) is the only exception. Robertson (2011)investigates the Better Factories Cambodia program in the apparel sector and finds that the Better Factories Cambodia helps improve working conditions of workers.

There is a large literature on the effect of programs on firms' level outcomes, especially in the context of small and medium enterprises (SME).Impact evaluations and programs that target firms are vary, ranging from training and technology assistance to loans and grants (for a review, see Lopez-Acevedo and Tan, 2010). Their effect is however ambiguous. A large number of studies find a positive effect of these programs on wages and employment. For example, Bruhn et al. (2012) measures the effect of a randomized subsidized consulting program for SMEs in Mexico and find that the program increases the number of workers and total wages. Criscuolo et al. (2007) find a business support scheme in the UK helps firms increase employment and investment. Mole et al. (2009) also find a positive effect on employment of consulting services for SMEs in the UK. Regarding the firm performance, fewer studies find positive effects of MSEs program. Benavente et al. (2007) examine the effect of the Technology Development Funds program in Chile and finds the program increases the sales, employment and export. On the contrary, many studies do not find significant effects of the SMEs programs on firms' performances, e.g., Tan and Lopez-Acevedo (2005); De Negri et al. (2006); Mole et al. (2009); Bruhn and Zia (2011); Karlan and Valdivia(2011) (for a review, see Lopez-Acevedo and Tan, 2010).

Regarding the BW programme, although there are a large number of descriptive studies of the BW programme, there is little research on the quantitative impact evaluation due to unavailability of data. This study aims at filling in part this void. Specifically, we will examine the effect of the BW programme on labor and business performances outcomesat the plant level using the Vietnam Enterprise Censuses (VEC). The VECs contains data on performances for the majority of the Vietnamese firms and has a panel data dimension, which allows us to observe firm outcomes not only in the years after but also the years before the BW programs. After matching the data with the better work data, we look at the impact of better work using firm fixed-effects regressions and difference-in-differences with propensity score matching.

This report is structured in six sections. In section two, we present an overview of labor market in Vietnam. In section three, we describe the data and compare key outcome variables among firms enrolled in the BW programme versus the rest of the economy. In sections four and five, we present the estimation method and results on the impact of the BW programme, respectively. Finally, section six concludes.

2. Labor markets in Vietnam

Vietnam is a developing country with high population and labor force. During the past two decade, the population has been constantly increasing by around one million annually. We observe an increase in employment level during the decade 2001-2011: In this period, the average growth of employment was about two percent. As a result total employment level increased to 51.4 million in 2011 from 38.6 million in 2001 (Table 1).

Table 1. Labor force at 15 years of age and above

| Year | Total (Thousand persons) | Thousand persons | | Total | Structure (%) | |
		Male	Female		Urban	Rural
2000	38545.4	19548.7	18996.7	100	50.7	49.3
2001	39615.8	20207.9	19407.9	100	51.0	49.0
2002	40716.0	20718.9	19997.1	100	50.9	49.1
2003	41846.7	21449.7	20397.0	100	51.3	48.7
2004	43008.9	21948.3	21060.6	100	51.0	49.0

Year	Total (Thousand persons)	Thousand persons		Total	Structure (%)	
		Male	Female		Urban	Rural
2005	44904.5	23493.1	21411.4	100	52.3	47.7
2006	46238.7	24613.9	21624.8	100	53.2	46.8
2007	47160.3	23945.7	23214.6	100	50.8	49.2
2008	48209.6	24709.0	23500.6	100	51.3	48.7
2009	49322.0	25655.6	23666.4	100	52.0	48.0
2010	50392.9	25897.0	24495.9	100	51.4	48.6
2011	51398.4	26468.2	24930.2	100	51.5	48.5

Source: GSO (2012)

The share of agriculture workers in total employment decreased from 55.1 percent in 2005 to 48.4 percent in 2011. The share of labor employed in industry and services has risen over time. Manufacturing and construction are two industrial sectors which account for 13.8 percent and 6.4 percent of employment in 2011, respectively (Table 2). Increasing share of manufacturing sector reflects structural changes in economy in recent years, albeit at slow speed.

Table 2.Share of employment by sector, 2005-2011

Sector	2005	2007	2008	2009	2010	2011
Agriculture, forestry and fishing	55.1	52.9	52.3	51.5	49.5	48.4
Manufacturing	11.8	12.5	12.9	13.5	13.5	13.8
Mining, water, and energy	1.2	1.2	1.1	1.1	1.1	1.1
Construction	4.6	5.2	5.3	5.4	6.3	6.4
Wholesale and retail trade	10.7	10.9	11.0	10.8	11.3	11.6
Transportation and storage	3.0	3.0	3.1	3.0	2.9	2.8
Accommodation and food service activities	1.9	2.4	2.8	3.3	3.5	4.0
Communication, finance, banking services	1.5	1.6	1.6	2.0	2.0	2.1
Socio-political organizations and defense	3.9	3.7	3.6	3.3	3.2	3.1
Education, health services	3.7	4.2	4.0	4.1	4.3	4.4
Other sectors	2.4	2.3	2.3	2.0	2.3	2.4
Total	100	100	100	100	100	100

Source: GSO (2012), http://www.gso.gov.vn

Since the BW programme currently covers firms in garment and textile, we use the Labor Force Survey in 2011 to examine the distribution and characteristics of workers in this industry compared with workers in other industries. Table 3 look at the distribution of workers by type of firm: Among all industries, 68 percent of wage earners work in the

formal sector[3]. Compared to the rest of the economy (labeled as 'others' in the following tables), the textile and garment sector is however characterized by a larger proportion of formal workers (about 76 and 86 percent respectively).

Table 3: Distribution of wage workers by employment sectors

| Sectors | Workers by industry | | | Total |
	Textile	Garment	Others	
Households	23.95	16.63	32.73	31.96
Private firms and organizations	33.08	38.53	19.37	20.30
Public firms and organizations	14.70	7.97	42.20	40.50
Foreign firms and organizations	28.27	36.87	5.71	7.23
Total	100	100	100	100
Number of observations	1,601	9,936	215,948	227,485

Source: Authors' estimation from Labor Force Survey 2011

Informal workers are less likely to have a contract. Their work is generally seasonal and lasts less than one year. Table 4 presents the characteristics of employment. Workers employed in the garment sector are more likely to have short-term contracts and to receive payment by piece rate compared to workers employed in other industries.

Table 4: Wage laborers by economic industries

| Groups | Workers by industry | | | Total |
	Textile	Garment	Others	
Type of contracts				
Long-term contract	42.96	29.95	45.26	44.57
Contract 1-3 years	28.15	43.94	14.59	15.98
Contract less than 1 year	2.96	9.65	4.02	4.26
Oral contract	17.04	10.15	24.45	23.76
No contract	8.89	6.31	11.69	11.43
Total	100	100	100	100
Payment methods				
Month wages	48.89	35.15	61.50	60.25
Daily wages	17.78	10.64	24.84	24.17
Wages by piece of product	33.33	54.21	12.67	14.64
Others	0.00	0.00	0.99	0.93
Total	100	100	100	100
Duration of the current jobs				
Less than 1 year	10.73	13.05	9.23	9.41

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[3]We identify the informal sector with household enterprises

Groups	Workers by industry			Total
	Textile	Garment	Others	
1-5 years	47.86	56.31	39.77	40.55
5-10 years	22.81	21.54	24.58	24.43
More than 10 years	18.59	9.09	26.42	25.61
Total	100	100	100	100

Source: Authors' estimation from Labor Force Survey 2011

Health and safety management systems are less paid attention in Vietnam. Level Work (2013) reports that around 97 percent of the factories visited them violated health and safety working conditions. Using the 2011 LFS, we can examine the social and health insurance of workers in Vietnam. Table 5 shows that nearly 60 percent of workers have health insurance and social insurance. Workers of garment and textile firms are more likely to have health and social insurance compared to workers employed in other sectors. However, the average monthly wages of garment and textile workers is lower than the average of the rest of the economy. Detailed statistics on the demography and living conditions of workers in apparel and BW programme firms can be found in ILO and IFC (2012).

Table 5: Employment of wage laborers

Variables	Workers by industry			Total
	Textile	Garment	Others	
% receiving salary during national holidays and weekend (yes=1)	62.22	70.54	60.03	60.51
% having health insurance (yes=1)	64.44	73.00	57.36	58.10
% having social insurance (yes=1)	61.48	69.88	56.56	57.19
Monthly wages	2555.6	2354.5	2957.7	2928.5
Monthly bonus	362.1	396.9	278.2	284.0
Number of working hours per week	49.30	50.79	46.90	47.09
% receiving payment for additional work	21.70	34.33	9.69	10.85
% receiving bonus	13.09	17.79	11.37	11.67
% receiving supports such as accommodation, travelling, clothes, etc.	34.21	35.45	17.92	18.80

Source: Authors' estimation from Labor Force Survey 2011

3. Data

For evaluating the impact of the Better Work programme, we use the2009 and 2011 Vietnam Enterprise Censuses. The Vietnam Enterprise Censuses (VECs) are conducted

annually by General Statistical Office of Vietnam (GSO). The censuses cover all registered enterprises throughout the country. The number of observations in VEC 2009 and VEC 2011 is 233,235 and 339,287, respectively. The two data sets contain a panel dimension for 176,178 firms (Nguyen, 2012).

The VECs contain data on firms' business activities including the type of firm ownership, the main business activity, number of workers (also by gender), number of workers with social insurance, labor cost, assets, turnover, and profits. Between 2009 and 2011, the number of firms increased remarkably1.

Table 6 presents the percentage of enterprises by geographic areas, ownership types, main industry, and size (measured by number of employees). Most enterprises are located in urban areas, big cities, and provinces of the delta regions. Half of the enterprises are found in the two largest cities, Hanoi, the capital, and Ho Chi Minh city. Other provinces and cities with high concentration of firms, especially foreign owned firms are HaiPhong, Dong Nai and Binh Duong. By ownership type, the (private) limited companies account for the largest proportion of firms, followed by private firms, and joint-venture firms. Foreign owned and state owned firms account for a lower share of firms. Looking at the distribution of firm size, around 60 percent of firms have less than 10 workers while firms with more than 300 workers account for around 2 percent.

Table 6: Distribution of firms by basic characteristics

	2009	2010	2011
Rural/Urban			
Rural	25.73	24.49	24.45
Urban	74.27	75.51	75.55
Regions			
Northern Mountains	5.38	5.02	4.83
Red River Delta	27.28	28.98	32.34
Central Coast	15.84	15.38	13.55
Highland	3.25	2.85	2.59
South East	37.91	38.67	38.38
Mekong River Delta	10.34	9.10	8.31
Provinces			
Ha Noi	16.65	18.59	21.93
HaiPhong	2.55	2.33	2.33
Binh Duong	2.86	2.83	2.56
Dong Nai	3.19	2.73	2.39
Ho Chi Minh city	29.30	30.65	31.02
Other provinces	45.44	42.87	39.76
Firm type			
State	1.48	1.20	0.99
Collective	5.53	4.50	3.93
Private	20.53	17.45	14.47

	2009	2010	2011
Limited company	53.17	55.93	56.96
Joint-venture	16.48	18.40	20.64
Foreign	2.81	2.53	3.00
Business industry			
Agriculture	3.86	3.33	3.02
Food manufacturing and Processing	2.86	2.44	2.26
Garment and textile	2.63	2.51	2.42
Wood and papers	2.21	1.93	1.81
Manufacture and mining	13.04	11.73	11.2
Construction	14.20	14.77	13.16
Trade	38.71	39.14	38.32
Services	22.48	24.14	27.81
Firm size			
1-5	30.18	33.72	41.58
6-10	32.20	30.00	24.86
11-30	22.37	21.70	20.07
31-100	9.65	9.33	8.87
101-300	3.75	3.52	3.14
Above 300	1.85	1.73	1.48
All firms	100%	100%	100%
Source: Estimation from EC 2009, EC 2010 and EC 2011.			

Firms covered by the programme located mainly in the South East of Vietnam. This area is the richest part of the country and presents a high density of firms from various sectors. A large proportion of firms covered by the BW program are indeed located in Ho Chi Minh City, Binh Duong and Dong Nai (See Figure 1, which presents the geographic location of Better Work firms)

Figure 1: Better Work firms in Vietnam
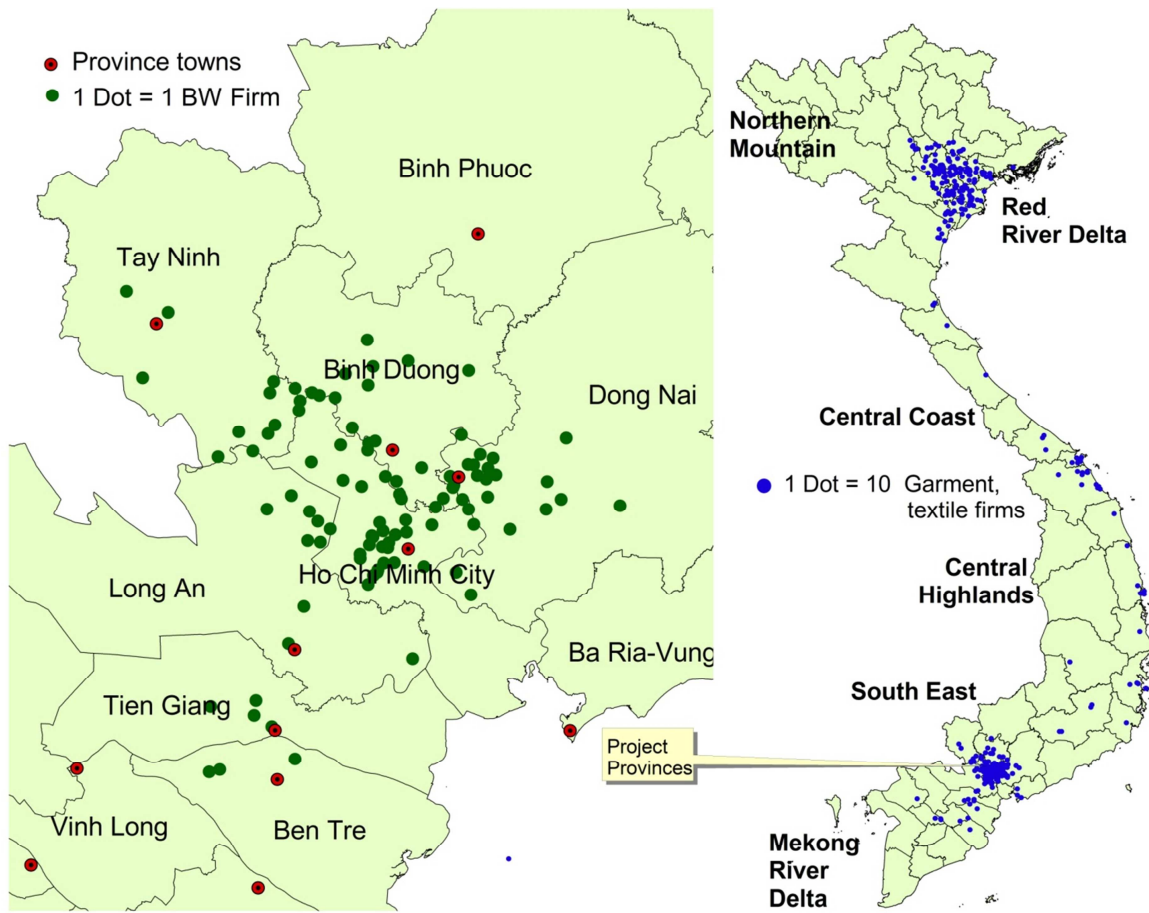
Source: Authors' preparation using data from Better Work programme

Out of 179 firms that appear to be enrolled in the Better Work program, we were able to identify 158 firms participating in the program. Using this information, Table 7 compares the key characteristics of participating firms with firms that are not enrolled in the Better Work program but are located in the same geographical areas. Firms under the Better Work programme tend to have a large number of workers, a higher proportion of female workers, and their workers are more likely to be covered by social insurance.

Table 7: Basic characteristics of firms with and firms without the Better Work program

Outcome variables	Better Work Firms		Non Better Work Firms	
	2009	2011	2009	2011
Total asset (Bil. VND)	199.42	280.85	78.25	112.91
Revenue (Bil. VND)	159.58	262.79	48.87	79.55
Profit before tax (Bil. VND)	4.267	5.174	2.654	2.577
Proportion in garment	0.895	0.898	0.103	0.113
Proportion of foreign firms	0.774	0.796	0.187	0.193
The number of workers	1267.5	1374.4	92.7	107.0
Proportion of female workers	0.783	0.746	0.392	0.379
Proportion of workers with insurance	0.892	0.897	0.474	0.428
Proportion of female workers with insurance	0.898	0.897	0.469	0.463
Wage per worker (Mil. VND/year)	31.20	49.25	42.58	47.54

Source: Estimation from EC 2009 and EC 2011.

4. Estimation method

Firm fixed-effects regression

Impact evaluation of a policy or a program is always challenging. Firms are enrolled in the Better Work program based on several selection criteria and voluntariness. When the program is not randomly assigned to the treatment group, there is always a problem of possible selection bias in estimating the effect of the program. The traditional econometric method to deal with selection or endogeneity bias is instrumental variable regression. Finding a valid instrument for a self-selected program is difficult. When convincing variables are not found, most studies on the impact evaluation of SMEs support program rely on the features of panel data to remove time-invariant unobserved heterogeneity (Lopez-Acevedo and Tan, 2010). Based on firm-level panel data, fixed-effects regression and difference-in-difference estimation are widely used (see Lopez-Acevedo and Tan, 2010 for a review of estimation methods in empirical studies of the impact evaluation of SMEs support program).

In this study, we are not able to find such an instrument for the Better Work program in Vietnam. Thus, we will use firm fixed-effects regression to measure the effect of Better Work programin Vietnam. Although there is no an endline survey of the Better Work program for impact evaluation, we use the data from the 2009 VEC and 2011 VEC

as the before-program and after-program data, respectively. The outcomes of firms are expressed as follows:

$$Y_{it} = \alpha + D_{it}\beta + X_{it}\gamma + T_t\delta + v_i + u_{it}, \qquad (1)$$

where, Y_{it} is a performance indicator of firm i at the time t. T_t is the dummy variable for theyear 2011. D_{it} is a dummy variable which equals one for firms that are part of the Better Work program as on 2011. X_{it} is the control variables.

We use similar specifications as equation (1) to measure the effect of the Better Work program on various firm related outcome variables including size (as measured by the number of employee), labor cost, assets, etc.

We do not include any additional explanatory firm-level variables in model (1). Variables such as firm size and assets can be affected by the Better Work program and should not be controlled in the model (Heckman et al., 1999; Angrist and Pischke, 2008). However, we control for few provincial level variables to examine whether the estimates are sensitive to control variables. Exogenous variables such as ownership and geography of firms are time-invariant and included in the firm fixed effects v_i.

We then further analyze whether the impact of Better Work Programs can spill over other firms. To conduct this analysis,we adopt a specification similar to equation 1 and estimate the following firm fixed-effects regression:

$$Y_{ijt} = \beta_0 + C_{jt}\beta_1 + X_{ijt}\beta_2 + T_t\beta_3 + v_{ij} + u_{ijt}, \qquad (2)$$

Where Y_{itj} is a performance indicator of a not participatory BW firm i (for example size or turnover) in commune j in the year t. C_{jt} is a dummy variable that equals one if BW firms are located in thecommune. In sum, we use a similar model as (1), but replace the BW programme by the variable indicating the communes with the BW programs. We assume spill-over effect at the commune level. Additionally, we exclude BW factories from the sample.

Difference-in-differences with propensity score matching

In addition to fixed-effects regression, we also use difference-in-differences with propensity score matching to measure the effects of the BW programme. Although the

difference-in-differences with propensity score matching relies on a similar identification assumption in the selection of time-invariant unobservables as the fixed-effects regression, the matching method has the main advantage that it does not rely on functional form assumptions on outcome.

The ideas of thedifference-in-differences with propensity score matching is to compare the outcome of the treatment group (firms participating in the BW programme) with a similar control group (firms not participating in the BW programme but have similar characteristics as the BW firms) before and after the BW programme. Simply comparing the outcomes between the treatment and control groups after the treatment can include unobserved selection bias. If we assume this selection bias is time-invariant, we can remove this bias by subtracting the difference in pre-treatment outcomes between the treatment and control group from the difference in post-treatment outcomes between the treatment and control group.

To select the control group which has similar characteristics as the treatment group, we use the method of propensity score matching (Rosenbaum and Rubin, 1983).[4] We start by estimating the probability of being a household with migrants at time t by using a logit or probit model, $P(D_{it}=1)=F(X_{it-1})$, where X is a vector of observed variables before migration.

More specifically, let Δy_i be the difference between outcome of a BW firmbefore and after the BW program. Δy_j is the difference between outcome of a non-BW firm before and after the BW program. Then the difference-in-differences estimator is expressed as follows:

$$\delta = \sum_{i \in BW} \left[\Delta y_i - \sum_{j \in C} g(p_i, p_j) \Delta y_j \right]. \qquad (3)$$

where$p$ is the probability of firms participating in the BW programme. $g(.)$ is a function assigning the weights on control firm$j$ in forming a comparison with the BW firm$i$. The

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[4] For detailed discussion of the matching method, see e.g., Rosenbaum and Rubin, 1985; Heckman et al., 1997; Augurzky and Schmidt, 2001; Imbens and Wooldridge, 2009; Smith and Todd, 2005.

function *g(.)* differs for the different matching estimators proposed in the literature. The probability of firms participating is called propensity score which is estimated using a probit model with firm characteristics as explanatory variables based on the 2009 VEC data.

5. Estimation results

In this study, we use different samples of firms to estimate Model (1) and (2). Firstly, we use the sample of all the firms regardless the industrial sector of the firms. The regression results are presented in Table A.1 and A.2 in Appendix. An important assumption of the fixed-effects regressions is that the treatment and control groups have parallel growth of the outcomes in the absence of the treatment. To test this assumption, we use the panel data before the Better Work Programme to examine whether there is a significant difference in firm outcomes between future treated firms (ie the firms that will then be enrolled in BW) and control groups. We use the panel data of ECs 2007 and 2009 to estimate the firm outcomes on dummy variable of the Better Work Programs. There are 60 firms of the Better Work Programme identified in the ECs 2007 and 2009. For two out of 10 outcomes, we find a positive and statistical significant effectof the Better Work Programme(Tables A.3 and A.4 in Appendix). As a result the use of the whole database does not pass the "parallel assumption" for all the variables under analysis.

Since the BW program covers the apparel firms, wethen limit the sample to apparel firms. Using this limited sample, we do not find statistically significant effects of BW firms in the ECs 2007 and 2009. It means that the treatment and control groups in apparel sectors had a similar growth rate of firm outcomes during 2007-2009. Since this sample passes the "parallel" assumption, we estimate and interpret only the fixed-effects regressions based on the sample of apparel firms. Table 8 presents the regression resultsof the impact of BW on firm outcomes related to labor. We find a positive and significant effect of the BW program on firm size and wages per worker. The effect of the BW program on other outcomes is quite small and not statistically significant.

Table 8. Regression of labor outcomes on better work program: sample of apparel firms

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)
Firms of Better Work	0.113**	-0.011	-0.014	-0.024	0.070**
	(0.056)	(0.014)	(0.017)	(0.026)	(0.034)
Log of the number of firms in province	0.076	-0.083**	-0.070	-0.046	-0.299***
	(0.116)	(0.033)	(0.059)	(0.058)	(0.088)
Log of total laborers in province	1.049**	0.241*	0.011	-0.090	0.744**
	(0.443)	(0.145)	(0.195)	(0.203)	(0.346)
Log of the average wage of province	-0.120	0.158***	-0.155**	-0.152**	0.004
	(0.153)	(0.044)	(0.074)	(0.073)	(0.134)
time	-0.048	-0.051**	0.088***	0.079**	0.490***
	(0.074)	(0.020)	(0.034)	(0.035)	(0.059)
Constant	-4.398	-0.913	1.618	2.162	0.281
	(3.613)	(1.161)	(1.691)	(1.775)	(2.835)
Observations	9,609	9,607	8,806	8,633	9,566
R-squared	0.002	0.033	0.006	0.004	0.278
Number of id	5,433	5,433	5,370	5,332	5,425

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table 9 examines the impact of the BW programs on other business performance outcomes. The BW firms tend to have higher capital than the non-BW firms. However, other firm outcomes including profit and revenue are not statistically different between the BW and non-BW firms.

Table 9. Regression of firm business outcomes on better work program: sample of apparel firms

Explanatory variables	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Firms of Better Work	0.249***	-0.041	-0.021	0.140	-0.005
	(0.084)	(0.031)	(0.013)	(0.089)	(0.009)
Log of the number of firms in province	-0.832***	0.260***	0.027	-0.082	0.202
	(0.165)	(0.042)	(0.026)	(0.191)	(0.180)
Log of total laborers in province	0.895	-0.315	0.189	1.526**	-0.072
	(0.616)	(0.194)	(0.129)	(0.761)	(0.347)
Log of the average wage of province	0.134	-0.233***	0.160***	0.773**	0.206
	(0.216)	(0.068)	(0.042)	(0.308)	(0.228)
time	0.366***	-0.007	-0.121***	0.300**	-0.114
	(0.106)	(0.031)	(0.018)	(0.140)	(0.129)

Explanatory variables	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Constant	9.476*	1.182	-1.930*	-5.168	-2.075
	(5.452)	(1.692)	(1.071)	(6.900)	(4.662)
Observations	9,588	9,609	9,609	9,414	9,380
R-squared	0.038	0.033	0.092	0.152	0.004
Number of id	5,432	5,433	5,433	5,387	5,380

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Next, we estimate spill-over effects of the BW program (Equation 2). We proxy the spillover effects of the BW program with either a dummy variable that equals one if a firm is located in a communes with Better Work firms or with the proportion of the BW firms to the total number of apparel firms in the communes. We use three models. In the first model BW firms are dropped from the sample. The second model includes BW firms and a dummy variable that equals one if the firm is part of the BW program. The third model includes the dummy variable that reflect participation in the BW program and interact this variable with the variables that proxy for spill-over effects. The regression results are presented in Table A.7 to A.11 in Appendix. We do not find any spillover effects, except for the ratio of female works: Plant in the communes where BW factories are located also experienced a decrease in the share of female workers.

Finally, we use the difference-in-differences with propensity score matching estimator. The propensity score is estimated using a probit model with explanatory variables of firm characteristics in the 2009. In this paper, we use kernel matching with bandwidth of 0.01 and 0.05. We calculate standard errors using bootstrap techniques. We do not use the nearest neighbor matching estimator, since Abadie and Imbens (2006) find that bootstrap can give invalid standard errors for the nearest neighbor matching estimator. We find a positive and statistically significant effect of the BW program on log of wages of firms. The effect on labor size and capital is positive as the fixed-effects regression founds, but not statistically significant. Propensity score matching often gives large standard errors than parametric regressions.

6. Conclusions

Vietnam is a dynamic economy that is witnessing a rapid expansion of the industrial sector. The number of registered firms increased from 112,950 in 2005 to339,287in 2011. Working conditions appear poor in many firms: For example, more than 40% of workers employed in firms and organizations do not have health and social insurance.

In an attempt to increase the competitiveness and working conditions of the garment sector, the Better Work (BW) Vietnam programme has been launched by ILO and IFC. Using Vietnam Enterprise Censuses, this paper provides a first quantitative evaluation of the program. Specifically, we examine the effect of the BW program on labor and business performance of firms using fixed-effects regressions and difference-in-differences with propensity score matching. We find that the BW firms are more likely to have a larger number of workers and provide higher wages to workers compared to non-BW apparel firms. BW firms also have high capital than other firms. However, there are statistically significant effects on sales and profit of the BW firms. The absence of the effect of the program on sale and profits might be due to the short time span available for conducting this analysis. Future work in this area will further analyze this dimension.

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Appendix

Table A.1. Regression of labor outcomes on better work program: sample of all the firms

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)
Firms of Better Work	0.142***	-0.055***	0.049***	0.019	0.380***
	(0.047)	(0.017)	(0.015)	(0.025)	(0.037)
Log of the number of firms in province	0.050	-0.010	-0.078***	0.013	-0.401***
	(0.036)	(0.008)	(0.025)	(0.026)	(0.068)
Log of total laborers in province	0.565***	-0.027	0.081	-0.062	0.738***
	(0.206)	(0.038)	(0.118)	(0.134)	(0.265)
Log of the average wage of province	0.066	0.026**	-0.092**	-0.211***	0.525***
	(0.052)	(0.012)	(0.041)	(0.047)	(0.098)
time	-0.082***	0.012***	0.011	0.027	0.098**
	(0.023)	(0.004)	(0.016)	(0.017)	(0.042)
Constant	-2.416	0.547*	0.766	1.428	-0.316
	(1.627)	(0.282)	(0.928)	(1.037)	(2.159)
Observations	352,347	347,730	306,088	287,118	349,468
R-squared	0.001	0.0047	0.011	0.0069	0.040
Number of id	176,178	176,178	176,178	170,674	176,148

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.2. Regression of firm business outcomes on better work program: sample of all the firms

Explanatory variables	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Firms of Better Work	0.488***	-0.052*	-0.064***	0.203**	-3.447
	(0.103)	(0.030)	(0.012)	(0.081)	(3.385)
Log of the number of firms in province	-1.295***	0.169***	-0.008	0.358***	17.638
	(0.109)	(0.021)	(0.009)	(0.086)	(17.286)
Log of total laborers in province	2.353***	-0.398***	0.044	1.030**	3.873
	(0.446)	(0.085)	(0.061)	(0.439)	(15.021)
Log of the average wage of province	0.878***	-0.131***	-0.005	0.494***	31.467
	(0.136)	(0.027)	(0.013)	(0.153)	(31.068)
time	0.041	0.019	-0.020***	0.171***	-10.211
	(0.064)	(0.012)	(0.006)	(0.056)	(10.154)
Constant	-0.174	2.402***	-0.002	-5.029	-297.103
	(3.562)	(0.672)	(0.449)	(3.114)	(311.803)
Observations	351,384	352,356	352,356	340,366	337,584
R-squared	0.040	0.016	0.010	0.084	0.000
Number of id	176,166	176,178	176,178	175,653	175,198

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.3. Regression of labor outcomes on better work program:
sample of all the firms – panel 2007-2009 EC

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)
Firms of Better Work	0.010	-0.029*	0.015	0.010	0.095**
	(0.039)	(0.016)	(0.015)	(0.011)	(0.044)
Log of the number of firms in province	0.079*	-0.010	-0.004	0.083**	-0.154**
	(0.046)	(0.009)	(0.027)	(0.035)	(0.063)
Log of total laborers in province	0.250	-0.016	-0.161	-0.371*	0.479
	(0.307)	(0.041)	(0.153)	(0.197)	(0.345)
Log of the average wage of province	-0.284***	0.053***	-0.053	-0.032	-0.768***
	(0.054)	(0.010)	(0.042)	(0.040)	(0.062)
Time	0.161***	-0.023***	0.028	-0.005	0.841***
	(0.046)	(0.009)	(0.033)	(0.033)	(0.052)
Constant	1.680	0.206	1.862*	2.493*	6.104**
	(2.357)	(0.303)	(1.110)	(1.474)	(2.609)
Observations	141,355	139,758	124,486	114,194	139,165
R-squared	0.004	0.007	0.003	0.004	0.056
Number of id	95,351	94,965	92,057	84,653	93,849

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.4. Regression of firm business outcomes on better work program:
sample of all the firms – panel 2007-2009 EC

Explanatory variables	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Firms of Better Work	-0.114	0.059	-0.019	0.143	-2.057
	(0.125)	(0.036)	(0.015)	(0.121)	(2.162)
Log of the number of firms in province	-0.715***	0.065***	-0.015	0.099	2.841
	(0.093)	(0.016)	(0.014)	(0.117)	(2.577)
Log of total laborers in province	1.568***	-0.248***	-0.007	0.928	-0.644
	(0.459)	(0.085)	(0.086)	(0.751)	(2.103)
Log of the average wage of province	-1.305***	0.147***	0.075***	-0.406**	-6.654
	(0.149)	(0.025)	(0.015)	(0.194)	(8.040)
Time	1.278***	-0.128***	-0.076***	0.652***	5.004
	(0.116)	(0.020)	(0.012)	(0.159)	(6.094)
Constant	11.740***	0.866	-0.088	2.392	23.184
	(3.488)	(0.636)	(0.624)	(5.899)	(42.911)
Observations	140,685	141,534	141,534	132,925	131,882
R-squared	0.030	0.005	0.008	0.062	0.000
Number of id	94,934	95,529	95,529	89,676	89,190

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.5. Regression of labor outcomes on better work program:
sample of apparel firms – panel 2007-2009 EC

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)
Firms of Better Work	-0.011	-0.015	-0.013	-0.013	0.023
	(0.051)	(0.018)	(0.016)	(0.017)	(0.053)
Log of the number of firms in province	-0.004	-0.066	-0.097	-0.027	-0.255
	(0.226)	(0.050)	(0.074)	(0.083)	(0.159)
Log of total laborers in province	0.370	0.085	-0.090	-0.179	0.842
	(0.683)	(0.191)	(0.277)	(0.252)	(0.584)
Log of the average wage of province	-0.356**	-0.028	0.051	0.014	-0.146
	(0.151)	(0.029)	(0.063)	(0.070)	(0.109)
time	0.245*	0.023	0.021	0.016	0.560***
	(0.131)	(0.030)	(0.054)	(0.059)	(0.093)
Constant	3.483	0.841	1.694	1.976	0.086
	(5.843)	(1.620)	(2.390)	(2.191)	(4.825)
Observations	3,908	3,906	3,607	3,488	3,877
R-squared	0.007	0.013	0.006	0.001	0.280
Number of id	2,709	2,708	2,634	2,539	2,685

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.6. Regression of firm business outcomes on better work program:
sample of apparel firms – panel 2007-2009 EC

Explanatory variables	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Firms of Better Work	0.032	0.039	0.015	0.102	-0.030
	(0.119)	(0.035)	(0.015)	(0.126)	(0.031)
Log of the number of firms in province	-0.440	0.206***	-0.075*	-0.120	0.466
	(0.331)	(0.053)	(0.044)	(0.399)	(0.454)
Log of total laborers in province	-1.215**	0.194	0.263	0.068	0.572
	(0.591)	(0.215)	(0.161)	(1.179)	(0.621)
Log of the average wage of province	-0.533***	0.081*	0.114***	-0.284	0.012
	(0.167)	(0.048)	(0.035)	(0.327)	(0.035)
time	0.769***	-0.147***	-0.129***	0.754***	-0.178
	(0.132)	(0.041)	(0.032)	(0.239)	(0.177)
Constant	25.331***	-3.381*	-1.715	10.598	-8.693
	(6.020)	(1.866)	(1.381)	(10.300)	(8.768)
Observations	3,893	3,914	3,914	3,763	3,741
R-squared	0.046	0.017	0.084	0.140	0.011
Number of id	2,698	2,715	2,715	2,590	2,577

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.7: Regression of firm outcomes on communes of the BW program

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Commune having etter work firms (yes=1)	-0.004	-0.002	0.012	-0.001	-0.006	0.012	-0.009	-0.015	-0.025	-0.028
	(0.043)	(0.010)	(0.017)	(0.017)	(0.022)	(0.052)	(0.013)	(0.010)	(0.062)	(0.020)
Log of the number of firms in province	0.060	-0.083**	-0.067	-0.050	-0.292***	-0.889***	0.270***	0.032	-0.100	0.210
	(0.122)	(0.033)	(0.062)	(0.061)	(0.090)	(0.170)	(0.042)	(0.026)	(0.197)	(0.185)
Log of total laborers in province	1.133**	0.231	-0.014	-0.055	0.690*	1.048	-0.375*	0.220*	1.705**	0.023
	(0.527)	(0.148)	(0.216)	(0.219)	(0.384)	(0.689)	(0.212)	(0.131)	(0.840)	(0.339)
Log of the average wage of province	-0.130	0.157***	-0.146*	-0.159**	0.014	0.127	-0.241***	0.150***	0.756**	0.188
	(0.156)	(0.045)	(0.080)	(0.078)	(0.138)	(0.214)	(0.070)	(0.042)	(0.305)	(0.227)
Time	-0.042	-0.050**	0.083**	0.081**	0.488***	0.380***	-0.004	-0.118***	0.309**	-0.110
	(0.076)	(0.021)	(0.036)	(0.036)	(0.061)	(0.108)	(0.032)	(0.018)	(0.142)	(0.130)
Constant	-4.931	-0.839	1.735	1.950	0.578	8.824	1.579	-2.172**	-6.380	-2.812
	(4.101)	(1.199)	(1.822)	(1.877)	(3.062)	(5.903)	(1.826)	(1.091)	(7.488)	(4.802)
Observations	9,344	9,342	8,542	8,372	9,301	9,324	9,344	9,344	9,149	9,115
R-squared	0.002	0.032	0.006	0.004	0.270	0.036	0.035	0.089	0.148	0.005
Number of id	5,301	5,301	5,238	5,200	5,293	5,300	5,301	5,301	5,255	5,248

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.8: Regression of firm outcomes on communes of the BW program

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Ratio of number of better work firms to all commune firms	-0.144	0.014	0.022	-0.037	-0.039	-0.122	0.092*	-0.074	-0.109	-0.000
	(0.148)	(0.047)	(0.071)	(0.085)	(0.096)	(0.163)	(0.047)	(0.057)	(0.206)	(0.018)
Log of the number of firms in province	0.056	-0.090***	-0.061	-0.044	-0.280***	-0.849***	0.261***	0.028	-0.072	0.212
	(0.124)	(0.031)	(0.063)	(0.063)	(0.091)	(0.171)	(0.042)	(0.027)	(0.197)	(0.188)
Log of total laborers in province	1.165**	0.224	0.046	-0.048	0.756**	1.041	-0.390*	0.181	1.800**	-0.052
	(0.484)	(0.151)	(0.206)	(0.217)	(0.371)	(0.643)	(0.203)	(0.136)	(0.784)	(0.368)
Log of the average wage of province	-0.131	0.150***	-0.155**	-0.150**	0.045	0.179	-0.235***	0.162***	0.844***	0.222
	(0.161)	(0.042)	(0.077)	(0.075)	(0.141)	(0.223)	(0.070)	(0.044)	(0.320)	(0.239)
Time	-0.043	-0.046**	0.083**	0.076**	0.473***	0.357***	-0.003	-0.121***	0.269*	-0.123
	(0.077)	(0.019)	(0.036)	(0.036)	(0.062)	(0.110)	(0.032)	(0.019)	(0.145)	(0.135)
Constant	-5.129	-0.695	1.257	1.807	-0.136	8.341	1.739	-1.879*	-7.676	-2.395
	(3.882)	(1.192)	(1.792)	(1.886)	(3.037)	(5.678)	(1.781)	(1.135)	(7.086)	(4.916)
Observations	9,270	9,268	8,501	8,333	9,227	9,250	9,270	9,270	9,077	9,045
R-squared	0.002	0.032	0.006	0.004	0.270	0.035	0.034	0.089	0.150	0.004
Number of id	5,271	5,271	5,226	5,188	5,263	5,270	5,271	5,271	5,226	5,221

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.
*** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.9: Regression of firm outcomes on communes of the BW program

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Ratio of number of better work firms to all commune firms	-0.112	0.012	0.019	-0.038	-0.015	-0.075	0.076	-0.082	-0.069	-0.004
	(0.136)	(0.045)	(0.068)	(0.082)	(0.098)	(0.159)	(0.056)	(0.060)	(0.226)	(0.017)
Better work firms (yes=1)	0.108*	-0.012	-0.013	-0.023	0.069**	0.249***	-0.043	-0.022*	0.135	-0.005
	(0.056)	(0.014)	(0.017)	(0.027)	(0.034)	(0.085)	(0.031)	(0.013)	(0.089)	(0.010)
Log of the number of firms in province	0.075	-0.089***	-0.066	-0.041	-0.286***	-0.792***	0.253***	0.025	-0.050	0.206
	(0.118)	(0.031)	(0.060)	(0.060)	(0.089)	(0.166)	(0.043)	(0.026)	(0.190)	(0.183)
Log of total laborers in province	1.084**	0.238	0.026	-0.075	0.813**	0.855	-0.303	0.201	1.665**	-0.061
	(0.448)	(0.146)	(0.198)	(0.206)	(0.351)	(0.613)	(0.193)	(0.131)	(0.755)	(0.355)
Log of the average wage of province	-0.128	0.148***	-0.153**	-0.144*	0.029	0.194	-0.235***	0.159***	0.835***	0.216
	(0.158)	(0.042)	(0.076)	(0.074)	(0.138)	(0.220)	(0.069)	(0.043)	(0.315)	(0.234)
Time	-0.047	-0.046**	0.085**	0.074**	0.477***	0.339***	-0.004	-0.120***	0.269*	-0.118
	(0.075)	(0.018)	(0.035)	(0.036)	(0.060)	(0.106)	(0.031)	(0.018)	(0.141)	(0.132)
Constant	-4.629	-0.800	1.455	1.969	-0.447	9.198*	1.161	-1.988*	-6.744	-2.244
	(3.675)	(1.145)	(1.734)	(1.820)	(2.894)	(5.427)	(1.689)	(1.093)	(6.851)	(4.778)
Observations	9,531	9,529	8,761	8,590	9,488	9,510	9,531	9,531	9,338	9,306
R-squared	0.00249	0.033	0.006	0.004	0.278	0.0373	0.032	0.0919	0.154	0.004
Number of id	5,402	5,402	5,357	5,319	5,394	5,401	5,402	5,402	5,357	5,352

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.

*** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.10: Regression of firm outcomes on communes of the BW program

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Ratio of number of better work firms to the total apparel firms in communes	0.262	0.088	-0.101	-0.140	0.068	0.129	0.108	-0.236*	0.147	0.006
	(0.403)	(0.135)	(0.139)	(0.175)	(0.250)	(0.365)	(0.105)	(0.123)	(0.532)	(0.036)
Better work firms (yes=1)	0.112**	-0.012	-0.013	-0.023	0.070**	0.248***	-0.041	-0.019	0.140	-0.005
	(0.056)	(0.014)	(0.017)	(0.027)	(0.034)	(0.085)	(0.031)	(0.012)	(0.089)	(0.009)
Log of the number of firms in province	0.077	-0.082**	-0.071	-0.047	-0.298***	-0.832***	0.261***	0.026	-0.081	0.202
	(0.116)	(0.033)	(0.059)	(0.059)	(0.088)	(0.165)	(0.042)	(0.026)	(0.191)	(0.180)
Log of total laborers in province	1.034**	0.238	0.013	-0.085	0.735**	0.895	-0.317	0.193	1.500*	-0.072
	(0.446)	(0.146)	(0.195)	(0.203)	(0.346)	(0.617)	(0.195)	(0.130)	(0.763)	(0.347)
Log of the average wage of province	-0.121	0.157***	-0.154**	-0.151**	0.003	0.134	-0.233***	0.161***	0.771**	0.206
	(0.153)	(0.044)	(0.074)	(0.073)	(0.134)	(0.216)	(0.068)	(0.042)	(0.308)	(0.228)
Time	-0.048	-0.051**	0.088***	0.079**	0.490***	0.366***	-0.007	-0.121***	0.301**	-0.114
	(0.074)	(0.020)	(0.034)	(0.035)	(0.059)	(0.106)	(0.031)	(0.018)	(0.140)	(0.129)
Constant	-4.302	-0.897	1.610	2.133	0.345	9.462*	1.185	-1.943*	-4.983	-2.075
	(3.637)	(1.170)	(1.693)	(1.777)	(2.836)	(5.456)	(1.697)	(1.077)	(6.913)	(4.670)
Observations	9,606	9,604	8,803	8,630	9,563	9,585	9,606	9,606	9,411	9,377
R-squared	0.002	0.033	0.006	0.004	0.277	0.038	0.033	0.092	0.152	0.004
Number of id	5,432	5,432	5,369	5,331	5,424	5,431	5,432	5,432	5,386	5,379

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.

*** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.11: Regression of firm outcomes on communes of the BW program

Explanatory variables	Log of the number of workers	Proportion of female workers	Proportion of workers with insurance	Proportion of female workers with insurance	Log of wage per worker (Mil. VND/year)	Log of capital	Ratio of owned capital in total capita	Ratio of fixed-assets in total asset	Log of revenue	Ratio of profit to revenue
Ratio of number of better work firms to the total apparel firms in communes	-0.112	0.012	0.019	-0.038	-0.015	-0.075	0.076	-0.083	-0.070	-0.004
	(0.136)	(0.045)	(0.068)	(0.082)	(0.098)	(0.159)	(0.055)	(0.060)	(0.226)	(0.017)
Better work firms (yes=1)	0.144	-0.056*	0.022	0.021	0.028	0.288	-0.000	-0.011	0.254**	0.007
	(0.102)	(0.032)	(0.026)	(0.049)	(0.056)	(0.177)	(0.047)	(0.018)	(0.127)	(0.016)
Ratio of number of better work firms to the total apparel firms in communes * Better work firms (yes=1)	-0.091	0.111*	-0.087	-0.107	0.103	-0.101	-0.109	-0.025	-0.299	-0.032
	(0.151)	(0.060)	(0.071)	(0.109)	(0.106)	(0.282)	(0.108)	(0.034)	(0.192)	(0.029)
Log of the number of firms in province	0.075	-0.088***	-0.066	-0.042	-0.286***	-0.792***	0.252***	0.025	-0.051	0.206
	(0.118)	(0.031)	(0.060)	(0.060)	(0.089)	(0.166)	(0.043)	(0.026)	(0.191)	(0.183)
Log of total laborers in province	1.079**	0.245*	0.017	-0.087	0.819**	0.850	-0.309	0.200	1.647**	-0.063
	(0.449)	(0.148)	(0.201)	(0.209)	(0.351)	(0.617)	(0.192)	(0.131)	(0.756)	(0.356)
Log of the average wage of province	-0.128	0.148***	-0.153**	-0.143*	0.029	0.194	-0.235***	0.159***	0.835***	0.216
	(0.158)	(0.042)	(0.076)	(0.074)	(0.138)	(0.220)	(0.069)	(0.043)	(0.315)	(0.234)
Time	-0.047	-0.047**	0.086**	0.075**	0.477***	0.340***	-0.003	-0.120***	0.270*	-0.118
	(0.075)	(0.018)	(0.035)	(0.036)	(0.060)	(0.106)	(0.031)	(0.018)	(0.141)	(0.132)
Constant	-4.585	-0.854	1.529	2.066	-0.497	9.245*	1.213	-1.976*	-6.599	-2.228
	(3.682)	(1.159)	(1.751)	(1.832)	(2.897)	(5.452)	(1.688)	(1.094)	(6.864)	(4.783)
Observations	9,531	9,529	8,761	8,590	9,488	9,510	9,531	9,531	9,338	9,306
R-squared	0.003	0.034	0.006	0.004	0.278	0.037	0.0323	0.0920	0.154	0.004
Number of id	5,402	5,402	5,357	5,319	5,394	5,401	5,402	5,402	5,357	5,352

Robust standard errors in parentheses. The standard errors are corrected for within-district correlation.

*** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.12.Estimation of propensity score

treatment	Coef.	Std. Err.	z	P>z
Log of the number of workers	0.267	0.063	4.24	0.000
Proportion of female workers	1.549	0.418	3.71	0.000
Proportion of workers with insurance	0.607	0.217	2.80	0.005
Log of wage per worker (Mil. VND/year)	0.061	0.126	0.48	0.629
Log of capital	-0.099	0.061	-1.62	0.106
Log of revenue	0.105	0.063	1.67	0.095
Binh Duong province	0.946	0.150	6.29	0.000
DongNai province	0.754	0.188	4.01	0.000
Ho Chi Minh city	0.691	0.134	5.17	0.000
_cons	-5.616	0.598	-9.40	0.000
Pseudo R2	0.3026			
Number of observations	3905			

Source: Authors' estimation from the EC 2009 and EC 2011.

Table A.13. Difference-in-difference with propensity score matching

Outcome variables	2009			2011			Diff-in-diff	
	Treated	Controls	Difference	Treated	Controls	Difference	Estimates	Std. Err.
Kernel propensity score matching with bandwidth of 0.01								
Log of the number of workers	6.633	6.518	0.115	6.816	6.595	0.221	0.106	0.073
Proportion of female workers	0.808	0.802	0.006	0.784	0.784	0.000	-0.005	0.012
Proportion of workers with insurance	0.893	0.876	0.017	0.918	0.873	0.045	0.028	0.016
Proportion of female workers with insurance	0.895	0.878	0.017	0.905	0.875	0.031	0.014	0.022
Log of wage per worker (Mil. VND/year)	3.349	3.344	0.005	3.850	3.741	0.109	0.104**	0.041
Log of capital	10.747	10.729	0.017	11.169	11.025	0.144	0.127	0.119
Ratio of owned capital in total capita	0.383	0.432	-0.048	0.357	0.427	-0.070	-0.022	0.042
Ratio of fixed-assets in total asset	0.424	0.392	0.032	0.349	0.323	0.027	-0.005	0.036
Log of revenue	11.061	10.922	0.139	11.761	11.439	0.322	0.183	0.145
Ratio of profit to revenue	0.044	0.080	-0.036	0.039	0.052	-0.012	0.024	0.051

Outcome variables	2009			2011			Diff-in-diff	
Kernel propensity score matching with bandwidth of 0.05								
	Treated	Controls	Difference	Treated	Controls	Difference	Estimates	Std. Err.
Log of the number of workers	6.633	6.346	0.288	6.816	6.420	0.396	0.108	0.092
Proportion of female workers	0.808	0.789	0.019	0.784	0.772	0.012	-0.007	0.012
Proportion of workers with insurance	0.893	0.839	0.054	0.918	0.839	0.079	0.025	0.020
Proportion of female workers with insurance	0.895	0.842	0.053	0.905	0.841	0.064	0.011	0.024
Log of wage per worker (Mil. VND/year)	3.349	3.328	0.021	3.850	3.719	0.131	0.111**	0.043
Log of capital	10.747	10.626	0.121	11.169	10.902	0.267	0.146	0.113
Ratio of owned capital in total capita	0.383	0.426	-0.043	0.357	0.422	-0.065	-0.023	0.042
Ratio of fixed-assets in total asset	0.424	0.387	0.037	0.349	0.316	0.033	-0.004	0.031
Log of revenue	11.061	10.826	0.234	11.761	11.349	0.412	0.177	0.124
Ratio of profit to revenue	0.044	0.114	-0.070	0.039	0.040	-0.001	0.070	0.080

Source: Authors' estimation from the EC 2009 and EC 2011.