

## **Determinants of labour demand in the manufacturing sector: does firm ownership matter?**

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*This paper examines the effect of firm ownership on labour demand in Vietnamese manufacturing over the period 2000-09. The core focus of the paper is an econometric analysis of the determinants of labour demand in a manufacturing firm using firm-level data. The results show that the labour demand of domestic private firms and FIEs has responded slowly to wage changes while wholly owned FIEs and joint ventures are found to have higher employment elasticity with respect to output, compared to domestic firms, in particular in the export-oriented industries. Interestingly, the impact of firm ownership on labour demand has been missing after further outward-oriented reforms since 2006.*

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## **1. Introduction**

Much of the interest in the effects of economic reforms in a labour-abundant developing economy concerns the effects on manufacturing employment. In fact, there is a vast literature examining the impact of international trade and foreign investment on employment generation in manufacturing in developing countries.<sup>1</sup> So far few research attempts have been undertaken to examine manufacturing employment in Vietnam following outward-oriented economic policy reforms. Several studies, however, investigate the issue of firm-ownership types in association with labour productivity, export propensity and wages in the Vietnamese manufacturing sector (Athukorala & Tran 2012; Phan & Ramstetter 2004b, 2004a, 2009). In addition, the overall trends and patterns of manufacturing employment resulting from trade and investment liberalization have been examined in a further few empirical studies (Fukase 2012; Jenkins 2004; Jenkins 2006; Kien & Heo 2009; McCaig 2011). Out of this literature, an assertion that developing labour-intensive manufacturing for exports is an important premise for job generation and poverty alleviation is one of the key concerns in the theoretical framework of the Lewis-Fei-Ranis growth model in a labour-abundant economy such as Vietnam. However, the important issue of how firm ownership affect labour demand for a manufacturing firm in a context of export-oriented industrialization (EOI) in Vietnam is yet to be explored and we also need to examine how it can inform current debate about job creation following EOI.

On these grounds, there is a key rationale for expecting varied impacts of firm ownership on labour demand in a manufacturing sector following economic reforms in a developing economy. One possible explanation for this is that foreign investment enterprises normally show more efficiency in business performance than domestic firms due to acquisition of firm-specific assets (Bellak 2004; Lipsey 2004; Ramstetter 1999; Ramstetter & Sjöholm 2006). In addition, the development of private firms can also contribute to labour expansion in the manufacturing sector because these firms tend to be involved in labour-intensive industries as has been the case in labour-abundant economies in East Asia (Hill 1990a, 1990b; Ranis 1979; Riedel 1997; Song 1990). By contrast, in a typical transition economy, state owned

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<sup>1</sup>For useful surveys of this literature, see Currie & Harrison 1997; Feenstra & Hanson 1996; Feenstra & Hanson 1997; Greenaway, Hine & Wright 1999; Hanson & Harrison 1999; Harrison & Hanson 1999; Hasan & Chen 2004; Lipsey 2004; Sjöholm & Lipsey 2006; Suryahadi, Chen & Tyers 2001.

enterprises which were assigned a significant position for economic development are mainly involved in capital-intensive industries with low job creation (Djankov & Murrell 2002; Megginson & Netter 2001).

This paper examines this and related issues through an analysis of determinants of labour demand in Vietnamese manufacturing in relation to outward-oriented economic policy reforms over the period 2000-09. Thus, my proposition, derived from the association between firm ownership and manufacturing performance, is that changes in firm ownership types following the outward-oriented reforms can lead to a significant variation on labour demand through its impact on output and wages. These variations in ownership have emanated through reforming public enterprises, developing domestic private firms as well as attracting foreign invested enterprises during the reform process.

In this paper, I am specifically interested in the performance of manufacturing employment, because the dynamism of employment expansion in a labour abundant economy relies heavily on this sector. The empirical core of this paper provides an econometric analysis of determinants of labour demand, using a firm-level panel data set, paying attention to the implications of firm-ownership types. The panel dataset used in the study is derived from the unpublished returns to the annual Enterprise Survey, undertaken by the General Statistical Office of Vietnam (GSO) in the period 2000-09.

The structure of this paper is as follows. Section 2 provides an overview of the trends and patterns of manufacturing employment, to set the stage for the ensuing empirical analysis. Section 3 examines the firm ownership impact on labour demand in manufacturing firms to show variation in labour demand elasticities with respect to output and wages, respectively. The final section provides some concluding remarks for implications of outward-oriented reforms on labour demand in Vietnamese manufacturing.

## **2. Outward-oriented reforms and manufacturing employment: An overview**

Outward-oriented economic policy reforms since the early 2000s have generated special interest in how effective the role of manufacturing has been in job generation in Vietnam. This section begins with an examination of employment growth and its patterns in particular manufacturing industries, with reference to five firm ownership groups. Following from this,

it presents a statistical description of the industrial composition of manufacturing with respect to ownership category and firm size.

There has been a significant increase in employment in the manufacturing sector in Vietnam following the economic reforms.<sup>2</sup> This growth has mainly been driven by the dynamism of a private firm group, which has played a pivotal role in notable changes in employment composition over the period 2000-09. Domestic private enterprises and wholly owned foreign-invested enterprises (FIEs) dominated this impressive employment generation, while an SOE group recorded a downturn in job creation throughout this period. At the same time, employment in a group of joint venture FIEs has been minor and stable. The data on employment growth and its patterns, presented by firm ownership group for every particular industry, are summarized in Tables 1 and 2. The data reveal several interesting features.

The role of SOEs in labour absorption has mostly declined across sub-industries. As can be seen in Table 2, from the early 2000s, this public enterprise group played an important role in job creation across most two-digit industries, except for the office, accounting and computing machinery industry (VSIC 30). However, in this first decade of the 2000s, only capital-intensive industry (VSIC 34, 35), e.g. motor vehicles, achieved modest job growth (Table 1). By 2009, the contribution of SOEs to employment generation was almost negligible in export-oriented industries, typically those that supported the manufacture of apparel (VSIC 181) and footwear (VSIC 192). Apart from motor vehicles, there were only four other sub-industries in which the public enterprise group accounted for more than a quarter of total employment in 2009. These were tobacco (VSIC 16), publishing and printing (VSIC 22), chemical products (VSIC 24) and basic metals (VSIC 27). A majority of enterprises operating in these sub-industries were still government-owned, through state-monopoly power. This is somewhat consistent with the concentration of SOEs in Vietnamese industrial structure. The sluggish employment growth in this public enterprise group is explained by the government's efforts to restructure as well as downsize SOEs and even to privatize a number of inefficient ones. Above all, this declining trend was also reflected in SOE's affiliates, which meant that joint ventures with state enterprises in a foreign investment group had only a minor job creation role in almost all sub-industries.

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<sup>2</sup> Over the period 2000-09, manufacturing had a striking employment growth rate, around 8.2 per cent per annum. This figure was computed from GSO, Statistical Yearbook 2000 & 2009.

**Table 1: Annual compound growth of manufacturing employment in Vietnam, 2000-2009 (in %)**

<b>Manufacturing industries by a two-digit VSIC</b>	<b>All firms</b>	<b>SOEs</b>	<b>JV with State</b>	<b>Domestic private</b>	<b>JV with Private</b>	<b>Wholly owned FIEs</b>
15: Food products	6.6	-12.6	-1.9	18.9	22.4	13.8
16: Tobacco products	1.6	1.3	9.3	-2.4	n.a.	n.a.
17: Manufacture of textiles	4.4	-10.5	-9.1	14.6	13.7	14.5
18: Wearing apparel	14.8	-9.4	2.9	18.6	16.9	31.1
<i>181: Manufacture of wearing apparel</i>	15.0	-9.4	4.7	19.0	16.9	31.2
19: Leather products	8.8	-16.8	-20.3	4.4	48.5	17.3
<i>192: Footwear</i>	8.6	-16.6	-20.3	4.6	48.4	17.1
20: Wood products	7.9	-8.3	-6.3	11.2	4.8	8.8
21: Paper products	10.0	-7.0	-12.5	15.1	12.9	21.0
22: Publishing and printing	10.8	-1.9	n.a.	39.1	7.3	57.0
24: Chemical products	6.7	-6.3	-4.9	24.1	13.9	20.1
25: Rubber and plastic products	14.6	-4.2	-5.7	17.7	12.4	23.1
26: Non-metallic mineral products	9.4	-3.3	7.4	22.3	7.8	16.8
27: Basic metals	8.8	-3.7	1.1	29.2	10.3	34.5
28: Fabricated metal products	16.5	-3.3	-0.1	24.5	26.2	27.5
29: Machinery and equipment n.e.c	7.9	-9.7	-9.1	27.0	21.4	15.7
30: Office, accounting and computing machinery	30.9	n.a.	n.a.	n.a.	n.a.	30.7
31: Electrical machinery and apparatus	13.4	-5.5	3.5	20.9	28.5	19.8
32: Radio, television and communication equipment	18.2	-8.7	-4.4	16.6	28.5	34.6
33: Medical, precision and optical instruments	10.6	-30.2	1.8	0.7	n.a.	24.6
34: Motor vehicles, trailers and semi-trailers	15.1	7.3	6.8	19.8	9.5	31.4
35: Manufacture of other transport means	14.0	4.6	21.9	23.4	16.7	24.3
36: Manufacture of furniture, n.e.c	20.9	0.7	-5.3	18.5	20.3	26.3
<i>361: Furniture</i>	23.4	0.2	-3.6	21.2	20.6	33.7
<b>Whole manufacturing</b>	<b>11.0</b>	<b>-7.0</b>	<b>1.6</b>	<b>16.4</b>	<b>22.0</b>	<b>22.1</b>

**Note:** n.a: data not available.

**Source:** Author's calculation based on the unpublished GSO enterprise survey 2000-2009.

**Table 2: Manufacturing employment by ownership in Vietnam, 2000 and 2009 (in %)**

Manufacturing industries by a two-digit VSIC	Total employment ('000 people)		Percentage shares									
			SOEs		JVs with State		Domestic private		JVs with Private		Wholly owned FIEs	
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009
15: Food products	254	453	54.7	9.1	5.5	2.6	24.8	65.8	0.8	2.9	6.9	12.4
16: Tobacco products	12	14	95.6	93.0	3.0	5.9	1.1	0.7	0.0	0.0	0.0	0.0
17: Manufacture of textiles	121	178	61.4	15.4	3.3	1.0	18.6	42.9	0.5	1.0	15.5	35.6
18: Wearing apparel	217	753	52.3	6.2	1.8	0.7	28.0	37.5	1.7	2.0	15.9	52.1
<i>181: Manufacture of wearing apparel</i>	214	752	52.9	6.2	1.6	0.7	27.6	37.5	1.8	2.0	15.9	52.2
19: Leather products	282	600	25.6	2.3	3.0	0.2	37.1	25.7	0.3	4.3	34.0	67.1
<i>192: Footwear</i>	259	543	26.3	2.4	3.3	0.2	36.8	26.4	0.3	4.8	33.3	66.0
20: Wood products	60	119	29.6	6.9	2.8	0.8	50.7	66.4	1.4	1.1	10.0	10.8
21: Paper products	35	82	46.7	10.3	1.5	0.2	39.4	59.5	0.3	0.3	8.8	20.9
22: Publishing and printing	22	57	91.8	30.7	0.0	0.0	4.0	31.0	0.7	0.5	0.5	11.5
24: Chemical products	64	114	72.9	22.5	5.5	2.0	12.1	47.1	0.8	1.4	6.9	20.0
25: Rubber and plastic products	47	162	35.6	7.1	5.0	0.9	31.8	40.3	1.8	1.5	22.6	42.9
26: Non-metallic mineral products	123	278	63.6	20.9	4.4	3.7	24.2	65.7	0.5	0.4	3.3	5.8
27: Basic metals	29	62	80.9	26.9	3.9	2.0	11.4	53.7	1.1	1.2	1.6	10.7
28: Fabricated metal products	48	190	50.5	9.5	7.3	1.8	23.2	42.3	0.5	1.1	13.0	29.4
29: Machinery and equipment n.e.c	30	59	70.7	14.2	2.0	0.4	11.6	50.0	0.4	1.2	13.0	24.4
30: Office, accounting & computing machinery	3	34	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	99.5	98.0
31: Electrical machinery and apparatus	36	113	38.4	7.4	8.8	3.9	9.7	17.3	0.3	0.8	41.8	68.3
32: Radio, television & communication equipment	16	71	44.6	4.4	20.5	3.1	7.7	6.8	1.1	2.3	25.3	81.4
33: Medical, precision and optical instruments	7	16	31.4	0.5	8.0	3.8	33.7	14.5	0.0	0.3	25.8	75.7
34: Motor vehicles, trailers and semi-trailers	15	52	50.9	27.3	18.3	9.4	13.6	19.6	0.2	0.1	12.3	40.9
35: Manufacture of other transport means	38	125	63.3	29.1	8.8	16.1	13.2	27.0	2.9	3.6	10.1	22.0
36: Manufacture of furniture, n.e.c	63	346	9.6	1.8	2.1	0.2	49.5	41.3	1.5	1.4	34.2	50.4
<i>361: Furniture</i>	39	258	12.0	1.8	2.7	0.3	58.3	49.4	2.4	1.9	20.8	42.6
<b>Whole manufacturing</b>	<b>1,522</b>	<b>3,882</b>	<b>48.4</b>	<b>9.9</b>	<b>4.2</b>	<b>1.9</b>	<b>27.0</b>	<b>41.7</b>	<b>0.9</b>	<b>2.0</b>	<b>16.8</b>	<b>39.7</b>

Source: Author's calculation based on the unpublished GSO enterprise survey 2000-2009

**Table 3: Industrial composition of manufacturing employment by three main specific ownership in Vietnam, 2000 & 2009(in %)**

Manufacturing industries by a two-digit VSIC	Total employment		SOEs		Domestic private		Wholly owned FIEs	
	2000	2009	2000	2009	2000	2009	2000	2009
<i>(1) Labour intensive sector</i>	<b>50.4</b>	<b>55.9</b>	<b>42.0</b>	<b>32.1</b>	<b>55.1</b>	<b>43.4</b>	<b>75.8</b>	<b>79.2</b>
<b>Traditional labour intensive</b>	<b>46.3</b>	<b>49.8</b>	<b>38.9</b>	<b>29.0</b>	<b>53.4</b>	<b>41.7</b>	<b>66.5</b>	<b>67.5</b>
17: Manufacture of textiles	7.9	4.6	10.1	7.1	5.5	4.7	7.3	4.1
18: Wearing apparel	14.3	19.4	15.4	12.1	14.8	17.5	13.4	25.5
19: Leather products	18.5	15.5	9.8	3.6	25.4	9.6	37.4	26.1
36: Manufacture of furniture, n.e.c	4.1	8.9	0.8	1.7	7.5	8.8	8.3	11.3
22: Publishing and printing	1.5	1.5	2.8	4.5	0.2	1.1	0.0	0.4
<b>Electronics</b>	<b>4.1</b>	<b>6.0</b>	<b>3.1</b>	<b>3.0</b>	<b>1.7</b>	<b>1.7</b>	<b>9.3</b>	<b>11.7</b>
30: Office, accounting and computing machinery	0.2	0.9	0.0	0.0	0.0	0.0	1.2	2.2
31:Electrical machinery and apparatus	2.4	2.9	1.9	2.2	0.9	1.2	5.9	5.0
32: Radio, television and communication equipment	1.0	1.8	1.0	0.8	0.3	0.3	1.6	3.8
33: Medical, precision and optical instruments	0.4	0.4	0.3	0.0	0.5	0.1	0.7	0.8
<i>(2) Resource based, labour-intensive sector</i>	<b>21.4</b>	<b>15.1</b>	<b>22.8</b>	<b>16.2</b>	<b>22.7</b>	<b>23.3</b>	<b>9.1</b>	<b>4.5</b>
15: Food products	16.7	11.7	18.9	10.8	15.3	18.4	6.8	3.6
16: Tobacco products	0.8	0.3	1.5	3.3	0.0	0.0	0.0	0.0
20: Wood products	3.9	3.1	2.4	2.1	7.4	4.9	2.3	0.8
<i>(3) Resource based, capital-intensive sector</i>	<b>19.6</b>	<b>18.0</b>	<b>24.6</b>	<b>31.3</b>	<b>16.9</b>	<b>23.7</b>	<b>8.8</b>	<b>8.6</b>
21: Paper products	2.3	2.1	2.2	2.2	3.3	3.0	1.2	1.1
24: Chemical products	4.2	2.9	6.3	6.7	1.9	3.3	1.7	1.5
25: Rubber and plastic products	3.1	4.2	2.3	3.0	3.7	4.0	4.2	4.5
26: Non-metallic mineral products	8.1	7.2	10.7	15.1	7.3	11.3	1.6	1.1
27: Basic metals	1.9	1.6	3.2	4.3	0.8	2.0	0.2	0.4
<i>(4) Capital intensive sector</i>	<b>8.6</b>	<b>11.0</b>	<b>10.5</b>	<b>20.1</b>	<b>5.3</b>	<b>9.5</b>	<b>6.2</b>	<b>7.7</b>
28: Fabricated metal products	3.2	4.9	3.3	4.7	2.7	5.0	2.5	3.6
29: Machinery and equipment n.e.c	2.0	1.5	2.9	2.2	0.8	1.8	1.5	0.9
34: Motor vehicles, trailers and semi-trailers	1.0	1.3	1.0	3.7	0.5	0.6	0.7	1.4
35: Manufacture of other transport means	2.5	3.2	3.3	9.5	1.2	2.1	1.5	1.8
<b>Total employment ('000 people)</b>	<b>1,522</b>	<b>3,882</b>	736	384	412	1,617	256	1,541

Source: Author's calculation based on the unpublished GSO enterprise survey 2000-2009

Since 2000, growth in employment is observable in both firm ownership groups (domestic private enterprises and wholly owned FIEs) although at varying speeds as noted in Table 1. The employment expansion in these two firm groups has compensated for the contraction in SOE employment in most industries. For instance, between 2000 and 2009 the number of workers employed in the apparel industry (VSIC 181) expanded at an impressive rate of 15 per cent. This was driven primarily by the growing importance of both firm ownership groups (domestic private and wholly owned FIE) in labour absorption, despite a notable decline (minus nine per cent) in SOE employment over that period. Equally important is that the industries with the fastest employment growth over the examined period were those with the greatest participation of domestic private firms or wholly owned FIEs. This feature is of relevance in manufacturing industries such as food products (VSIC 15), apparel (VSIC 181), footwear (VSIC 192) and furniture (VSIC 361), in which private firms have the most impressive job growth. This pronounced shift in employment pattern away from state toward private ownership is prominent among East Asian economies (Ranis 1979; Song 1990).

The increasing importance of the private firm ownership group in job generation across particular industries in Vietnamese manufacturing has been underpinned by the expansion of industries with high export-orientation. The period 2000-09 has witnessed a marked employment expansion by domestic private firms and wholly owned FIEs, possibly influenced by the rise in exports. However, there have been contrasting trends among these firm ownership groups. By 2009, the employment share of the domestic private firm group across export industries was particularly high in food processing, wood products and furniture industries. These industries largely depend on the supply of domestic resources for production. At the same time, the group of wholly owned FIEs dominates conventional labour-intensive industries, such as garments and footwear. A corollary to this dominance in the traditional labour-intensive sector is the contribution of this firm group to employment generation in the newly emerging export industry of electronics (VSIC30-33).

In another perspective, Table 3 shows the industrial composition of employment disaggregated into three main firm ownership groups.<sup>3</sup> Manufacturing sub-industries are classified into four main sectors in order to facilitate analysis. This classification is broadly in line with an examination of factor intensity in manufacturing trade and production (Krause

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<sup>3</sup> Two corporate forms of joint-venture FIEs played unimportant roles in employment generation over the period 2000-09 due to their minor shares in total employment.

1982; Lary 1968).<sup>4</sup> These are labour-intensive, resource-based (labour-and capital-intensive) and capital-intensive sectors. The former includes traditional labour-intensive industries and electronics. It is particularly interesting to note that a factor intensity ranking for the electronics industry is shown to unambiguously change between industrialized economies and developing ones (Lall 2000), so it is quite logical to treat this industry as a labour-intensive sector in the context of a labour-abundant developing economy. This treatment is relevant to this empirical analysis due to the rise of global production networks, which expand trade through the fragmentation-based division of labour (Athukorala & Hill 2010). Consequently, this composition shows three notable remarks.

First, there has been a growing concentration of a wholly owned FIE group in the labour-intensive sector over the period 2000-09. During this time, above three-quarters of workers employed in this group came from this sector. The high export-orientation of the manufacture of apparel and footwear has been the dominant factor behind this structural shift. In 2009, each of these two industries accounted for about a quarter of total employment created within this firm group. Within this wholly owned FIE group, the electronics industry contributed another 10 per cent of total employment. This suggests that export-oriented FIEs have become a dynamic driver of employment generation in the manufacturing sector. Regarding the domestic private firm group, the number of workers recruited within this group is more equally distributed across all sub-industries. Of particular interest is that the employment share of this group has significantly reduced in both areas of labour-intensive sectors (traditional and resource-based) during 2000-09. This group is less heavily concentrated on the traditional labour-intensive sector (accounting for about 40 per cent of the total employment generated within this firm ownership group) compared to the wholly owned FIE group in 2009. However, the domestic private firms recorded a noticeable increase in their share of total employment for the resource-based, labour-intensive sector. By contrast, SOEs have become less labour-intensive over the years. Within this public ownership group, the employment share of the traditional labour-intensive sector declined from 38.9 per cent to 29 per cent between 2000 and 2009. It appears that state enterprises relied heavily on resource- or capital-intensive industries, which normally require advanced technology and large-scale capital investment.

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<sup>4</sup>These capital intensity ratios have been computed from the data compiled from the Enterprise Survey of 2000-09 at the 4-digit level of disaggregation.

In terms of firm size, compositional shifts in the employment size distribution by ownership group capture quite accurately the evolution of enterprise reform (Table 4). First, among various ownership groups, domestic private firms are by far the most numerous, and employ the largest workforce in a segment of small firms with 20-49 workers. As would be expected, this domestic private firm group has reaped the main benefits of the reforms, its employment shares across every segment of firms with different sizes increased significantly over this period. The other two segments in which this firm group have higher shares of employment in (at least a half of employment) in 2009 accord with expectation: small-medium and large-medium firms. Second, an interesting feature of the wholly owned FIE group is a rising proportion of employment share of this group involving large-sized firms. These large firms have been the major players in Vietnamese manufacturing in terms of job creation, their employment share has changed dramatically, rising to 53 per cent of total employment in the related firm-size segment in 2009. This outcome is consistent with an experience of foreign-invested manufacturing in the East Asian economies (Athukorala & Menon 1995; Koo 1985; Ranis & Schive 1985). All together, the legal reform on the enterprise and investment regime in 2000 together with further liberalization reforms in 2006 explains much of the proliferation of these private firms in Vietnamese manufacturing. Conversely, there was a shrinking employment share of firms with state ownership over the period 2000-09, but the decline was large by comparison for these segments of large medium and large firms. The erosion of public ownership in aggregate employment could have been ascribed at least in part to the effects of overall enterprise reform, in particular the privatization and downsizing of SOEs. An even more plausible reason is that the enterprise reform has freed up the private firms to expand their position in an economy rather than the role of privatizing the SOEs.

**Table 4: Size distribution of manufacturing employment by ownership\*, Vietnam 2000 and 2009 (in %)**

Size of firm (workforce)	SOEs		JV with State		Domestic private		JV with Private		Wholly owned FIEs	
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009
Small (20-49 employees)	8.3	1.0	2.4	0.3	80.9	87.3	1.1	0.9	7.4	10.5
Small-medium (50-199 employees)	32.1	4.7	5.5	1.3	48.2	70.0	1.6	1.6	12.5	22.4
Large-medium (200-499 employees)	50.2	11.2	6.0	2.4	27.0	53.1	1.1	2.1	15.7	31.3
Large (500+ employees)	56.6	12.5	3.6	2.2	19.5	30.1	0.6	2.4	19.7	52.7
<b>Whole manufacturing</b>	49.7	10.4	4.3	2.0	27.8	43.8	0.9	2.1	17.3	41.7

**Note:\*** Figures show the percentage of employment in each firm ownership group of enterprises with a workforce of 20-49,50-199, 200-499, and more than 500 workers. In each row, all figures for each year add up to 100.

**Source:** Author's calculation based on the unpublished GSO enterprise survey 2000-2009.

In sum, these data support the hypothesis that when aggregate manufacturing employment is expanding rapidly, the changing ownership type across different enterprises can generate a high rate of job creation, depending on the progress of the liberalization process in trade, investment and enterprise structure during the period 2000-09.

### 3. Firm ownership and labour demand in manufacturing

This section first develops the model specification for the analysis of determinants of labour demand at a firm level in Vietnamese manufacturing over the period 2000-09. A next part discusses estimation methodology, data sources and methods of data compilation. The final presents estimation results for the effects of economic reforms on labour demand in manufacturing, taking account of firm ownership features and industry characteristics.

#### 3.1 The model

The labour demand model developed by Hamermesh (1993) is widely applied in the literature.<sup>5</sup> It starts with a Hicks-neutral Cobb-Douglas demand function for the representative firm  $i$  in manufacturing in period  $t$ :

$$Y = A^\gamma L_{it}^\alpha K_{it}^\beta \quad (1)$$

Where  $i$ : firm,  $t$ : time,  $Y$  = real output;  $A$ = total factor productivity;  $K$  = capital stock;  $L$ = units of labour employed; and where  $\alpha$  and  $\beta$  denote the factor share coefficients and  $\gamma$  captures the growth in efficiency in the production process. The marginal products of each factor are  $\frac{\partial Y}{\partial L} = A^\gamma \alpha \frac{Y}{L}$  for labour and  $\frac{\partial Y}{\partial K} = A^\gamma \beta \frac{Y}{K}$  for capital. A profit-maximizing firm will utilize labour and capital at such levels that the marginal product of labour equals the wage ( $w$ ) and the marginal product of capital equals its user cost ( $r$ ). Solving this system simultaneously to eliminate capital from the equation for the firm output produces the following equation:

$$Y_{it} = A^\gamma L_{it}^\alpha \left[ \frac{\beta L w_{it}}{\alpha r_{it}} \right]^\beta \quad (2)$$

Transforming the equation by natural logarithm, with lower letters denoting logarithmic values, and manipulation gives the preliminary equation of the firm's derived labour demand as:

$$l_{it} = \lambda_0 + \lambda_1 y_{it} + \lambda_2 w_{it} + \lambda_3 r_t \quad (3)$$

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<sup>5</sup> See Fabbri et.al 2003, Görg et al. 2009; Greenaway, Hine & Wright 1999; Hamermesh 1993, Navaretti, Checchi & Turrini 2003; Mouelhi 2007 and the works cited therein.

Where:  $\lambda_0 = \frac{-(\gamma \ln A + \beta \ln \beta - \beta \ln \alpha)}{(\alpha + \beta)}$ ;  $\lambda_1 = \frac{1}{(\alpha + \beta)}$ ;  $\lambda_2 = \frac{-\beta}{(\alpha + \beta)}$  ·  $\lambda_3 = \frac{\beta}{(\alpha + \beta)}$

By definition,  $\lambda_1$ ,  $\lambda_2$  are output elasticity of labour demand and wage elasticity of labour demand, respectively.

Based on an equation (3), the basic empirical model used in this chapter can be written as:

$$l_{it} = \lambda_0 + \lambda_1 y_{it} + \lambda_2 w_{it} + \lambda_3 r_t + u_{it} \quad (4)$$

where  $l_{it}$  denotes the logarithmic value of employment level of firm  $i$  at time  $t$ .  $w_{it}$  is the logarithmic value of average wage of firm  $i$  at time  $t$ .  $y_{it}$  denotes the logarithmic value of revenues as a proxy for output. And  $r_t$  captures a rental cost of capital of a given firm at time  $t$ .  $u_{it}$  is a white-noise error term.

It is important to note that labour absorption in a firm will depend on firm-specific characteristics. The first feature is ownership, which used here, is typical of a firm operating in a transition economy. A process of restructuring and downsizing a state-owned enterprise (SOE) can lead to massive lay-offs, while a foreign investment enterprise exploiting a country's comparative advantage, may generate higher employment. In addition, incorporating this feature is also motivated by the literature on the behaviour of foreign-invested enterprises (FIEs) in host countries. Thus, in order to examine whether firm ownership impact on labour demand elasticities, an equation (4) is augmented by adding ownership dummies. Firms are divided into four ownership categories for this purpose. DP is a dummy for domestic private firm, it takes a value of one if the firm is a domestic private one and zero otherwise; JV is a dummy for joint ventures and WFIE is a dummy for wholly owned FIEs. And SOE is treated as the base dummy. To further investigate the effect of firm ownership, interaction terms between ownership dummies with output and wages, respectively are incorporated to measure the differential effect of firm ownership on labour demand.

Apart from the nature of ownership, industry characteristics can affect labour absorption in each firm. This is because firms in different industries would operate under various technologies that result in varied labour demands. We can assume that this is a source of industry-specific differences. For instance, employment generation could be higher in labour-intensive sub-industries than in resource-intensive ones. Thus, industry dummies for every

two-digit VSIC industry (INS) are included as an explanatory variable. It is worth noting that both these dummies presenting firm and industry characteristics can be varied over the period of study. This is explained by the ongoing revisions to legislation on enterprise formation and investment throughout the reform process, which allow firms to change ownership types as well as fields of business.

Adding these two dummy variables to the benchmark model (4) results in a full empirical model of examining a firm ownership impact on labour demand for a manufacturing firm:

$$\begin{aligned}
 l_{ijt} = & \lambda_0 + \lambda_1 y_{ijt} + \lambda_2 w_{ijt} + \lambda_3 r_t + \lambda_4 DP_{ijt} + \lambda_5 DP_{ijt} * y + \lambda_6 DP_{ijt} * w + \lambda_7 JV_{ijt} + \lambda_8 JV_{ijt} * y \\
 & + \lambda_9 JV_{ijt} * w + \lambda_{10} WFIE_{ijt} + \lambda_{11} WFIE_{ijt} * y + \lambda_{12} WFIE_{ijt} * w + \lambda_{13} INS_{ijt} + \gamma T_t + \mu_{ij} \\
 & + \varepsilon_{ijt} \quad (5)
 \end{aligned}$$

where  $i=1,2,\dots, n$  is the firm,  $j=1,2,\dots, k$  is the industry, and  $t=1,2,\dots, T$  is the time unit in years. The variables are listed below.

$l_{ijt}$	Employment in log form
$y_{ijt}$	Firm output in log form
$w_{ijt}$	Real wage in log form
DP	A dummy for domestic private firms
JV	A dummy for joint venture firms
WFIE	A dummy for wholly owned FIEs
INS	A vector of 21 industry dummies
$T_t$	A vector of time dummy variables
$\mu_{ij}$	“Unobserved effect” captures time-invariant firm features
$\varepsilon_{ijt}$	A stochastic error term

This empirical model specification has several crucial elements that deserve attention. First, we assume the supply of labour to a manufacturing sector is elastic so that a shift in labour away from agriculture into manufacturing can be made at low marginal cost.<sup>6</sup> In this way, wages can be treated as exogenous. This allows us to explain the estimated coefficients of output and wages as labour demand elasticity with respect to output and wages, respectively. As in my own study, real wages in the manufacturing sector are rising, thus, an assumption of elastic labour supply, which is able to capture an accurate summary of labour market conditions in Vietnam is very much consistent with our analytical framework of manufacturing employment based on the Lewis-Fei-Ranis growth model of a labour-abundant

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<sup>6</sup> The Lewis development model (1954) presumes that the supply of unskilled labour is perfectly elastic to the modern sector. Actually, the labour supply is only required to be elastic so that a shift in labour away from the subsistence sector to the modern sector can be made at low marginal wages.

economy. This assumption is also robust with relation to an analysis using firm-level datasets for relaxing endogeneity, an issue that we discuss later.

Second, the choice of estimating labour demand function conditional on output shows high relevance to our analysis of employment generation in the manufacturing in a developing economy.<sup>7</sup> This is explained by the notion that one of the most important objectives for many labour surplus developing countries is to generate new jobs in a modern sector (manufacturing) in order to recruit unskilled workers from agriculture (Lewis 1954). In light of this view, growth in output proxied for market size, which can partly rest on export growth, would translate into job generation in the manufacturing sector. Since exogenous shocks to product demand are likely to stimulate changes in demand for labour in a particular manufacturing industry in the same direction. Much less important is an effect of incorporating output variable in increasing estimation efficiency. A simple reason is that estimating the labour demand model controlling the product demand shocks captured by output changes is likely to alleviate bias on coefficient estimates.

The postulated effects of the explanatory variables on the dependent variable are as follows. The main explanatory variable in this labour demand model is the real wage rate ( $w$ ) which would be expected to be negative, since the negative sign in the coefficient implies a substitution relationship between labour and other input factors when wages increase. Another important control variable, real output ( $y$ ) is expected to be positive, since output growth for a firm exploring a comparative advantage of labour abundance would result in a higher level of labour absorption.

Next, a set of intercept dummies representing specific firm ownership categories (DP, JV and WFIE) are expected to be positive. This is because these private firms are assumed to have a higher level of job creation than public enterprises, since it is widely argued that the former have performed better in using capital and labour in labour-abundant economies (Kuo 1983; Song 1990). Regarding the interaction of the dummies with wages, the effect of these interactive terms on labour demand could be positive or negative. A simple reason is that it becomes easier to substitute away labour toward other factors in response to an increase in wages due to the outward-oriented reforms. Consequently, firms are increasingly involved with global production networks following the reforms (Fabbri, Haskel & Slaughter 2003;

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<sup>7</sup> Another form of labour demand model is mainly based on the relation between labour and wages and other input factors as well as their prices.

Görg & Strobl 2002; Navaretti, Checchi & Turrini 2003). In this case, a negative sign would be justified. In contrast, these firms could have a less elastic labour demand because of increasing proportions of skilled workers in the job structure or rigidity in labour market (Feenstra & Hanson 1997). Then, the expected sign of this coefficient would be positive.

Similarly, the interactive variable with output is postulated to be positive since the outward-oriented reforms are predicted to bring about an output expansion, mainly due to increasing access to international markets for exports. This expansion would result in a proportional increase in labour absorption in each firm. Of particular interest is the close association between firm ownership feature and employment generation during the EOI, derived from the previous examination of employment growth and its pattern. My proposition rests on the idea that the most part of job creation in a manufacturing sector would be attributed to increasing participation of private enterprises. This is because these firms in a labour-abundant economy tend to be more significantly involved in export-oriented industries that are closely associated with a highly intensive usage of the comparative advantage offered by that abundant factor.

### **3.2 Data**

In this analysis, the manufacturing sector covers all 21 particular industries, except the manufacture of refined petroleum and gas (VSIC 23) due to the unavailability of data and the distortion caused by price fluctuation in this industry. The data for the empirical analysis are compiled from unpublished returns to the Enterprise Survey conducted by the General Statistical Office of Vietnam (GSO). The survey covers all large and medium-sized enterprises and a representative sample of small firms with less than 10 employees. The survey provides all key information on enterprise performance, *inter alia*, output, employment, wages, capital stock, intermediate inputs and ownership types. Data on each firm are coded and stored individually in a unique identification unit by tax code and the Vietnamese standard industrial classification (VSIC) at the four-digit level. This empirical study data for manufacturing firms provides data for the ten years from 2000 to 2009.

The raw data from the survey are extracted and cleaned to build a firm-level panel data for estimating purposes. In the first stage, all observations with non-positive values on employment, capital and output are excluded. Any erroneous observations or outliers are also eliminated in the dataset. Then, any missing values in the years after 2000 are extrapolated by using the average values for the years immediately before and after that year. In addition, the survey classifies 14 different ownership categories, in which there are 11 various types of

domestic companies and three forms of foreign investment enterprises. For simplicity, and to illuminate significant differences in labour demand at a firm level by ownership group, the data used for an estimation purpose are aggregated firms into four specific ownership types: State-owned enterprise (SOE), domestic private firm (DP), joint venture (JV) and wholly owned FIE (WFIE).<sup>8</sup> As noted previously, a presence of firm identification codes provides a convenient way to construct a panel and trace the firms over time. The final data set is an unbalanced panel, covering more than ten thousand firms for each year in the period 2000-09.

Apart from labour, which is measured by the number of workers employed, all other variables are in nominal values, which are then converted into real value series using appropriate deflators. The deflators for the output series are taken from the current and constant price series of manufacturing outputs at the two-digit VSIC level from GSO. The capital deflators are computed from the current and constant values of fixed-capital formation from the national accounts category. The consumer price index (CPI) is used as a deflator to calculate real wage rates. In addition, the deflator for the intermediate input series for each manufacturing industry was computed as the weighted shares of the price indices of products used as inputs in that industry. The weights for the measurement of input shares are calculated using the 2000 Input-Output table (I-O table). To obtain these weights, the 112 sectors in the I-O table are firstly aggregated at the two-digit VSIC level, using the concordance table of GSO. Consequently, input price indices are derived after the input shares for every two-digit sector are calculated. As a result, the difference between output and intermediate inputs at constant prices indicate real value added. Finally, data for the user cost of capital is not available in our dataset. Assuming that the capital market is nation-wide and under perfect conditions, following previous studies (Görg et al. 2009; Greenaway, Hine & Wright 1999; Milner & Wright 1998), it is quite relevant that rental costs of capital is captured by time dummies in our estimation.

As the four-digit VSIC dataset of firm-level manufacturing industries provided by GSO does not provide a strong, convincing indicator of firms involved in merchandise exports, I refer to trade orientation in the manufacturing industry in order to capture this firm characteristic. The trade orientation of an industry is determined by the export-output ratios and import-output ratios in the related industry at the four-digit VSIC level over the period 2000-09. Then, whole manufacturing firms are grouped into three industrial sectors based on a threshold of 15

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<sup>8</sup> A firm ownership type of joint venture FIEs includes both two forms of joint ventures between FIEs and SOEs or domestic private firms. As noted earlier, an employment share of each kind of joint venture in total is minor.

per cent that follows the work of Pavcnik (2002). The export-oriented sector includes particular industries at a four-digit VSIC level, that have export-output ratios greater than 15 per cent. The import-oriented sector comprises four-digit VSIC industries whose import-output ratios are more than 15 per cent. The remaining industries are classified as the less-traded goods sector. By this classification, the export-oriented sector in Vietnamese economy mainly covers traditional labour-intensive, resource-based, labour-intensive industries and the emerging industry of electronics, which is very much in line with the Vietnamese government's priorities in following the strategy of EOI.<sup>9</sup>

### 3.3 Estimation method

The labour demand model is estimated by standard panel data estimation techniques, exploring the firm-level data set. Pooled OLS, fixed effects (FE) and random effects (RE) estimations are the mostly widely used alternative techniques (Baltagi 2006; Wooldridge 2002). Of greater concern is to include the unobservable individual effects into this estimation model. However, over the examined period, the variable of interest-firm ownership dummy is time-invariant in most firms while it is varied over time in some other firms. This feature can be ignored by employing an estimation method that taking into consideration of the firm-individual effect. For instance, under the FE estimation, variables that do not change over time will be fully absorbed by the unobserved firm-specific effect including the ownership effect on labour demand in most firms. In that case, the choice of the pooled OLS estimator is preferred over FE one in order to capture how do firm ownership, *per se*, influence on labour demand.

Estimators which take into account unobserved firm-specific and time-specific effects are particularly relevant to explore the effects of changing ownership on labour demand over time. The difference between FE and RE is that the former also takes into account the firm-specific effects that control for omitted variables that are constant over time. The use of FE estimator is reliant on an assumption on whether a possible correlation exists between the unobserved fixed effects and the explanatory variables. Conventionally, the Hausman test is used to examine whether the coefficient estimates of FE specification are different from those of the RE one (Greene 2008). If they are found to be significantly different, then the FE methodology will give efficient and unbiased linear estimators. Additionally, since there was strong evidence of heteroskedasticity in this estimation, we derived consistent variance-

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<sup>9</sup> The lists of 4-digit VSIC manufacturing industries in each classified sector are not shown in the paper. They are available on request from the author.

covariance standard errors of the estimation coefficients, using the Huber-White ‘sandwich’ estimator.

The panel estimators would be biased and inconsistent in the presence of possible simultaneity and endogeneity in the labour demand equation. The endogeneity of wage variable can exist since labour demand and labour supply rely on wage rates that are interacted by labour demand and labour supply at the equilibrium. Consequently, exogenous shocks to labour demand will lead to shocks to wage rates. In other words, aggregate demand or technological shocks can lead to a simultaneous change of demand for labour and wages. When these shocks cannot be captured by the model, the simultaneity occurs due to a possible correlation between the error term and wage rates. However, the simultaneity should not be a major concern due to the labour supply assumption. This study assumes that the labour supply conditions facing each manufacturing firm are elastic. As noted earlier, this assumption is strongly relevant to an examination of labour demand at a manufacturing firm in a labour abundant economy. Any shifts in the labour supply curve would then result in changes in wages, which would trace out in the labour demand schedule. Conversely, any exogenous shocks to the demand for labour do not affect wages. Another important point is that the inclusion of time dummies in the model that capture exogenous shocks to labour demand would also alleviate endogeneity. Additionally, this study uses a firm-level data set at a highly disaggregated data, thus relieving the seriousness of endogeneity effect. This caveat is rooted on the view that demand or technological shocks to the labour demand at a firm level do not influence wage rate simultaneously as long as there is little possibility that one individual firm could acquire monopolistic position in the related labour market (Hamermesh 1993). Therefore, this should not be a serious issue. Given these caveats, our panel data technique estimators in this analysis should be reliable.

In addition, as in a labour abundant economy, a majority of employment opportunities in the manufacturing sector are closely associated with an export expansion of labour-intensive manufacturing goods. Thus this analysis is also interested in evaluating how much the labour demand is different among firm ownership group following the export-oriented industrialization. Therefore, estimations of the sub-samples of firms in the export-oriented sector and import-competing one as classified in the data section are also undertaken. Firms in the export-oriented sector, which generate about 70 per cent of the aggregate employment manufacturing, are more exposed to liberalizations of trade, investment and enterprise regime than other firms are.

### 3.4 Results

Table 5 reports the estimation results for the effect of firm ownership on labour demand. The first three columns report the estimated results of the Pooled OLS while the remaining ones show those of the FE.

**Table 5: Firm ownership, labour demand in Vietnamese manufacturing, 2000-09**

*Dependent variable: logarithm of firm's number of employment*

	Pooled OLS			Fixed effects		
	All	Export sector	Import sector	All	Export sector	Import sector
	(1)	(2)	(3)	(4)	(5)	(6)
DP	-0.373*** (0.0450)	-1.294*** (0.102)	-0.408*** (0.0981)	-0.0702 (0.0645)	0.0186 (0.124)	-0.367*** (0.118)
JV	0.627*** (0.0881)	0.727*** (0.187)	0.339** (0.157)	-0.130 (0.190)	-0.414 (0.314)	-0.602** (0.305)
WFIE	0.459*** (0.0660)	0.0353 (0.134)	0.504*** (0.122)	0.0387 (0.169)	-0.106 (0.271)	-0.487* (0.268)
DP*y	-0.0694*** (0.00569)	-0.0425*** (0.0129)	-0.0894*** (0.0138)	-0.0251*** (0.00811)	-0.0378*** (0.0143)	0.00119 (0.0148)
JV*y	-0.0574*** (0.00924)	0.0232 (0.0211)	-0.0692*** (0.0168)	0.0380** (0.0182)	0.0677** (0.0290)	0.0400 (0.0304)
WFIE*y	-0.0125* (0.00693)	0.0779*** (0.0143)	-0.0400*** (0.0149)	0.0382*** (0.0128)	0.0517** (0.0203)	0.0328 (0.0221)
DP*w	0.0452*** (0.0134)	0.280*** (0.0334)	0.0708** (0.0321)	0.0673*** (0.0159)	0.0799** (0.0320)	0.0885*** (0.0301)
JV*w	-0.208*** (0.0274)	-0.464*** (0.0568)	-0.134** (0.0520)	0.0812*** (0.0308)	0.0661 (0.0576)	0.113** (0.0515)
WFIE*w	-0.252*** (0.0191)	-0.265*** (0.0430)	-0.236*** (0.0368)	0.0735*** (0.0204)	0.0648* (0.0377)	0.127*** (0.0346)
(l)	0.624*** (0.00541)	0.586*** (0.0124)	0.620*** (0.0134)	0.284*** (0.00868)	0.269*** (0.0153)	0.280*** (0.0156)
(w)	-0.470*** (0.0128)	-0.637*** (0.0322)	-0.493*** (0.0310)	-0.290*** (0.0156)	-0.313*** (0.0315)	-0.309*** (0.0294)
Constant	0.0516 (0.0439)	1.433*** (0.0995)	0.535*** (0.0955)	1.929*** (0.0870)	2.371*** (0.136)	2.081*** (0.129)
Industry dummies	Yes			Yes		
Time dummies				Yes	Yes	Yes
F-statistics				17.71	25.97	16.97
Observations	128,539	51,421	37,428	128,539	51,421	37,428
R-squared	0.735	0.609	0.708	0.249	0.217	0.286
No. of firms				32,766	14,141	10,718
Hausman test				$\chi^2(40)=17,210$ $\chi^2(20)=5,201$ $\chi^2(20)=4,370$		

**Notes:** \*\*\*, \*\* and \* Denote significance at the 1%, 5% and 10% levels, respectively.

(a) Standard errors adjusted for arbitrary heteroskedasticity are given in brackets.

(b) All equations use fixed effect estimates controlled for heteroskedasticity and conditioned on Hausman test for selection between random and fixed effects. See Appendix 1 for RE estimates

(c) All specifications include annual time dummies and/or industry dummies. For brevity, their coefficients are not reported here.

The OLS estimated results of firm ownership dummies (intercept and interactive term) are statistically significant in most equations. With the exception of WFIE\*y in the sub-sample of firms in the export-oriented sectors, the coefficients of the interactive terms with output are negative. This implies that within the same two-digit industries, the labour demand of private firms, both domestic and foreign is less elastic to output growth than SOEs in general. However, on average wholly owned FIEs have higher output elasticity of labour demand than SOEs in the export-oriented sector. This infers that given one percentage growth of output, the labour demand of wholly owned FIEs can increase more than that of SOEs by 0.08 per cent in this sector, all other factors being held constant.

The coefficients of the interaction variables between wage and foreign ownership (JV\*w and WFIE\*w) are negative and statistically significant in all equations while its interactive term for domestic private ownership (DP\*w) has an opposite sign. The implication of this is that foreign invested enterprises in general have higher (more negative) wage elasticity of labour demand than SOEs, given being other factors constant. On the contrary, a domestic private firm in all samples has lower (less negative) wage elasticity of labour demand than SOEs. Then, the coefficients of all intercept dummies but domestic private firms (DP) are statistically significant with a positive sign. This suggests that labour demand of foreign invested firms is generally higher than that of SOEs while private domestic firms have a lower demand for labour than the latter, holding other factors constant. Having uncontrolled for individual effects (firm-and time-specific effects), these findings address difference in labour demand elasticity by firm ownership.

As shown in Table 5, the FE estimated results of firm ownership dummies are rather mixed. The coefficients on the interaction terms with wages are highly significant with the positive sign in the entire manufacturing sample. This result shows there is a significant difference in the wage elasticity across every firm-ownership types. For instance, *ceteris paribus*, a one per cent increase in labour costs reduces demand for labour by 0.284 per cent in SOEs, while a one per cent rise in the wage results in a 0.217 per cent decrease (computed as  $-0.284 + 0.067$ ) in the number of workers demanded in domestic private firms. Similarly, this wage rise also induces a 0.210 per cent reduction in labour demand for wholly owned FIEs and a 0.203 per cent decline for joint ventures. On average, all three forms of private firms have lower wage elasticity than SOEs. A possible explanation for this is differences in recruitment policy among firm ownership groups. SOEs have various hiring policies, which are mostly relied on non-market considerations, thus leading to a less sensitive to wages. Additionally, another

plausible reason for the various impact of firm ownership through wage changes relies on the nation-wide application of different minimum wages for all kinds of firm ownership. Looking at the export perspective, the positive sign and significance of this interaction term for domestic private firms and wholly owned FIEs imply that these firms have adjusted labour demand slowly in response to wages changes compared to public firms. Apart from the reasons already discussed, this slow adjustment may be caused by wage rigidity from keeping low labour costs in labour-intensive manufacturing export industries in order to maintain their competitiveness in the overseas market. In addition, the coefficient of  $JV*w$  turns out to be significant with a positive sign in a sample of import-competing sector. This suggests evidence of the lower magnitude of wage elasticity in private firms than that of SOEs which are so robust in this sector.

With the exception of an import-competing sample, these coefficients of the interactive dummy with output are significant at the 5% level or even better. As expected, the coefficients of  $JV*y$  and  $WFIE*y$  are positive, suggesting a higher employment elasticity in relation to output changes. All else being equal, the two corporate forms of foreign investment adjust labour demand more rapidly than do domestic firms, public and domestic, in response to output shocks. It is particularly interesting to note that the output elasticity of labour demand for FIEs becomes more elastic in the export-oriented sector. This finding is very much consistent with the commonly held perception that foreign investors are normally interested in labour-intensive investment projects that use a large amount of unskilled labour for export production. The practice of using labour-intensive technology in export-oriented foreign investment projects since 2000 has added impetus to generate more employment opportunities in the process of EOI.

However, the sign of  $DP*y$  is negative and significant in both the entire sample and that of the export sector, suggesting domestic private firms have lower output elasticity of labour demand than SOEs. This finding runs counters to *a priori* expectations that domestic private firms would contribute to employment expansion through output growth as well as that of exports as has been the experience of East Asian labor-abundant economies. This result notwithstanding, may not be surprising in a transitional economy such as Vietnam's, where the domestic private firms still faced unequal treatment in terms of market access, access to investment incentives and capital. For example, even though the import tariffs have been lower in the final product sectors over the period 2000-05, its tariffs on these input-supplying sectors where still remain high. This tariff improvement only provides favourable conditions

for SOEs and FIEs to access in the upstream industries rather than domestic private firms (Athukorala 2006). Over that period, many domestic private firms also experience difficult obstacles to obtain bank credit because commercial bank lending practices in Vietnam were heavily relied on institutional procedures, personal connections and creditability and collateral that are in favour of SOEs and FIEs (Malesky & Taussig 2009) .

As for the import-competing sector, ownership feature is found to have no significant impact on labour demand of a manufacturing firm through its output. The reason is quite straightforward since import-competing industries normally involve highly capital-intensive technology. As in the case of the Vietnamese economy, many public enterprises that have concentrated on these sheltered industries in favour of import-substitution strategies are evidently inefficient and have a lower employment outcome of output expansion.

It is likely that the intercept ownership dummy failed to yield a statistically significant coefficient in all but the import-competing sample. It seems that there is no evidence that changing firm ownership could matter to the labour demand at a typical firm by a possible change in its intercept. As for the import sample, its estimated intercept dummies are negative and statistically significant at 10 per cent or even better. Thus, by and large, compared with all kinds of private firms, labour demand in the import-competing sector is higher in public firms. This finding is plausible given that most state enterprises in these import-substituting industries are highly protected, received concessional treatment from the government and commercial banks, and most are biased towards capital intensity.

In both OLS and FE estimations, the coefficients of the two basic variables of labour demand, output and wages, have the expected signs (positive and negative, respectively) at a high level of significance. First, the estimates of wage elasticity of labour demand are highly consistent with the plausible range of those generally identified in the literature (Görg et al. 2009; Hamermesh 1993; Mouelhi 2007). It is important to note that its magnitude for firms operating in the export-oriented sector is larger compared to typical manufacturing firms as well as those in the import-competing ones, providing statistical evidence that wage elasticity for firms belonging to the export sector is relatively high. In other words, given one percentage decrease in wage rates, firms in the export sector can increase the number of workers employed more than firms in the import sector can do by 0.14 per cent. Second, the magnitude of the output coefficient is far from uniform across the three samples. In particular, all other thing being equal, the degree of employment elasticity with respect to output for

firms in the import-competing sector is considerably larger compared to that for those firms in the export-oriented sector.

The employment growth in Vietnamese manufacturing employment over the period 2000-09 has been underpinned by the increasing participation of domestic private firms and wholly owned FIEs. The rising role of the private firm group is premised on the changes in business environment that accumulated from the enterprise reform and its related consequences. However, it is important to note that there has been a noticeable difference in the legal regime regulating all firm-ownership types before and after 2006. This difference rests on the fact that the most dramatic enterprise reform in 2006 was proposed to build a consistent business climate for all firms onward. In this context, it raises the need to explore how the firm ownership attribute is important to determine a firm's labour demand in two sub-periods: 2000-05 and 2006-09.

Our main concern is whether there are any differences in the impact of changes in firm ownership on labour demand before and after 2006. As shown in the first three columns of Table 6, the estimated coefficients on the intercept ownership dummies and their interactive terms for the period 2000-05 are generally in line with those for the overall period in several respects. First, the coefficients attached to three explanatory variables  $DP^*w$ ,  $JV^*w$  and  $WFIE^*w$  are positive and highly significant in many cases. *Ceteris paribus*, the wage elasticity in private firms is found to be less elastic, as compared to that of public firms. Second, the interaction terms with output are highly significant but their sign are mixed. The coefficients attached to  $JV^*y$  and  $WFIE^*y$  are positive but that of  $DP^*y$  is negative in the first two columns. Hence, by and large, the period 2000-05 also indicates that a firm ownership attribute has a different impact on the output elasticity of labor demand, in particular with firms in the export-oriented industries.

Apart from these similarities, however, the intercept dummies distinguishing firm-ownership types become significant and negative in most of the cases examined, as compared to the corresponding estimations for the whole period. Implicitly, the labour demand of domestic private firms and FIEs was found to be shifted down as compared to that of SOEs. One plausible reason is that there were still several administrative and legal barriers that all corporate forms of private enterprises were facing in their business activities throughout the period 2000-05. This discriminatory business environment, which restricted access to economic resources such as capital and land, to some extent hindered business performance of

these private firms. Moreover, government's attitude to SOEs also was a contributing factor to this environment due to its distorted incentive structure.

**Table 6: Firm ownership, labour demand in manufacturing: FE estimates, Vietnam 2000-05 and 2006-09**

*Dependent variable: logarithm of firm's number of employment*

	Period 2000-05			Period 2006-09		
	All	Export sector	Import sector	All	Export sector	Import sector
	(1)	(2)	(3)	(4)	(5)	(6)
DP	-0.121* (0.0694)	-0.0273 (0.136)	-0.397*** (0.130)	0.0957 (0.173)	0.623* (0.375)	-0.0845 (0.358)
JV	-0.805*** (0.240)	-0.873*** (0.322)	-0.777** (0.310)	0.221 (0.327)	0.332 (0.605)	0.255 (0.556)
WFIE	-0.753*** (0.199)	-0.627** (0.252)	-0.661*** (0.248)	0.348 (0.273)	0.526 (0.503)	-0.196 (0.513)
DP*y	-0.0136 (0.0088)	-0.0272* (0.0152)	0.0115 (0.0168)	-0.0168 (0.0185)	-0.0670* (0.0385)	-0.0165 (0.0392)
JV*y	0.0377* (0.0211)	0.0705** (0.0352)	0.0384 (0.0342)	0.0325 (0.0337)	0.0447 (0.0606)	-0.0619 (0.0519)
WFIE*y	0.0470*** (0.0149)	0.0679*** (0.0224)	0.0284 (0.0284)	0.0205 (0.0240)	0.00552 (0.0461)	0.000643 (0.0447)
DP*w	0.0680*** (0.0176)	0.086** (0.0347)	0.0785** (0.0323)	-0.0134 (0.0288)	-0.0200 (0.0554)	0.0761 (0.0770)
JV*w	0.0757** (0.0364)	0.0736 (0.059)	0.106* (0.0633)	0.0144 (0.0570)	-0.0722 (0.109)	0.212** (0.0913)
WFIE*w	0.0345 (0.0248)	0.0190 (0.0460)	0.0993** (0.0405)	0.0478 (0.0332)	0.0262 (0.0600)	0.155* (0.0801)
(y)	0.255*** (0.0094)	0.237*** (0.0161)	0.261*** (0.0178)	0.250*** (0.0194)	0.272*** (0.0404)	0.265*** (0.0401)
(w)	-0.277*** (0.0171)	-0.312*** (0.0339)	-0.284*** (0.0310)	-0.198*** (0.0283)	-0.188*** (0.0545)	-0.298*** (0.0765)
Constant	2.273*** (0.0899)	2.678*** (0.143)	2.307*** (0.138)	1.941*** (0.227)	2.049*** (0.395)	2.133*** (0.371)
Industry dummies	Yes			Yes		
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	17.64	25.79	16.63	16.02	23.28	15.87
Observations	69,177	28,025	19,198	59,362	23,396	18,230
R-squared	0.251	0.220	0.309	0.201	0.165	0.230
No. of firms	19,892	8,701	6,264	20,097	8,227	6,786
Hausman test	$\chi^2(36)=9,987$	$\chi^2(16)=3,190$	$\chi^2(16)=2,375$	$\chi^2(33)=9,015$	$\chi^2(14)=2,911$	$\chi^2(14)=2,539$

**Notes:** \*\*\*, \*\* and \* Denote significance at the 1%, 5% and 10% levels, respectively.

- (a) Standard errors adjusted for arbitrary heteroskedasticity are given in brackets.
- (b) All equations use fixed effect estimates controlled for heteroskedasticity and conditioned on Hausman test for choice between random and fixed effects. See Appendix 2 for RE estimates
- (c) All specifications include annual time dummies and/or industry dummies. For brevity, their coefficients are not reported here.

Next, we examine whether firm ownership matter to the labour demand over the period 2006-09. The most conspicuous result emerging from the last three columns of Table 6 is that the coefficients of ownership dummies and the respective interactive variables are remarkably resilient to its inclusion in the model in most cases. All these insignificant coefficients reveal that, on the whole, wage and output elasticities of labour demand do not differ across all firm-ownership types. This result is also robust for firms in the export-oriented sector. This provides statistical evidence that we cannot recognize any differences in wage elasticity among all firms regardless of ownership status. Similarly, the significant impact of joint ventures and wholly owned FIEs on output elasticity has disappeared in the export-oriented sector although this elasticity is still found to be less elastic for domestic private firms. The only exception in the export sector sample where the coefficient on a domestic private dummy (DP) is positive and significant at a 10 per cent. Despite albeit weak evidence, this finding can suggest the significant contribution of domestic private firms on job creation in the export sector. Moreover, with regard to the import-competing sample, the coefficients of interactive variables  $JV*w$  and  $WFIE*w$  are positive and significant at standard levels. Implicitly, these firms have lower wage elasticity, compared to public enterprises. All in all, this result is consistent with the widely expected views about the missing of ownership impact on labour demand as the reform on enterprise policy in reducing numerous constraints to private firms. This also stems from dramatic improvements on the general trade and investment climate, which primarily captures the cumulative outcome of outward-oriented policy reforms. Hence, this finding reflects what has been achieved in Vietnamese manufacturing as a result of liberalization reforms.

All estimators of the labour demand model pass the F-test on the null hypothesis of no unobserved individual effects statistically significant at the one per cent level. These fixed effects estimators are amply supported by the Hausman test for correct specification of the RE model. The test decisively rejected the null hypothesis that explanatory variables and unobserved firm heterogeneity are uncorrelated, favouring the use of the FE estimator in this analysis.

#### **4. Conclusions**

This paper has explored various aspects of labour demand in the Vietnamese manufacturing under the outward-oriented reforms' mirror. An analysis of employment growth and its pattern across particular manufacturing industries was used as a backdrop for

the central theme involved the estimation of determinants of labour demand in manufacturing with a special reference to the firm ownership feature.

The result strongly shows that private firm group has played an important role in employment expansion in the Vietnamese manufacturing sector. Participation of domestic private firms is observed across every two-digit VSIC manufacturing industry, but they are mostly involved in the resource-based, labour-intensive sector, whereas the group of foreign invested enterprises, in particular wholly invested FIEs, has increasingly expanded their crucial position in labour-intensive sector, including both traditional industries and the emerging export industry of electronics. This inference is basically consistent with the behaviour of efficiency-seeking foreign investors entering Vietnam.

The firm ownership attribute has different impacts on firm's labour demand in manufacturing over the period 2000-09. First, we observed that on average all three corporate forms of private firm group have lower wage elasticity of labour demand than SOEs, indicating these private firms have adjusted labour demand slowly. Second, it was found that wholly owned FIEs and joint ventures had higher employment elasticity with respect to output, compared to domestic firms, public and private. This situation stems from the advantages of foreign entrepreneurs in marketing and access to international markets, whereas domestic firms do not seem to have much experience in world trade. More importantly, the foreign investment firm group was observed to have a high magnitude of output elasticity in the export-oriented industries, as postulated for the case of a labour-abundant economy. This implies the significance of export-oriented industrialization on manufacturing employment in Vietnam. In short, the finding supports the importance of export-oriented foreign direct investment during the early stage of economic development.

However, the discernable difference of ownership impact on labour demand seems to have vanished due to the changing investment and business climate in Vietnam after 2006. The estimation results strongly lend support to the view that, on the whole, wage and output elasticities of labour demand in manufacturing do not differ across all firm-ownership types over the period 2006-09. Thus, this result is consistent with the widely expected perception about the missing of ownership impact on labour demand as dramatic improvements in liberalization of trade, investment and enterprise policy regime were adopted in 2006. In other words, this reflects what has been achieved in Vietnamese manufacturing induced by the outward-oriented reforms.

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**Appendix 1: Labour demand in Vietnamese manufacturing: RE estimates, Vietnam 2000-09**

*Dependent variable: logarithm of firm's number of employment*

	All	Export sector	Import sector
Constant	0.664*** (0.0688)	1.591*** (0.127)	0.988*** (0.134)
(y)	0.436*** (0.00851)	0.381*** (0.0151)	0.451*** (0.0169)
(w)	-0.311*** (0.0157)	-0.363*** (0.0308)	-0.357*** (0.0315)
DP	-0.0193 (0.0690)	-0.168 (0.127)	-0.217 (0.138)
DP*y	-0.0606*** (0.00869)	-0.0533*** (0.0151)	-0.0582*** (0.0174)
DP*w	0.0452*** (0.0161)	0.103*** (0.0314)	0.0902*** (0.0324)
JV	0.418*** (0.139)	0.414* (0.241)	0.0963 (0.231)
JV*y	-0.0331** (0.0156)	0.0189 (0.0271)	-0.0463* (0.0259)
JV*w	0.0344 (0.0301)	0.0345 (0.0579)	0.0971* (0.0518)
WFIE	0.557*** (0.101)	0.645*** (0.168)	0.280 (0.181)
WFIE*y	-0.0234** (0.0116)	0.0203 (0.0194)	-0.0507** (0.0209)
WFIE*w	0.00263 (0.0205)	0.0329 (0.0377)	0.0926** (0.0364)
Industry dummies	Yes		
Time dummies	Yes	Yes	Yes
Observations	128,539	51,421	37,428
R <sup>2</sup> (within)	0.234	0.210	0.272
No. of firms	32,766	14,141	10,718

**Notes:** \*\*\*, \*\* and \* Denote significance at the 1%, 5% and 10% levels, respectively.

(a) Standard errors adjusted for arbitrary heteroskedasticity are given in brackets.

(b) All equations use random effect estimates controlled for heteroskedasticity.

(c) All specifications include annual time dummies and/or industry dummies. For brevity, their coefficients are not reported here.

**Appendix 2: Labour demand in Vietnamese manufacturing: RE estimates, Vietnam 2000-05 & 2006-09**

*Dependent variable: logarithm of firm's number of employment*

	Period 2000-05			Period 2000-09		
	All	Export sector	Import sector	All	Export sector	Import sector
Constant	0.572*** (0.0802)	1.624*** (0.151)	0.913*** (0.147)	0.378** (0.159)	1.280*** (0.340)	0.740** (0.346)
(y)	0.456*** (0.0103)	0.391*** (0.0180)	0.465*** (0.0195)	0.456*** (0.0166)	0.398*** (0.0355)	0.498*** (0.0364)
(w)	-0.320*** (0.0177)	-0.382*** (0.0330)	-0.335*** (0.0345)	-0.176*** (0.0304)	-0.208*** (0.0559)	-0.341*** (0.0846)
DP	0.176** (0.0811)	-0.0533 (0.152)	-0.0649 (0.151)	0.205 (0.161)	0.0840 (0.342)	0.00223 (0.353)
DP*y	-0.0923*** (0.0107)	-0.0778*** (0.0184)	-0.0764*** (0.0202)	-0.0660*** (0.0171)	-0.0543 (0.0356)	-0.100*** (0.0375)
DP*w	0.0631*** (0.0183)	0.126*** (0.0340)	0.0836** (0.0361)	-0.0814*** (0.0310)	-0.0301 (0.0566)	0.0718 (0.0854)
JV	0.660*** (0.164)	0.650** (0.290)	0.208 (0.259)	0.483* (0.250)	0.620 (0.521)	0.517 (0.450)
JV*y	-0.0720*** (0.0190)	-0.0149 (0.0325)	-0.0721** (0.0299)	-0.0157 (0.0256)	0.0363 (0.0551)	-0.0913** (0.0457)
JV*w	0.0473 (0.0366)	0.0448 (0.0615)	0.105* (0.0631)	-0.0987* (0.0532)	-0.140 (0.104)	0.0733 (0.0997)
WFIE	0.936*** (0.121)	0.960*** (0.194)	0.671*** (0.225)	0.585*** (0.197)	0.553 (0.398)	0.411 (0.377)
WFIE*y	-0.0720*** (0.0146)	-0.0140 (0.0231)	-0.0982*** (0.0272)	-0.0205 (0.0202)	0.0412 (0.0415)	-0.0864** (0.0391)
WFIE*w	-0.0155 (0.0253)	0.00281 (0.0453)	0.0636 (0.0432)	-0.0728** (0.0355)	-0.0512 (0.0629)	0.118 (0.0881)
Industry dummies	Yes			Yes		
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	69,177	28,025	19,198	59,362	23,396	18,230
R <sup>2</sup> (within)	0.226	0.207	0.286	0.189	0.157	0.215
No. of firms	19,892	8,701	6,264	20,097	8,227	6,786

**Notes:** \*\*\*, \*\* and \* Denote significance at the 1%, 5% and 10% levels, respectively.

- (a) Standard errors adjusted for arbitrary heteroskedasticity are given in brackets.
- (b) All equations use random effect estimates controlled for heteroskedasticity.
- (c) All specifications include annual time dummies and/or industry dummies. For brevity, their coefficients are not reported here.