FOREIGN DIRECT INVESTMENT AND THE LABOUR MARKET IN VIETNAM'S SERVICES SECTOR

A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ECONOMICS

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I certify that the above publications incorporate the research completed during my PhD candidature in Economics at James Cook University. I also acknowledge that copyright of published works resides with the copyright holder(s).

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Abstract

The overall aim of this thesis is to investigate, theoretically and empirically, the impacts of foreign direct investment (FDI) on the host labour market. Specific objectives focus on exploring the role of FDI firms in determining wages and the employment of female workers (hereafter referred to as female employment) by domestic firms, using the empirical case of the services sector in Vietnam. While the literature suggests that foreign firms, especially large multinationals, tend to pay higher and employ women more intensively than local firms, there is scant evidence on whether and how FDI firms can influence domestic firms' wages and gendered employment, notably in the context of service industries. This thesis contributes to filling these knowledge gaps from both theoretical and empirical grounds.

To realise the research objectives, I constructed two theoretical models to illustrate how the presence of FDI firms can be a determinant of local firms' pay and employment decisions. The first model shows that foreign presence can influence the expected average wage of domestic firms (causing so-called 'wage spillovers') through two contrasting channels, namely productivity spillovers and cut-off capability. The second model shows that FDI firms can affect domestic firms' female employment (measured by female-to-male labour ratio), directly via augmented female productivity spillovers and indirectly via the cut-off effect. The ultimate impact of foreign presence on wage and female employment depend on the relative strength of the two channels.

Guided by the theoretical frameworks, I then specified two econometric models to empirically test and estimate the impacts of FDI firms on average wage and female employment of domestic counterparts. The empirical analyses utilise rich panel datasets of firms in Vietnam's services sector over the five-year period 2009-2013, which were extracted from the enterprise survey database of the General Statistics Office (GSO). In the specified models, foreign presence is the variable of interest and measured by the employment share of FDI firms in an industry,

region and year. To address the potential endogeneity problem, I utilised the Generalised Method of Moments with Instrumental Variable (IV-GMM) estimation technique. Of this method, I adopted a novel approach to constructing IVs, which capitalises on the geographical and industry segmentation of the local labour market. In the estimation procedure, I conducted a number of diagnostic checking, including the endogeneity test, underidentification and overidentification tests (for the relevance and validity of selected instruments), and accounted for multicollinearity, autocorrelation, and heteroskedasticy problems.

The estimation results indicate that FDI firms exert positive and statistically significant impacts on the pay level and female employment of domestic firms in Vietnam's services sector. Specifically, a one per cent increase in foreign presence induces local firms to raise their real wage and female-to-male labour ratio by 1.15 per cent and 2.18 per cent on average, respectively. The findings also suggest that higher paying firms tend to be larger, state owned, more capital intensive, and well established. Additionally, smaller, privately owned, less labour-intensive firms are more likely to hire women at a higher rate.

To provide deeper insights into the heterogeneity of FDI-linked impacts, I extended the analysis by examining different layers of disaggregation. Notably, at the two-digit Vietnam SIC level, the scatterplots of the data and the estimation results reveal divergent effects of foreign presence on domestic firms' wages (positive in the high-wage group and negative in the low-wage group), and female employment (positive in the male-intensive group and insignificant in the female-intensive group). Likewise, additional investigations at the three-digit level show heterogeneous FDI impacts, depending on specific characteristics of domestic and foreign firms. While the existence of positive FDI impacts at the overall sector level may imply services FDI attraction as a viable strategy to improve local wages and promote female employment opportunities, the findings of heterogeneous effects warrant a more cautious and selective approach to be adopted by local firms, workers and governments in policy and decision formulation.

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Chapter 1: Introduction

1.1 Background and significance

Foreign direct investment (FDI) has been considered a key driving force for economic growth and development in many host countries, particularly in the developing world. According to World Investment Reports (UNCTAD, 2018c, 2019), FDI inflows now account for about 40 per cent of external finance to developing and transition economies. The presence of foreign firms can exert considerable impacts on recipient economies, including labour markets. Policymakers generally expect FDI inflows to generate significant employment, enhance labour productivity and improve wages/income for the local workforce (Arnal & Hijzen, 2008). These widespread expectations partially explain strong incentives and fierce competition among host governments in attracting foreign firms. Given the increasing importance of FDI, further research on FDI impacts on the host labour market is of great significance from both analytical and policy perspectives. Furthermore, FDI in the services sector has rapidly increased and accounted for a dominant share of global FDI, implying growing relevance of research devoted to the role of foreign presence in this sector.

The existing literature of FDI impacts on labour markets in recipient economies can be categorised into three main strands. The first strand of research examines the relationship between FDI and wages. Of this literature, a substantial body concentrates on wage gaps between foreign and domestic firms. Empirical evidence strongly suggests that foreign firms pay higher wages than domestic counterparts (Conyon, Girma, Thompson, & Wright, 2002; Görg, Strobl, & Walsh, 2007). Nevertheless, the overall impact of FDI on local wages can be subject to endogeneity problems. Foreign firms may select highly qualified employees, acquire high-wage domestic firms, and operate in high-wage industries or high-wage regions (Balsvik & Haller, 2010).

The second strand focuses on the employment effect of FDI. Foreign entry can shift up labour demand, directly creating new job opportunities for local workers (Axarloglou & Pournarakis, 2007). Moreover, foreign firms can generate indirect jobs by facilitating industrial contacts when buying inputs from domestic firms (backward linkages) or supplying inputs to domestic firms (forward linkages). In some cases, foreign firms can exert adverse effects on labour demand directly by divestment and closure of production facilities, and indirectly by increased competitive pressure in the local product market (Coniglio, Prota, & Seric, 2015; Moosa, 2002).

The third strand of research emphasises the role of FDI in enhancing human capital accumulation and labour productivity of the local workforce. The entry of foreign firms involves the transfer of assets through on-the-job training provided to local workers (Aitken, Harrison, & Lipsey, 1996; Kim, 2015). If local employees successfully absorb these productive assets, FDI can directly contribute to human capital accumulation. More importantly, foreign presence can affect the labour productivity of domestic firms, causing productivity spillovers (Anwar & Nguyen, 2010; Javorcik, 2004; Newman, Rand, Talbot, & Tarp, 2015; Sun, 2011). Empirical evidence on FDI-induced productivity spillovers is substantial but far from unanimous for both developed and developing countries (see for example Gorg and Strobl (2001); Görg and Greenaway (2004); Wooster and Diebel (2010); and Iršová and Havránek (2013)).

By comprehensively reviewing three major research strands on FDI and host labour markets, I identified four significant knowledge gaps that this thesis attempts to address in order to extend the existing literature as follows.

First, modest attention has so far been given to exploring the impact of FDI inflows on domestic firms' wages, namely wage spillovers. This is in contrast to substantial evidence on FDI and wage gaps, revealing the existence of a foreign wage premium, which

unambiguously benefits local workers in foreign firms. Exploring wage spillover effects will develop deeper insights and shed light on whether workers in domestic firms (accounting for an overwhelming proportion of the local workforce) can be better-off or worse-off from the presence of FDI firms. Addressing this research gap is of analytical and policy significance as the findings can carry far-reaching implications on a major share of the local workforce (i.e., workers in domestic firms).

Second, examining FDI impact on domestic firms' female employment remains a striking gap in the existing literature. On the contrary, the finding of higher female representation within foreign firms (compared to domestic counterparts) is relatively well documented within the FDI-gendered employment research. In fact, while previous studies mostly analyse the FDI employment effect on the overall host labour market with a particular focus on the internalised effect on FDI firms' employment changes, scant evidence exists for the influence of FDI firms on domestic firms' female employment via spillover effects. Filling this research gap can have deeper implications for the host labour market to close gender gaps in employment and boost the long-term productivity of the workforce at large. This research area is essential from both academic and policy perspectives given the increased FDI inflows globally and persistent gender inequalities in labour markets, notably in labour-abundant developing economies.

Third, while productivity spillovers from FDI are exhaustively investigated, other related types of FDI-generated spillovers, such as those on domestic firms' wages or female employment, have received far less attention. Foreign firms with superior tangible and intangible assets can significantly enhance the labour productivity of the local workforce directly via on-the-job training and indirectly via spillovers. Arguably, foreign ownership advantages and their associated productivity spillovers can exert far-reaching impacts on other aspects of the host labour market such as wages and gendered employment. Therefore,

exploring new forms of spillovers from FDI, theoretically and empirically, can add significant insights by shedding light on the complex ways through which FDI firms affect workers, firms, and industries of host economies.

Fourth, evidence on all three strands of labour-market impacts of FDI is notably scarce on firms and/or industries within the services sector. By contrast, the existing literature exhibits an overwhelming focus on firms and/or industries within the traditional manufacturing sector. In reality, however, services have become the largest and fastest growing sector. An increasingly dominant share of global FDI flows is within the services sector. Therefore, the rising prominence of services FDI demonstrates the great relevance of narrowing the substantial research gap on the potential impacts of services FDI on host economies, including the labour market.

This thesis aims to fill the above-mentioned research gaps by investigating the impacts of FDI inflows on domestic firms' wages and female employment in the services sector in Vietnam. The research contributes to existing FDI literature from both theoretical and empirical aspects. Notably, theoretical models are constructed to demonstrate different channels through which FDI firms can influence domestic firms' average wages and female employment, resulting in spillover effects. Furthermore, significant empirical evidence is provided by specifying and estimating econometric models, using rich firm-level panel datasets of the services sector in Vietnam over the period 2009-2013.

Vietnam represents a relevant and stimulating setting for this research. The compelling success story of this emerging Southeast Asian economy has been well circulated across various regional and global agendas. Since the *Doi Moi* (renovation) reform launched in 1986, Vietnam has radically transformed from a war-torn country to be one of the world's fastest growing and most dynamic economies with an average GDP growth rate of 6.4 per cent per annum during the 2000s (WB, 2017b). Notably, it has experienced a dramatic surge

in inward FDI since the early 1990s, ranked the 6th FDI priority location globally between 2007 and 2009 (UNCTAD, 2010). Furthermore, as the world's 14th most populated country, Vietnam is characterised by a large labour force of nearly 60 million people, low wages and persistent gender gaps, notably in the labour market (WB, 2017a; WEF, 2017a).[1] Additionally, empirical evidence for the case of Vietnam's services sector is also valuable given the scant literature on these research areas devoted to this transition economy. Therefore, Vietnam provides a highly suitable and interesting case for examining FDI impacts on the labour market, especially from income and gender perspectives.

1.2 Aims and objectives

The central aim of this thesis is to examine, theoretically and empirically, the impacts of FDI on the host labour market in the services sector. To achieve this overall aim, four specific objectives are established as follows:

(i) To build a theoretical model to explain the channels via which FDI firms affect wages of domestic firms;

(ii) To explore empirically the impact of FDI inflows on wages of domestic firms in the services sector, using the case of Vietnam with a firm-level panel dataset from 2009 to 2013;

(iii) To build a theoretical model to explain the channels via which FDI firms affect female employment of domestic firms;

(iv) To explore empirically the impact of FDI inflows on female employment of domestic firms in the services sector, using the case of Vietnam with a firm-level panel dataset from 2009 to 2013.

[1] Readers can refer to Global Gender Gap Reports (WEF, 2014; 2017a) for additional data on various aspects of gender inequality in Vietnam. For more detailed discussions on corporate/social culture and other institutional factors related to gender discrimination and inequality in Vietnam, see for example Liu (2004); T.-H. Pham and Reilly (2007); Son (2011); Lam and Laura (2016); T. Q. T. Nguyen and Simkin (2017); T. Pham and Talavera (2018).

1.3 Methodology

To achieve the stated research aim and objectives, the thesis adopts rigorous theoretical and empirical strategies, which essentially engage a three-stage process.

Of these, the first stage entails the modelling of the impacts of FDI presence on the local labour market. Notably, theoretical models are established to describe various spillover channels via which foreign firms can influence average wage levels and female employment by domestic firms in the host economy.

The second stage, guided by theoretical setups, focuses on the detailed specification of econometric models, which comprise a vector of explanatory variables, particularly foreign presence (*FDI*) as a proxy capturing potential effect of foreign firms. To take into account possible endogeneity bias of the central variable (*FDI*), the thesis employs the feasible two-step generalised method of moments with excluded instrumental variables (IV-GMM) estimator, where I utilised a novel approach to construct IVs. Besides, a number of diagnostic tests are performed to examine the reliability of the specified models and the estimation techniques, which also allows verifying the validity, prediction and generalisation power of the results.

Finally, the third stage features the empirical testing and estimation of hypothesised FDI-linked effects, utilising datasets of firms in Vietnam's services sector. At this stage, empirical investigation is further extended to shed light on the heterogeneity of FDI spillovers for subsets of the data based on firm and industry specific characteristics. The empirical findings give significant implications for local workforce, firms and policymakers regarding the presence of FDI firms and local labour market.

1.4 Data

In this thesis, the empirical analyses utilise rich firm-level panel datasets for the services sector in Vietnam over the five-year period 2009-2013. The data were obtained from

comprehensive Enterprise Surveys database of Vietnam General Statistics Office (GSO). Of which, GSO adopts two methods of direct and indirect data gathering for all business entities in the economy. Given the research scope of the thesis focusing on firms in the services sector, the enterprise data source by GSO is more suitable than that of the World Bank, which consists of a representative sample of private firms largely in the manufacturing sector.

Since enterprise surveys contain extensively raw data, it is critical to conduct thorough data screening and cleaning procedure to ensure the reliability and usability of final datasets. This process includes checking raw data and recoding firms that fall into the research scope; recoding and constructing variables; inspecting data for errors and outliers; constructing panel datasets. For data management and analyses, the thesis employs the statistical software Stata 14, which is a preferred analytical tool in economics and econometrics research.

1.5 Structure of the thesis

Following the first chapter of introducing the thesis, Chapter 2 provides background knowledge on FDI and the services sector, both globally and in Vietnam, to highlight the relevance and significance of exploring this area of research. Next, Chapter 3 gives a comprehensive review of the existing literature on the impacts of FDI on the host labour market, focusing on three main strands of FDI influences on wages, employment and labour productivity. Chapter 4 describes the research methodology (including both theoretical and empirical strategies) and data used in the thesis. Chapters 5 and 6 present the empirical results and relevant analyses regarding the impacts of FDI presence on domestic firms' wages and female employment for the case of Vietnam's services sector over the study period. Lastly, Chapter 7 concludes the thesis by summarising key findings, describing major implications for local workforce, firms and policymakers, as well as acknowledging the thesis's limitations and pointing out the directions for future research.

Chapter 2: An Overview of FDI in the Services Sector

2.1 Introduction

This chapter provides the background knowledge on FDI and the services sector, both globally and in Vietnam, to highlight the relevance and significance of examining the research area of interest. It comprises three parts. Section 2.2 describes the conceptual background of FDI and services. A number of definitions and approaches to categorising these two key concepts are explained. Section 2.3 gives an overview of services and FDI from a global perspective. It illustrates the growing importance of the tertiary sector from various respects, including total output, employment, female employment and international trade. Furthermore, there has been a remarkable shift of global FDI from manufacturing towards services with services FDI reaching about two-thirds of total inward FDI stocks.

Section 2.4 provides an overview of services and FDI in Vietnamese economy. In Vietnam's economic development, services have played an increasingly significant role, being the most important contributor to Gross Domestic Product (GDP) and the second largest sector in providing jobs. Notably, services have shown important but fluctuating patterns in terms of FDI inflows to Vietnam. This section also identifies major strengths and constraints of Vietnam in attracting FDI inflows to the services sector. Lastly, Section 2.5 summarises the chapter.

2.2 Conceptual background

2.2.1 Conceptual background of FDI

In the international investment literature, FDI has become a widely recognised terminology. According to United Nations' 1999 World Investment Report (UNCTAD, 1999), FDI is 'an investment involving a long-term relationship and reflecting a lasting interest and control of a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise, affiliate enterprise or foreign affiliate)'. The International Monetary Fund's Balance of Payments Manual defines FDI as 'an investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of the investor, the investor's purpose being to have an effective voice in the management of the enterprise'.

Similarly, OECD's Benchmark Definition (1996) refers to FDI 'as cross-border investment by a resident entity in one economy with the objective of obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise'. Moosa (2002) defines FDI as 'the process whereby residents of one country (the source country) acquire ownership of assets for the purpose of controlling the production, distribution and other activities of a firm in another country (the host country)'.

The above definitions of FDI share one common feature, namely the long-term control of a foreign investor over the management of a firm in another country. This is the most important characteristic to distinguish FDI from foreign portfolio investment (FPI), which involves short-term and passive investment in financial assets (e.g., stocks and bonds) overseas without seeking management. The element of control offers foreign direct investors an informational advantage over foreign portfolio investors and domestic savers (Razin,

Sadka, & Yuen, 1999). Generally, a minimum of 10 per cent shareholding is the basic threshold for an investment project to be regarded as FDI. Nonetheless, in some cases, a foreign investor owning less than 10 per cent might exert significant influence on the firm management. Hence, Chaudhuri and Mukhopadhyay (2014) suggest that other factors should also be taken into consideration, including representation in the board of directors, participation in policy-making processes, interchange of managerial personnel, access to technical information, and provision of long-term loans at lower than market rates.

To categorise FDI, a widely adopted approach is basing on types of activity conducted by a foreign investor (Caves, 1971; Chaudhuri & Mukhopadhyay, 2014; Moosa, 2002). Accordingly, FDI can be classified into three groups: horizontal, vertical, and conglomerate FDI. Of these, horizontal FDI refers to investment made to expand the production abroad in an industry or business activity similar to the one undertaken in the home country. The underlying motives include accessing the local market, the exploitation of monopolistic or oligopolistic advantages (e.g., patents), and avoidance of trade costs (e.g., transportation, tariffs). Meanwhile, vertical FDI involves investment in a downstream (backward) or upstream (forward) industries as compared to the one operated in the source country. Notably, exploiting raw materials and cheap labour usually stimulates vertical FDI projects. Finally, conglomerate FDI engages new activities that neither replicate nor vertically relate to the existing ones in the home country. Due to the lack of prior experience, FDI projects of this type usually take the entry mode of joint ventures with foreign or domestic firms already operating in the industry.

On the basis of investment objectives, FDI is divided into: resource-seeking, market-seeking, and efficiency-seeking (Behrman, 1974; Dunning, 1993; Zaheer & Manrakhan, 2001). First, resource-seeking FDI is undertaken for accessing and securing the host country's resources (e.g., minerals, labour), which are of greater abundance and/or lower

costs than those in the home country. This form of investment is related to vertical FDI projects, particularly in manufacturing industries intensively using raw materials as intermediary inputs. Second, market-seeking FDI, closely linked to horizontal FDI, aims at serving overseas markets by producing and distributing to local consumers, rather than exporting from the home country. This type of FDI is typically essential to firms in service industries due to the low tradability of most services. Third, efficiency-seeking FDI is usually adopted by multinational enterprises (MNEs) as a strategy to spread value-adding activities globally to achieve efficient resource allocation. This type of investment provides MNEs with not only market access but also geographical diversification, economies of scope, and international sourcing of inputs.

Several other approaches to FDI typology have also been identified in the literature and statistics on international investment. For instance, based on the direction of investment flows, FDI is distinguished between inward and outward investment. On the basis of entry modes, FDI consists of three major groups, namely greenfield investment, joint venture, mergers and acquisitions. From the viewpoint of host governments, FDI is categorised into three types: import-substitution, export-increasing, and government-initiated FDI.

2.2.2 Conceptual background of services

From a macro perspective, services are referred to as the 'tertiary' sector, one of the three sectors in an economy (J. M. Clark, 1940; A. G. Fisher, 1935; J Fourastié, 1954). It comprises a diverse array of industries that provide intangible products, including telecommunication, transportation, tourism, finance, banking, insurance, wholesale, retail, and so on. Services represent a dominant component in developed and industrialised economies. Meanwhile, the 'primary' sector involves the extraction of raw materials and consists of such activities as agriculture, forestry, fishing, and mining. This sector constitutes the largest segment in less developed economies. Finally, the 'secondary' sector, also known

as manufacturing or production sector, is comprised of activities that transform raw materials into final or semi-final goods. Most industries in this sector are increasingly mechanical engineering, for example electronics, garment, textile, and food processing. As an economy becomes more developed, the portion of the primary and secondary sectors decreases while that of the tertiary/services sector increases.

From a micro perspective, services can be defined as heterogeneous outputs produced to order and which cannot be traded separately from their production (OECD, 2005). Typically, the production of services must be confined to activities that are capable of being carried out by one unit (i.e., producer) for the benefit of another (i.e., consumer). According to Haksever and Render (2013), services are economic activities that produce time (as a saving for customers), place, form, or psychological utilities. They can be acts, deeds, or performances that are largely intangible in nature. Similarly, the Australian Services Roundtable (ASR, 2006) defines services as activities delivering help, utility or care, an experience, information or other intellectual content, of which the value is mostly intangible rather than residing in any physical product.

The services literature has identified four distinctive features that differentiate services from manufactured goods (Edgett & Parkinson, 1993; Moeller, 2010; Zeithaml, Parasuraman, & Berry, 1985). They are called *IHIP* characteristics (i.e., intangibility, heterogeneity, inseparability, and perishability). First, intangibility denotes the fundamental nature that services do not have a physical existence, hence cannot be touched, held, tasted or smelt. Second, services are highly heterogeneous and thus hardly standardised since they involve human interactions and service quality can vary greatly, depending on providers' performance and customers' perception. Third, the characteristics of inseparability emphasises the simultaneity of service provision and consumption, that is, services can be consumed only when they are produced. Fourth, perishability refers to the fact that services

cannot be stored or saved for later sale or use, thus once purchased the service is completely consumed and cannot be delivered to another customer.

As services can be defined from different perspectives, they can also be categorised by several approaches. Of these, Katouzian (1970) divides service activities into three types, based on the relation with other economic sectors. First, new services refer to emerging activities in terms of income and time, including such industries as education, entertainment, hotels and restaurants. Second, complementary services (e.g., finance, banking and transportation) facilitate the production of the secondary/manufacturing sector. Third, old services include activities prevalent in the pre-industrial period, notably domestic services.

Another approach to services typology was adopted by Browning and Singelmann (1978). Accordingly, services are distinguished by four major types, depending on the nature and recipient of services. First, the distributive services (e.g., communication, transportation, retail trade) involve the distribution of goods, information and passenger transport. Second, producer services (e.g., banking, legal, real estate, professional) serve as intermediate inputs in the production process of manufacturing industries. Third, social services (e.g., medical, education, government, religion) are mainly non-market activities that governments and non-profit organisations provide to the wider population. Fourth, personal services (e.g., domestic servants, hotels, restaurants, entertainment) are mostly consumed by individual customers.

While scholars can literally propose various ways to categorise services, the International Standard of Industrial Classification (ISIC) has been a widely adopted reference to report and classify service (and other major) activities in accounts and statistics of almost all countries. The United Nations (2017) developed the ISIC initially in 1948 and published revisions in 1958, 1968, 1989, 2002, and 2007. According to the latest revision,

services comprise 15 major groups of activities ranging from Section G to Section U as listed in Table 2.1 below:

Table 2.1: ISIC classification of services

Code	Industry
G -	Wholesale and retail trade; repair of motor vehicles and motorcycles
H -	Transportation and storage
I -	Accommodation and food service activities
J -	Information and communication
K -	Financial and insurance activities
L -	Real estate activities
M -	Professional, scientific and technical activities
N -	Administrative and support service activities
O -	Public administration and defence; compulsory social security
P -	Education
Q -	Human health and social work activities
R -	Arts, entertainment and recreation
S -	Other service activities
T -	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U -	Activities of extraterritorial organisations and bodies

Source: United Nations (2017)

The above-tabulated categories of services by the United Nations are adopted in most national and regional accounts (Haksever & Render, 2013; Kozak & Kozak, 2016; Marks, 2009; OECD, 2005). Nevertheless, there are slight differences in the documented groups of services among national and regional classifications. For example, North American Industry Classification System (NAICS) regards utilities (i.e., electricity, gas and water supply) as part of the services sector. The Australian and New Zealand Standard Industrial Classification (ANZSIC) and Vietnam Standard Industrial Classification (VSIC) extend service industries to include utilities and construction.

2.3 Services and FDI: A global overview

2.3.1 The importance of services in the global economy

The growing importance of services in the global economy has been predicted since the 1930s by the three-sector theory (C. Clark, 1940; A. G. B. Fisher, 1935; Fisher, 1939; Jean Fourastié, 1949). Accordingly, economies would gradually shift from the primary to the secondary/manufacturing, and eventually to the tertiary/services sector. At the primitive phase of development, the primary sector (particularly agriculture) plays a central role in generating income and employment. This sector could on average account for 65 per cent of the workforce while the secondary and services represent 20 per cent and 15 per cent, respectively.

During the second phase of industrialisation, the growing demand for machinery in the primary sector would facilitate manufacturing production. The subsequent workforce allocation could be 40 per cent (primary), 40 per cent (manufacturing), and 20 per cent (services). During the third phase of development, a high level of technology and automation in the primary and manufacturing sectors would shift the labour demand to services, which satisfies increasingly sophisticated needs by other economic activities and individual consumers. As a result, services could attract 70 per cent of the workforce and the remaining participates in the primary (10 per cent) and manufacturing (20 per cent) sectors.[2]

The theoretical prediction of the growing prominence of services has largely been confirmed in practice. In fact, this sector has played a far more significant role in various aspects of the world economy, notably regarding output, employment, international trade and investment. Services now represent the leading and most dynamic economic activity globally. Figure 2.1 shows the share of services in the world's GDP, covering both developed

[2] The figures of sectoral shares in the three phases represent indicative changes in the relative importance of the three sectors for a typical economy, following the predictions of the three-sector theory (C. Clark, 1940; A. G. B. Fisher, 1935; Fisher, 1939; Jean Fourastié, 1949).

and developing economies over the period 1970-2016. The sector's output shares exhibited a similar upward trend at both the global and disaggregated levels by development status. In 2016, total output of services activities reached up to US$ 48.38 trillion, accounting for more than 67 per cent of global output. Nevertheless, there exist stark differences between developed and developing economies. Services contributed to a much larger proportion of the output in the former group (76 per cent in 2016) compared to that of the latter group (56 per cent). Furthermore, the share of services in GDP of developing economies has shown a more fluctuating pattern over the same period.

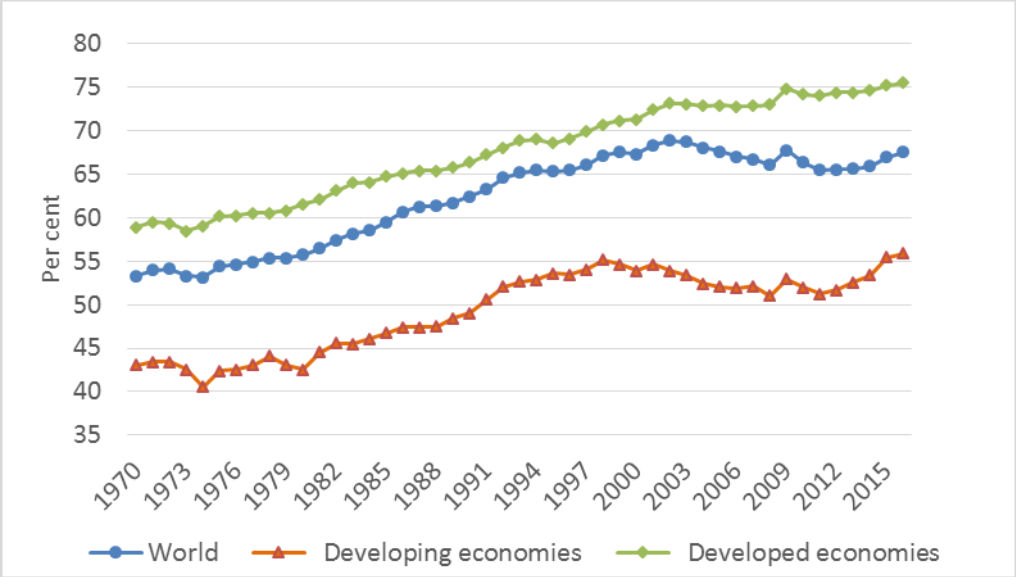

Figure 2.1: GDP share of services by development status (1970-2016)

Source: Based on UNCTAD database (2018a)

In terms of employment, services have also made increasingly significant contribution to the global economy. Indeed, Figure 2.2 indicates that employment shares of services have followed trends similar to those of output. In 1992, the sector created 781.4 million jobs, accounting for 34 per cent of the total job creation. By 2018, 1,710 trillion jobs were provided by services activities, comprising more than half of total employment. Again, a huge and persistent gap between developed and developing groups can be observed. By

2017, the sector accounted for 74 per cent of employment in developed economies while this share in developing counterparts was modest at 21 per cent.

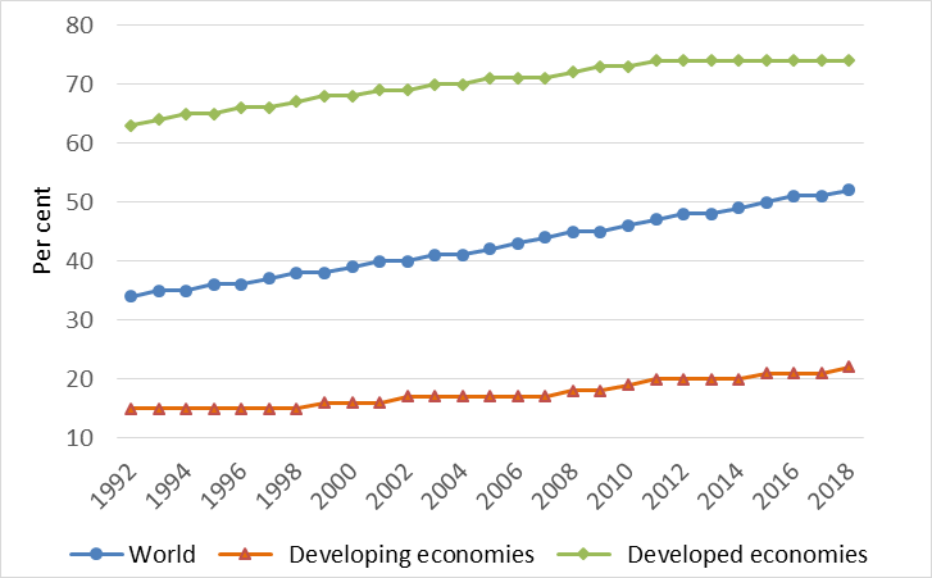

Figure 2.2: Employment share of services by development status (1992-2018)

Source: Based on ILO database (2018)

Combining Figures 2.1 and 2.2, it can be seen that the gap in the employment shares between the two groups is even wider than the gap in the output shares, which might be due to that relatively more productive labour force was devoted to services in developing economies (i.e., 21 per cent of the workforce producing 56 per cent of output), as compared to developed ones (74 per cent of the workforce producing 76 per cent of output). This can be partly associated with stark differences in the employment and output contributions of the primary sector in the developing countries. In fact, the labour force in this group remains predominantly concentrated in the low-value-added activities of the primary sector (62 per cent), which contributes merely 9 per cent to GDP (ILO, 2018; UNCTAD, 2018a). Thus, the rising services sector in the developing group tends to attract more skilled workers that comprise a lower share of the workforce but contribute a much higher share of output.

Furthermore, services have become the largest employer absorbing female labour. Table 2.2 shows the changes in the contribution of the three sectors in female employment across

the globe and groups of economies from 1992 to 2018. Similar to the trends in total employment, the primary and manufacturing sectors exhibit declining shares in employing female workers while services show the opposite pattern. Specifically, services attracted more than 55 per cent of women in the workforce during the period of 2011-2018, as compared to 38 per cent during 1992-2010. Besides, the shares of female employment in services also varied substantially between two groups of economies. This gap is more substantial than that of total employment. During 2011-2018, services in developed economies play a dominant role in hiring female, accounting for 87 per cent, which is nearly 4.3 times higher than that of the developing group. While this substantial difference in the latest period (4.3 times) is likewise related to the historical dominance of the primary sector in absorbing female labour in developing economies, it shows a narrowing gap between the two groups over time (down from 5.8 and 5.2 times in two earlier periods, respectively).

Table 2.2: Sectoral share in female employment by development status

	World	Developing economies	Developed economies
1992-2000			
Primary	42.33	80.22	4.56
Manufacturing	20.00	6.11	17.00
Services	37.67	13.56	78.22
2001-2010			
Primary	36.30	76.80	3.10
Manufacturing	18.00	7.10	13.00
Services	45.80	16.00	83.80
2011-2018			
Primary	28.63	71.38	2.00
Manufacturing	16.00	8.00	11.00
Services	55.25	20.38	86.88

Source: Calculations based on ILO database (2018)

While international trade has predominantly involved the sale of tangible goods across borders, many intangible services have become increasingly mobile and tradable. Trade in services can take place via three modes: (i) from one economy to another (services cross the border); (ii) within an economy to a service customer of another economy (consumer crosses the border); and (iii) through the presence of natural persons of one economy in another economy (supplier crosses the border) (UN, 2012). Services of high tradability include transportation, tourism, education, telecommunication, finance and banking. This is a noticeable trend given the growing contribution of services to the global output and employment.

Figure 2.3 shows the export shares of services from 1980 to 2016. An upward but fluctuating pattern can be seen across the world and groups of economies. Sharp variations occurred since the global financial crisis that began in 2007. By 2017, the services sector accounted for nearly 24 per cent of the world total exports. Despite comprising a modest proportion, the contribution of services in global trade is expected to rise and should not be underestimated. Similar to the trends in the output and employment, developed economies exhibit a stronger engagement in services exports than developing counterparts. By 2017, the shares of services exports were 29 per cent and 17 per cent for the former and latter groups, respectively.

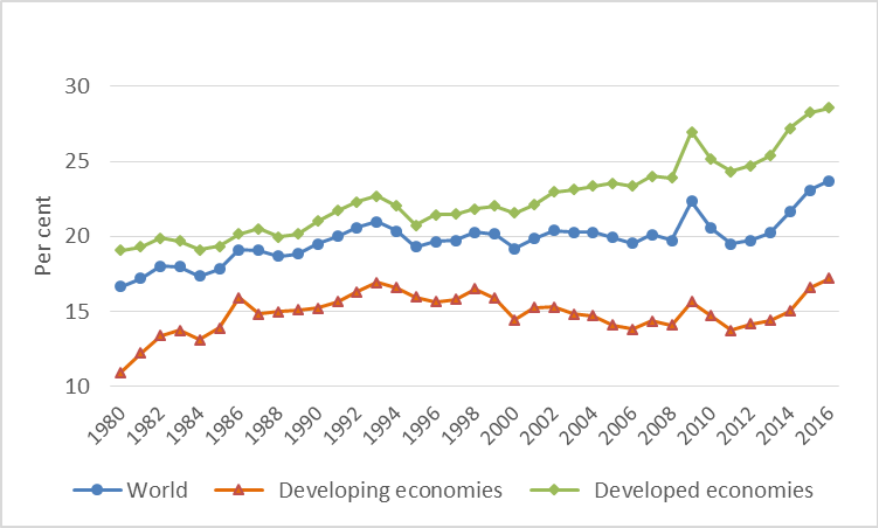

Figure 2.3: Export share of services by development status (1980-2016)

Source: Based on UNCTAD database (2018b)

2.3.2 Global FDI: A shift towards services

The international investment landscape has undergone a marked shift of FDI sectoral composition from manufacturing towards services. This foreseeable change is in line with the rise of services in other aspects of the world economy such as output, employment and international trade. Intuitively, due to the intangible nature of services, FDI has been considered crucial for access to efficient services in the increasingly tertiarised global economy. By the 1950s, services accounted for about 20 per cent of global FDI stock, and the share grew steadily to 25 per cent in the 1970s (UNCTAD, 1989). Since then, dramatic increases in the proportions of services FDI have taken place worldwide. Generally, the shift of global FDI towards services is mainly attributed to three factors.

First, it is largely associated with the growing importance of the tertiary sector in the world economy (Cuadrado-Roura, 2013; Doytch & Uctum, 2011). As services account for an increasingly dominant share in GDP and employment in almost all economies, tremendous opportunities have arisen for foreign firms to meet the expanding demand of local markets. In fact, services are generally intangible and most FDI in services is market seeking. These features suggest a greater potential and efficiency of FDI flowing to host service markets.

Second, services FDI has been further facilitated by the privatisation and deregulation of this sector in host economies, particularly in developing ones (UNCTAD, 2004; 2010, 2014a). Many key industries (such as finance and banking, telecommunication, transportation, and retail trade), previously under state or domestic private ownership, are now open for foreign investors to various extents. Moreover, this liberalisation process closely relates to the growth of the service component in various international agreements in trade and investment.

Third, the prevalence of service offshoring and outsourcing has also contributed to the increase of services FDI (Cuadrado-Roura, 2013; Ramasamy & Yeung, 2010). The advancement of information and communication technology has promoted the tradability of many services. Consequently, various services have been offshored to foreign affiliates located in low-cost destinations. Furthermore, foreign and domestic manufacturing firms alike tend to outsource many services used as their intermediary inputs (e.g., telecommunication, legal and tax consulting, marketing, research and development, etc.) due to cost or capacity related issues. In this context, FDI firms, especially large multinationals, are usually more advantageous and competitive in providing these services than domestic counterparts.

Figure 2.4 shows the distribution of global inward FDI stock by sector between 1990, 2002 and 2012. By 1990, service activities rose up to claim nearly half of total FDI stock. The share of this sector exhibited an upward trend to become the dominant component of FDI globally, reaching about two thirds (equivalent to approximately 15 trillion US dollars) in 2012. This share is rather close to that of services in world GDP (as depicted in Figure 2.1). On the contrary, the manufacturing sector shows its declining shares over the years from 41.32 per cent in 1990 to only 26.16 per cent (equivalent to nearly 6 trillion US dollars) in 2012.

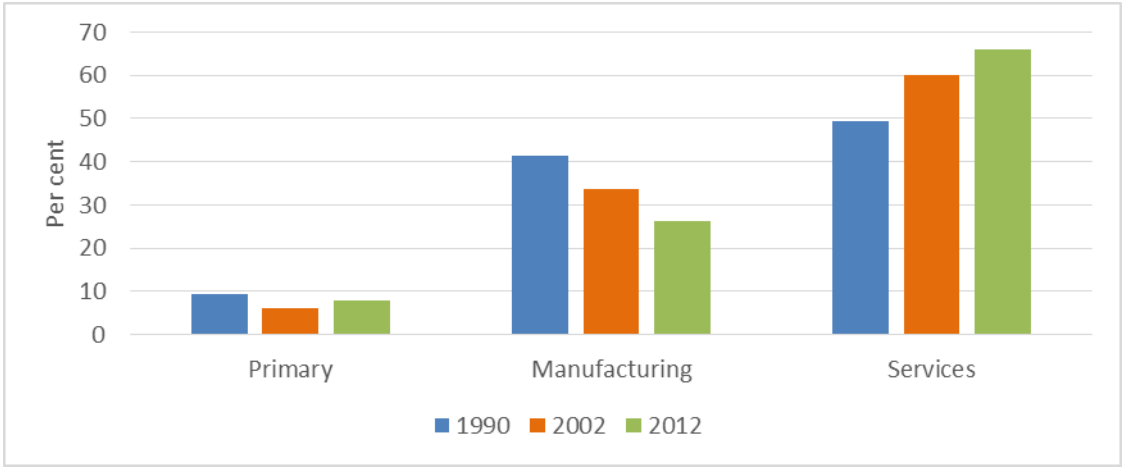

Figure 2.4: Global inward FDI stock, share by sector

Source: Based on World Investment Reports (UNCTAD, 1992, 2004, 2014b)

The above contrasting patterns in manufacturing and services FDI clearly indicate a considerable shift of the world investment towards the tertiary sector. While significant changes in FDI occur among manufacturing and services, the primary sector shows comparably lower but more stable shares of total FDI stock in these periods. In fact, this non-dominant sector gained an increased proportion from 6.19 per cent in 2002 to 7.69 per cent (equivalent to greater than 1.7 trillion US dollars) in 2012.

Figure 2.5 depicts the estimated inward FDI stock by sector for two groups of economies in 2002 and 2012 (the latest year that data of this disaggregated level are available). It can be seen that inward FDI largely concentrates in developed countries, of which the corresponding values in all three sectors more than double those of developing counterparts. More importantly, services increased significantly, constituting the biggest share of the FDI stock of both groups. By 2012, the shares of services FDI in the total FDI stock of developed and developing economies are relatively close to each other, being 67.89 per cent and 62.73 per cent, respectively. It is worth noting that over this 10-year period, the developing group demonstrates a slightly higher growth in services FDI, narrowing the gap with the developed counterpart from 2.85 times (in 2002) to 2.39 times (in 2012).

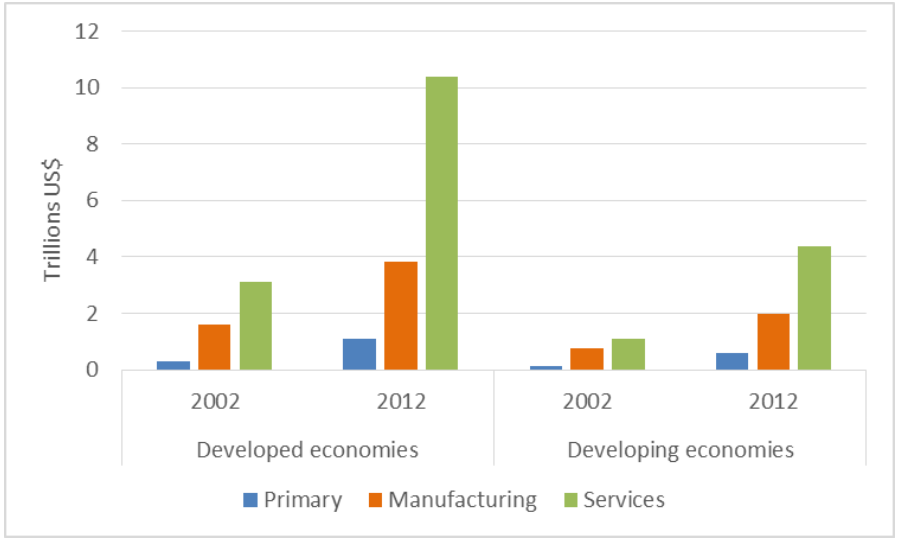

Figure 2.5: Global Inward FDI stock by sector and development status

Source: Based on World Investment Reports (UNCTAD, 2004, 2014b)

While manufacturing FDI also shows substantial increases in value during this period, this sector accounts for decreasing proportions in the total FDI stock across developed and developing economies, with a larger scale in the latter group. Specifically, during 2002–2012 the shares of manufacturing FDI continuously shrank from 31.81 per cent to 25.02 per cent and from 37.69 per cent to 28.78 per cent among developed and developing groups, respectively. These figures affirm the shift of global FDI towards services, which appears to be more prominent in developing countries.

Figure 2.6 illustrates changes in services FDI by major industries over the years 1990, 2002 and 2012. While overall FDI in services increased markedly in volumes as well as relative sectoral shares worldwide, patterns among service industries are rather heterogeneous. Three main remarks are worth noting. *First,* investment in finance (i.e., financial and insurance activities) consistently represents the largest industry in attracting services FDI. Nevertheless, its shares are fluctuating with a sharp decline from 40.22 per cent in 1990 to 28.62 per cent in 2002 before bouncing back to 36.22 per cent in 2012.

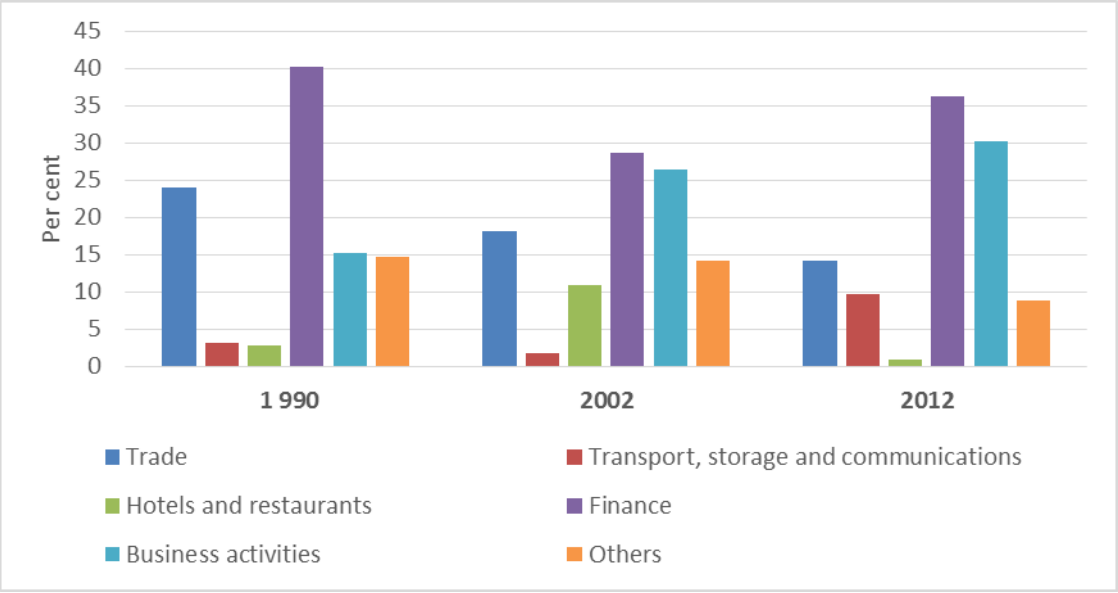

Figure 2.6: Global Inward FDI stock in services by industry

Source: Based on World Investment Reports (UNCTAD, 1992, 2004, 2014b)

Second, while the proportions of FDI in trade (i.e., wholesale and retail) demonstrate a downward trend, those of business activities (i.e., professional, scientific and technical services, real estate and renting) exhibit an opposite pattern over these periods. Notably, FDI in business activities rose sharply from 15.17 per cent (1990) to 30.24 per cent (2012), which was more than twice the share of FDI in trade. Third, another two emerging industries, namely (i) hotels and restaurants and (ii) transport, storage and communication, show striking variations over the years. While in 1990 their percentages are relatively close, the 2012 figures show an about thirteen-fold decline of the former (to merely 0.85 per cent) and a nearly six-fold increase of the latter (up to 9.73 per cent), as compared to their respective shares 10 years ago.

2.4 Services and FDI: An overview of Vietnam's economy

2.4.1 The role of services in Vietnam's economy

Since winning independence in 1975, Vietnam has undergone extraordinary transformation, internally and externally. This emerging economy is located in the dynamic South East Asia and has transitioned from being centrally planned to market oriented, rural to urban, agrarian to industrialised, and nationally focused to globally integrated. The Renovation (Doi moi) reform launched in 1986 has markedly transformed the war-torn economy. Notably, the country has been successful in curbing inflation crisis by cutting the rate from 774 per cent in 1986 to 67.5 per cent in 1990 and 3.5 per cent in 2018 (GSO, 2018). At the same time, Vietnam has experienced remarkable economic growth, being one of the fastest growing economies in the world with GDP growth rate averaging 6.5 per cent per annum over the period 2000-2017 (WB, 2017b). The country has also become increasingly integrated into the regional and global economy by signing various bilateral and multilateral agreements on trade and investment liberalisation, including opening up many service industries to foreign investors. By 2019, Vietnam has engaged in 25 free trade agreements (12 signed, 4 under negotiation, 9 under consultation) (ADB, 2019).

During the development process of the economy, services have played an increasingly important role.[3] Figure 2.7 shows the sectoral composition in GDP of Vietnam during the period of 1986-2016. Notably, services have risen to become the dominant contributor to the country's total output since the early 1990s. There exhibits an upward pattern despite some fluctuations over time, particularly the sharp decline following the Asian and global financial crises. The share of services hit the record high of about 44 per cent in 1995 and 2009, remaining the most important contributor to GDP in 2016 (41 per cent). It is worth noting that while services constitute the largest sector in Vietnam, its output share is much lower than that of average developing economies (56 per cent in 2016). Indeed, Vietnam's per capita GDP (US$ 1,725) remains relatively far below the average of the developing group (US$ 4,732) (UNCTAD, 2018a). Hence, further development is expected to lead to a higher service share. This implies potential for growth of services in Vietnam as well as challenges faced by the government to unlock and realise the untapped potential.

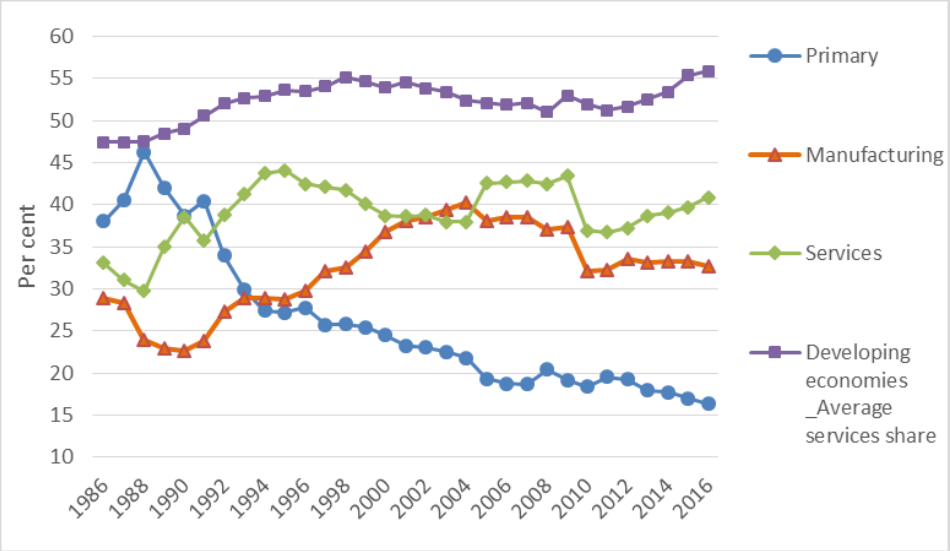

Figure 2.7: GDP share by sector in Vietnam's economy (1986-2016)

Source: Based on GSO database (2018) and UNCTAD database (2018a)

[3] Compared to manufacturing, the services sector tends to be more diverse, comprising various kinds of industries with largely different characteristics. See Tables A2.1, A2.2, and A2.3 in the Appendices for more data on the heterogeneity of service industries regarding the distribution of workers by educational attainment, gender gaps in educational attainment and average wages across industries.

Similarly, the manufacturing sector demonstrated strong growth, with its share in GDP rising from the lowest proportion (prior to 1993) to surpass services in 2003 and 2004. Nevertheless, the manufacturing share began a downward trend since 2005 and slightly recovered five years later, becoming the second largest contributor to the country's total output in 2016 (33 per cent). Contrary to the other two sectors, the primary sector has become less and less important in contributing to GDP. Notably, this sector's share decreased nearly three-fold from 46 per cent in 1988 to merely 16 per cent in 2016. These patterns are consistent with those of other countries across the world.

The sectoral shares in total employment of Vietnam and average developing countries during 1992-2018 are presented in Figure 2.8. While the GDP shares by sector (shown in Figure 2.7) are markedly fluctuating, the employment shares exhibit relatively smooth linear patterns. Notably, the primary sector remains the largest employer in the local labour market, but its proportion has declined sharply from 72 per cent in 1992 to 40 per cent in 2018. Meanwhile, an increased number of labour are attracted and shifted to services and manufacturing sectors. Of these, services continuously constitute the second largest sector in providing jobs to Vietnam's economy. By 2018, the services sector had created about 20.8 million jobs to the local workforce. Its employment share shows an upward trend, doubling from 17 per cent in 1992 to 35 per cent in 2018. More importantly, the services sector in Vietnam appears to outperform average developing economies in this respect as the employment share of this sector in the average developing group grew slower, steadily increasing from 15 per cent in 1992 to 22 per cent in 2018.

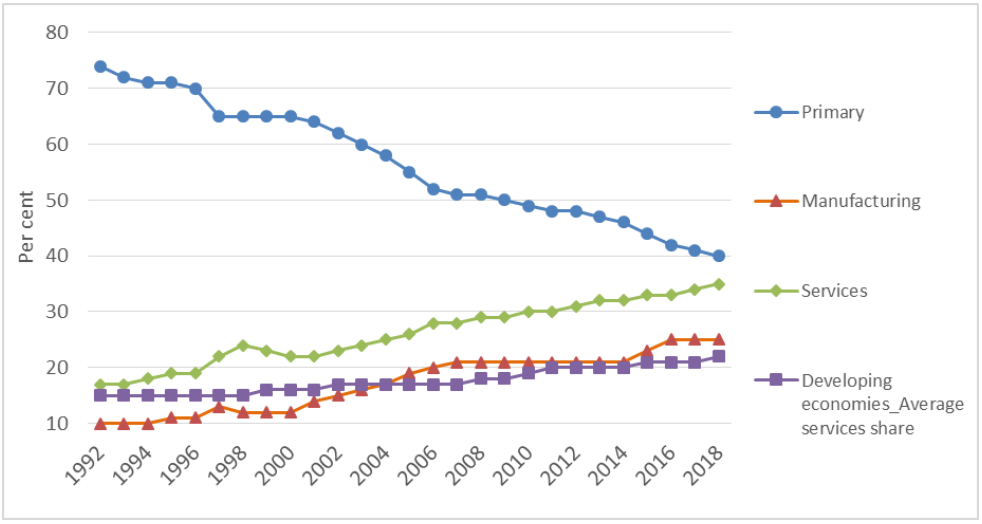

Figure 2.8: Employment share by sector in Vietnam's economy (1992-2018)

Source: Based on GSO database (2018) and ILO database (2018)

Furthermore, services have played an even more important role in attracting female labour force. Figure 2.9 shows that service industries become an increasingly dominant employer of female workers in Vietnam over the period 1992-2018. The services employment share for female workers has risen significantly from 18 per cent in 1992 to 39 per cent in 2018, which is close to the share of the primary sector (41 per cent) and much higher than that of the manufacturing (21 per cent). Notably, Figure 2.9 also indicates that service industries in Vietnam attract a larger proportion of women than average developing economies.

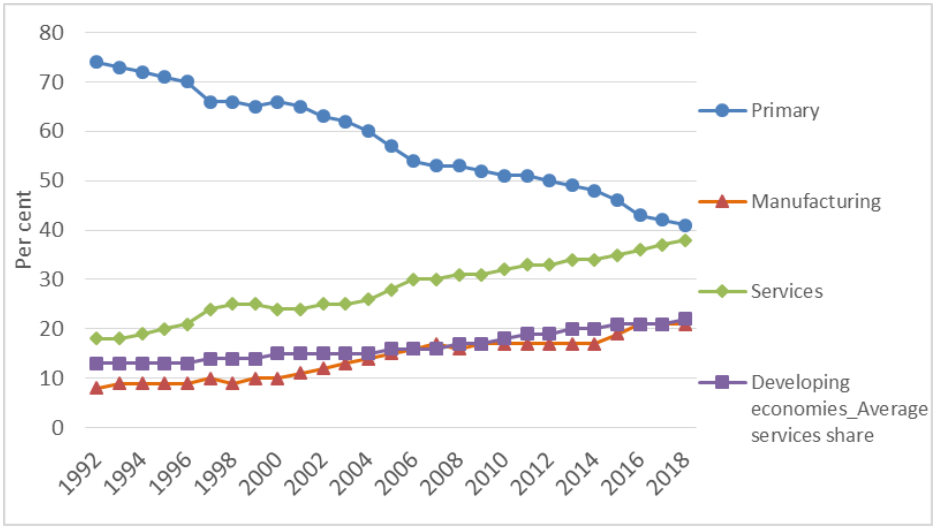

Figure 2.9: Female employment share by sector in Vietnam (1992-2018)

Source: Based on GSO database (2018) and ILO database (2018)

Figure 2.10 depicts the movement of services trade in Vietnam during the period 1990-2016. The share of services in total exports increased from nearly 7 per cent in 1990 to over 23 per cent in 1998 before falling sharply following the Asian financial crisis. Since then, the services share continued a downward trend, accounting for more than 10 per cent of total exports in 2016. Besides, the patterns of services exports and imports are roughly similar. Notably, the share of services imports was continuously higher than that of services exports prior to 1997 and the remaining period shows an opposite circumstance with services imports making up the record low of about 7 per cent in 2018. Compared to average developing economies, services trade of Vietnam performed better in terms of contribution to total trade during the period 1991-2001. Nevertheless, the following years show declining proportions of both imports and exports, which fell far below the average of developing countries. Given the overall upward trend in services trade across the globe, Vietnam might need to devote greater policy efforts to boost growth momentum and promote trade in services.

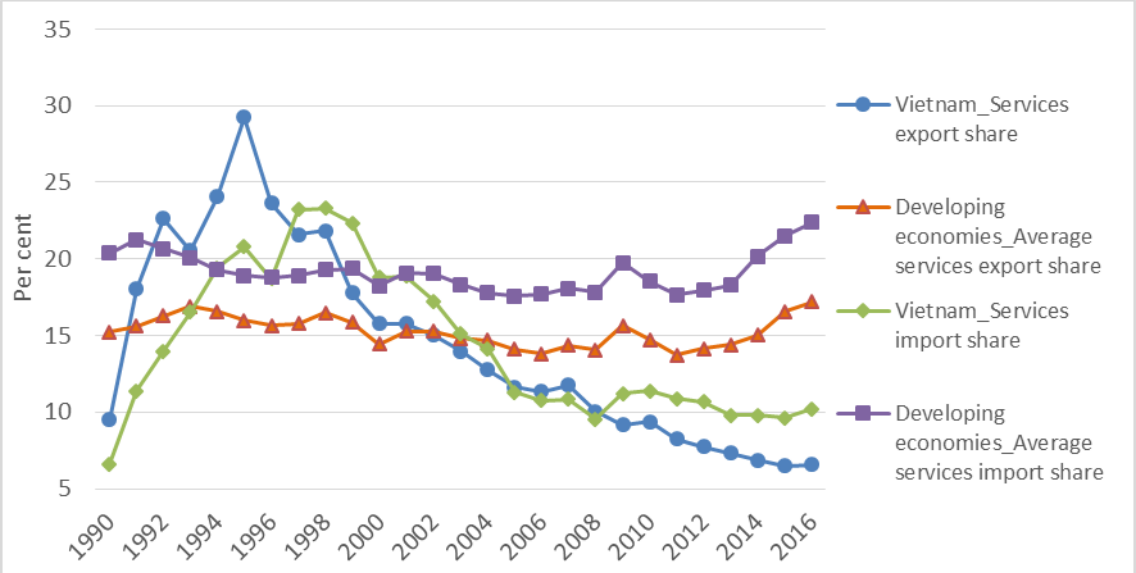

Figure 2.10: Services export and import shares in Vietnam (1990-2016)

Source: Based on GSO database (2018) and UNCTAD database (2018a)

2.4.2 Services FDI in Vietnam: Some stylised facts

The sectoral shares in the number of FDI projects in Vietnam in 1996, 2006 and 2016 are presented in Figure 2.11. The primary sector is the least significant contributor, showing a continuously downward trend over these years. Its share has dropped markedly from nearly 11 per cent in 1996 to 0.65 per cent (with 17 projects) in 2016. Meanwhile, FDI has been largely concentrated in the other two major sectors, which is consistent with the trends of global FDI flow. By 2006, manufacturing was the dominant sector in luring FDI projects with the proportion surging from 55 per cent in 1996 to 65 per cent 10 years later. Despite a considerable increase from 639 projects to 1042 projects in 2006 and 2016, manufacturing share went down substantially to about 40 per cent during this period. Hence, the shift from manufacturing toward services can be clearly seen over the past decade. By 2016, services constituted the largest sector in attracting FDI with 1554 projects, accounting for about 60 per cent of total number of registered projects.

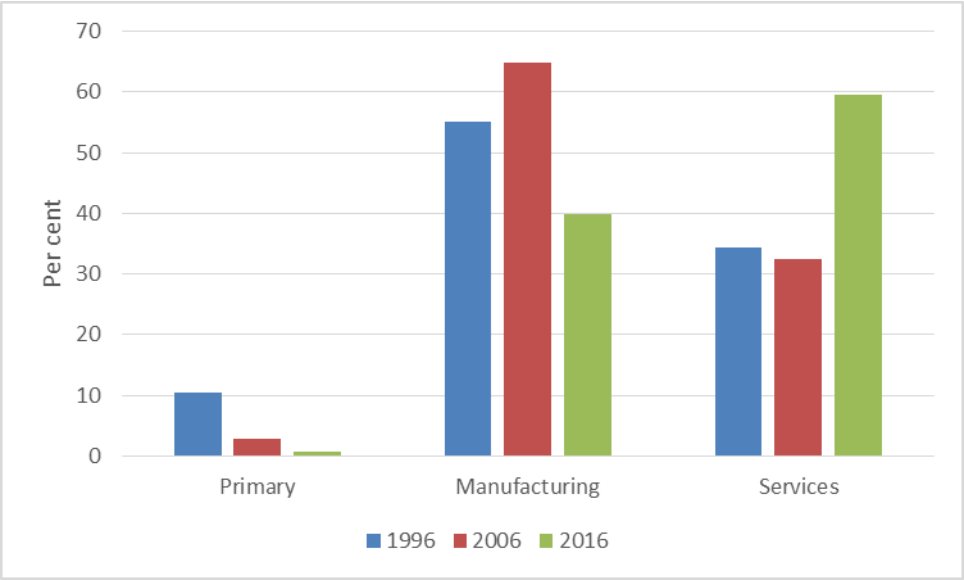

Figure 2.11: Number of FDI projects in Vietnam, share by sector

Source: Based on GSO database (2018)

While the sectoral distribution in FDI project number indicates a noticeable shift towards services in Vietnam, the trend in registered FDI capital is rather different. Figure

2.12 depicts the relative shares in total inward FDI capital of the three sectors over the periods between 1996, 2006 and 2016. The primary sector has consistently attracted the lowest proportion of FDI capital, representing an average 2 per cent during these years. Furthermore, manufacturing share rose sharply from about 28 per cent in 1996 to roughly 69 per cent in 2006. Regardless of a minor drop to nearly 63 per cent in 2016, this sector sustained its dominant role in luring FDI capital. Meanwhile, services demonstrated an opposite pattern compared to manufacturing. By 1996, FDI capital was concentrated in services, accounting for more than 70 per cent (equivalent to roughly US$6 billion). By 2006, this sector saw a two-fold decline to 29 per cent before slightly recovering (up to 36 per cent) in 2016, which is rather in contrast to the global FDI trends. In fact, the sectoral composition of GDP in Vietnam (Figure 2.7) shows a similar marked switch from services to manufacturing between 1996 and 2006. Nonetheless, FDI in services recovered slowly following the Asian financial crisis while the overall services sector bounced back rapidly to reclaim its dominant role in output contribution.

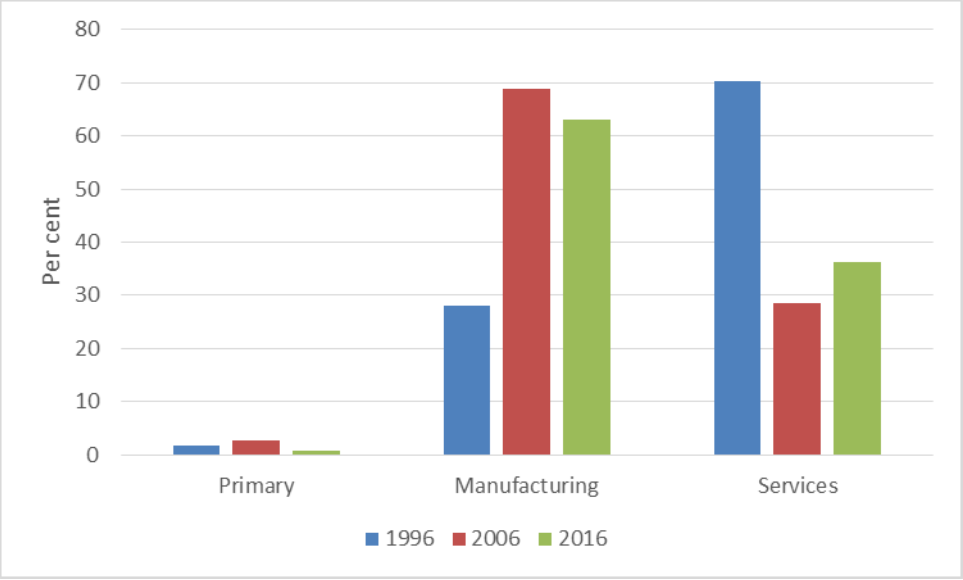

Figure 2.12: Total FDI registered capital in Vietnam, share by sector

Source: Based on GSO database (2018)

Figure 2.13 demonstrates the composition of services FDI in Vietnam by major industries in 2006 and 2016. Resembling the global patterns, a large number of FDI projects

were attracted to a small number of service industries. Of these, business activities (including professional, scientific and technical services, real estate and renting) constitute the dominant industry, making up more than 44 per cent of the total projects in 2006. Nevertheless, its share decreased two-fold to merely 22 per cent in 2016. Meanwhile, wholesale and retail trade has risen as the largest industry in luring services FDI projects by 2016. Its share went up sharply from 5 per cent to 33 per cent over the ten-year period. The proportions of the other two main industries (i.e., transport, storage and communications; and hotels and restaurants) in the total services FDI projects are stable at 6-7 per cent during this period. Notably, while the global trends indicate finance (i.e., financial and insurance activities) as the biggest industry in services FDI attraction, Vietnam shows a rather stark difference with a modest share of roughly 1 per cent over the years.

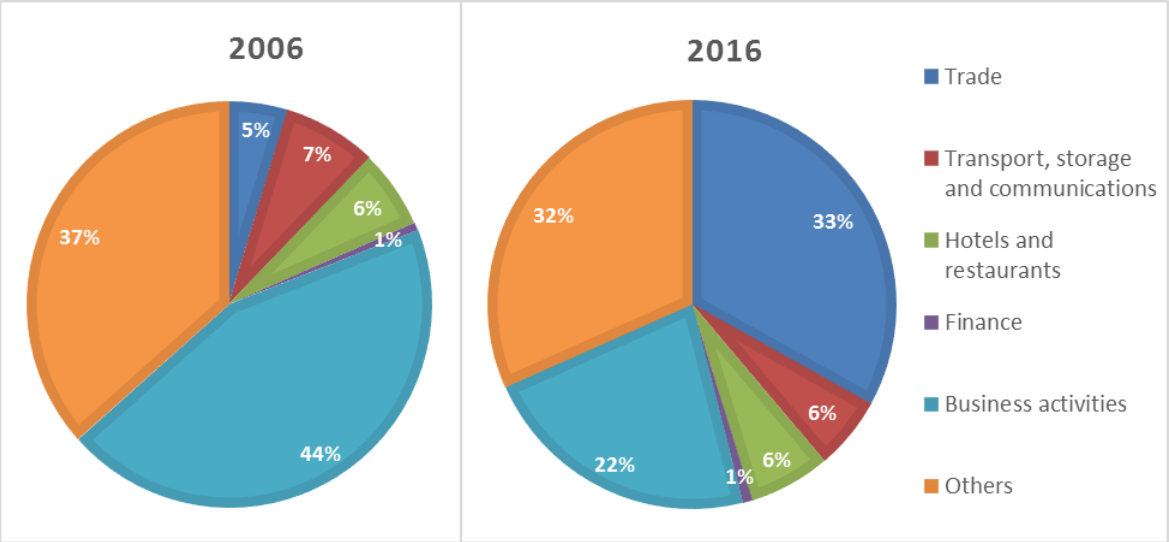

Figure 2.13: Number of services FDI projects in Vietnam, share by industry

Source: Based on GSO database (2018)

The relative importance of service industries in FDI landscape can be further analysed by depicting the distribution of registered capital as shown in Figure 2.14. Despite having a declining share from 45 per cent in 2006 to 34 per cent in 2016, business activities remain the most important industry in attracting services FDI in Vietnam over the past 10 years. The

proportion of wholesale and retail trade in total services FDI registered capital has gone up markedly, though to a smaller extent compared to that of project number, from 4 per cent in 2006 to 20 per cent in 2016. While Figure 2.13 shows similar shares in total project number of other two main industries, namely (i) transport, storage and communication; and (ii) hotels and restaurants, Figure 2.14 suggests a decrease of the former and an increase of the latter over the same period. Last but not least, foreign investment in finance has made a more significant contribution to total services FDI registered capital, raising its share from 1 per cent in 2006 to nearly 6 per cent in 2016.

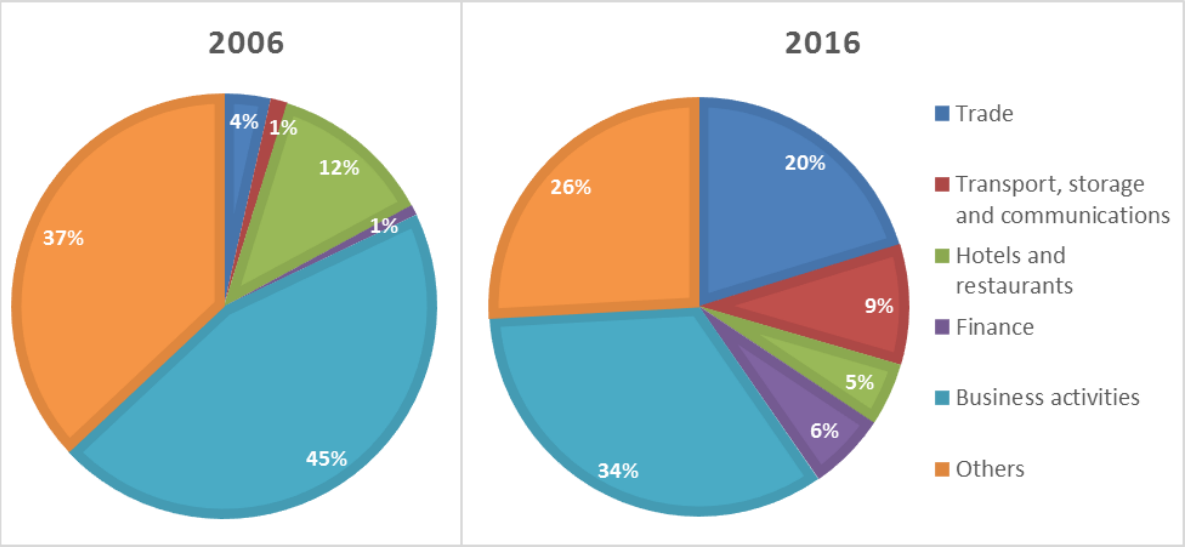

Figure 2.14: Total services FDI registered capital in Vietnam, share by industry

Source: Based on GSO database (2018)

2.4.3 Services versus manufacturing in Vietnam: A closer look

The services sector is widely perceived to be more diverse than other sectors (See Tables A2.1, A2.2, and A2.3 in the Appendices, displaying the heterogeneity of service industries). Besides rich diversity, service industries differ from manufacturing in various key respects, including those under examination by this thesis. Of these, Figure 2.15 depicts the average wage differences by ownership type in these two sectors. Notably, both domestic and foreign firms in services pay higher than their counterparts in manufacturing. Specifically, domestic

service firms pay about 20 per cent higher than domestic manufacturing ones. Foreign service firms also offer considerably higher wages (2.7 times) compared to their foreign manufacturing counterparts. Furthermore, the foreign-domestic pay gap is much larger in the services sector (4.2 times) relative to the manufacturing sector (1.8 times). Wage premium in services might be associated with higher labour quality in this sector. In fact, Figure 2.16 shows the differences in educational attainment of the workforce in services and manufacturing. While most of the manufacturing workers are unskilled labour (69 per cent having no training/formal degree), the majority of labour in the services sector possess better skills (62 per cent having training/formal degree).

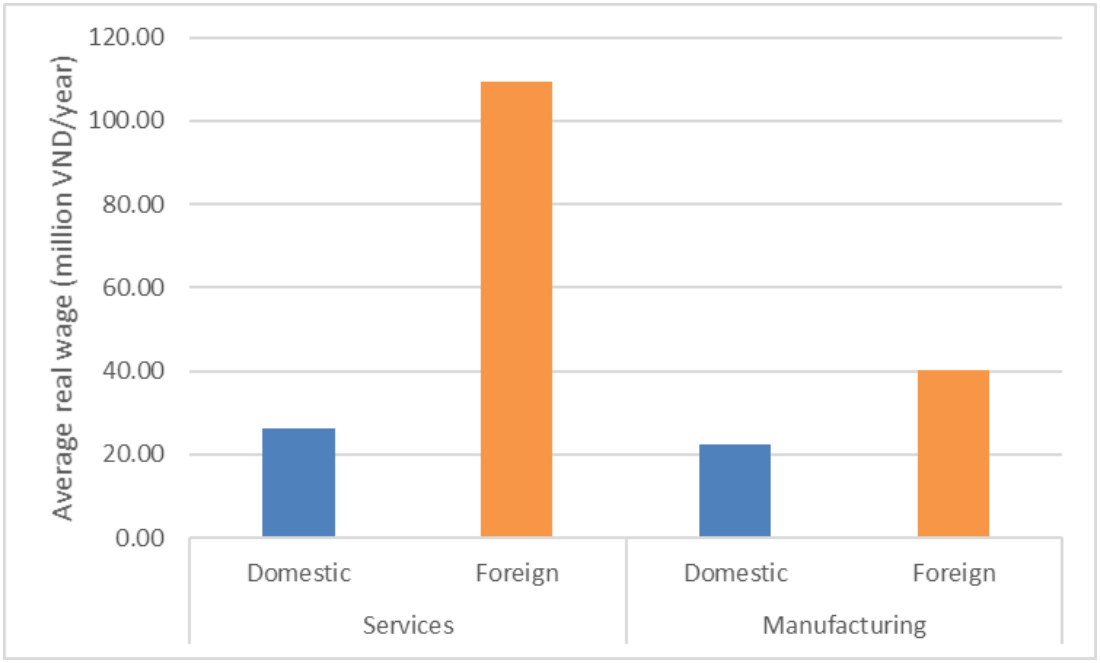

Figure 2.15: Average wage rate differences by sector and firm ownership

Source: Based on GSO's Enterprise Survey in 2012

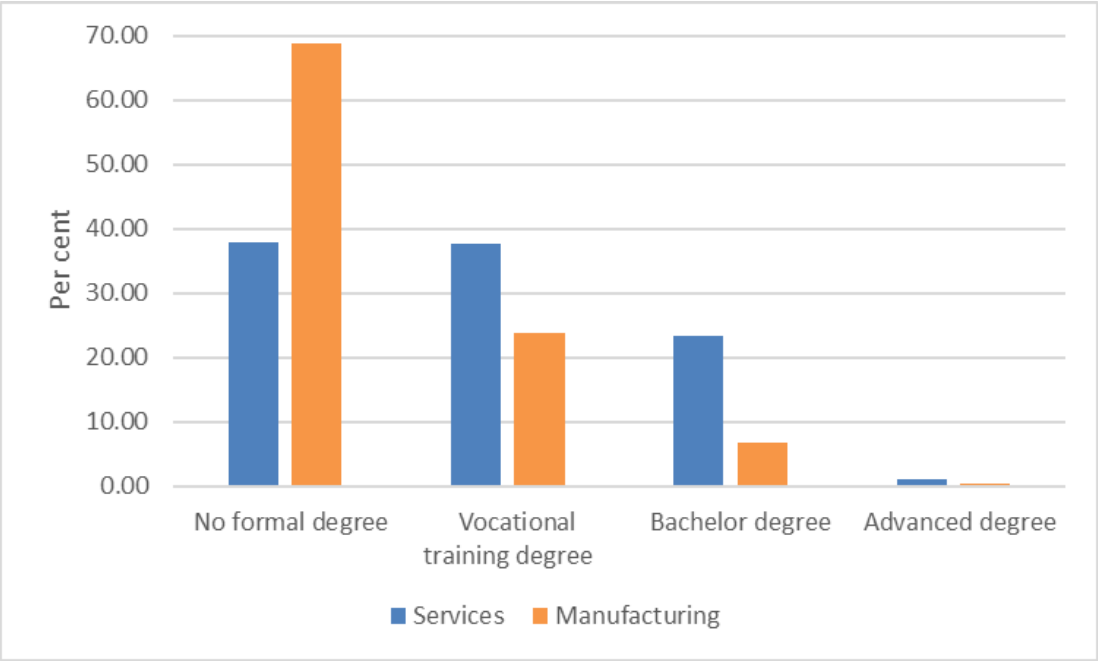

Figure 2.16: Educational attainment by sector

Source: Based on GSO's Labour Force Survey in 2012

Figure 2.17 demonstrates the gender gap in employment by ownership type for the two sectors. Notably, foreign firms in both sectors tend to employ a greater share of female labour compared to local firms. Furthermore, both domestic and foreign firms in the manufacturing sector tend to hire female workers more intensively than their counterparts in services. The female/male employment ratio among manufacturing firms is roughly 1.5 times of that among services firms. This gender gap in employment is markedly wider among foreign firms with the ratio in manufacturing being 2.6 times higher than that in services. Moreover, domestic firms in services are the most male-intensive across both sectors, which implies significant potential for promoting the hiring of female labour.

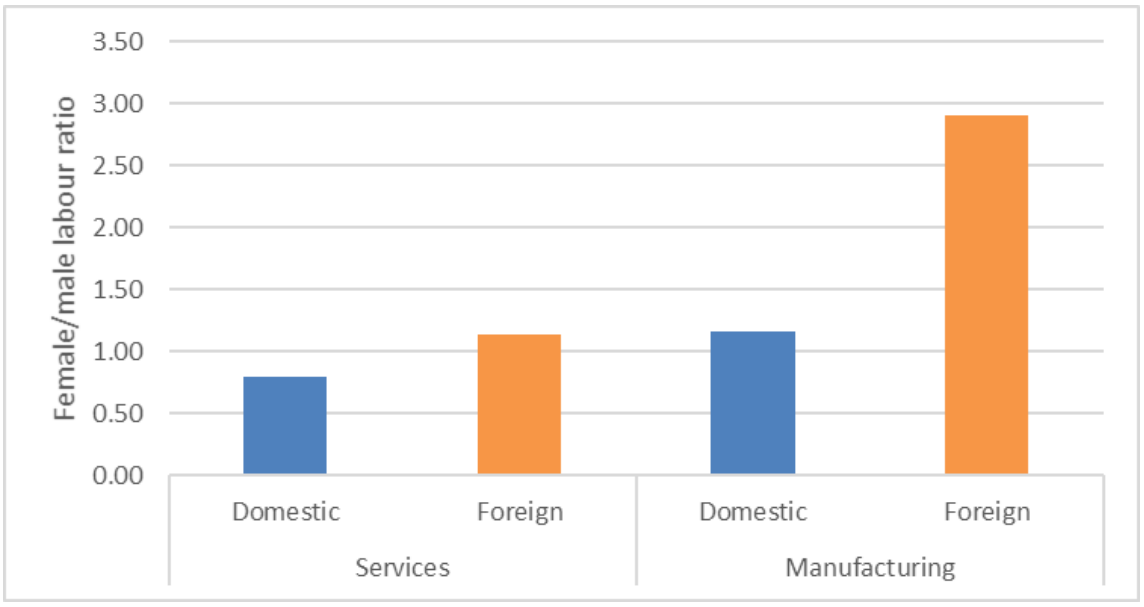

Figure 2.17: Gender gap in employment by sector and firm ownership

Source: Based on GSO's Enterprise Survey in 2012

2.4.4 The strengths and constraints of Vietnam in attracting services FDI

2.4.4.1 Strengths

The increased commitment of the Vietnamese government to promoting growth in services is one crucial strength in attracting services FDI. This sector has been considered the new growth engine and vital to Vietnam's long-term plan to become a medium-to-high-income economy by 2050. The country has adopted substantial policy changes to boost the development of services in domestic market and enhance the presence in international service market. For example, the finance industry has undergone radical reforms of restructuring the banking system, gradually opening to foreign investors, privatising state-owned banking institutions, and strengthening the capitalisation of domestic banks. Furthermore, the continuously improved legal and institutional environment has further stimulated FDI inflows to services, including the *Law on Telecommunications 2009*, the L*aw on Real Estate Business 2006*, *Law on Credit Institutions 2010, Intellectual Property Law 2005*, the revised *Law on Investment* and *Law on Enterprises 2005*.

Reforms in the services sector have been largely driven by Vietnam's rapid integration into the regional and global economies. On 11th January 2007, the country became the 150th member of the World Trade Organisation, demonstrating its strong commitment to widening market access to foreign service providers by gradually liberalising 11 key service industries. In addition, Vietnam has been actively engaged in a growing number of bilateral and multilateral agreements on trade and investment liberalisation. Major deals with strategic partners include ASEAN (1993), the US (2001), Japan (2009), South Korea (2015), Eurasian Economic Union (2016), Hong Kong-China (2017), and notably the Comprehensive and Progressive Agreement for Trans-pacific Partnership – CPTPP (2018). Vietnam's increased economic integration and determined efforts to stimulate the services sector have significantly enhanced market access and investment environment favourable to FDI firms.

A growing domestic market is another key advantage of Vietnam to compete for services FDI. Coupled with the country's high economic growth, income per capita has surged nearly 16-fold from 130 US dollars in 1990 to 2,060 US dollars in 2016 (WB, 2018b). Rising disposable income in the world's 14th most populated country (with about 95 million people) indicates huge potential of rising demand for consumer services such as tourism, retail, education, entertainment, and telecommunication. For instance, mobile phone subscriptions per 100 people in Vietnam have gone up dramatically from 0.03 in 1995 to 127.53 in 2016 (WB, 2018b). Furthermore, the country's expanding manufacturing industry has been well positioned to be Asia's new industrial hub, given the relocation of global manufacturing FDI away from major destinations like China and India due to their rising costs. This trend has boosted the strong demand for producer services such as finance and banking; transportation; professional, scientific and technical activities. Therefore, Vietnam presents a highly promising market for foreign service firms. This comparative advantage

becomes more significant as services FDI is predominantly market-seeking and service industries in Vietnam are rather immature with limited supply capacity.

Unique natural resources, historical sites and cultural values are essential assets for Vietnam to attract foreign investment in one of the largest service industries, namely tourism. Of these, the country is particularly well known for the seven UNESCO World Heritage sites, becoming a desirable destination among domestic and international tourists. Tourism constitutes the biggest services export contributor, hosting a high record of more than 13 million of foreign arrivals in 2017 – a substantial increase of 30 per cent compared to previous year. According to the World Economic Forum (WEF, 2017b), Vietnam was ranked the 10th in the world's top fastest growing destinations for leisure travel spending for 2016-2026. This booming industry has greatly contributed to the country's social-economic development, accounting for 9 per cent of GDP, 7 per cent of total employment, and 10 per cent of total investment in 2016 (WTTC, 2017). Along with strong policy commitment to tourism growth and rising disposable incomes (of local and regional neighbouring markets, notably China), natural, cultural and historical endowments have made Vietnam increasingly attractive and promising among foreign investors in the smoke-free industry.

FDI inflows in Vietnam's services (and manufacturing alike) have been enormously boosted by a number of other major competitive advantages, notably (i) stable political regime, (ii) strategic geographical location, and (iii) abundant and cost-competitive workforce. Of these, socio-political stability represents one key strength of this emerging economy, which strongly enables a progressively transparent, supportive and stimulating investment environment for foreign businesses. Furthermore, Vietnam possesses a strategic location in the centre of the rising South East Asia. Proximity to other main markets in Asia, a long coastline (of 3,260 km) with easy access to the world's major shipping routes have highly facilitated transportation and trading activities. Last but not least, Vietnam has long

been known as a favoured FDI destination due to its young and abundant labour force. Total workforce has surged markedly from 33 million in 1990 to 58 million in 2017 with nearly 70 per cent of the population aged between 15 and 64 (WB, 2018b). More importantly, this young workforce has been increasingly educated and skilled while labour costs remain competitive at less than half that of China (Hayakawa & Tsubota, 2014; Leung, 2015; Tongzon, 2005). All these profound advantages have played a significant role in enhancing Vietnam's competitiveness to lure FDI, notably into the rising services sector.

2.4.4.2 Constraints

Despite having tremendous advantages as a desirable location for services FDI, there are several constraints on attracting greater foreign investment flows to the services sector in Vietnam. Notably, market access by foreign investors remains restricted in a number of key service industries. For example, in telecommunication, foreign ownership is limited to 65 per cent (for non-facility-based services) and 49 per cent (for facility-based services). Similarly, maximum legalised foreign equity threshold is 30 per cent for joint stock banks and 49-51 per cent for most transport services (maritime, waterways, rail, and road). Besides, in other service industries that are subject to full foreign ownership restriction, usually under different phases, the implementation of Vietnam's WTO commitments on services has encountered various challenges. In some instances, regulations and conditions by local authorities appear even stricter and more complicated than those required by the signed commitments. Consequently, foreign investors are faced with greater barriers and difficulties in licensing procedures.

The strong presence of state-owned enterprises (SOEs) in several crucial service industries is another factor inhibiting services FDI in Vietnam. These industries largely fall to those that foreign (and domestic) ownership is restricted because the government considers them as strategic or sensitive. Typical examples of state-owned giants in services include Vietnam Posts and Telecommunication Corporation (VNPT), Vietnam National

Shipping Lines (VINALINES), the State Capital Investment Corporation (SCIC), Airports Corporation of Vietnam, Vietnam Airlines, Vietnam Satellite Digital Television Corporation, Vietnam Bank for Agriculture and Rural Development. In practice, state-owned firms have benefited from various forms of preferential treatment by state and local authorities, notably favourable access to land and credit. Despite increased divestment and privatisation in SOEs, the continued overwhelming foothold of these SOEs can significantly distort the market, deteriorate investment environment, and thus discourage FDI flows into Vietnam's services sector.

Other major constraints dampening FDI inflows to Vietnam's services (and other sectors alike) consist of poor infrastructure, shortage of skilled labour, and complex administrative procedures. Of these, inadequate and under-developed infrastructure presents a critical obstacle to promote FDI in typical service industries like logistics, telecommunication, tourism, and transportation. While low labour cost indicates a comparative advantage of Vietnam in FDI competition, it is also associated with low skill and low productivity levels of the local workforce, discouraging FDI inflow. The country has been faced with difficulties in supplying FDI firms with highly skilled and educated workforce, particularly in many skill-intensive industries like professional, scientific and technical services. Moreover, compared to FDI projects in the manufacturing sector, those in services are challenged by more complex and conflicting regulations related to market entry and post-entry operations due to the incomplete legal system governing service activities in the economy.

2.5 Summary

This chapter provides background information on FDI and services globally and for the specific case of Vietnam's economy. Notably, FDI definitions emphasise the long-term control of foreign investor over the management of a firm in another country. Compared to the relatively unanimous definition of FDI, services are more diverse and complex to be

defined and classified, partly due to the heterogeneous nature of services and their rapid evolution. Of these, the International Standard of Industrial Classification (ISIC) has been a widely adopted reference to report and categorise service activities in accounts and statistics of almost all countries, including Vietnam – the empirical case of this research.

Services now constitute the leading and most dynamic economic activity globally, accounting for two-thirds of output, more than half of total employment and nearly one-third of total exports. It also represents the largest employer absorbing female labour. More importantly, global FDI has been sharply shifted from manufacturing towards services. This phenomenon is mostly associated with the rise of the tertiary sector, privatisation and deregulation of services in host economies, the prevalence of service offshoring and outsourcing. Notably, the role of services varies significantly across groups of economies.

The services sector has also played an increasingly important role in Vietnam. Generally, the patterns of how services contributed to this emerging economy are relatively similar to the global context. Nevertheless, this sector has lost its growth momentum, showing a sharp decline in total inward FDI by 2006, which is in contrast to the trend of global FDI. To accelerate FDI in services, Vietnam exhibits major strengths of strong reform commitment in the services sector, large and growing domestic market, and unique resources for tourism development. Other major competitive advantages include stable political regime, strategic geographical location, and large and cost-competitive workforce. Nonetheless, major constraints facing the economy in attracting greater services FDI consist of limited market access by foreign investors and the dominant role of state-owned enterprises in several crucial service industries; poor infrastructure; shortage of skilled labour, and complex administrative procedures.

Chapter 3: The Impacts of FDI on the Host Labour Market: A Literature Review

3.1 Introduction

This chapter provides a comprehensive review of previous research on the impacts of FDI on the host labour market. The entry and increased presence of FDI firms can generate significant effects on recipient countries in various aspects. One of these is the potential influence on the host labour market. Policymakers generally expect FDI to create large-scale employment, enhance labour productivity and improve wages/income for the local workforce (Arnal & Hijzen, 2008). These widespread expectations may explain considerable incentives and competition among host governments in attracting foreign investors. The existing literature on the impacts of FDI on the host labour market can be categorised into three main strands: (i) FDI and wages; (ii) FDI and employment; and (iii) FDI and labour productivity. Host governments largely expect that FDI inflows will generate positive or beneficial impacts on labour markets while empirical evidence for both developed and developing economies is far from homogenous.

Following this, Section 3.2 reviews the first strand of FDI and wages, which largely focuses on the indirect effects of foreign firms via wage spillovers. Next, Section 3.3 reviews the second strand of FDI and employment, devoting major attention to FDI impact on female employment. Section 3.4 gives a brief review on FDI and labour productivity, which is the most intensively examined strand of previous studies on FDI-linked impacts on the host labour market. Finally, Section 3.5 summarises the chapter.

3.2 FDI and wages

3.2.1 Wage gaps

A growing literature examines the relationship between foreign ownership and wages in the host labour market. The wage effect of FDI is closely associated with the income and welfare of individual local workers and the whole recipient country. For many developing countries, FDI has greatly contributed to poverty reduction by providing millions of local employees with regular and decent income (Feliciano & Lipsey, 2006; Girma, Greenaway, & Wakelin, 1999). Workers in FDI firms are the first to gain direct benefits from the wage effect of FDI. Furthermore, the host economy can arguably be rebalanced and boosted once these additional incomes are spent on domestic consumption (Elliott & Zhou, 2015). These effects can be more profound as the empirical literature shows strong evidence that foreign firms tend to pay, on average, higher wages than domestic firms (Aitken et al., 1996; Conyon et al., 2002; Girma et al., 1999; Görg et al., 2007).

A substantial body of the FDI-wage literature examines wage gaps between domestic firms and foreign firms. In a pioneering work, Aitken et al. (1996) conducted cross-section comparisons of wages across domestic and foreign firms in Mexico, Venezuela and the US. The findings indicate that average wages are about 30 per cent higher in foreign firms than domestic counterparts for all three countries. The wage differentials remain, though at lower percentages, after controlling for the impact of the skill mix of workers, industry composition, location of foreign affiliates, firm size and capital intensity. Similar results of foreign wage premium are supported by empirical studies for both developed and developing host countries (Barry, Gorg, & Strobl, 2005; Y. Chen, Démurger, & Fournier, 2005; Conyon et al., 2002; Elliott & Zhou, 2015; Eren, 2009; Feliciano & Lipsey, 2006; Girma et al., 1999; Huttunen, 2007). It is, however, worth noting the overall impact of FDI on average wages might be distorted due to endogeneity problem. The existence of a foreign wage premium

may be attributable to the fact that foreign firms select highly qualified employees, acquire high-paying domestic firms or operate in high-wage industries or high-wage regions. Balsvik and Haller (2010) investigate the case of Norwegian manufacturing firms and indicate that foreign investors tend to acquire large, high-wage and high-productivity firms.

While the foreign wage premium is well documented, the causes of such differentials remain debatable. Generally, three major explanations are discussed in the literature. First, foreign firms tend to have strong incentives to pay higher wages than local competitors to attract and retain workers, particularly high-quality ones (Aitken et al., 1996; Girma et al., 1999). More importantly, a low turnover rate can reduce training costs and minimise the risk of productive know-how spilling over to domestic competitors via labour movement. Second, higher wages by foreign multinationals can be seen as rent sharing between employers and employees (Budd, Konings, & Slaughter, 2005). Compared to local firms, foreign firms are widely perceived to own superior productivity advantages and profitability, which enable them to pay higher wages to reinvest in the workforce. Finally, foreign affiliates are more likely to offer higher salaries to protect and enhance public reputation when complying with local labour law and being good payers (Almond & Ferner, 2007).

The impact of FDI on skilled-unskilled wage gaps in the host labour market also receives considerable investigation. The entry of foreign firms, notably large multinationals, arguably introduces modern technologies and management practices that are skill-intensive or skill-biased. In fact, substantial empirical findings suggest that FDI inflows can increase the demand for skilled-workers, widening the wage gaps between skilled and unskilled groups in both developed and developing countries (Anwar & Sun, 2012; Berman, Bound, & Griliches, 1994; Chaudhuri & Banerjee, 2010; Zhao, 2001). In a study for a developing country, Te Velde and Morrissey (2004) reveal that wages of both skill groups are improved while skill wage gaps are worsened in Thailand given the FDI presence. A similar result is

supported for a developed economy by Taylor and Driffield (2005), finding that FDI inflows in the UK manufacturing industries account for 11 per cent of wage inequality even after controlling the effect of trade and technology. On the contrary, Airola (2008) asserts that the widened skill wage gaps in Mexican manufacturing industries is not caused by increased FDI inflows but by privatisation and other domestic reforms.

A final strand of the FDI-wage gap literature examines the impact of FDI firms on local gender wage gaps (i.e., the relative female-to-male wages). In a country-specific study, Braunstein and Brenner (2007) investigate the influence of inward FDI on gendered wages in urban China, using data for 1995 and 2002. The estimation results indicate that in 1995 female workers were better off in gaining greater pay increases resulting from FDI presence while in 2002 their male counterparts benefited more from FDI. This reversion might be explained by the shift of FDI firms towards higher productivity production, which favoured male-dominated industries in the latter period. Using firm level data of manufacturing industry in 2004, Z. Chen, Ge, Lai, and Wan (2013) found that the entry of FDI firms within the same region and industry exerted a positive impact on reducing the gender wage gap in Chinese labour market. In a cross-country study, Oostendorp (2009) investigates the impact of FDI and trade on gender wage disparities. Using the ILO survey data on wages of more than 80 countries between 1983 and 1999, the paper finds mixed results, varying across levels of economic development. Inward FDI and foreign trade tend to narrow the occupational gender wage disparity in high-income economies. This positive effect was due to a decrease in discrimination and/or an increase in the relative demand for female workers in the wave of globalisation. Meanwhile, there is little evidence that FDI and trade help bridge the female-to-male pay gap in lower-income countries.

3.2.2 Wage spillovers

Recent evidence suggests that foreign entrants can exert indirect impacts on wages of domestic firms, causing wage spillovers. Compared to the extensive literature on wage differentials, this wage spillover effect is much less researched. Wage spillovers can take place via labour market competition and productivity spillovers. Of these, the entry of generally higher-paying foreign firms can significantly shift up the labour demand, triggering domestic firms to increase wage rates to attract and retain workers, particularly high-quality labour (Aitken et al., 1996; Driffield & Taylor, 2006; Girma et al., 1999; Hoi & Pomfret, 2010). The subsequent upward pressure on wage level paid by domestic firms is more likely to occur if the FDI projects are greenfield investments (with additional labour demand) and the local labour market is highly competitive (with limited supply of skilled workers).

Moreover, the existence of productivity spillovers from FDI may be crucial in generating wage spillovers (Barry et al., 2005; Görg & Greenaway, 2004). In this case, domestic firms can enhance labour productivity, enabling them to pay higher wages to workers. Conversely, negative productivity spillovers may result in negative wage spillovers to domestic firms. The empirical findings of wage spillovers are scarce and mixed for both developed and developing host economies. Of these, positive spillovers are mainly found in the latter group.

The study of Aitken et al. (1996) is the pioneering work that examines wage spillovers and compares wages by foreign and domestic manufacturing firms in Mexico, Venezuela and the US. The basic approach to test wage spillovers is regressing domestic firms' average wages on a number of explanatory factors, including foreign presence (measured by employment share of FDI firms). Although foreign firms are found to offer higher wages in all three countries, wage spillovers only exist for the US. The lack of wage spillovers for

Mexico and Venezuela might be due to significant wage differentials between these two groups of firms, and low absorptive capacity of local firms. It is worth noting that the study uses cross–sectional data for the US (in 1987) and data are aggregated at the industry level instead of the firm level.

Adopting a similar approach, Feliciano and Lipsey (2006) investigate wage differentials and wage spillovers from FDI to US firms but extend the analysis by including non-manufacturing industries. Using firm level panel data for 1987 and 1992, the study reveals that foreign firms pay approximately 30 per cent higher than domestic counterparts, with a larger margin for non-manufacturing firms. More importantly, some positive wage spillovers are found in the non-manufacturing sector. However, there is no evidence of such effect in the manufacturing sector, which contradicts the findings of Aitken et al. (1996). Axarloglou and Pournarakis (2007) also examine the case of US manufacturing industries with an emphasis on employment and wage impacts of FDI across states from 1974 to 1994. The results indicate rather weak effects of foreign entrants on local wages and employment in most states. Such effects are dependent on subgroups of industries, suggesting the importance of industry characteristics in explaining spillovers from FDI to local labour market.

Several empirical papers analyse FDI-induced wage spillovers in the UK – another developed and high-wage economy. Girma et al. (1999) examine productivity and wage differentials and spillovers from FDI to the UK manufacturing firms. Using firm-level panel data for the period of 1991-1996, the study suggests five per cent and ten per cent higher average wage and labour productivity of foreign firms, respectively. Surprisingly, no wage and productivity spillovers from FDI are found. Nevertheless, the inclusion of firm level characteristics (skill mix, competition, technology gap) results in some positive spillovers. Similarly, Driffield and Girma (2003) test for wage spillovers from FDI to domestic firms in the UK electronics industry over the years of 1980-1992. Contrary to Girma et al. (1999),

this study shows significant evidence of wage spillovers. Specifically, significant wage spillovers are uniformly distributed across regions for skilled workers. Meanwhile, wage spillovers for unskilled workers are more pronounced in assisted areas with high unemployment levels. Positive wage spillovers are also supported by Driffield and Taylor (2006) who examine inter-industry and inter-regional wage spillovers from FDI in the UK manufacturing industries.

Barry et al. (2005) contribute to the literature by separately estimating the impact of FDI on wages of domestic exporters and non-exporters in Irish manufacturing industries. The study employs firm-level panel data (1990-1998) estimated by linear generalised methods of moments with instruments estimator and accounts for the endogeneity problem of FDI presence. The main findings indicate that foreign presence negatively affects wages of domestic exporting firms. The negative spillover effect of FDI on domestic exporters occurs due to the crowding out effect of FDI through the labour market when FDI firms poach the best workers away from local counterparts via higher wages. Meanwhile, domestic non-exporting firms appear to neither benefit nor suffer from foreign entry. The absence of spillovers is attributable to the low absorptive capacity of local non-exporters. While extending the literature by testing for wage spillovers based on exporting behaviour of domestic firms, Barry et al. (2005) only control for firms' productivity and size in the model, which may omit important firm-level variables in the wage determination functions.

Using a similar approach, Muñoz-Bullón and Sánchez-Bueno (2013) analyse the intra-industry wage spillovers in Spanish manufacturing industries. The study also uses firm level panel data (1992-2008) as in Barry et al. (2005) but adopts the random effect model. The estimation results suggest no significant evidence of positive wage spillovers from FDI at the aggregate level after controlling for firm specific characteristics (share of skilled workers, share of foreign workers, size, added value, capital intensity, competition level,

share of part-time and share of temporary workers). Further examination of labour skills of domestic firms shows that only workers in domestic firms that employ a highly skilled workforce will benefit from wage spillovers.

In a more recent study for Italy, Pittiglio, Reganati, and Sica (2015) test for the wage spillovers effect from FDI through both horizontal and vertical channels. Using a firm-level dataset between 2002 and 2007, the research fails to find any positive wage spillovers from FDI to local firms at both spillovers channels. Nevertheless, significant vertical wage spillovers are found when including a proxy for the technology gap (between domestic and foreign firms) in the model. Accordingly, domestic firms with small or medium gaps benefit from wage spillovers, while domestic firms with large gaps suffer. Therefore, the authors recommend FDI to be directed towards the sectoral and local characteristics of the host economy.

The FDI-linked wage spillover effect is also found to be mixed in empirical studies of host developing countries. Lipsey and Sjöholm (2004) test for wage spillovers from FDI on domestic manufacturing firms in Indonesia with a cross-sectional dataset for 1996. Apart from firm level characteristics (e.g., size, ownership, female share), the analysis is extended by including workers' education levels to control their impacts on firms' wage determination. The main findings suggest significant positive spillovers to domestic firms' wages for both white-collar and blue-collar workers. Furthermore, foreign entry enables domestic counterparts to pay higher wages (with greater gains for white-collar workers) when examining wage spillovers at the provincial level. Tomohara and Takii (2011) also support the positive wage spilliover effect for Indonesian manufacturing firms, using a panel dataset from 1989 to 1996.

Hale and Long (2011) extend the literature by testing wage spillovers from FDI to Chinese private and state-owned firms in the manufacturing and service industries. The study

uses the World Bank survey dataset of 1,500 firms in 2001, which provides a range of firms and workers' characteristics. The estimation results show different outcomes with respect to ownership types of domestic firms. Accordingly, the entry of FDI firms into the same industry and region positively affect wages of skilled workers in domestic private firms. Meanwhile, foreign presence appears to have no effect on wages of workers in domestic state-owned firms. Similarly, Elliott and Zhou (2015) investigate the case of China but focus on manufacturing firms only. Using cross-sectional data from 2004, the paper supports the results by Hale and Long (2011). In general, foreign ownership has positive effect on wages of domestic manufacturing firms located in the same areas.

Chidambaran Iyer (2012) analyses the effect of foreign firms on average wages offered by Indian manufacturing firms from 1989 to 2004. Similar to Hale and Long (2011), a set of firm level characteristics are controlled in domestic firms' wage equations, including age, research and development expenditure, export ratio and size. While previous studies mainly use employment share of FDI firms as a proxy for foreign presence, Chidambaran Iyer (2012) measures the role of FDI by output share of foreign firms at the three-digit and four-digit industry levels. The results are contradictory and depend on the aggregation of data used. Accordingly, foreign presence measured at the three-digit level has a negative effect on domestic firms' wages while measurement at four-digit level indicates a positive effect. The findings imply that the wage spillovers effect may be sensitive to the choice of FDI measurement.

Srithanpong (2014) provides empirical evidence on wage spillovers from inward FDI to domestic firms in Thai manufacturing industries. Using cross-sectional firm-level data in 2007, the study takes into account a number of domestic firms' characteristics such as capital intensity, age, labour quality and ownership type. In contrast to previous studies, Srithanpong (2014) adopts two measures of FDI, namely foreign employment share and foreign output

share in the industry. The use of an alternative FDI proxy can deal with biases due to measurement. The main findings show the positive effect of FDI on the average wages of Thai manufacturing firms or positive wage spillovers at both the regional and industry levels.

To the best of the author's knowledge, Hoi and Pomfret (2010) is the only research examining FDI-linked wage spillovers for the case of Vietnam, using data from 2000 to 2010. The fixed-effect estimations indicate significant positive wage impact from FDI to domestic counterparts. Of these, horizontal spillovers occur regardless of labour market conditions and firms' characteristics, but vertical spillovers depend on firms and industries' characteristics. While the study by Hoi and Pomfret (2010) provides empirical evidence on FDI-linked wage effect on Vietnamese firms, it is restricted to the sample of domestic private firms in the manufacturing sector. This thesis extends the literature, particularly for Vietnam, by shedding light on differential FDI-induced wage spillovers in the diverse services sector, employing a more recent dataset and a rigorous estimation technique (IV-GMM) to address the potential endogeneity problem. Furthermore, the empirical models and findings are linked back to the theoretical framework, resulting in insightful interpretation and implications.

3.3 FDI and employment

3.3.1 FDI and overall employment

FDI is generally viewed as having positive effects on the host labour market by generating direct and indirect employment. The entry of foreign firms usually shifts the labour demand upward, directly creating new job opportunities for local workers, at least in the short run (Axarloglou & Pournarakis, 2007; Coniglio et al., 2015). Moreover, foreign affiliates can generate jobs indirectly through facilitating industrial contacts when they are suppliers to domestic buyers in upstream industries (forward linkages) and buyers of domestic suppliers in downstream industries (backward linkages) (Karlsson et al., 2009).

These effects can have considerable implications for policymakers in host countries, particularly in labour-abundant developing economies. Host governments normally emphasise the employment expansionary effect of FDI as a major benefit and an effective solution to reduce unemployment.

Arguably, the extent of the job creation effect by foreign firms depends largely on the modes of FDI (Dunning & Lundan, 2008; Ernst, 2005). Of these, greenfield investment (i.e., FDI projects establishing a new foreign firm) is considered to have the highest potential of employment contribution since it can directly foster substantial labour demand for new operation. Meanwhile, another popular entry mode of FDI, namely mergers and acquisitions (M&A), is usually considered as having minimal employment expansion effect. Furthermore, it should be noted that job creation by FDI entry might vary across industries. Intuitively, the FDI impact on employment is more significant if foreign firms enter labour-intensive industries than capital-intensive ones.

While the presence of FDI firms is generally expected to stimulate employment, especially from policy and theoretical perspectives, the empirical evidence indicates that FDI can have insignificant and even contracting effects on the local job market. Girma (2005) examines the direct employment effect of acquisition FDI in the UK manufacturing sector. The results suggest that by acquiring and restructuring current firms, FDI can improve efficiency without causing significant changes in the number of employees. Several empirical findings indicate that the quantitative effect of FDI on the local employment is modest (Brännlund, Nordström, Stage, & Svedin, 2016; Kurtishi-Kastrati, 2013).

Furthermore, Moosa (2002) asserts that foreign firms can adversely affect labour demand by divestment and closure of production facilities. Job reduction may also occur when the entrance of foreign firms forces domestic counterparts to cut production and shut down as a result of competitive pressure (Coniglio et al., 2015). Such crowding–out effects

of FDI are more likely to take place in open and highly competitive markets, and when FDI firms mainly produce for domestic markets rather than exporting. Finally, in the short run, the job creation potential of inward FDI might be negatively affected by the introduction of labour-saving technologies, notably in highly productive foreign firms (Jenkins, 2006; Jude & Silaghi, 2016; Pfaffermayr, 2001).

3.3.2 FDI and female employment

From an economics perspective, the gender wage gap (i.e., the ratio of female to male wages) and employment gap (i.e., the ratio of female to male employment) are the two measures most widely adopted in analysing gender inequality in labour markets (Aguayo-Tellez, 2012). Within the FDI-gender employment strand, previous studies show consistent evidence that foreign firms, particularly large multinationals, tend to employ female workers at higher rates than domestic counterparts. By employing more women, FDI firms can reap substantial benefits from optimising female labour' under-utilised skills as well as taking advantage of gender wage gaps pervasively found in many recipient economies, notably labour abundant developing ones.

Curd et al. (2007) examine the impact of inward FDI on Chinese women through survey data. They find that multinationals show high interest in employing local females who on average account for more than 70 per cent of their total workforce. This hiring preference is attributed to two main reasons. First, women are perceived to possess skills and attributes that enable them to be more suitable and productive (than men) in many FDI-concentrated manufacturing industries such as electronics, textile, garment and apparel. As indicated in earlier studies (Elson & Pearson, 1981; Fernández-Kelly, 1983), employers normally prefer females because of their putative nimble fingers; their obedience and being less prone to worker unrest; their being suited to tedious work; and their reliability and trainability relative to male counterparts. Second, FDI firms tend to employ more females to benefit from gender

wage gaps in China while female labour is under-utilised in local firms (partly resulting from gender discrimination in labour markets). In fact, the gender wage gap is significant when the average wage of females is approximately 70 per cent that of males.

In a cross-country study, Hewlett and Rashid (2010) suggest that foreign invested firms can significantly improve their prospects by adopting strategies to attract and retain talented women in emerging economies. The study employs survey data on 4,350 college-educated men and women working in five large multinationals (i.e., Bloomberg, Booz & Company, Intel, Pfizer, and Siemens) across five countries (i.e., Brazil, Russia, India, China, and the United Arab Emirates). The sample shows that women demonstrate surprisingly high educational attainment, career ambition and commitment. Taking the case of UAE as an example, females account for 65 per cent of college graduates; 92 per cent consider themselves ambitious; and more than 80 per cent of them express strong work commitment. However, the authors find that female talent is under-developed and under-utilised in emerging economies, mainly due to family-related responsibilities and gender discrimination in the local labour markets. Meanwhile, multinationals have recognised and promoted the benefits of hiring this vibrant and growing female workforce to meet their talent shortage and boost long-term business prospects.

Focusing on female employment in managerial positions, Siegel, Pyun, and Cheon (2014) provide significant empirical evidence on FDI and female labour in South Korea during the period 2005-2007. Their key findings indicate that by hiring more female managers, foreign firms gain considerable competitive advantages to improve their profitability. Notably, foreign affiliates are more likely to hire women as senior managers than domestic firms. In a further analysis, the authors examine female hiring practices of multinationals originating from Japan, a society considered to be heavily gender discriminatory. They find that Japanese foreign affiliates exhibit different behaviour by

showing a higher probability of hiring female managers than parent corporates in their home country. This result suggests that foreign firms behave strategically as they can identify the opportunity and take the competitive advantage of hiring female workers who are perceived as an excluded or disadvantaged group in the local managerial labour market.

In addition to benefiting from women's under-utilised skills and gender wage gaps, FDI affiliates might employ a higher proportion of females (than domestic firms) simply because of corporate culture as suggested by Kodama, Javorcik, and Abe (2016). This study explores the impacts of foreign ownership on gender employment outcomes and work practices in Japan, which has greater gender inequality than other developed countries.[4] The findings indicate that foreign affiliates largely transplant their parent corporate culture and norms in hiring practices, which are more gender-equal than those of domestic counterparts. Accordingly, the share of females in the firm's total workforce as well as managerial positions are all higher in FDI affiliates than in domestic firms. Moreover, foreign firms are more likely to have smaller gender wage gaps and provide female-friendly employment practices such as flexible working arrangements, telecommuting, and child-care subsidies.

The FDI-female labour relationship is also discussed in several recent studies examining the determinants of female employment. Of these, Fakih and Ghazalian (2015) empirically investigate the role of macro and micro factors, including foreign ownership, in determining female employment of manufacturing firms in the Middle East and North African (MENA) region. The study employs firm-level data obtained from the World Bank's Enterprise Surveys database between 2001 and 2009. Their fractional Logit estimation results indicate that local firms' female employment is largely determined by a set of macro factors (i.e., economic development and gender equality) and micro factors (i.e., foreign ownership,

[4] According to the Gender Gap Index Report by the World Economic Forum (2014), Japan ranked 104th out of 142 countries surveyed.

export, size and labour composition). Notably, MENA's manufacturing firms with higher levels of FDI ownership have a higher proportion of female workers in their workforce. Specifically, a 10 per cent increase in foreign ownership leads to a 1.4 per cent increase in female employment rates of MENA's manufacturing firms.

With a similar approach, Ahmed, Feeny, and Posso (2016) contribute to the empirical evidence of inward FDI as a determinant of female employment in Bangladesh's manufacturing firms. The study also adopts the fractional Logit model, estimated with firm-level panel data covering the years 2007, 2011 and 2013. The findings suggest the important role of firm-specific characteristics in influencing female employment, including firm size, export activity, technology level and ownership structure. Contrary to Fakih and Ghazalian (2015), this study reveals a negative impact of inward FDI on female employment. The authors attribute this result to the prevailing gender discrimination in the local labour market and FDI firms' preference for employing higher skilled and educated workers who are more likely to be male.

While previous studies mostly suggest positive effects of inward FDI on female labour within FDI firms, there is surprisingly scant evidence of whether and how FDI firms can impact female employment of domestic firms. To the best of my knowledge, Tang and Zhang (2017) is the very first study attempting to explore this spillover effect of FDI on domestic firms' female employment, using the empirical case of China's manufacturing firms over the years 2004-2007. First, a theoretical model is constructed to show that domestic firms update their beliefs about female workers upon observing FDI firms' decisions in the same labour market, causing so-called 'cultural spillovers'. The empirical results reveal the existence of such spillovers with a one standard-deviation increase in FDI presence causing a 0.7 per cent increase in the female employment shares of domestic firms in the same industry. Similar to Kodama et al. (2016), this research also provides empirical evidence of foreign affiliates transplanting their parent corporate culture in hiring females.

3.4 FDI and labour productivity

Compared to the two strands of literature on the labour market impacts of FDI presence discussed in previous sections, the impact of FDI on labour productivity has been far more extensively researched. Foreign affiliates are widely perceived to possess superior intangible assets such as technological know-how, managerial and marketing skills, export experience and reputation (Aitken et al., 1996; Khalifah, Mohd Salleh, & Adam, 2015). These productive advantages could enable them to overcome the higher costs of establishing facilities overseas and competing with domestic firms who presumably have better knowledge of local markets, including contacts with suppliers, demand conditions, legal environment and culture (Girma et al., 1999; Graham & Krugman, 1995). The entry of foreign multinationals largely involves the transfer of intangible assets through on-the-job training provided to local workers (Aitken et al., 1996; Kim, 2015). Therefore, if these productive assets are successfully absorbed by local employees, FDI can directly contribute to the human capital accumulation of the FDI sector and the entire host country alike. This productivity enhancing effect can provide long-term benefits, which may partially explain strong incentives of host governments to attract FDI.

Furthermore, the entry of FDI firms with advantageous assets can arguably affect the labour productivity of domestic firms (Blomström & Sjöholm, 1999; Javorcik, 2004; Newman et al., 2015). Such an effect, known as productivity spillovers, can take place via contacts between foreign and domestic firms operating in the same industry (horizontal linkages) or across industries (vertical linkages). Of these, vertical linkages may comprise forward linkages (FDI firms supply inputs to domestic firms) and backward linkages (FDI firms buy inputs from domestic firms). The existence of positive productivity spillovers indicates that domestics firms can enhance productivity by observing and imitating skills and techniques of FDI counterparts (i.e., demonstration and imitation effect), self-innovating to stay competitive

(competition effect), and employing workers trained by FDI firms (labour mobility effect) (Khalifah et al., 2015; Kokko, 1996). Recent studies suggest that this fundamental form of spillovers from FDI can also exert indirect effects on local firms' performance (e.g., revenues, export quality) via so-called 'cut-off capability' (Anwar & Sun, 2018; Sun & Anwar, 2017). The cut-off capability represents the lowest level of capability that a firm needs to enter the market. If foreign firms generate positive productivity spillovers in the host economy, which in turn will reduce the cut-off capability, the presence of foreign firms will stimulate the entry of new firms in the industry. Nonetheless, negative spillovers may occur if FDI firms push up competitive pressure, forcing domestic (less productive) firms to cut production or even go bankrupt, which Aitken and Harrison (1999) referred to as the 'market stealing' effect.

Empirical evidence on FDI-induced productivity spillovers is substantial but far from unanimous. The pioneering studies of Caves (1974) and Globerman (1979) suggest positive productivity spillovers from FDI to domestic firms of Australia and Canada, respectively. Similar evidence is supported in the following works for both developed and developing host countries (Blomström & Persson, 1983; Branstetter, 2006; Kokko, 1996; Sun, 2011; Xu & Sheng, 2012). Conversely, some empirical papers suggest an insignificant or negative spillover effect of FDI on local firms' productivity (Aitken & Harrison, 1999; Sadik & Bolbol, 2001). The mixed results are mainly attributable to differences in data used, estimation methodology, measurement of key variables, FDI characteristics, and absorptive capacity of domestic firms and host countries (Iršová & Havránek, 2013; Lenaerts & Merlevede, 2015; Wooster & Diebel, 2010).

3.5 Summary

This chapter reviewed previous studies on FDI and the host labour market. The review indicates a growing body of literature investigating the relationship between foreign ownership and key aspects of the local labour market, namely wages, employment and

labour productivity. Notably, four major knowledge gaps could be identified following the in-depth review of related literature.

First, the FDI-host labour market literature has so far paid modest attention to exploring the impact of inward FDI on domestic firms' wages, causing so-called wage spillovers. This is in contrast to the extensive evidence on FDI and wage gaps, suggesting the existence of foreign wage premium, which unambiguously benefits workers in foreign firms.

Second, investigating the potential impact of FDI firms on domestic firms' female employment remains a striking gap in the existing FDI literature. By contrast, the finding of higher female intensity within FDI firms (compared to domestic counterparts) is relatively well documented within the FDI-gendered employment research.

Third, while productivity spillovers from inward FDI are thoroughly examined, other related types of FDI-induced spillovers, such as those on domestic firms' wages or female employment, have received far less attention. Research findings on other forms of FDI spillovers would provide the host country's policymakers with deeper insights and implications on the influence of foreign firms, stimulating optimal policy formulation and intervention process.

Last but not least, evidence on all the three research strands of FDI impacts on the host labour market is particularly scant in the services sector. On the contrary, the existing literature exhibits an overwhelming focus on the manufacturing sector. Compared to firms and industries in manufacturing, those in services generally tend to be more diverse, implying greater heterogeneity and distinctive impacts of foreign presence. Furthermore, as described in Chapter 2 (Section 2.4.3), there are stark differences between these two sectors in terms of wages and female employment for both domestic and FDI firms, which underscores the particular need for examining FDI impacts on these labour-market aspects in the specific context of the services sector.

Chapter 4: Research Methodology and Data

4.1 Introduction

This chapter describes the research methodology and data used for the empirical analyses in the thesis. Sections 4.2 presents the process of modelling the impact of FDI presence on domestic firms' wages, causing wage spillovers. Whereas, Section 4.3 entails the modelling of FDI impact on female employment of domestic firms. First, theoretical models are constructed to explain channels via which foreign firms can influence average wage levels (Section 4.2) and female-to-male employment ratios (Section 4.3) by domestic firms. Next, guided by the theoretical setups, econometric models are specified to estimate and test the existence of hypothesised spillover effects from FDI firms in Vietnam's services sector. The empirical models comprise a vector of explanatory variables, of which the variable, foreign presence (*FDI*), captures the effect of FDI firms in the local labour market.

Section 4.4 presents the strategy adopted to estimate the econometric models specified in Sections 4.2 and 4.3. In particular, the potential endogeneity of the key variable (FDI) is highlighted, which requires the use of the IV-GMM estimation technique to address the bias and inconsistency due to the problem. This section entails a novel approach to constructing instrumental variables to satisfy the simultaneous conditions of relevance and validity. The thesis employs a number of diagnostic tests that are also presented in this section. Next, Section 4.5 describes the research data, including data source, data screening and panel construction, and data management and analysis tool. Finally, Section 4.6 summarises the chapter.

4.2 Modelling FDI impact on domestic firms' wages

4.2.1 Theoretical modelling

4.2.1.1 Labour demand

This section establishes a link between the presence of FDI firms and the equilibrium wage rate of domestic firms, using the standard framework of profit maximisation with Melitz-type heterogeneous firms (Melitz, 2003). In a monopolistically competitive product market,[5] firms employ workers from the local labour market to produce outputs. On the demand side of the product market, a representative consumer has the following constant elasticity of substitution (CES) utility function:[6]

$$U = \left[\int_{\omega\in\Omega} q(\omega)^{\rho} d\omega\right]^{\frac{1}{\rho}} \tag{4.2.1}$$

where ω indexes the products; Ω refers to the set of all available products; q is the quantity of consumption. All products are substitutes for each other ($0 < \rho < 1$) and have a constant elasticity of substitution of $\frac{1}{1-\rho}$. Maximization of utility function, subject to a budget constraint, yields the following demand function:

$$q = \Phi p^{\frac{1}{\rho-1}} \tag{4.2.2}$$

where p is the price; $\Phi \equiv \frac{Y}{\int_{\omega\in\Omega} p(\omega)^{\frac{\rho}{\rho-1}} d\omega}$ measures the level of aggregate demand; and Y is the consumer's income. Each firm takes Φ as given because they are small relative to the

[5] In theoretical modelling, monopolistic competition is a widely-held assumption, and it is more consistent with data as compared to monopoly or perfect competition (see for example, Melitz (2003); Egger and Kreickemeier (2009); Sun (2014); Tang and Zhang (2017)). In this research, the empirical analyses in Chapters 5 and 6 indicate that the services sector in Vietnam comprises a large number of heterogeneous firms, providing substantially differentiated products. Besides, the summary statistics also show the average Herfindahl index, as a proxy of market competition, is notably low at 0.01. Thus, the examined sector can be categorised as being monopolistically competitive.

[6] Other researchers also utilise the CES utility function to model the impacts of FDI firms on domestic firms' output performance indicators, such as revenues and export quality (Anwar & Sun, 2018; Sun & Anwar, 2017). This thesis develops the framework to incorporate the role of foreign presence in determining the input-related aspect of local firms, namely average wages.

industry. Therefore, the impact of a change in each firm's output on the industry's aggregate demand (Φ) is negligible.

On the production side, the industry consists of both domestic and FDI firms located in different regions of the country, where γ measures the level of foreign presence in the industry-region ($0 \leq \gamma \leq 1$). Upon entry into the industry, each firm pays a fixed entry cost, including costs of business registration and market research. After entering the industry and paying the fixed cost of production (f) (e.g., setting up plant and purchasing machine), firms employ one unit of labour to produce s units of output.

The production process can be described by the production function $F(l) = sl$, where l is labour used, and s is labour productivity. Labour productivity (s) depends on a set of observed firm-specific characteristics (namely $\eta = x_1^{\lambda_1} x_2^{\lambda_2} x_3^{\lambda_3} x_4^{\lambda_4}$, where η is an aggregate index that depends on x_1, x_2, x_3 and x_4 which represent size, ownership, age and capital intensity respectively) and an unobserved capability endowment (θ). The capability endowment is randomly drawn from a Pareto distribution upon entry, with the probability density function given by:

$$g(\theta) = \begin{cases} \frac{\mu \underline{\theta}^{\mu}}{\theta^{\mu+1}}, \theta \geq \underline{\theta} \\ 0, \theta < \underline{\theta} \end{cases} \quad (4.2.3)$$

where μ is a shape parameter and $\underline{\theta}$ is the minimum value of θ.

Moreover, the FDI literature suggests that the presence of FDI firms with advantageous assets (such as technological know–how, managerial and marketing skills, export experience and reputation) can affect labour productivity of domestic firms, causing productivity spillovers (Javorcik, 2004; Kathuria, 2001; Newman et al., 2015). Thus, labour productivity of domestic firm i depends on the firm characteristics (η), capability endowment (θ), and foreign presence (γ) as follows:

$$s = \eta \theta e^{\alpha \gamma}$$

where parameter α captures the sign and the magnitude of the FDI–induced productivity spillover effect. A positive value of this parameter implies that FDI firms enhance the productivity of domestic firms. On the contrary, a negative value of this parameter suggests that FDI firms adversely affect the productivity of domestic counterparts.

Given that $\frac{1}{s}$ units of labour are employed to produce one unit of output, the marginal cost of production for domestic firm *i* can be written as:

$$MC = \frac{w}{s} = \frac{w}{\eta\theta e^{\alpha\gamma}}$$

where *MC* represents marginal cost of production and *w* denotes the firm's wage rate. If the productivity spillover is positive, an increase in foreign presence (FDI) reduces domestic firms' marginal cost of production, everything else equal.

Given the MC, the profit of domestic firm *i* can be written as follows:

$$\pi = \left(p - \frac{w}{\eta\theta e^{\alpha\gamma}}\right) q - f \tag{4.2.4}$$

The first-order condition of the profit maximization problem is as below:

$$p^* = \frac{w}{\rho\eta\theta e^{\alpha\gamma}}$$

where p^* represents the optimal price.

Substituting this condition into the profit function, the optimal profit for firm *i* can be obtained as follows:

$$\pi^* = \frac{1-\rho}{\rho^{\frac{\rho}{\rho-1}}} \Phi \left(\frac{w}{\eta\theta e^{\alpha\gamma}}\right)^{\frac{\rho}{\rho-1}} - f \tag{4.2.5}$$

The firm will enter the industry if it makes non-negative profit ($\pi^* \geq 0$). The condition $\pi^* = 0$ defines a cut-off capability (θ*), which can be written as below:

$$\theta^* = \frac{1}{\rho(1-\rho)^{\frac{1-\rho}{\rho}}} \Phi^{\frac{\rho-1}{\rho}} w\eta^{-1} e^{-\alpha\gamma} f^{\frac{1-\rho}{\rho}} \tag{4.2.6}$$

Equation (4.2.6) implies that if FDI-induced productivity spillover effect is positive ($\alpha > 0$), an increase in foreign presence leads to a decrease in the cut-off capability of domestic

firms. Subsequently, the lower cut-off capability allows more firms to enter and survive in the industry. Given the demand function and optimal pricing, the optimal quantity (q^*) produced by firm *i* is derived as below:

$$q^* = \Phi\left(\frac{w}{\rho\eta\theta e^{\alpha\gamma}}\right)^{\frac{1}{\rho-1}}$$

Using the production function (*F(l) = sl*), we can obtain the labour demand (l^d) of domestic firm *i* as follows:

$$l^d = \Phi\rho^{\frac{1}{1-\rho}}w^{\frac{1}{\rho-1}}\eta^{\frac{\rho}{1-\rho}}\theta^{\frac{\rho}{1-\rho}}e^{\left(\frac{\rho}{1-\rho}\right)\alpha\gamma}$$

Therefore, the aggregate demand can be written as:

$$L^d(w) = \frac{\mu\theta^{\mu}}{\mu-\frac{\rho}{1-\rho}}\rho^{\mu}(1-\rho)^{\frac{1-\rho}{\rho}\mu-1}\Phi^{\frac{1-\rho}{\rho}\mu}w^{-1-\mu}e^{\alpha\mu\gamma}f^{1-\frac{1-\rho}{\rho}\mu}\int\eta^{\mu}\tilde{g}(\eta)d\eta \qquad (4.2.7)$$

where $\tilde{g}(\eta)$ is the probability density function of η; and $\mu > \frac{\rho}{1-\rho}$.

4.2.1.2 Labour supply

In each region, workers are faced with job offers from firms in the region. If a worker rejects job offers, s/he will enjoy leisure. The value of such leisure is the worker's reservation wage (w^r), and a job offer will only be accepted if it is higher than the worker's reservation wage. The reservation wage depends on various factors. For example, individuals with high qualifications or having children might have higher reservation wages. In addition, job seekers in a region with high unemployment rate might have lower reservation wages because of the unfavourable job market. We assume the reservation wage is exogenously distributed, with a probability density function of $g(w^r)$.

Each region has a labour endowment, $\bar{L}$. For simplicity, we assume that workers make decision on whether to accept a job offer in a first–come–first–accept manner, namely they will accept a job offer as long as its wage rate is higher than their reservation wage, and will not hold an acceptable job offer to wait for better offers. This non-strategic behaviour

facilitates the formulation of labour supply function, and it is the case when firms' job offers require workers to make decisions in a very short time frame.

Subsequently the aggregate labour supply with which firms are faced is the labour endowment in the region, times the probability that the firm's job offer is accepted, as follows:

$$L^s(w) = \overline{L} Prob(w \geq w^r) = \overline{L} \int_0^w g(w^r) d\, w^r \tag{4.2.8}$$

Assume that w^r is uniformly distributed over the interval $\left[0, \overline{w^r}\right]$ where $\overline{w^r}$ is the upper bound of the reservation wage in region *j*, the labour supply facing domestic firm *i* can be expressed as below:

$$L^s(w) = \overline{L} \frac{w}{\overline{w^r}} \tag{4.2.9}$$

Note that the term $\frac{\overline{L}}{\overline{w^r}}$ is region specific and does not vary across firms.

4.2.1.3 The equilibrium in the labour market

Equating the aggregate demand of labour (L^d) with the aggregate supply of labour (L^s), we can derive the equilibrium wage rate (w^*) as follows:

$$w^* = \left[\frac{\mu \theta^{\mu}}{\mu - \frac{\rho}{1-\rho}} \rho^{\mu} (1-\rho)^{\frac{1-\rho}{\rho}\mu - 1} f^{1 - \frac{1-\rho}{\rho}\mu} \frac{\overline{w^r}}{\overline{L}} \int \eta^{\mu} \tilde{g}(\eta) d\eta \right]^{\frac{1}{2+\mu}} \Phi^{\frac{1-\rho}{\rho} \frac{\mu}{2+\mu}} e^{\frac{\mu}{2+\mu}\alpha\gamma} \tag{4.2.10}$$

Later in our empirical estimation, the equilibrium wage rate is unobserved. Instead, we have data of firm average wage. Motivated by the equilibrium wage rate in Equation (4.2.10), we specify the average wage function as follows:

$$ln\overline{w} = \tilde{\beta}_0 + \tilde{\beta}_1 \ln\Phi + \tilde{\beta}_2 \ln \frac{\overline{w^r}}{\overline{L}} + \tilde{\beta}_3 ln\eta + \tilde{\beta}_4 \gamma + \tilde{\beta}_5 ln\theta \tag{4.2.11}$$

where $\overline{w}$ represents average wage and $\tilde{\beta}$s are the coefficients. Note that the equilibrium wage in Equation (4.2.10) has industry-region-time variations while the firm average wage has firm-industry-region-time variations. Accordingly, we add firm characteristics and capability endowment to capture the firm-level variations in the data.

The firm will only survive in the industry and pay wages to employees, if it makes profit. That is, firms are observed in the sample only if its capability endowment is higher than the cut-off level ($\theta \geq \theta^*$). Therefore, the conditional expectation of the firm's average wage can be derived as follows:

$$E[ln\overline{w}|\ \theta \geq \theta^*] = \tilde{\beta}_0 + \tilde{\beta}_1 \ln\Phi + \tilde{\beta}_2 \ln\frac{\overline{w^r}}{\overline{L}} + \tilde{\beta}_3 ln\eta + \underbrace{\tilde{\beta}_4\gamma}_{Direct} + \underbrace{\tilde{\beta}_5 E[ln\theta|\theta \geq \theta^*]}_{Indirect} \qquad (4.2.12)$$

Equation (4.2.12) indicates that the expected (average) wage by domestic firm *i* depends on aggregate demand level (Φ), regional fixed effect ($\frac{\overline{w^r}}{\overline{L}}$), firm's characteristics (η), capability endowment and foreign presence (γ). Note that FDI presence affects the firm's average wage through two channels: (i) a direct impact via productivity spillovers ($\tilde{\beta}_4$ which is a monotone increasing function of α) and (ii) an indirect impact via the cut-off capability (θ^*).

Using the Pareto distribution given in Equation (4.2.3), we can derive the conditional probability density function of the firm capability endowment as follows:

$$g(\theta|\theta \geq \theta^*) = \begin{cases} \dfrac{\mu(\theta^*)^\mu}{\theta^{\mu+1}}, \theta \geq \theta^* \\ 0, \theta < \theta^* \end{cases}$$

Therefore, the conditional expectation of the firm capability endowment can be written as below:

$$E[ln\theta|\theta \geq \theta^*] = \mu(\theta^*)^\mu \int_{\theta^*}^{\infty} \theta^{-(\mu+1)} ln\theta d\theta = \mu^2 \ln\frac{1}{\rho(1-\rho)^{\frac{1-\rho}{\rho}}} + \mu^2\left(\frac{\rho-1}{\rho}\right) ln\Phi +$$

$$\mu^2 lnw - \mu^2 ln\eta - \mu^2\alpha\gamma + \mu^2\left(\frac{1-\rho}{\rho}\right) lnf + \mu \qquad (4.2.13)$$

By differentiating Equation (4.2.12) with respect to γ, together with Equation (4.2.13), we can derive the marginal impact of foreign presence on the expected equilibrium wage rate of domestic firm *i* as follows:

$$\frac{\partial E[ln\overline{w}|\theta \geq \theta^*]}{\partial \gamma} = \underbrace{\tilde{\beta}_4}_{Direct} + \underbrace{\tilde{\beta}_5 \frac{\partial E[ln\theta|\theta \geq \theta^*]}{\partial \gamma}}_{Indirect} = \underbrace{\tilde{\beta}_4}_{Direct} - \underbrace{\tilde{\beta}_5 \frac{2\mu^2}{2+\mu}\alpha}_{Indirect} \quad (4.2.14)$$

Equation (4.2.14) illustrates that foreign presence affects the expected (average) wage via two contrasting channels. For instance, if positive productivity spillovers exist (i.e., $\alpha > 0$ or $\tilde{\beta}_4 > 0$), the direct effect of an increase in FDI presence on the domestic firm's wage is positive. Meanwhile, the indirect effect is negative as it decreases the cut–off capability, putting a downward pressure on the expected average wage (i.e., $-\tilde{\beta}_5 \frac{2\mu^2}{2+\mu}\alpha < 0$). The net impact of FDI presence on the firm average wage depends on the relative strength of these two channels.[7]

4.2.2 Econometric modelling

The theoretical model in Section 4.2.1 indicates that domestic firms' average wage depends on the presence of FDI firms (i.e., wage spillovers) and a set of other factors, including firm-specific characteristics. Therefore, the theoretical setting provides a foundation to specify the following econometric model, which is further expanded from Equation (4.2.11), to empirically test and estimate wage spillover effect from FDI firms to domestic counterparts in Vietnam's services sector:

$$\begin{aligned} ln\overline{w}_{ikjt} = {} & \beta_0 + \beta_1 lnSize_{ikjt} + \beta_2 Own_{ikjt} + \beta_3 lnAge_{ikjt} \\ & + \beta_4 lnK\_intensity_{ikjt} + \beta_5 TechGap_{ikjt} \\ & + \beta_6 Herfindahl_{kjt} + \beta_7 FDI_{kjt} + \beta_8 dIndustry_k \\ & + \beta_9 dRegion_j + \beta_{10} dTime_t + \varepsilon_{ikjt} \end{aligned} \quad (4.2.15)$$

[7] Given the Pareto distribution, the impact of FDI presence on domestic firms' equilibrium wage depends on the shape parameter μ.

In Equation (4.2.15), the average wage ($\overline{w}$) of domestic firm *i* in service industry *k* in region *j* at time *t* is calculated as total wages (*TW*) divided by the total employment (*L*) (i.e., $\overline{w} = \frac{TW}{L}$), then transformed to the natural logarithmic form ($ln\overline{w}_{ikjt}$). Total wages include salaries, commissions, bonuses, overtime and vacation pay and other benefits.

Notably, later in the estimations, I restrict the sample to domestic firms, in order to capture the FDI impact on domestic firms' wages, namely wage spillovers, and thus disentangle any influence of FDI firms on their own wages. This restriction also enables one to eliminate possible bias due to foreign wage premium that has largely been found in the FDI-wage literature (Aitken et al., 1996; Barry et al., 2005; Pittiglio et al., 2015). Furthermore, compared to the cross-sectional data, using panel data enables me to separate the FDI effects resulting from observed firm and industry characteristics from those due to unobserved factors (Muñoz-Bullón & Sánchez-Bueno, 2013; Sjöholm & Lipsey, 2006).

Following the setup of the theoretical model, a vector of explanatory variables is included in the empirical model to capture the role of factors which potentially affect domestic firms' average wages. Of these, foreign presence (FDI) is the variable of interest and is measured by the employment share of FDI firms as follows:

$$FDI_{kjt} = \frac{\sum_{i \in F_{kjt}} y_{ikjt}}{\sum_{i \in F_{kjt} \cup D_{kjt}} y_{ikjt}} \tag{4.2.16}$$

where *y* is the total employment of firm *i* in service industry *k* in region *j* at time *t*; *F* is the set of foreign firms and *D* is the set of domestic firms.

The employment share of FDI firms is a preferred proxy of foreign presence in previous studies on FDI-linked wage spillovers as it can essentially capitalise the contribution and potential impacts of foreign firms on local labour markets (see for example, Barry et al. (2005); Driffield and Girma (2003); Hoi and Pomfret (2010); Muñoz-Bullón and Sánchez-

Bueno (2013); Pittiglio et al. (2015)). However, the measurement of FDI in this research differs from many previous studies in that it allows for variations in three dimensions. Specifically, Equation (4.2.16) shows that the measure of FDI presence varies across industry, region and over time, while previous literature mostly allows FDI presence to vary across industry and/or time.

Other control variables comprise firm size ($lnSize_{ikjt}$); ownership structure (Own_{ikjt}); firm age ($lnAge_{ikjt}$); capital intensity ($lnK\_intensity_{ikjt}$); technology gap between domestic and foreign firms ($TechGap_{ikjt}$); competitive pressure in the local market ($Herfindahl_{ikjt}$); industry, region and time dummies ($dIndustry_k, dRegion_j, dTime_t$); and error term ($\varepsilon_{ikjt}$). The construction of these explanatory and their expected impact on domestic firms' average wages are described in more details in Section 4.2.3.

Furthermore, it should be noted that the impact of aggregate demand (Φ) is captured by time dummies and regional fixed effect ($\frac{\overline{w^r}}{\overline{L}}$) is controlled by the fixed effects in the regression. Equation (4.2.6) suggests that the cut-off capability is a function of a set of explanatory variables, including firm characteristics, which is absorbed into the explanatory variables in Equation (4.2.15).[8] The elasticity of substitution (ρ) is an underlying structural parameter embedded in the reduced-form parameters (β_i) in the empirical model. Estimating unobserved structural parameters is not the objective of this research.

4.2.3 Variable construction

Apart from the key variable, FDI presence, the theoretical model in Section 4.2.1 also shows the relevance of other factors in explaining firms' average wages, notably firm-specific characteristics. Additionally, the previous empirical evidence suggests considerable

[8] The set of firm-level variables include firm size ($lnSize_{ikjt}$), ownership structure (Own_{ikjt}), firm age ($lnAge_{ikjt}$), capital intensity ($lnK\_intensity_{ikjt}$), and technology gap ($TechGap_{ikjt}$).

influence of firm and industry features on wage differences among domestic firms as well as between domestic and foreign firms (Aitken et al., 1996; Brown & Medoff, 2003; Driffield & Girma, 2003; Elliott & Zhou, 2015; Feliciano & Lipsey, 2006; Hoi & Pomfret, 2010). Thus, a vector of firm-level and industry-level variables is included in the specified econometric model (Equation 4.2.15) to control for the impacts of firm and industry heterogeneity, which, if not, is likely to result in the omitted variable problem.

Firm size or scale ($lnSize_{ikjt}$) has been considered an important determinant of wages in previous studies. This variable is measured by a domestic firm's total sales in natural logarithm. The previous empirical evidence generally finds a positive influence of operation size on firms' average wages (Girma et al., 1999; Hoi & Pomfret, 2010; Pittiglio et al., 2015; Sjöholm & Lipsey, 2006; Villarreal & Sakamoto, 2011). Compared to small firms, larger firms are more financially capable and have well-established compensation policies, allowing them to offer workers with better wages and other benefits.

The impact of ownership structure (Own_{ikjt}) on domestic firms' average wages is also captured in the empirical analysis. It is a dummy variable taking a value of 1 for privately-owned firms, and 0 for state-owned firms. State-owned firms usually have stronger and more secure financial bases for funding their wage systems, but are faced with constraints in the wage settings. Meanwhile, privately-owned firms have considerable flexibility in determining wage structures and incentive policies, which may also be subject to unexpected changes due to poor financial conditions. Empirical findings show that state-owned firms tend to pay higher average wages than non-state counterparts (De Fraja, 1993; Démurger, Li, & Yang, 2012; Hale & Long, 2011; Melly, 2005).

Firm age ($lnAge_{ikjt}$), measured by years of operation in natural logarithm, can exert contrasting impacts on firm wage determination. On the one hand, newly-established firms are more likely to have higher labour productivity, which may enable them to pay higher

wages (Aitken et al., 1996; Bellak, 2004). On the other hand, well-established firms tend to claim a solid foothold in the market and are usually larger, which may signal their business success and capability to offer higher wages (Hoi & Pomfret, 2010; Pittiglio et al., 2015; Villarreal & Sakamoto, 2011).

Capital intensity ($lnK\_intensity_{ikjt}$) can play an essential role in affecting firm wages. This variable is calculated as the natural logarithm of fixed assets to total employment ratio. Higher capital intensity implies a lower labour cost share in total cost structure, which may induce firms to meet high wage demands and employ competent high-paid workers. Empirical findings from previous studies largely show a positive effect of capital intensity on firms' average wages (Arai, 2003b; Hoi & Pomfret, 2010; Muñoz-Bullón & Sánchez-Bueno, 2013; Sjöholm & Lipsey, 2006; Villarreal & Sakamoto, 2011).

Technology gap ($TechGap_{ikjt}$) is introduced into the empirical model to capture the potential impact of technological differences on domestic firms' average wages. Technology gap is defined as the difference in labour productivity level (measured by output per worker) between each domestic firm and that of average FDI firms in the industry.[9] Domestic firms may find it challenging to compete with FDI firms and benefit from foreign presence given a large technology gap, which leads to lower wages in domestic firms (Hoi & Pomfret, 2010). Meanwhile, domestic firms are less likely to gain positive spillovers from FDI presence given small technological gaps due to negligible learning potential. Therefore, technology gap is expected to influence domestic firms' average wages but the direction of impact is found to be mixed in the literature (Conyon et al., 2002; Pittiglio et al., 2015).

[9] Following the existing literature, technology gap is proxied by productivity gap as an FDI firm's higher productivity level is arguably associated with technological differences between foreign and domestic firms (Anwar & Nguyen, 2011; Chuang & Hsu, 2004; Kohpaiboon, 2006; Kokko, 1996; Pittiglio et al., 2015).

The level of competition in each industry, measured by the *Herfindahl* index, can contribute to wage differences among firms (Hoi & Pomfret, 2010). A low value of Herfindahl index indicates a low level of concentration or equivalently a high competitive pressure. Accordingly, intense competition is likely to induce domestic firms to cut production, putting downward pressure on average wages. The index is calculated as follows:

$$Herfindahl_{kjt} = \sum_{i=1}^{n} \left(\frac{x_{ikjt}}{X_{kt}}\right)^2$$

where x_{ikjt} denotes the sales of domestic firm i in region j industry k at time t and X_{kt} refers to the total sales of industry k.

In Equation (4.2.15), a set of industry dummies ($dIndustry_k$), regional dummies ($dRegion_j$), and year dummies ($dTime_t$) are included to allow average wages of domestic firms to vary across regions, industries and years. The error term (ε_{ikjt}) is added to capture the impacts of all omitted variables, and is assumed to be normal, independent and identically distributed (i.i.d.) ($\varepsilon_{ikjt} \sim N(0, \sigma^2)$.

Finally, it should also be noted that domestic firms in a given industry are largely subject to the same macroeconomic environment in Vietnam's economy; hence, the effects of macroeconomic factors are captured by the time dummies in the specified econometric model. Table 4.1 summarises the measurement of key explanatory variables and their expected impacts on domestic firms' average wages.

Table 4.1: Summary of variable measurement and expected signs

(Econometric model of FDI impact on domestic firms' wages)

Variable	Measurement	Expected sign
Foreign presence (FDI_{kjt})	The employment share of FDI firms in the total employment of industry *k* in region *j* at time t;	+/-
Firm size ($lnSize_{ikjt}$)	Total sales in natural log form;	+
Ownership structure (Own_{ikjt})	Dummy variable with the value of 1 for privately-owned and 0 for state-owned;	+/-
Firm age ($lnAge_{ikjt}$)	Firm market experience proxied by the number of years in operation in natural log form;	+/-
Capital intensity ($lnK\_intensity_{ikjt}$)	Ratio of fixed assets to total employment in natural log form;	+
Technology gap ($TechGap_{ikjt}$)	The difference in the labour productivity level (measured by total output per worker) of domestic firm *i* and that of average FDI firms in each industry *k;*	+/-
Competition ($Herfindahl_{kjt}$)	Competitive pressure measured by the *Herfindahl* index ($\sum_{i=1}^{n}\left(\frac{x_{ikjt}}{X_{kt}}\right)^2$) where x_{ikjt} is the sales of domestic firm *i* and X_{kt} is the total sales of industry *k.*	-

4.3 Modelling FDI impact on domestic firms' female employment

4.3.1 Theoretical modelling

In order to model the impact of FDI presence on domestic firms' employment of female workers, I expand the theoretical model in Section 4.2.1 to allow firms to make optimal decision on hiring male and female workers. As a result, some components of the theoretical model are similar to those in Section 4.2.1. Nevertheless, for the sake of completeness, I still present them in this section.

The labour market is composed of both male (*m*) and female (*f*) workers, differing in productivity. Firms employ male and female labour to produce output in a monopolistically competitive product market. Consumers have constant elasticity of substitution (CES) preferences ,[10] with the utility function $\left[\int_{\omega\in\Omega} q(\omega)^{\rho} d\omega\right]^{\frac{1}{\rho}}$ where ω denotes the products; Ω refers to the set of all available products; q is the quantity of consumption; and $1/(1-\rho)$ is the elasticity of substitution ($0 < \rho < 1$).

Similar to Section 4.2, subject to their budget constraint, consumers maximise the CES utility function, which yields the following demand function:

$$q(\omega) = \Phi p^{\frac{1}{\rho-1}} \tag{4.3.1}$$

where p is the price, $\Phi \equiv \frac{Y}{\int_{\omega\in\Omega} p(\omega)^{\frac{\rho}{\rho-1}} d\omega}$ measures the level of aggregate demand, and Y is consumer income. Each firm is small relative the industry and thus takes Φ as given.

The industry is composed of both domestic and foreign firms that are located in different regions of the country, where γ proportion of firms are FDI-invested firms in the industry-region ($0 \leq \gamma \leq 1$, namely γ measures the level of foreign presence). Foreign presence varies across industries and regions and can be proxied by a number of measures (e.g., output share, employment share or asset share of FDI firms in the industry-region).

When firms enter the industry, they draw capability endowment (θ) from an exogenous distribution. After entry, firms pay the fixed cost of production (*f*), and then employ one unit of male labour and *c* units of female labour to produce *s* units of output. Accordingly, *c* denotes the combination of female and male workers in the workforce (i.e. female-to-male labour ratio) and *s* measures the productivity of workers, which depends on capability

[10] The CES utility function has been used to model the impacts of FDI firms on domestic firms' output performance indicators such as revenues and export quality (Anwar & Sun, 2018; Sun & Anwar, 2017). This thesis develops the framework to incorporate the role of foreign presence in determining the input-related aspect of local firms, namely the employment of female workers.

endowment (θ) and firm-specific characteristics (η) (for instance, size, ownership structure, age and capital intensity). Moreover, it has been well documented that the presence of FDI firms (γ) can generate spillover effects on the productivity of domestic firms, resulting in so-called technological or productivity spillovers (Blomström & Sjöholm, 1999; Gorg & Strobl, 2001; Haskel, Pereira, & Slaughter, 2007; Javorcik, 2004; Newman et al., 2015; Takii, 2005; Zhou, Li, & Tse, 2002). Accordingly, the relationship between productivity (s) and its impact factors can be specified as follows:

$$s = \theta\eta\chi e^{\alpha\gamma} \tag{4.3.2}$$

where the coefficient α captures the direction and strength of spillover effects of FDI on domestic firms' productivity; χ denotes a set of unobserved factors.

In order to hire workers, firms pay wage rates, w_m and w_f, to male and female workers respectively. There exists a wage gap between male and female workers, namely $w_m = \lambda w_f$ where $\lambda \neq 1$. Given that $\frac{1}{s}$ and $\frac{c}{s}$ units of male and female workers, respectively, are employed to produce one unit of output, the marginal costs of production (MC) can be written as:

$$MC = \frac{w_m + cw_f}{s} = \frac{(\lambda + c)w_f}{s} \tag{4.3.3}$$

In the production process, firms combine male and female workers as follows:

$$L = \left[L_m^{\tau} + \left(\hat{s}L_f\right)^{\tau}\right]^{1/\tau} \tag{4.3.4}$$

where L is the aggregate labour; L_m and L_f refer to male and female labour inputs, respectively; τ is the aggregation parameter ($0 < \tau < 1$) and $\hat{s}$ denotes the female labour augmented productivity, which is specified by the following equation:

$$\hat{s} = \theta\hat{\eta}e^{\beta\gamma} \tag{4.3.5}$$

Equation (4.3.5) allows female labour augmented productivity to vary across different levels of FDI presence (γ), capability endowment (θ) and a subset of firm-specific characteristics ($\hat{\eta}$) (for example, firm size and capital intensity).[11]

Notably, recent studies suggest that FDI firms may generate asymmetric productivity spillovers to male and female workers, as their labour forces tend to be more female-intensive than those of domestic counterparts (Ahmed et al., 2016; Curd et al., 2007; Fakih & Ghazalian, 2015; Hewlett & Rashid, 2010; Kodama et al., 2016; Siegel et al., 2014; Tang & Zhang, 2017). FDI firms employ female workers more intensively, mainly to benefit from female workers' under-exploited skills and gender wage gaps, and transplant corporate culture across borders. This hiring practice, together with the experience and knowledge of fully utilising female labour force, by foreign firms may spill over to domestic counterparts. As a result, domestic firms can learn these skills to stimulate the productivity of female workers. Therefore, the presence of FDI firms is likely to affect female labour augmented productivity, and the coefficient β indicates the direction and strength of FDI-linked asymmetric spillovers. If $\beta > 0$, FDI firms exert female-labour biased spillovers and $\beta < 0$ suggests male-labour biased spillovers.

Given the demand function (Equation 4.3.1) and marginal cost of production (Equation 4.3.3), the profit function is derived as below:

$$\pi = \left[p - \frac{(\lambda+c)w_f}{s}\right] q - f \tag{4.3.6}$$

Firms then set the following price to maximise their profit:

$$p^* = \frac{(\lambda+c)w_f}{\rho s} \tag{4.3.7}$$

[11] A subset of firm-specific characteristics can be gender biased (Almeida & Carneiro, 2009; Bridges, 1980; Caraway, 2007; Ilmakunnas & Maliranta, 2005).

The optimal profit (π^*) is obtained by substituting the optimal price into the profit function (Equation 4.3.6), as follows:

$$\pi^* = \frac{1-\rho}{\rho^{\frac{\rho}{\rho-1}}} \Phi \left[\frac{(\lambda+c)w_f}{\theta\eta\chi e^{\alpha\gamma}}\right]^{\frac{\rho}{\rho-1}} - f \tag{4.3.8}$$

Firms then endogenously choose the combination (c) of male and female workers to maximize their profit. To do so, firms equate the ratios of marginal product against wage rate between male and female workers ($i.e. \frac{MPL_m}{w_m} = \frac{MPL_f}{w_f}$), which yields the following optimal female-male labour ratio:

$$c = \frac{L_f}{L_m} = \lambda^{\frac{1}{1-\tau}} \hat{s}^{\frac{1}{1-\tau}} = \lambda^{\frac{1}{1-\tau}} (\theta\hat{\eta}e^{\beta\gamma})^{\frac{1}{1-\tau}} = \lambda^{\frac{1}{1-\tau}} \theta^{\frac{1}{1-\tau}} \hat{\eta}^{\frac{1}{1-\tau}} e^{\frac{\beta}{1-\tau}\gamma} \tag{4.3.9}$$

Taking logarithm of both sides of Equation (4.3.9), we obtain the following equation:

$$lnc = \frac{1}{1-\tau} ln\lambda + \frac{1}{1-\tau} ln\theta + \frac{1}{1-\tau} ln\hat{\eta} + \frac{\beta}{1-\tau}\gamma \tag{4.3.10}$$

Equation (4.3.10) indicates that the optimal female-to-male labour ratio of domestic firms depends on their capability endowment, firm-specific characteristics, male-to-female wage gap and the presence of FDI firms in the industry-region.

A firm will only remain in the industry if it makes profit ($\pi^* \geq 0$). Therefore, the break-even condition (i.e., $\pi^* = 0$) defines a cut-off capability (θ^*) as a function of FDI presence and other factors as follows:

$$\theta^* = \psi(\gamma, \lambda, w_f, f, \hat{\eta}, \Phi, \rho) \tag{4.3.11}$$

As a result, the expectation of the firm's optimal female-to-male labour ratio, conditional on the firm being observed in the sample, can be written as:

$$E[lnc|\ \theta \geq \theta^*] = \frac{1}{1-\tau} ln\lambda + \frac{1}{1-\tau} E[ln\theta|\theta \geq \theta^*] + \frac{1}{1-\tau} ln\hat{\eta} + \frac{\beta}{1-\tau}\gamma$$

$$= \frac{1}{1-\tau} ln\lambda + \underbrace{\frac{1}{1-\tau}\left[\frac{\int_{\theta^*}^{\infty} ln\theta g(\theta) d(\theta)}{Pro(\theta \geq \theta^*)}\right]}_{Indirect} + \frac{1}{1-\tau} ln\hat{\eta} + \underbrace{\frac{\beta}{1-\tau}\gamma}_{Direct} \quad (4.3.12)$$

Accordingly, FDI presence in the industry exerts two contrasting effects on domestic firms' expected optimal female-to-male labour ratio. The direct channel is via the augmented female productivity spillovers and the indirect channel is via the cut-off capability. For example, if an increase in FDI presence ($\gamma\uparrow$) results in positive spillovers to the productivity of female workers, domestic firms tend to employ more females relative to males via the direct channel (*i.e.,* $\frac{\beta}{1-\tau}\gamma \uparrow$), everything else equal. Meanwhile, the positive productivity spillovers from FDI lower the cut-off capability, enabling less capable firms to enter the industry and lowering the conditional expected capability in the industry (*i.e.,* $\frac{\int_{\theta^*}^{\infty} ln\theta g(\theta) d(\theta)}{Pro(\theta \geq \theta^*)} \downarrow$). Subsequently, the conditional expected female-to-male labour ratio is decreased. The net impact of FDI presence on domestic firms' female-to-male labour ratio depends on the relative strength of these two channels.

4.3.2 Econometric modelling

As demonstrated in the theoretical model in Section 4.3.1, the female-to-male labour ratio of a domestic firm depends on the presence of FDI firms and a number of factors such as gender wage gap, capability endowment and firm-specific characteristics.[12] Accordingly,

[12] Note that the capability of a surviving firm must be equal to or greater than the cut-off capability level (i.e., $\theta \geq \theta^*$), which is a function of a set of firm-level characteristics subsequently controlled by the explanatory variables in Equation (4.3.13). The set of firm-level variables include firm size ($lnSize_{ikjt}$), capital intensity ($lnK\_intensity_{ikjt}$), and ownership structure (Own_{ikjt}).

the following econometric model is specified to empirically estimate and test FDI spillovers on domestic firms' female employment in Vietnam's services sector:

$$lnFMR_{ikjt} = \alpha_0 + \alpha_1 lnSize_{ikjt} + \alpha_2 lnK\_intensity_{ikjt} + \alpha_3 Own_{ikjt} + \alpha_4 Herfindahl_{kjt} + \alpha_5 FDI_{kjt} + \alpha_6 lnWageGap_{jt} + \alpha_7 lnIndFemale_{kt} + \alpha_8 dIndustry_k + \alpha_9 dRegion_j + \alpha_{10} dTime_t + \epsilon_{ikjt} \quad (4.3.13)$$

The dependent variable, $lnFMR_{ikjt}$, denotes the female-to-male labour ratio of domestic firm *i* in service industry *k* located in region *j* at time *t*. It is measured by the firm's total number of female workers divided by total number of male workers and transformed to the natural logarithm form (hereinafter also referred to as female employment). This measure of female employment is consistent with the setting from the theoretical model.

An alternative measure adopted in previous studies is the share of female workers in total labour (Ahmed et al., 2016; Fakih & Ghazalian, 2015). Note that the female-to-male labour ratio (i.e., $\frac{L_f}{L_m}$) is linked to the female share (i.e., $\frac{L_f}{L_m+L_f} = \frac{1}{\frac{L_m}{L_f}+1}$), and compared with the share, the ratio has an advantage that it is unconstrained (by definition the share is constrained between 0 and 1). Furthermore, in the estimation, the sample is restricted to domestic firms to capture the influence of FDI firms on domestic counterparts' female employment, as well as to avoid possible bias due to higher female intensity in FDI firms.

The key variable is foreign presence (FDI_{kjt}), which as shown in the theoretical model, can exert contrasting effects on domestic firms' expected female employment via asymmetric spillovers and the cut-off effect. Foreign presence is proxied by the employment share of FDI firms in each three-digit industry: $FDI_{kjt} = \sum_{i \in F_{kjt}} L_{ikjt} / \sum_{i \in F_{kjt} \cup D_{kjt}} L_{ikjt}$ where *L* is the total employment of firm *i* in service industry *k* in region *j* at time *t*; *F* is the set of foreign firms; and *D* is the set of domestic firms in industry *k* in region *j* at time *t*. Hence, this proxy allows the presence of FDI firms to vary over three-digit industries,

locations and years. It can be noted that this approach to measuring foreign presence is similar to the one in modelling the FDI impact on domestic firms' wages (Section 4.2.2). This measurement is preferred since it is likely to capture the contribution and potential influence of foreign affiliates on host labour force (see for example, Barry et al. (2005); Driffield and Girma (2003); Hoi and Pomfret (2010); Muñoz-Bullón and Sánchez-Bueno (2013); Pittiglio et al. (2015)).

The empirical model in Equation (4.3.13) also comprises a set of other explanatory variables, namely firm size ($lnSize_{ikjt}$), capital intensity ($lnK\_intensity_{ikjt}$), ownership structure (Own_{ikjt}), competitive pressure in the local market ($Herfindahl_{ikjt}$), gender wage gap ($lnWageGap_{jt}$), industry female intensity ($lnIndFemale_{kt}$), industry, region and time dummies ($dIndustry_k, dRegion_j, dTime_t$), and error term ($\varepsilon_{ikjt}$). Section 4.3.3 provides detailed description of the construction of these remaining right-hand-side variables as well as their expected influence on female employment of domestic firms. Also note that the capability of a surviving firm must be equal to or greater than the cut-off capability level (i.e., $\theta \geq \theta^*$), which is a function of a set of firm-level characteristics subsequently influenced by the explanatory variables in Equation (4.3.13).

4.3.3 Variable construction

Section 4.3.1 indicates that a domestic firm's female-to-male employment ratio is determined by FDI presence and a set of other factors, which are then included as a set of control variables in the empirical model. Of these, firm size ($lnSize_{ikjt}$) can play a significant role, despite that existing literature finds the direction and magnitude of its effect rather inconclusive. On the one hand, larger size suggests a better capability of acquiring high-skilled and high-paid workers, who are more likely to be male (Arai, 2003a; Bridges, 1980; Ozler, 2000). On the other hand, large firms may employ greater proportions of female (than small firms) because they have stronger incentives to demonstrate a good record of

complying with labour regulations, including those on workplace gender-equity (Ahmed et al., 2016; Almeida & Carneiro, 2009).

As a proxy of technological upgrading, the capital intensity of a firm ($lnK\_intensity_{ikjt}$) has been well documented to have a negative correlation with female employment[13]. More capital-intensive firms are associated with mechanically and technologically sophisticated tasks that are presumably more suitable for male (Caraway, 2007). This gender norm results in a lower representation of women in such work (Kucera & Tejani, 2014; Ozler, 2000). Furthermore, capital-intensive firms tend to have fewer incentives to employ relatively cheaper female labour, given a smaller fraction of labour cost in total cost (Seguino, 2005; Tejani & Milberg, 2016).

The potential impact of ownership structure on female employment is controlled by including a dummy variable (Own_{ikjt}). Whether a firm is state-owned or privately owned might have significant but contrasting implications for female employment. Compared to the privately-owned firms, the state-owned firms are considered to be more favourable to women in terms of working conditions and benefits as well as labour law supervision (Hewlett & Rashid, 2010; Ibrahim, 1989). Hence, state-owned firms tend to have higher proportions of female employees in their workforce compositions than their private counterparts (Ahmed et al., 2016; Fakih & Ghazalian, 2015). Nevertheless, Çağatay and Berik (1990) asserted that patron-client relationships in job allocations, weakening government commitment to enforcing labour regulations, and shrinking public sector might disadvantage women in the state-owned firms.

[13] This proxy is more associated with potential capability in upgrading tangible technology such as machinery and equipment. Meanwhile, in the earlier empirical model (Section 4.2.3), the variable 'technology gap (*TechGap*)' refers to the domestic-foreign gap in overall (tangible and intangible) technological capacity, which is generally measured by differences in productivity levels, following the existing literature (Anwar & Nguyen, 2011; Chuang & Hsu, 2004; Kohpaiboon, 2006; Kokko, 1996; Pittiglio et al., 2015).

The competitive pressure faced by a domestic firm (measured by the Herfindahl index, $Herfindahl_{kjt}$) is likely to be an important determinant of female employment. In light of the widely-documented relationship between gender wage gaps and growing competition, firms are more likely to adopt a cost-minimising strategy by employing more women to cut labour cost and stay competitive (Seguino, 1997; Standing, 1999). In addition, competition can reduce employers' discrimination, increasing female shares in the labour force (Tang & Zhang, 2017). Conversely, a higher level of competition in the market may drive domestic firms to attract high-skilled and competent workers via higher wages (Hoi & Pomfret, 2010), which tends to favour male job seekers (Arai, 2003a). As firms vary substantially in their approaches under increased competition pressure, the direction of this factor's impact on female employment remains unclear.

The role of gender wage gap ($lnWageGap_{jt}$) in determining a domestic firm's female employment is accounted for in the empirical model.[14] A widening male-to-female wage gap implies a lower cost of employing women. Thus, firms are likely to hire a larger proportion of female to take advantage of significant pay gaps and reduce labour costs (Curd et al., 2007; Fakih & Ghazalian, 2015). Nonetheless, the wage gap between male and female might reflect or signal their differences in productivity and skill levels. Therefore, firms aiming to lure and retain a high-skilled and productive workforce might prefer male if the wage gap implies skill difference.

The industry female intensity ($lnIndFemale_{kt}$) proxies the relative importance of female employment level in each two-digit industry. Furthermore, this variable captures the possibility that firms operating in more female-intensive industries are likely to have a higher

[14] Since the gender wage gap is not available in GSO's Enterprise Surveys, data from GSO's Labour Force Surveys are used to calculate male-to-female wage gaps, which vary across regions and years.

female share in the labour composition, and foreign firms may prefer to invest in industries with higher female ratios.

The empirical model also allows domestic firms' female employment to vary across three-digit industries, regions and years. Therefore, industry dummies ($dIndustry_k$), regional dummies ($dRegion_j$) and year dummies ($dTime_t$) are included as control variables.[15] Finally, ϵ_{ikjt} is an error term and assumed to be independently and identically distributed (i.i.d.) ($\varepsilon_{ikjt} \sim N(0, \sigma^2)$. Table 4.2 details the measurement of main explanatory variables in the empirical model and their expected impacts on domestic firms' female employment.

Table 4.2: Summary of variable measurement and expected signs

(Econometric model of FDI impact on domestic firms' female employment)

Variable	Measurement	Expected sign
Foreign presence (FDI_{kjt})	The employment share of FDI firms in the total employment of industry *k* in region *j* at time t;	+/-
Firm size ($lnSize_{ikjt}$)	Total sales in natural log form;	+/-
Capital intensity ($lnK\_intensity_{ikjt}$)	Ratio of fixed assets to total employment in natural log form;	-
Ownership structure (Own_{ikjt})	Dummy variable with the value of 1 for privately-owned and 0 for state-owned;	+/-
Competition level ($Herfindahl_{kjt}$)	Competition level measured by the *Herfindahl* index ($\sum_{i=1}^{n}\left(\frac{x_{ikjt}}{X_{kt}}\right)^2$) where x_{ikjt} is the sales of domestic firm *i* and X_{kt} is the total sales of industry *k;*	+/-
Gender wage gap ($lnWageGap_{jt}$)	Ratio of average male wages to average female wages in region *j* at time *t* in natural log form;	+/-
Industry female intensity ($lnIndFemale_{kt}$)	Ratio of female to male workers in industry *k* at time *t* in natural log form.	+

[15] Note that all domestic firms are subject to the same macroeconomic environment in the host economy; hence, the effects of macroeconomic factors are captured by the time dummies in the econometric model.

4.4 Estimation strategy

4.4.1 Endogeneity problem

In estimating the specified econometric models of FDI impacts on domestic firms' average wages (Equation (4.2.15)) and female employment (Equation (4.3.12)), it is critical to note that foreign presence (FDI_{kjt}) is potentially endogenous due to the possible two-way causality with the dependent variables. A simultaneous causation may exist between the FDI presence and each of the dependent variable, namely domestic firms' average wages ($ln(\overline{w}_{ikjt})$) and female-to-male labour ratio ($lnFMR_{ikjt}$). Failure to take into account the endogeneity problem results in biased and inconsistent parameter estimates.

On the one hand, the presence of FDI firms can impact average wages and female employment of domestic counterparts as shown in the constructed theoretical models (Sections 4.2.1 and 4.3.1). Notably, likely effects of foreign firms are expected to take place via two contrasting channels, namely direct and indirect ones. The net impact of FDI presence depends on the relative strength of the two channels. Furthermore, the review of FDI-host labour market literature presented in Chapter 3 suggests that, compared to local firms, FDI firms tend to pay higher wages (Aitken et al., 1996; Barry et al., 2005; Elliott & Zhou, 2015; Feliciano & Lipsey, 2006; Girma et al., 1999) and employ female labour more intensively (Curd et al., 2007; Fakih & Ghazalian, 2015; Hewlett & Rashid, 2010; Kodama et al., 2016; Tang & Zhang, 2017). Arguably, these persistent gaps between FDI and domestic firms can allow the presence of foreign affiliates to exert significant impacts, both directly and indirectly, on local firms' labour practices, notably in terms of wages and female employment.

On the other hand, domestic firms' wages and female employment can impact the presence of FDI firms in the host economy. The reverse causality may occur due to the possibility that wages and gendered workforce abundance at the local labour market can be

essential factors in attracting inward FDI. Of these, average local wages (as a proxy for labour costs and labour quality of the host workforce) may arguably be an important ground in foreign investors' decisions (Cheng & Kwan, 2000; Villaverde & Maza, 2015). Moreover, higher female representation might indicate a relatively 'cheaper' and under-utilised labour force, which can be a key determinant of stimulating foreign entry (Braunstein, 2000; Busse & Nunnenkamp, 2009). Therefore, it is reasonable to suspect and, more importantly, to take into consideration the likely reverse causation from the variable of foreign presence (FDI_{kjt}) to the respective dependent variables in the two econometric models (i.e., $ln(\overline{w}_{ikjt})$ and $lnFMR_{ikjt}$).

4.4.2 The IV-GMM estimation method

In order to address the possible endogeneity problem encountered in estimating the two specified econometric models in Sections 4.2.2 and 4.3.2, this thesis employs the feasible two-step IV-GMM estimator. The GMM estimator was introduced by Hansen (1982) and has become an increasingly popular estimation method in applied economics. Unlike the maximum likelihood estimator (MLE), the GMM approach does not require any distributional assumption (Hall, 2005). Moreover, compared to the Ordinary Least Square (OLS), fixed effect or random effect estimators, this estimation technique has the advantage of providing consistent, asymptotically normal and efficient estimates, particularly in the presence of the endogeneity problem with appropriate instrumental variables (Doytch & Uctum, 2011; Hall, 2005; Yin, Ma, Liang, & Yuan, 2011).

To employ the IV-GMM estimator, it is critical to select appropriate instrumental variables, which are required to be correlated with the likely endogenous variable (i.e., FDI_{kjt}), and uncorrelated with the error term (i.e., ε_{ikjt} in Equation (4.2.15) and ϵ_{ikjt} in Equation (4.3.13)). In practice, it is challenging to find suitable instruments, notably in complicated models comprising a large number of right-hand-side variables. This is mostly

attributable to data unavailability for constructing instrumental variables that can satisfy the above-mentioned conditions both economically and statistically.

As a result, previous studies on FDI impacts tend to rely on lagged values of FDI presence as instruments (Driffield & Girma, 2003). While the use of lags as instruments is relatively convenient, it may lead to considerable loss of information due to decreased sample size. This drawback of using lags in the IV-GMM estimator can become more severe if the examined dataset is a short panel (i.e., large N and small T), which is the case for the empirical analysis in this thesis. Therefore, using lags as instruments is not a preferred strategy in estimating the specified models. Instead, the thesis takes an alternative method of IVs construction, which is detailed in the following section.

4.4.3 IVs construction

Adopting a novel approach to IVs selection, the thesis constructs two instrumental variables, which capitalises on the geographical and industry segmentation of the labour market in Vietnam[16]. For each service industry under examination, two respective instruments, *IV1* and *IV2*, are constructed. Of these, the first instrument, *IV1*, is defined as the employment share of FDI firms in manufacturing industry 1 in region *j* (a region different from where the domestic service firm is located) at time *t*. Whereas, the second instrument, *IV2*, is calculated as the employment share of FDI firms in the manufacturing industry 2 in region *j* (also a region different from where the domestic service firm is located) at time *t*.

The two instruments of FDI shares in the distinctive manufacturing industries are then matched with FDI presence in an examined service industry across the same year *t* and different regions. That is, the FDI presence of service industry *k* in region *j* is instrumented by the FDI presence of the two manufacturing industries in a region that does not neighbour

[16] In one of the publications based on the empirical analyses from this thesis (D. T. H. Nguyen, 2019), I utilised an alternative technique to construct IVs, also known as a 'shift-share' or 'supply-push' approach (Bartik, 1991; McLaren & Yoo, 2017; Moretti, 2010).

j. For example, if the examined service industry is tourism, then tourism FDI in region 1 (i.e., Red River Delta) is instrumented by leather FDI (IV1) and electronics FDI (IV2) in region 4 (i.e., Central Highlands).

The remaining matched regions for respective service and manufacturing FDI include Northern Midland and Mountain – Southeast (2-5); Central Coast – Mekong River Delta (3-6); Central Highlands – Red River Delta (4-1); Southeast – Northern Midland and Mountain (5-2); and Mekong River Delta – Central Coast (6-3). The selection of IVs for each estimation will be further explained in the empirical analyses and discussions presented in Chapters 5 and 6. Figure 4.1 shows the regional map of mainland Vietnam, which demonstrates the geographical segmentation among the matched pairs of regions.

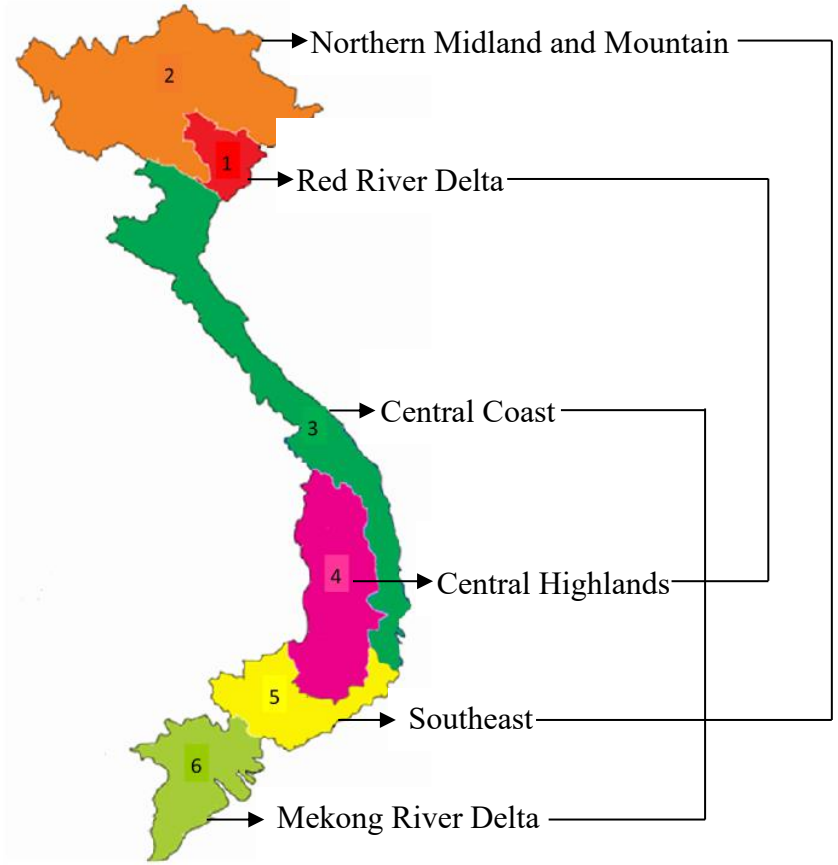

Figure 4.1: Regional map of mainland Vietnam

Source: Adaption based on the regional map for Vietnam's urban development plan (Vietnamtimes, 2015)

The constructed IVs are expected to be closely correlated with the potentially endogenous variable (i.e., FDI presence in a selected service industry – FDI_{kjt}). Arguably, inward FDI in the manufacturing and services sectors largely share common macro-level determinants at the host economy of Vietnam. As shown in Chapter 2 (Section 2.4), foreign investors in both sectors are, to a certain extent, attracted by and beneficial from major competitive advantages of Vietnam as an FDI destination, including such factors as growing domestic market; preferential tax incentives; political and macroeconomic stability; strategic geographical location; rich natural and cultural resources; and abundant and cost-competitive workforce.

Besides, the chosen IVs are unlikely to directly affect the equilibrium wages and female-to-male ratios of domestic firms in the service industry (i.e., ε_{ikjt} in Equation (4.2.15) and ϵ_{ikjt} in Equation (4.3.13)). Arguably, the manufacturing industries demand labour skill sets that are substantially different from those of the service industries. More importantly, the above-described IV construction ensures that FDI firms in selected two manufacturing industries are located in a region non-adjacent to that of the examined service domestic firms. The matched regions are distinctive in various respects, including the differences in real wages and female intensity as observed consistently in the data for both domestic and foreign firms in the examined service industries (see the data description sections of Chapters 5 and 6 for more details).

4.4.4 Diagnostic testing

In the empirical analyses of the thesis, a number of key diagnostic tests are performed to examine the reliability of the specified econometric models and the chosen estimation techniques. These tests allow one to affirm the validity of the empirical results as well as the prediction and generalisation power of the estimates obtained by the research. Specifically, major tests are conducted for evaluating: (i) potential endogeneity; (ii) relevance of selected

instruments; (iii) validity of selected instruments; (iv) multicollinearity; (v) heterokedasticity and autocorrelation; and (vi) overall model significance.

4.4.4.1 Potential endogeneity

As discussed earlier in Section 4.4.1, the key variable of interest, foreign presence (FDI_{kjt}), is likely to violate the exogeneity assumption due to potential reverse causality with the dependent variables ($ln(\overline{w}_{ikjt})$ and $lnFMR_{ikjt}$) in the two specified models. This problem, if found and unaddressed, can lead to biased, inconsistent and inefficient estimates. Therefore, it is critical to test for the existence of endogeneity to employ appropriate estimation method and ensure the validity of model estimation results.

In the empirical exercises presented in Chapters 5 and 6, endogeneity tests are implemented to verify whether the variable of interest, FDI_{kjt}, is exogenous or not. The test, based on the *C*-statistic (also known as a 'GMM distance' or 'difference-in-Sargan' statistic), specifies a null hypothesis that the suspect regressor can be treated as exogenous and the alternative hypothesis is otherwise (Baum, Schaffer, & Stillman, 2003). Respective hypotheses for the two specifications can be written as follows:

- Model of FDI impact on domestic firms' wages (Equation (4.2.15)):

$$H_0: E[\varepsilon_{ikjt}|FDI_{kjt}] = 0$$

$$H_1: E[\varepsilon_{ikjt}|FDI_{kjt}] \neq 0$$

- Model of FDI impact on domestic firms' female employment (Equation (4.3.13)):

$$H_0: E[\epsilon_{ikjt}|FDI_{kjt}] = 0$$

$$H_1: E[\epsilon_{ikjt}|FDI_{kjt}] \neq 0$$

Accordingly, a rejection of the null hypothesis suggests that the variable under examination (FDI_{kjt}) is endogenous. Thus, the IV-GMM estimator is the appropriate estimation technique for the dataset. Furthermore, the use of relevant and valid instrumental variables is required. Conversely, a failure to reject the null indicates that the suspect

explanatory variable satisfies the exogeneity assumption hence the conventional non-IV estimation techniques (i.e., OLS, FE, RE) are feasible while the IV-GMM method does not provide more efficient estimates.

4.4.4.2 Relevance of instruments

If the suspect regressor, foreign presence (FDI_{kjt}) in either specification, is found to be endogenous, the IV-GMM estimator demands the use of appropriate instruments, which must be both relevant and valid. Instrumental variables are considered relevant if they are closely correlated with the endogenous regressor. To assess the relevance of the selected instruments, the thesis employs the underidentification test. The underidentification test can be interpreted as a *Langrange Multiplier (LM)* test, using the Kleibergen and Paap (2006) rk statistic. It allows one to determine whether the minimal canonical correlation between the endogenous regressor and the selected instruments is statistically different from zero. Of these, it tests the null hypothesis that excluded instruments have insufficient explanatory power to predict the endogenous variable in the specified model for the identification of the parameters.

Essentially, the LM test checks whether the equation is identified or not. Thus, it is the test of the rank of matrix: under the null that the equation is underidentified, the matrix of reduced form coefficients on the number of excluded instruments (IVs) has the rank $\Gamma = x - 1$ where x is the number of endogenous regressors. Given the discussions in Sections 4.4.1 and 4.4.3, the null and alternative hypotheses of the underidentificaiton test for the two examined models can be stated as below:

$$H_0: \Gamma = 0 \ (underidentified)$$

$$H_1: \Gamma = 1 \ (identified)$$

Based on the associated *p*-values for the *Kleibergen-Paap rk LM* statistic, if the null is rejected, the matrix is full column rank. This means that the excluded instruments are

relevant or being correlated with the endogenous regressor. Whereas, failure to reject the null indicates that the selected instruments are irrelevant and should not be selected for the IV-GMM estimation of the specified models.

4.4.4.3 Validity of instruments

The qualified instruments must be not only relevant but also valid (i.e., being uncorrelated with the error term). To evaluate the validity of the selected instruments, this thesis adopts the overidentification test since I have more instruments than the number of endogenous variables. It is also known as the Sargan-Hansen test, which has a joint null hypothesis that the instruments are valid. Respective hypotheses for the two empirical models can be expressed as follows:

- Model of FDI impact on domestic firms' wages (Equation (4.2.15)):

$$H_0\text{: } E\left[\varepsilon_{ikjt}\middle|IV1^{a}_{k_1^a j^a t}, IV2^{a}_{k_2^a j^a t}\right] = 0$$

$$H_1\text{: } E\left[\varepsilon_{ikjt}\middle|IV1^{a}_{k_1^a j^a t}, IV2^{a}_{k_2^a j^a t}\right] \neq 0$$

- Model of FDI impact on domestic firms' female employment (Equation (4.3.13)):
  - $H_0\text{: } E\left[\epsilon_{ikjt}\middle|IV1^{b}_{k_1^b j^b t}, IV2^{b}_{k_2^b j^b t}\right] = 0$
  - $H_1\text{: } E\left[\epsilon_{ikjt}\middle|IV1^{b}_{k_1^b j^* t}, IV2^{b}_{k_2^b j^b t}\right] \neq 0$

where specific sets of two constructed instruments for each model, namely $(IV1^{a}_{k_1^a j^a t}, IV2^{a}_{k_2^a j^a t})$ and $(IV1^{b}_{k_1^b j^b t}, IV2^{b}_{k_2^b j^b t})$, have the subscripts denoting two selected manufacturing industries $(k_1^a, k_2^a/k_1^b, k_2^b)$ in regions (j^a/j^b) different from those of domestic firms (j) in the same year (t).

For the efficient GMM estimator, the test statistic is Hansen's *J* statistic that is the minimised value of the GMM criterion function. A rejection of the null hypothesis in the overidentification test casts doubt on the validity of the selected instruments. Meanwhile, a failure to reject the null in the overidentification test confirms that the constructed

instruments are valid to be utilised in the IV-GMM estimation to address the endogeneity bias and inconsistency.

4.4.4.4 Multicollinearity

The empirical analysis of this thesis also takes into account the possible multicollinearity problem in the two econometric models. Basically, multicollinearity can occur if two or more explanatory variables in a regression model are moderately or highly correlated. As the degree of multicollinearity increases, the estimated coefficients become unstable and the standard errors of the coefficients can be greatly inflated. Severe multicollinearity can cause misleading estimates, weakening the statistical power of regressions. Given the nature of survey data used and relatively large number of right-hand-side variables in the specified models, multicollinearity is likely to exist. Therefore, it is important to detect multicollinearity and provide proper treatment to reduce the severity of the problem, if present.

To detect potential multicollinearity of key explanatory variables in the two specifications, the thesis employs two widely used indicators, namely the correlation matrix and variance inflation factor (VIF), including VIF-related measures (e.g., square root of VIF (SQRT VIF) and tolerance ($\frac{1}{VIF}$)). Of these, an examination of the correlation matrix of regressors can reveal the strength of relationship between pairs of variables. Meanwhile, a VIF quantifies how much the variance of an estimated coefficient is inflated by the existence of correlation among the regressors.

To determine the severity of multicollinearity, several rules of thumb are suggested and widely exercised (Alin, 2010; Dormann et al., 2013; Fox, 1991; Morrow-Howell, 1994). Generally, multicollinearity warrants further investigation if the correlation matrix shows that absolute correlation coefficient between two variables is greater than 0.7. Furthermore, multicollinarity is considered problematic when the value of VIF for individual explanatory

variable is greater than 10, which is equivalent to SQRT VIF greater than 2.0 or tolerance less than 0.2.

4.4.4.5 Heteroscedasticity and autocorrelation

Heteroscedasticity and autocorrelation are two other major problems likely encountered in estimating regression models, which lead to severe violation of classical assumptions. Notably, heteroscedasticity arises if the variance of the errors is not constant or homoscedastic across observations. Whereas, autocorrelation in error, also known as serial correlation, exists when error terms are correlated over time. While an OLS estimation with these two problems (if found in the data and untackled) can still produce unbiased coefficients, the associated standard errors and variance are incorrect and misleading. Consequently, statistical interval estimation and inference procedures based on the OLS estimated coefficients are no longer strictly applicable.

To check for potential heteroscedasticity, a commonly used method is to plot the squared residuals against the fitted values and/or regressors. Additionally, a non-graphical approach is to use the White's test or Breusch-Pagan test, which has the null hypothesis that the error terms are homoscedastic. To detect whether the error terms are serially correlated or not, the Durbin-Watson test or the Wooldridge test (Wooldridge, 2002) can be easily employed. Nonetheless, an efficient and increasingly popular approach to dealing with these biases is computing robust standard errors (R.S.E) (Petersen, 2009; Stock & Watson, 2008). In the IV-GMM estimations, this thesis also employs this procedure of computing standard errors.

4.4.4.6 Overall model significance

As a standard test, Fisher's Wald/F-tests are conducted to evaluate the overall significance of the fitted models for FDI impacts on domestic firms' wages and female employment. Differing from the t-test, the F-test enables an investigation of multiple

hypotheses jointly. The null and alternative hypotheses for each specified model can be expressed as follows:

- Model of FDI impact on domestic firms' wages (Equation (4.2.15)):

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = 0$$

$$H_1: \beta_k \neq 0 \text{ for at least one } k,\ k = 1,\ldots,10$$

- Model of FDI impact on domestic firms' female employment (Equation (4.3.13)):

$$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0$$

$$H_1: \alpha_s \neq 0 \text{ for at least one } s,\ s = 1,\ldots,10$$

Given the p-values associated with the F-tests, if the null hypothesis is rejected, it implies that estimated coefficients are jointly different from zero or the model is overall statistically significant. Hence, the fitted model can reliably predict the dependent variable under examination. If we fail to reject the null, there is no evidence of explanatory power of the empirical model.

4.5 Data

4.5.1 Data source

The thesis utilises the firm-level panel data for the services sector in Vietnam over the period 2009-2013. The research data were obtained from the comprehensive Enterprise Surveys commissioned by GSO and conducted by Provincial Statistical Offices. This is also known as the establishment census, which has been the largest and most widely used database for firm-level studies on Vietnam's economy (see, for example, Anwar and Nguyen (2011); Hoi and Pomfret (2010); A. N. Nguyen and Nguyen (2008); K. T. Nguyen (2014); T. B. N. Pham (2013); Truong, Jongwanich, and Ramstetter (2015)). Notably, this source provides highly relevant and large-scale data for empirical studies on the impacts of FDI on the local firms and the economy of Vietnam as it covers all business entities across the state, private and foreign sectors.

Enterprise Surveys collect rich information on characteristics and operation indicators. The adopted questionnaires comprise a vast array of firm-specific data. Major sections include: (i) identity (e.g., registered name, tax file number, location, start year of operation, ownership structure, industry classification); (ii) labour force (e.g., number of total workers, number of female workers, wages, insurance, other compensations); (iii) financial capacity (e.g., total capital, fixed asset; long-term investment); (iv) business performance (e.g., total sales of goods and services, inventory, total and net profit, costs, taxes); and other indicators on R&D activities, information and technology application.

GSO employs two methods of data gathering to conduct nation-wide surveys:

(i) *Direct method*:

Staff of Provincial Statistical Offices interview enterprise representatives to explain the survey and ask for specific information required. Accordingly, these staff fill in all sections of the questionnaires. This method provides direct assistance and only applies to establishments that encounter constraints in meeting accounting standards (e.g., those of small size, under preparation for dissolving, or under investigation).

(ii) *Indirect method*:

Staff of Provincial Statistical Offices organise seminars to give detailed instructions to enterprise representatives (usually chief accountants) on how to fill in each section of questionnaires as well as where, when and how to send the completed surveys. Additionally, establishments can download and fill in questionnaires if they have previous experience of survey procedure and have internet access. This second approach is more cost-effective and widely adopted.

An alternative micro-level data source is from World Bank's Enterprise Surveys conducted for selected developing countries worldwide, including Vietnam (WB, 2018a). While the World Bank's database also provides firm-level indicators, it only constitutes a

representative sample of an economy's private businesses and dominantly focuses on the manufacturing sector. Given the focus of this thesis being the services sector across domestic state and private firms, the GSO's enterprise survey database is a better fit than that of the World Bank. Additionally, the GSO's comprehensive surveys allow an examination of firms at a larger scale, which can enhance the generalisation power of the empirical results obtained in this study.

4.5.2 Data screening and procedure of panel construction

The main empirical analysis of the thesis employs the GSO's enterprise survey data on 15 service industries at the two-digit level of VSIC (as the latest version of 2007). Table 4.3 presents the list of included service industries, ranging from Section D to Section S. While some industries are relatively concentrated in a few activities (e.g., real estate activities; education), others are more diverse with a wide range of services (e.g., professional, scientific and technical activities; information and communication).

Table 4.3: List of included two-digit service industries

Two-digit code	Service industry
D35	Electricity, gas, stream and air conditioning supply
E36-39	Water supply, sewerage, waste management and remediation activities
F41-43	Construction
G45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H49-53	Transportation and storage
I55-56	Accommodation and food service activities
J58-63	Information and communication
K64-66	Financial and insurance activities
L68	Real estate activities
M69-75	Professional, scientific and technical activities
N77-82	Administrative and support service activities
P85	Education

Q86-88	Human health and social work activities
R90-93	Arts, entertainment and recreation
S94-96	Other service activities

Within the services sector, three industries were excluded from the analysis, namely (i) public administration and defense; compulsory social security (Section O); (ii) activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (Section T); and (iii) activities of extraterritorial organisations and bodies (Section U). These industries constitute establishments engaging mostly in non-business activities (i.e., public goods by government, non-profit activities by extraterritorial bodies or self-supply services by households). Thus, they do not fall within the research scope of this thesis, which involves the business activities of FDI firms and their impacts on the local labour market outcomes.

As the enterprise surveys contain extensive raw information on firm-level indicators, it is critical to conduct data screening and cleaning. This process ensures that the final constructed datasets are usable and reliable for subsequent empirical analyses. Major steps include checking raw data and recoding firms within research scope; recoding and constructing variables while taking into account inflation impact; inspecting data for outliers and missing values; constructing panel data. Further details are described below.

First, based on the reported codes of major business activities, data for each year are screened out to keep firms operating in selected service industries only. Industry classifications are then recoded and labeled consistently. The classifications include two-digit level (for the analysis on the whole services sector) and three-digit level (for the analysis on subsets of selected service industries).

Second, dependent and explanatory variables in each empirical model are calculated and constructed, following the specifications in Sections 4.2 and 4.3. Variables are recoded and

labeled consistently across years. Of these, the related monetary variables (e.g., wages, sales, assets) are measured in national currency (Vietnam Dong – VND). To take into account the likely impact of inflation, all the monetary values are deflated to 2009 constant price, using the Consumer Price Index obtained from GSO. Based on the database, a foreign firm is defined as an FDI firm if it is 100 per cent foreign owned or joint ventured with a local (private/state-owned) firm.

Third, the dataset for each year is inspected for possible errors, including identifying outliers and missing values. As mentioned earlier, GSO's surveys were conducted dominantly by the indirect method (i.e., self-reported by enterprise representatives), and survey respondents generally differ in their levels of attention and effort when filling questionnaires. Hence, it is imperative to expect and address errors in survey data. A number of screening techniques (including scatter plotting, tabulating data or summary statistics) are adopted to identify systematic missing values and extreme/unrealistic outliers. Observations that report non-positive values of key variables (e.g., wages, employment, sales, years of operation, assets) are dropped from the datasets.

Finally, the screened and constructed datasets for five years (2009-2013) are combined to generate a panel dataset. The panels are set up by matching firms' identity numbers across years. The usable datasets for empirical exercises are unbalanced panels, which capture the fact firms enter and exit the services sector over the five-year period. Detailed descriptions of the panel dataset for each empirical analysis are presented in Chapters 5 and 6.

4.5.3 Data management and analysis tool

The statistical software Stata version 14.1 is utilised as the preferred tool for data management and analysis in the thesis. It is known as a comprehensive and powerful statistical package with useful features and up-to-date techniques, which can help enhance

the quality and efficiency of empirical research. Compared to other alternative tools such as SPSS, SAS, Eviews or R, Stata is more widely used in empirical studies in economics and econometrics. Notably, this software offers strong statistical features for the management and analysis of survey data (Mitchell, 2007), which is the case of this thesis.

4.6 Summary

This chapter deals with methodological issues. It illustrates that the presence of FDI firms in the industry can be an important determinant of local firms' pay and employment decisions. Of these, FDI firms can influence the expected average wage of domestic firms through two contrasting channels, namely productivity spillovers and cut-off capability. Furthermore, FDI firms can also affect female-to-male labour ratios of domestic firms, directly via augmented female productivity spillovers and indirectly via cut-off capability. Given the contrasting nature of the identified channels, the net impact of FDI presence on the firms' wage and female employment depend on the relative strength of these two forces.

Following the theoretical settings, econometric models are then specified for empirically estimating and testing spillover effects from FDI firms to wages and female employment. The specifications include the variable of interest (foreign presence – FDI_{kjt}) and a set of control variables that are likely to influence the average wages and female-to-male labour ratios of domestic service firms. To estimate these models, FDI_{kjt} is potentially endogenous due to the possible two-way causality with the dependent variables. To take into account this possible bias, it was determined that the thesis would employ the feasible two-step IV-GMM estimator. Furthermore, key diagnostic tests are to be performed to examine the reliability of the specified models and the estimation techniques, which also allows verifying the validity, prediction and generalization power of the results.

The empirical analyses of the thesis utilise the firm-level panel data for the services sector in Vietnam over the period 2009-2013. The data were extracted from the comprehensive Enterprise Surveys commissioned by GSO. To conduct large-scale surveys, GSO adopts two methods of direct and indirect data gathering. The GSO's enterprise data source is most suitable for the purpose of this research. Since survey data are extremely raw, data screening and cleaning procedure is performed to ensure the reliability and usability of final datasets. They involve checking raw data and recoding firms that fall into the research scope of this thesis; recoding and constructing variables; inspecting data for errors; constructing panel data. The thesis uses the statistical software Stata as a tool for data management and analysis.

Chapter 5: FDI Impact on Domestic Firms' Wages – Empirical Results and Analyses

5.1 Introduction

This chapter presents the empirical results and analyses regarding the impact of FDI presence on domestic firms' wages, using rich firm-level panel data of Vietnam's services sector over the period 2009-2013. Section 5.2 provides empirical evidence for the whole services sector. It first describes the data at the sectoral level, including the distribution of firms by ownership across 15 two-digit service industries, the distribution of firms by region and ownership, average real wage by two-digit industry and ownership, and average real wage by region and ownership. This section also reports the estimation results and relevant analyses, which comprise diagnostic testing, the existence of FDI-linked wage spillovers and other determinants of domestic firms' wages for the entire services sector. Furthermore, Section 5.2 distinguishes the differences in FDI-linked wage spillovers between high-wage and low-wage service industries, pointing to the need for further analyses.

Sections 5.3 and 5.4 report the empirical evidence on FDI-induced wage spillovers from a high-wage and a low-wage service industry in Vietnam, respectively. The former is the financial, banking and insurance industry whereas the latter is the accommodation and food service industry. These two sections also present main findings on wage spillovers from FDI and other determinants, which are compared to the overall sector results. Extended analyses are conducted to further investigate the heterogeneity of wage spillovers, which is based on firm-specific characteristics. Finally, Section 5.5 summarises the chapter.

5.2 FDI impact on domestic firms' wages: Evidence from the whole sector

5.2.1 Data description

5.2.1.1 Distribution of firms by two-digit service industry and ownership

Table 5.1 presents the distribution of firms by ownership structure across 15 two-digit service industries. Of these, domestic privately-owned firms account for a dominant presence in all industries, ranging from 78 per cent to 99 per cent. This group of firms operate in the top three industries, namely wholesale and retail (G45-47); construction (F41-43); professional, scientific and technical activities (M69-75). They together account for about 76 per cent of the total number of privately-owned firms. The bottom three industries, ranked in terms of firm number, consist of human health and social work activities (Q86-88); water supply, sewerage, waste management and remediation activities (E36-39); arts, entertainment and recreation (R90-93), which all have less than 4,000 privately-owned firms. On the contrary, state-owned firms represent a modest proportion in the sample, having the total number of firms close to that of FDI firms. Similar to the private sector, the state-owned sector is also concentrated in the first two industries (G45-47; F41-43), but its third largest industry is transportation and storage (H49-53).

While FDI firms are present in all 15 service industries, their relative importance varies substantially. In terms of total number of firms, the top industries in attracting FDI are the professional, scientific and technical activities (M69-75); information and communication (J58-63); wholesale and retail trade; repair of motor vehicles and motorcycles (G45-47), which constitute roughly 50 per cent of total FDI firms in the sector. Meanwhile, if the relative share of FDI firm number is calculated, foreign presence is largest in J58-63, L68 and Q86-88. Finally, when the employment contribution of FDI firms is considered, the relative importance of foreign firms in each industry changes, with the share greater than the share of number of FDI firms. For example, in the accommodation and food service

activities, FDI firms account for only 1.5 per cent of total number of firms but their respective employment share in the industry is much larger, at 12.4 per cent.

Table 5.1: Distribution of firms by two-digit industry and ownership in the whole sector

VSIC Code	Two-digit service industry	Number of domestic firms		Number of FDI firms	Share of FDI firms (%)	Share of FDI employment (%)
		State-owned	Privately-owned			
D35	Electricity, gas, steam and air conditioning supply	402	7,321	26	0.337	0.213
E36-39	Water supply, sewerage, waste management and remediation activities	873	3,095	39	0.983	0.770
F41-43	Construction	2,206	157,415	1,047	0.656	1.002
G45-47	Wholesale and retail trade, repair of motor vehicles and motorcycles	2,357	443,955	1,341	0.300	1.339
H49-53	Transportation and storage	1,133	64,266	959	1.466	4.538
I55-56	Accommodation and food service activities	676	40,624	604	1.462	12.396
J58-63	Information and communication	386	17,426	1,363	7.652	12.227
K64-66	Financial and insurance activities	314	10,395	333	3.110	5.799
L68	Real estate activities	419	16,309	782	4.675	12.124
M69-75	Professional, scientific and technical activities	679	82,666	1,968	2.361	5.514
N77-82	Administrative and support service activities	375	30,947	361	1.153	2.333
P85	Education	22	7,763	288	3.699	11.283
Q86-88	Human health and social work activities	2	2,980	120	4.024	5.724
R90-93	Arts, entertainment and recreation	371	3,619	128	3.208	18.684
S94-96	Other service activities	30	7,377	82	1.107	7.641
	Industry average	**10,245**	**896,158**	**9,441**	**2.413**	**6.773**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

5.2.1.2 Distribution of firms by region and ownership in the whole sector

The distribution of firms across six regions for different ownership types is reported in Table 5.2. Notably, the Southeast (including Ho Chi Minh City – known as the country's economic hub) is the largest region for both domestic and FDI firms in the services sector. This leading area comprises 37 per cent and 55 per cent of privately-owned and foreign firms, respectively. Furthermore, the Red River Delta (including Hanoi – the country's capital city) is the second major region for private and FDI services firms while being the dominant location for domestic state-owned firms (37 per cent). On the contrary, the Central Highlands region is the least popular among all types of ownership. It only accounts for minimal shares of 0.4 per cent, 0.3 per cent and 0.04 per cent of total domestic state-owned, privately-owned and FDI firms in the sector, respectively.

Compared to the data across two-digit industries in the sector, FDI firms exhibit rather modest proportions across regions. Of these, Southeast and Red River Delta are the most favoured locations where foreign firms represent 1.5 per cent and 1.3 per cent of total service firms in the two regions, respectively. It is also worth noting that similar to the distribution by industry, FDI firms' contribution in terms of employment is much more significant than respective shares of firm numbers. On average of all regions, FDI share of employment (2.00 per cent) is 3.3 times greater than FDI share of firm number (0.61 per cent). Notably, in the Central Highlands, the employment share of FDI is 13.4 times higher than FDI share of firm number. Finally, in the most concentrated area of services FDI firms, namely Southeast, while foreign firms represent 1.5 per cent of total number of firms, they contribute 5.1 per cent of total employment in the region.

Table 5.2: Distribution of firms by region and ownership in the whole sector

Region	Number of domestic firms		Number of FDI firms	Share of FDI firms (%)	Share of FDI employment (%)
	State-owned	Privately-owned			
Red River Delta	3,754	281,263	3,624	1.272	3.139
Northern Midland and Mountain	853	42,703	121	0.278	0.605
Central Coast	1,867	135,031	397	0.290	1.010
Central Highlands	427	27,276	35	0.126	1.697
Southeast	2,315	331,213	5,154	1.545	5.106
Mekong River Delta	1,028	77,476	110	0.140	0.465
Regional average	**10,244**	**894,962**	**9,441**	**0.609**	**2.004**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

5.2.1.3 Average real wage by two-digit industry and ownership in the whole sector

Table 5.3 displays the average real wage by ownership across 15 two-digit industries. The highest paying industry among FDI firms is financial and insurance activities (K64-66), which is also the case among domestic state-owned firms. Privately-owned firms offer highest pay in real estate activities (L68). Meanwhile, accommodation and food service (I55-56) is the lowest paying industry among FDI firms. Domestic state-owned and privately owned firms pay the lowest in education (P85) and electricity, gas, steam and air conditioning supply (D35), respectively. Overall, the data present significantly higher average real wages for state-owned than privately owned firms in the sector, except education. Notably, FDI firms pay markedly higher than domestic counterparts in all two-digit industries with an average wage premium of 3.4 times (foreign-domestic private firms) and 1.86 times (foreign-domestic state firms).

Table 5.3: Average real wage by two-digit industry and ownership in the whole sector

VSIC Code	Two-digit service industry	Average real wage (domestic firms)		Average real wage (FDI firms)	Average real wage (All firms)
		State-owned	Privately-owned		
D35	Electricity, gas, steam and air conditioning supply	61.600	16.524	134.232	19.257
E36-39	Water supply, sewerage, waste management and remediation activities	40.157	24.504	62.321	28.282
F41-43	Construction	42.330	32.205	82.350	32.671
G45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles	47.392	28.485	96.634	28.788
H49-53	Transportation and storage	60.061	30.021	88.694	31.382
I55-56	Accommodation and food service activities	30.999	18.117	40.169	18.643
J58-63	Information and communication	56.993	39.231	100.860	43.970
K64-66	Financial and insurance activities	101.284	37.772	274.224	46.709
L68	Real estate activities	59.589	42.393	110.703	45.855
M69-75	Professional, scientific and technical activities	65.981	39.051	136.825	41.521
N77-82	Administrative and support service activities	50.029	31.124	91.093	32.032
P85	Education	28.524	30.553	108.416	33.326
Q86-88	Human health and social work activities	64.173	29.429	97.469	32.084
R90-93	Arts, entertainment and recreation	71.170	25.484	44.064	30.178
S94-96	Other service activities	34.632	18.628	49.853	19.034
	Industry average	**54.328**	**29.568**	**101.194**	**32.249**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

5.2.1.4 Average real wage by region and ownership in the whole sector

The average real wage across regions for domestic and FDI firms is presented in Table 5.4. Notably, Southeast is the largest area of FDI firms and also the highest paying region for all ownership types in the sector. Meanwhile, Northern Midland and Mountain is the

lowest paying region among domestic state-owned and foreign firms. Privately-owned firms have the lowest average real wage in Mekong River Delta. Compared to the data by two-digit industry, the data by region also show that private sector pays the lowest and foreign sector pays the highest. Nonetheless, foreign-domestic wage gaps across regions are less substantial than those across two-digit industries. Overall, average foreign wage premium across regions are 2.39 times (foreign-domestic private firms) and 1.37 times (foreign-domestic state firms).

Table 5.4: Average real wage by region and ownership in the whole sector

Region	Average real wage (domestic firms)		Average real wage (FDI firms)	Average real wage (All firms)
	State-owned	Privately-owned		
Red River Delta	50.731	32.748	91.929	33.725
Northern Midland and Mountain	34.797	26.153	28.851	26.329
Central Coast	40.376	21.928	48.977	22.257
Central Highlands	42.004	28.536	54.317	28.775
Southeast	67.889	34.375	123.814	35.965
Mekong River Delta	52.338	20.864	46.225	21.311
Regional average	**48.023**	**27.434**	**65.685**	**28.060**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

5.2.1.5 Summary statistics: Wage spillover estimation for the whole sector

Table 5.5 summarises statistics of key variables in the econometric model specified in Equation 4.2.15 (Section 4.2, Chapter 4) for the empirical study of the entire services sector. In Table 5.5, one can observe considerable variations for the continuous variables, reflecting the heterogeneity of firms in the sample. Regarding the dummy variable of ownership structure, the mean indicates that the majority of domestic firms are privately owned (98.87 per cent). The dominant presence of privately-owned firms across two-digit service industries and regions have also been described in detail in previous sections.

Table 5.5: Summary statistics – Wage spillover estimation for the whole sector

Variable	Obs	Mean	Std. Dev.	Min	Max
Average wage ($ln\overline{w}$)	906,403	3.2142	0.6554	-5.5514	10.3752
Foreign presence (*FDI*)	915,844	0.0315	0.0482	0.0000	0.5342
Firm size (*lnSize*)	906,046	7.2360	2.2651	-2.7202	18.7037
Ownership structure (*Own*)	906,403	0.9887	0.1057	0.0000	1.0000
Firm age (*lnAge*)	816,795	1.2838	0.8436	0.0000	7.6074
Capital intensity (*lnK_intensity)*	778,390	3.8151	1.5313	-6.3042	13.4354
Technology gap (*TechGap)*	906,046	1469.232	11444.99	-5813793	19822
Competition (*Herfindahl*)	915,844	0.0106	0.0258	0.0009	0.1826

Notes: Obs is acronym for number of observations, Std.Dev. for standard deviation, Min for minimum, Max for maximum.

Notably, FDI firms exhibit a moderate presence in the services sector, constituting 3.15 per cent of total employment in the two-digit industry-region. The maximum employment share of FDI firms is 53.42 per cent, and the minimum share is zero, implying no presence of FDI firms. It should be noted that FDI firms are present across all 15 service industries in two major regions, namely Red River Delta and Southeast. Nonetheless, in other four less popular locations, there is no foreign investment in a number of two-digit industries, which demonstrates the heterogeneity of FDI across these two dimensions. For example, there is no FDI firm operating in information and communication industry in Central Highlands, which results in a zero value of foreign presence in this particular industry-region.

Finally, as shown in Table 5.5, the average Herfindahl index as a proxy of market competition is relatively low at 0.01. Furthermore, a closer look at the sample shows that nearly 83 per cent of domestic firms in the services sector have Herfindahl index below the mean. In addition, a large number of firms, particularly privately-owned ones, across service industries provide substantially diverse activities. Therefore, the examined services sector can be categorised as being monopolistically competitive, which plausibly fits the theoretical framework in Section 4.2.1.

5.2.2 Estimation results and analyses

5.2.2.1 Diagnostic testing

Tables 5.6 and 5.7 display the correlation matrix and collinearity measures of key explanatory variables in the model, respectively. Severe multicollinearity can cause misleading estimates, weakening the statistical and forecasting power of regressions. As a rule of thumb adopted in the literature, multicollinearity is generally considered problematic if absolute correlation coefficient between two variables is greater than 0.7 and the individual value of variance inflation factor (VIF) is greater than 10 (equivalently, square root of VIF (SQRT VIF) greater than 2.0 or tolerance ($\frac{1}{VIF}$) less than 0.2) (Alin, 2010; Dormann et al., 2013; Fox, 1991; Morrow-Howell, 1994).

The reported figures in Table 5.6 indicate that the correlation coefficients between major independent variables are notably small (being less than 0.35), accounting for negligible common variance. Moreover, the collinearity measures given in Table 5.7 show low values of VIF and SQRT VIF (being less than 2.0), and equivalently high value of tolerance (being greater than 0.2). Thus, it is highly unlikely that severe multicollinearity can arise. Moreover, potential arbitrary heteroscedasticity is taken into account by employing robust standard errors in the IV-GMM estimations (Petersen, 2009; Stock & Watson, 2008).

Table 5.6: Correlation matrix – Wage spilliover estimation for the whole sector

	FDI	lnSize	Own	lnAge	lnK_intensity	TechGap	Herfindahl
FDI	1						
lnSize	-0.0949	1					
Own	-0.0337	-0.1884	1				
lnAge	-0.0227	0.3414	-0.161	1			
lnK_intensity	-0.0348	0.0697	-0.061	0.0520	1		
TechGap	-0.0392	-0.1139	0.0147	-0.0132	-0.0249	1	
Herfindahl	0.2883	-0.0730	-0.0460	0.0192	-0.0257	0.0249	1

Table 5.7: Collinearity measures–Wage spilliover estimation for the whole sector

Regressor	Variance inflation factor (VIF)	Square root of the VIF (SQRT VIF)	Tolerance
FDI	1.1000	1.0500	0.9064
lnSize	1.1900	1.0900	0.8395
Own	1.0600	1.0300	0.9473
lnAge	1.1500	1.0700	0.8711
lnK_intensity	1.0100	1.0000	0.9905
TechGap	1.0200	1.0100	0.9824
Herfindahl	1.1000	1.0500	0.9100

Table 5.8 presents the main estimation results for FDI impact on domestic firms' wages in the whole services sector. Regarding the overall model significance, the test obtains an *F*-statistic of 3113.91 with $p<0.01$, indicating the joint significance of the estimated coefficients. Notably, the null hypothesis (i.e., *FDI* is exogenous) is rejected at the one per cent level given the *C*-statistic for the endogeneity test being 91.36 ($p<0.01$). This result indicates that the IV-GMM estimator is an appropriate method to account for the endogeneity bias.

The adoption of the IV-GMM estimator requires the use of proper excluded instrumental variables. This empirical exercise utilises two instruments, namely the employment share of FDI firms in the beverage manufacturing industry in region *j* at time *t* (i.e., *IV1*), and the employment share of FDI firms in the furniture manufacturing industry in region *j* at time *t* (i.e., *IV2*), of which region *j* is different from where domestic service firms are located. The description of IVs construction as well as their appropriateness in terms of theoretical rationale were detailed in Section 4.4.3. Furthermore, the relevance and validity of these selected instruments are statistically examined by the underidentification and overidentification tests. The LM statistic (for underidentification test) is 2.0e+04 ($p<0.01$), hence the null hypothesis (i.e., excluded instruments are irrelevant) can be rejected at the

one per cent level. Moreover, the reported statistic of the overidentification test is 2.66 (p>0.1), which fails to reject the null hypothesis (i.e., selected instruments are valid). Overall, the test results affirm the appropriateness of the model and estimation method, including the relevance and validity of the instruments for the dataset.

Table 5.8: Estimation results – Wage spillovers for the whole sector

Variable	Estimated coefficient	Robust standard error	p-value
Foreign presence (FDI_{kjt})	1.1535	0.1447	0.0000
Firm size ($lnSize_{ikjt}$)	0.0733	0.0005	0.0000
Ownership structure (Own_{ikjt})	-0.1886	0.0096	0.0000
Firm age ($lnAge_{ikjt}$)	0.0430	0.0012	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0529	0.0006	0.0000
Technology gap ($TechGap_{ikjt}$)	0.000001	0.0000002	0.0000
Competition ($Herfindahl_{kjt}$)	-1.1006	0.0860	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*2.0e+04 (0.0000)*		
Overidentification test (Hansen J statistic)	*2.6580 (0.1030)*		
Endogeneity test (C-statistic)	*91.3620 (0.0000)*		
Model significance test (F-statstic)	*3113.9100 (0.0000)*		
No. of obs	*906,403*		

Notes: p-values for tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

5.2.2.2 Evidence of FDI impact on domestic firms' wages in the whole sector

The estimation results in Table 5.8 confirm the existence of positive wage spillovers from FDI firms to domestic firms in the whole services sector in Vietnam. The estimated

coefficient of foreign presence (*FDI*) is positive and statistically significant at the one per cent level. Therefore, not only do foreign firms pay much higher wages across 15 two-digit service industries and six regions, they also exert considerable upward pressure on average wages of domestic counterparts in the sector. A one per cent increase in foreign presence in the industry-region is associated with average wages that are 1.15 per cent higher among domestic firms. This empirical finding for Vietnam's services sector (in terms of direction of spillovers) is meaningful and relatively consistent with most previous findings for the manufacturing sector in developing host economies (Chidambaran Iyer, 2012; Hale & Long, 2011; Hoi & Pomfret, 2010; Lipsey & Sjöholm, 2004; Srithanpong, 2014; Tomohara & Takii, 2011; Villarreal & Sakamoto, 2011). Besides, the estimation suggests a more profound magnitude of wage spillovers as compared to that in Vietnam's manufacturing sector (Hoi & Pomfret, 2010).

The theoretical modelling in Chapter 4 (Section 4.2.1) indicates that the impact of FDI is conditional upon the relative strength of the two contrasting channels via which FDI firms affect domestic firms' average wages. The estimated coefficient reported in Table 5.8 captures the net impact of FDI in the entire services sector. Of which, a positive coefficient is resulted from the dominant effect of the positive channel over the negative one. For instance, if FDI firms exert positive productivity spillovers and its net impact on domestic firms' average wages is positive, then the direct channel (i.e., productivity spillovers) dominates the indirect one (i.e., cut-off capability), putting an upward pressure on the conditional expectation of domestic firms' average wages. Intuitively, domestic firms in the services sector are inclined to pay higher to their workers as they gain significant beneficial productivity spillovers from foreign firms, which increases the marginal product of labour. Whereas, the downward effect on local wages by the entry of firms with lower capability seems negligible.

5.2.2.3 Other determinants of domestic firms' wages in the whole sector

The estimation results in Table 5.8 suggest the importance of other factors in determining wages by domestic firms in Vietnam's services sector. The coefficients of control variables are all statistically significant at the one per cent level. Of these, a one per cent increase in firm size (*lnSize*) is associated with average real wages that are 0.07 per cent higher. This finding is unsurprising as previous literature mostly suggests that larger firms tend to possess stronger financial capacity and adopt better compensation practices, which allow them to pay higher than smaller firms (Girma et al., 1999; Hoi & Pomfret, 2010; Pittiglio et al., 2015).

Domestic service firms' ownership structure plays a considerable role in explaining their wage differences. The estimated coefficient of variable *Own* is negative and statistically significant at the one per cent level. This suggests that, on average, private firms pay 0.19 per cent lower than state counterparts in the entire sector. In fact, the data description reported in Tables 5.3 and 5.4 shows overwhelmingly higher average real wages by domestic state-owned firms across two-digit service industries and regions over the study period. Related literature, for example, De Fraja (1993) and Hale and Long (2011), also supports the same conclusion, asserting that state-owned firms may possess more favourable funding access than privately-owned firms, allowing the former to employ more competent and higher paid workers.

Two other major firm-specific variables, namely age (*lnAge*) and capital intensity (*lnK_intensity),* also show positive and statistically significant influence on wages by domestic firms in the services sector. Besides, the magnitude of the estimated coefficients is more or less close to each other. A one per cent increase in firm age and capital intensity causes domestic firms to push up average real wages by 0.04 per cent and 0.05 per cent, respectively. Well-established firms tend to have notable business success, more solid experience in both product and labour markets, enhancing their capability to pay higher. Similarly, capital-

intensive firms are more likely to achieve strong financial capability and sound compensation systems, allowing them to pay higher than labour-intensive counterparts. These findings are expected since previous studies generally suggest a positive correlation between these two variables and firms' wage levels (Arai, 2003b; Brown & Medoff, 2003; Hoi & Pomfret, 2010; Muñoz-Bullón & Sánchez-Bueno, 2013; Pittiglio et al., 2015; Sjöholm & Lipsey, 2006).

Finally, Table 5.8 also indicates that the last two control variables in the empirical model, namely technology gap (*TechGap)* and competition (*Herfindahl*), exert statistically significant but contrasting effects on average real wages by domestic service firms. Nevertheless, the effect of technology gap appears negligible because the estimated coefficient of variable *TechGap* is notably small (0.000001). Meanwhile, the influence of competition on local firms' wages is more pronounced. Accordingly, a one per cent increase in competitive pressure (i.e., lower Herfindahl index) is associated with average real wages that are 1.10 per cent higher. This finding implies that, facing increased competitive forces, domestic firms in Vietnam's services sector tend to adopt the strategy of attracting and retaining a productive and competent workforce, putting upward pressure on their average wage levels.

5.2.3 High-wage versus low-wage industries

Two-digit industries, notably in the services sector, are heterogeneous in a wide array of aspects, including average wage levels. In fact, the data description presented in Section 5.2.1 highlights the substantial differences in average real wages across 15 two-digit industries of Vietnam's services sector. Furthermore, the relative importance of FDI firms across two-digit service industries varies markedly. To obtain a graphical overview of how FDI-linked wage spillovers might differ by the industry wage level, Figures 5.1 and 5.2 depict the scatterplots of the data for low-wage and high-wage service industries. Of these, low-wage group is defined to have average real wage equal or less than sample mean for all domestic firms. Whereas, high-wage group has average real wage greater than sample mean.

The graphs seem to suggest divergent patterns of FDI-induced wage spillovers, exhibiting a positive impact in the high-wage group while having a negative impact in the low-wage group. Therefore, it is of analytical and policy interest to conduct further estimations to distinguish the direction and magnitude of FDI-linked wage spillovers between high-wage and low-wage service industries.

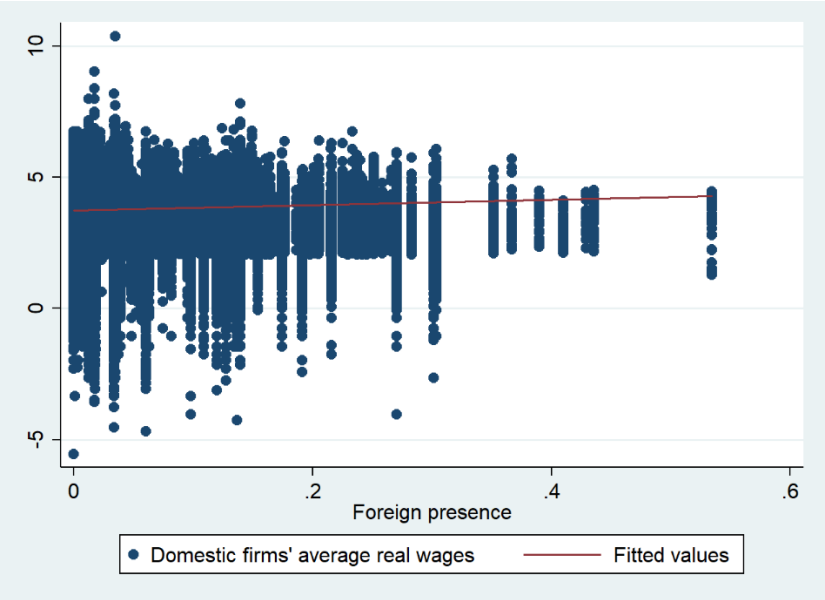

Figure 5.1: Scatterplot of foreign presence and domestic firms' average real wages in high-wage service industries

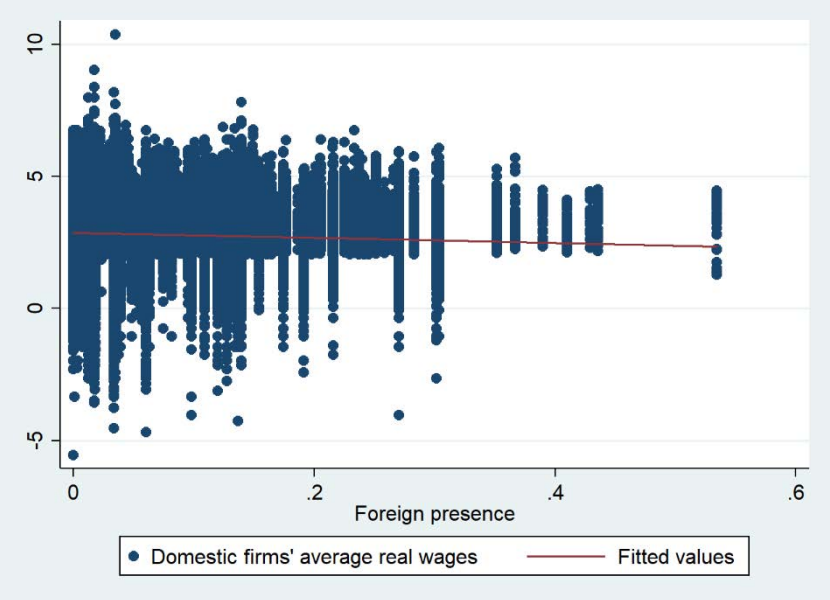

Figure 5.2: Scatterplot of foreign presence and domestic firms' average real wages in low-wage service industries

The sample of the whole services sector is divided into two subsets of low-wage and high-wage groups. Table 5.9 lists the two-digit service industries by wage level. Of these, the high-wage group comprises of eight two-digit industries and the top three highest paying ones are real estate activities (L68); financial and insurance activities (K64-66); information and communication (J58-63). The low-wage group consists of seven two-digit industries and the bottom three lowest paying ones are accommodation and food service activities (I55-56); other service activities (S94-96); electricity, gas, stream and air conditioning supply (D35).

Table 5.9: List of two-digit industries by wage level in the services sector

VSIC Code	**High-wage group**
F41-43	Construction
H49-53	Transportation and storage
J58-63	Information and communication
K64-66	Financial and insurance activities
L68	Real estate activities
M69-75	Professional, scientific and technical activities
N77-82	Administrative and support service activities
P85	Education
VSIC Code	**Low-wage group**
D35	Electricity, gas, stream and air conditioning supply
E36-39	Water supply, sewerage, waste management and remediation activities
G45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
I55-56	Accommodation and food service activities
Q86-88	Human health and social work activities
R90-93	Arts, entertainment and recreation
S94-96	Other service activities

Table 5.10 displays the estimation results, which confirm the graphical patterns plotted above. Notably, FDI firms exert a positive and statistically significant effect on average real wages of domestic firms operating in high-wage service industries with a one per cent increase in foreign presence causing domestic firms in the high-wage group to raise wages

by 3.34 per cent. On the contrary, FDI-linked wage spillover effect is negative and statistically significant in the low-wage group, with a one per cent increase in foreign presence lowering domestic firms' average real wages by 0.85 per cent. The finding might reflect weak absorptive capacity by firms in low-wage industries to realise beneficial FDI-induced spillovers. According to the theoretical framework in Section 4.2, the adverse net impact in this group implies the dominance of the negative channel. For example, given the positive productivity spillovers, the downward effect on local wages by the entry of lower capable firms (i.e., cut-off capability) is more pronounced than the upward effect to pay higher (i.e., productivity spillovers). This interesting and important evidence warrants the need for more in-depth analyses of FDI wage effect at the sub-sector level.[17] Hence, the following Sections 5.3 and 5.4 provide further insights at lower levels of disaggregation.[18]

Table 5.10: Estimation results: High-wage versus low-wage industries

	High-wage service industries			**Low-wage service industries**		
Variable	**Estimated coefficient**	**Robust standard error**	**p-value**	**Estimated coefficient**	**Robust standard error**	**p-value**
Foreign presence (FDI_{kjt})	3.3363	0.2229	0.0000	-0.8538	0.1617	0.0000
Firm size ($lnSize_{ikjt}$)	0.0196	0.0006	0.0000	0.0520	0.0006	0.0000
Ownership structure (Own_{ikjt})	-0.0506	0.0107	0.0000	-0.0652	0.0115	0.0000
Firm age ($lnAge_{ikjt}$)	0.0134	0.0019	0.0000	0.0179	0.0012	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0235	0.0008	0.0000	0.0251	0.0006	0.0000
Technology gap ($TechGap_{ikjt}$)	0.0000005	0.0000001	0.0000	0.0000007	0.0000003	0.0000
Competition ($Herfindahl_{kjt}$)	-0.4775	0.1196	0.0000	-0.5776	0.0906	0.0000

[17] A study on another low-wage industry, namely wholesale and retail trade, also reveals the evidence of negative wage spillovers from FDI firms and the divergent effects of foreign presence at different ends of the wage scale (D. T. H. Nguyen, 2019). See Table A5.10 in the Appendices for the main estimation results of this study.

[18] The choices of industries for the sub-sector analyses are based on the data in Table 5.3. Accordingly, the financial, banking and insurance industry, and the accommodation and food service are the highest and lowest paying industries in the sector, respectively.

Regional dummies ($dRegion_j$)	Included	Included
Industry dummies ($dIndustry_k$)	Included	Included
Year dummies ($dTime_t$)	Included	Included
LM statistic	*4433.9140 (0.0000)*	*9084.1940 (0.0000)*
Hansen J statistic	*37.7950 (0.0000)*	*4.5740 (0.0325)*
C-statistic	*214.8870 (0.0000)*	*12.7450 (0.0000)*
F-statistic	*180.2800 (0.0000)*	*1407.7400 (0.0000)*
No. of obs	*357,526*	*548,877*

Notes: (i) High-wage group is defined to have average real wage greater than sample mean, and low-wage group has average real wage equal or less than sample mean; (ii) p-values for the tests statistics are in parentheses; (iii) the estimations accounted for firm-fixed effects.

5.3 FDI impact on domestic firms' wages: Evidence from a high-wage service industry

5.3.1 Data description: FDI and wages in the financial, banking and insurance industry

The distribution of firms by ownership type across 10 three-digit financial, banking and insurance industries is presented in Table 5.11. Similar to the sectoral pattern, domestic privately-owned firms constitute the leading proportion in almost all industries, with one exception of reinsurance (K652). Notably, pension funding activities (K653) engage only private ownership. Furthermore, domestic privately-owned firms are largely concentrated in monetary intermediation (K641); other financial service activities (K649) (e.g., financial leasing, credit granting); and activities auxiliary to financial service activities (K661) (e.g., administration of financial markets, security and commodity contracts brokerage). These three major industries account for nearly 85 per cent and 78 per cent of domestic privately-owned firms and all firms, respectively. The top two industries by state ownership are also K641 and K649 while the third largest is K651 (Insurance).

Compared to the entire sector, FDI firms exhibit rather mixed figures of importance across three-digit financial, banking and insurance industries. Particularly, foreign firms are not present in trust, funds and other financial vehicles (K643); reinsurance (K652); and pension funding (K653). Regarding the number of firms, FDI is mainly attracted to monetary intermediation (K641); insurance (K651); and activities auxiliary to financial service activities (K661), which

comprise 83 per cent of all foreign firms. While the whole sector sample shows consistently greater foreign contribution in terms of employment than respective shares of firm number (with an average gap of nearly three times), the financial, banking and insurance shows a rather different trend at the three-digit level. Of these, FDI employment shares are smaller than their respective shares in firm number in three out of seven FDI-present industries (i.e., K641, K651, and K663). Overall, the sample average in this high-wage industry still indicates slightly higher employment share (5.36 per cent) than the share of firm number (4.48 per cent).

Table 5.11: Distribution of firms by three-digit level and ownership in the financial, banking and insurance industry

VSIC Code	Three-digit financial, banking and insurance industry	Number of domestic firms		Number of FDI firms	Share of FDI firms (%)	Share of FDI employment (%)
		State-owned	Privately-owned			
K641	Monetary intermediation	92	1,952	164	7.428	5.406
K642	Activities of holding company	13	49	1	1.587	6.844
K643	Trust, funds and other financial vehicles	6	269	0	0.000	0.000
K649	Other financial service activities*	69	3,125	23	0.715	3.883
K651	Insurance	68	403	79	14.364	9.439
K652	Reinsurance	1	0	0	0.000	0.000
K653	Pension funding	0	6	0	0.000	0.000
K661	Activities auxiliary to financial service activities*	46	1,066	30	2.627	3.769
K662	Activities auxiliary to insurance and pension funding	1	293	17	5.466	12.408
K663	Fund management activities	5	92	14	12.613	11.867
	Industry average	**301**	**7,255**	**328**	**4.480**	**5.362**

* Except insurance and pension funding activities

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Table 5.12 reveals the distribution of firms by region and ownership in the financial, banking and insurance industry. Resembling the distribution of the services sector, both domestic and foreign firms in this industry operate dominantly in two major regions of Red River Delta and Southeast where Hanoi and Ho Chi Minh City are respectively located. While the whole sector data show Southeast as the most favoured location among domestic and FDI firms, the data by the finance, banking and insurance industry display Red River Delta as the top region for domestic firms.

Moreover, three regions (i.e., Northern Midland and Mountain, Central Highlands, and Mekong River Delta) have no FDI firms in this high-wage industry. The lack of foreign presence in Vietnam's less developed regions results in lower average FDI shares in terms of firm number (1.90 per cent) and employment (2.30 per cent) as compared to the sectoral distribution. Nevertheless, the relative importance of FDI firms in this industry in the top two regions is much greater than that of the sector average. Notably in Southeast, FDI shares of firm number and employment are 7.37 per cent and 9.16 per cent, respectively, while those of the entire sector are 1.55 per cent and 5.11 per cent.

Table 5.12: Distribution of firms by region and ownership in the financial, banking and insurance industry

Region	Number of domestic firms		Number of FDI firms	Share of FDI firms (%)	Share of FDI employment (%)
	State-owned	Privately-owned			
Red River Delta	180	2,766	120	3.914	4.451
Northern Midland and Mountain	2	284	0	0.000	0.000
Central Coast	9	993	1	0.100	0.173
Central Highlands	12	114	0	0.000	0.000
Southeast	75	2,526	207	7.372	9.157
Mekong River Delta	23	565	0	0.000	0.000
Regional average	**301**	**7,248**	**328**	**1.898**	**2.297**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

The average real wage by ownership structure at the three-digit level of the financial, banking and insurance industry is shown in Table 5.13. As reported in Table 5.3, this industry is the highest paying in the entire services sector. Similar to the observation of the two-digit industry data, wages vary extensively across three-digit industries and ownership types. Notably, the top three highest paying industries among FDI firms are fund management activities (K663); monetary intermediation (K641); and activities auxiliary to insurance and pension funding (K662). Furthermore, K663 is also the top paying industry among domestic state-owned and privately-owned firms. In contrast, FDI firms in activities of holding company (K642) pay the lowest, whereas insurance (K651) and other financial service activities (K649) offer the lowest wages among state-owned and privately-owned firms, respectively. Overall, the average wage gap of 1.82 times (foreign-domestic state firms) is close to that of the sector (1.86 times) but the gap of 4.71 times (foreign-domestic private firms) is higher than that of the entire sector (3.4 times).

Table 5.13: Average real wage by three-digit level and ownership in the financial, banking and insurance industry

VSIC Code	Three-digit financial, banking and insurance industry	Average real wage (domestic firms)		Average real wage (FDI firms)	Average real wage (All firms)
		State-owned	Privately-owned		
K641	Monetary intermediation	100.564	44.677	316.197	67.173
K642	Activities of holding company	107.033	33.930	42.620	48.544
K643	Trust, funds and other vehicles	86.945	39.934	_____	40.960
K649	Other financial service activities*	112.614	25.009	178.927	27.988
K651	Insurance	86.137	43.755	221.681	74.551
K652	Reinsurance	225.527	_____	_____	225.527
K653	Pension funding	_____	37.417	_____	37.417

K661	Activities auxiliary to financial service activities*	90.722	57.578	192.280	62.452
K662	Activities auxiliary to insurance and pension funding	111.525	39.006	273.285	52.045
K663	Fund management activities	260.537	135.308	484.998	185.054
	Industry average	**131.289**	**50.735**	**238.804**	**82.171**

* Except insurance and pension funding activities

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Table 5.14 presents the average real wage by region for domestic and FDI firms in the financial, banking and insurance industry. While Southeast remains the highest paying region among foreign firms (which is similar to the sector sample average), Red River Delta becomes the highest paying region among domestic firms in this industry. Moreover, Central Coast is the lowest paying region across domestic privately-owned and foreign firms while it is Northern Midland and Mountain among domestic state-owned firms. Contrary to the whole services sector, data by the financial, banking and insurance industry reveal that regional foreign-domestic wage gaps are markedly larger than the industry foreign-domestic wage gaps. On average, foreign wage premium across regions are 6.97 times (foreign-domestic private firms) and 2.95 times (foreign-domestic state firms). Notably, the reported regional pay differentials in this industry are more substantial than those of the sectoral average (i.e., FDI firms pay 2.39 and 1.37 times higher than domestic privately-owned and state-owned firms in the sector, respectively).

Table 5.14: Average real wage by region and ownership in the financial, banking and insurance industry

Region	Average real wage (domestic firms)		Average real wage (FDI firms)	Average real wage (All firms)
	State-owned	Privately-owned		
Red River Delta	109.327	42.780	273.745	55.726
Northern Midland and Mountain	53.103	29.008	_____	29.176
Central Coast	78.539	25.332	183.308	25.967
Central Highlands	64.529	42.107	_____	44.242
Southeast	94.360	42.632	278.552	61.405
Mekong River Delta	98.366	29.314	_____	32.015
Regional average	**83.037**	**35.195**	**245.202**	**41.422**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

The summary statistics of key variables for the empirical study of the financial, banking and insurance industry is reported in the appendices (Table A5.1). Similar to the whole sector statistics, the figures also suggest significant heterogeneity in the sample due to the sizable variations for continuous explanatory variables. Compared to the sector average, private ownership in this high-wage industry remains dominant, though to a lower extent of 96.02 per cent (as compared to the sector mean of 98.87 per cent). Notably, FDI firms exhibit stronger presence compared to the whole sector sample, accounting for 5.01 per cent of total employment in the three-digit industry-region. The maximum employment share of FDI firms is 87.93 per cent (for fund management activities in Southeast), which is higher than the maximum share across two-digit service industries and regions (i.e., 53.42 per cent). The minimum share of FDI firms' employment is zero, reflecting heterogeneous foreign presence in various three-level industries and regions.

5.3.2 Estimation results and analyses

Table 5.15 presents the estimation results of FDI firms' impact on average wages of domestic firms in the financial, banking and insurance industry. It indicates the existence of

wage spillovers from foreign firms to domestic counterparts in this high-wage industry over the study period. The estimated coefficient of foreign presence (*FDI*) is positive and statistically significant at the one per cent level. Specifically, a one per cent increase in foreign presence causes the average wages of domestic firms to rise by 4.65 per cent. Compared to the estimation for the entire sector, the magnitude of FDI-linked wage spillovers in this high-wage service industry appears more profound. This finding implies substantial influence of high-wage and highly skilled foreign affiliates via the two spillover channels (i.e., productivity spillovers and cut-off capability) as described in the theoretical modelling in Chapter 4. Of these, the positive effect from one channel dominates the negative effect from the other, resulting in higher average wages among domestic firms in.

Regarding the diagnostic testing, the *F*-statistic and *C*-statistic suggest the significance of overall model as well as the presence of endogeneity bias. Accordingly, both statistic for overidentification and underidentifiction tests confirm the relevance and validity of selected instruments (i.e., foreign employment share in the fabricated metal product manufacturing and in the electrical equipment manufacturing at time *t* in region *j* non-adjacent to domestic financial firms). Furthermore, Tables A5.3 and A5.4 in the Appendices respectively report the correlation matrix and collinearity measures of main explanatory variables, which show that severe multicollinearity problem is unlikely to exist.

Table 5.15: Estimation results – Wage spillovers for the financial, banking and insurance industry

Variable	Estimated coefficient	Robust standard error	p-value
Foreign presence (*FDI*)	4.6484	1.5936	0.0040
Firm size (*lnSize*)	0.1033	0.0161	0.0000
Ownership structure (*Own*)	0.2212	0.2225	0.3200
Firm age (*lnAge*)	0.0316	0.0317	0.3190
Capital intensity (*lnK_intensity)*	0.0814	0.0130	0.0000

Technology gap (*TechGap)*	0.000001	0.000003	0.7490
Competition (*Herfindahl*)	0.1997	0.1857	0.2820
Regional dummies (*dRegion*)	Included		
Industry dummies (*dIndustry*)	Included		
Year dummies (*dTime*)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*60.6050 (0.0000)*		
Over-identification test (Hansen J statistic)	*0.2610 (0.6093)*		
Endogeneity test (C-statistic)	*8.2130 (0.0042)*		
Model significance test (F-statstic)	*33.3200 (0.0000)*		
No. of obs	*7,556*		

Notes: p-values for tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

Similar to the overall sector estimation results, Table 5.15 also suggests the positive role of two key firm-specific characteristics, namely firm size (*lnSize*) and capital intensity (*lnK_intensity)*, in determining wages of local firms in the financial, banking and insurance industry. Such findings are expected and consistent with previous literature (Arai, 2003b; Brown & Medoff, 2003; Girma et al., 1999; Hoi & Pomfret, 2010; Muñoz-Bullón & Sánchez-Bueno, 2013; Pittiglio et al., 2015). Notably, these two variables seem to exert greater impact in this industry since their estimated coefficients are marginally greater than those in the whole sector model. Accordingly, a one per cent increase in firm size and capital intensity is associated with average real wages that are 0.10 per cent and 0.08 per cent higher, respectively.

Contrary to the entire sector estimation results, Table 5.15 indicates statistically insignificant impact of other firm-level variables on domestic firms' average real wages in the financial, banking and insurance industry. Accordingly, ownership structure (*Own*), firm

age (*lnAge*), technology gap (*TechGap)* play an insignificant role in explaining wage differences among local firms in this specific industry. Such evidence might further suggest relatively pronounced wage impact absorbed by the two crucial characteristics of firm size and capital intensity. Moreover, the competitive pressure (*Herfindahl*) appears unimportant in determining local firms' wages in the financial, banking and insurance industry whereas this factor shows significant impact on average wages for the overall sector estimation.

5.4 FDI impact on domestic firms' wages: Evidence from a low-wage service industry

5.4.1 Data description: FDI and wages in the accommodation and food service industry

Table 5.16 displays the distribution of firms by ownership structure across five three-digit accommodation and food service industries. Notably, these categorised services (reported in Section I) comprise the core activities of the tourism industry (UNCTAD, 2007), representing a rising attraction of both domestic and foreign investment. Similar to the data for the whole sector and the financial, banking and insurance industry, firms in the accommodation and food services are overwhelmingly privately owned and unevenly distributed across three-digit categorised activities. Of these, the top two industries among both domestic and foreign firms comprise short-term accommodation (including hotels and resorts) (I551); restaurants and mobile food services (I561). These services account for 83 per cent, 55 per cent, and 56 per cent of total number of domestically state-owned, privately-owned, and FDI firms, respectively.

It is also worth noting that while FDI firms represent rather modest proportion in terms of firm number (with an average share of 0.94 per cent), their employment contribution is far greater, being approximately nine times higher (with an average share of 8.165 per cent). This difference in relative importance by foreign firms in accommodation and food service industry is markedly higher than that of the entire sector (2.8 times) and the financial, banking and insurance industry (1.2 times). Particularly, foreign firms in the short-term

accommodation (K551) and event catering (I562) represent considerable employment shares of nearly 18.5 per cent and 16 per cent, respectively.

Table 5.16: Distribution of firms by three-digit level and ownership in the accommodation and food service industry

VSIC Code	Three-digit financial, banking and insurance industry	Number of domestic firms		Number of FDI firms	Share of FDI firms (%)	Share of FDI employment (%)
		State-owned	Privately-owned			
I551	Short-term accommodation	387	17,988	294	1.575	18.487
I559	Other accommodation	0	11	0	0	0
I561	Restaurants and mobile food services	75	12,560	212	1.650	6.311
I562	Event catering	3	1,467	20	1.342	15.921
I563	Beverage serving activities	0	720	1	0.139	0.104
	Industry average	**465**	**32,746**	**527**	**0.941**	**8.165**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

The distribution of firms by region and ownership in the accommodation and food service industry is provided Table 5.17. Differing from the data of the overall sector and the financial, banking and insurance industry, the regional distribution of firms in this industry is more diverse. While Red River Delta and Southeast remain major locations, Central Coast becomes the largest and second largest region of domestically state-owned firms and privately-owned firms, respectively. In addition, this well-known tourism region (including highly developed tourist destinations in coastal provinces of Da Nang, Quang Nam, Khanh Hoa, Hue) attracts a bigger proportion of FDI firms (18.5 per cent of all FDI firms), as compared to 4 per cent of all FDI firms in the services sector. Hence, the relative importance of foreign firms in this service industry is also more remarkable across six regions, of which the maximum employment share by FDI firms is 20.4 per cent in Red River Delta. Notably, the average regional share of FDI employment is notably high at 10 per cent, as compared to about 2 per cent for the overall services sector.

Table 5.17: Distribution of firms by region and ownership in the accommodation and food service industry

Region	Number of domestic firms		Number of FDI firms	Share of FDI firms (per cent)	Share of FDI employment (per cent)
	State-owned	Privately-owned			
Red River Delta	137	7,054	269	3.741	20.441
Northern Midland & Mountain	25	708	12	1.637	4.394
Central Coast	159	7,179	97	1.322	7.510
Central Highlands	29	1,030	5	0.472	7.681
Southeast	85	13,982	134	0.953	15.152
Mekong River Delta	30	2,746	10	0.360	5.406
Regional average	**465**	**32,699**	**527**	**1.414**	**10.097**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Table 5.18 reports average real wages of FDI, domestic and all firms across three-digit accommodation and food service industries. The highest paying industry among FDI firms is the short-term accommodation industry, which is also the industry with the highest level of foreign investment, comprising more than 55 per cent of foreign firms in the sample. Notably, the foreign-domestic pay gaps across industries are significant at 2.96 times (short-term accommodation), 2.09 times (beverage serving activities), 1.56 times (event catering), and 1.38 times (restaurants and mobile food services). Overall, foreign firms pay considerably higher than domestic counterparts in all FDI-present three-digit industries with an average wage premium of 2.25 times.

Table 5.18: Average real wage by three-digit level and ownership in the accommodation and food service industry

VSIC code	Three-digit industry	Average real wage (FDI firms)	Average real wage (Domestic firms)	Average real wage (All firms)
I551	Short-term accommodation	53.6834	18.1556	18.7151
I559	Other accommodation	N.A.	24.1005	24.1005

I561	Restaurants and mobile food services	26.0139	18.9142	19.0314
I562	Event catering	33.3975	21.4494	21.6097
I563	Beverage serving activities	36.0214	17.2545	17.2805
	Industry average	**41.7492**	**18.5724**	**18.9345**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Table 5.19 shows the real wage differences between domestic and FDI firms across regions. Among FDI firms, the highest paying region is Southeast (including Ho Chi Minh City – the economic centre), and the lowest one is the Northern Midland and Mountain. Meanwhile, domestic firms pay the highest and lowest in Red River Delta (including Hanoi – the capital city) and Mekong River Delta, respectively. Generally, FDI firms pay much higher than domestic counterparts, regardless of geographical locations. Nevertheless, the foreign-domestic pay gaps are more substantial compared to those across three-digit industries. The smallest gap is found in the Northern area where FDI firms pay approximately 1.5 times higher than domestic firms.

Table 5.19: Average real wage by region and ownership in the accommodation and food service industry

No.	Region	Average real wage (FDI firms)	Average real wage (Domestic firms)	Average real wage (All firms)
1	Red River Delta	41.1582	20.8046	21.5386
2	Northern Midland & Mountain	26.7577	17.9042	18.0468
3	Central Coast	29.4456	16.5769	16.7448
4	Central Highlands	29.5450	17.6969	17.7525
5	Southeast	53.3053	19.1587	19.4809
6	Mekong River Delta	46.2324	15.6672	15.7769
	Regional average	**41.7492**	**18.5724**	**18.9345**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

The descriptive statistics of the main variables for the empirical study of the accommodation and food service industry is reported in the appendices (Table A5.6). As

observed in the data for the entire sector and the financial, banking and insurance industry, the statistics of this low-wage industry shows heterogeneous characteristics of firms across explanatory variables. Furthermore, private ownership in this industry accounts for 98.6 per cent of all domestic firms, which is rather close to the sector average (98.87 per cent). Notably, FDI firms constitute 13.34 per cent of employment in the industry-region. This average employment share is more than four times that of the whole sector (3.15 per cent), suggesting more considerable importance of FDI to the accommodation and food service industry. The maximum employment share of FDI firms is 38.01 per cent, and the minimum share is zero, implying no FDI presence.

5.4.2 Estimation results and analyses

Table 5.20 reports the estimation results for FDI impact on domestic firms' average wages in the accommodation and food service industry. The estimation reveals the existence of negative wage spillovers from FDI to domestic firms in this low-wage service industry. While FDI firms pay much higher across three-digit industries and regions, they put downward pressure on average wages of domestic counterparts. The coefficient of foreign presence (*FDI*) is negative and statistically significant at one per cent level. Specifically, a one per cent increase in FDI presence will lower domestic firms' average wages by 2.03 per cent. This finding is in contrast to those for the entire services sector (Section 5.2.2) and the financial, banking and insurance industry (Section 5.3.3), which both exhibit positive wage spillovers from FDI firms. The negative spillover outcome is also interesting since previous studies mostly suggest the opposite evidence.

Table 5.20: Estimation results – Wage spillovers for the accommodation and food service industry

Variable	Estimated Coefficient	Robust Standard Error	p-value
Foreign presence (FDI_{kjt})	-2.0339	0.3840	0.0000
Firm size ($lnSize_{ikjt}$)	0.1304	0.0054	0.0000
Ownership structure (Own_{ikjt})	-0.0090	0.0501	0.8580
Firm age ($lnAge_{ikjt}$)	0.0232	0.0089	0.0090
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0365	0.0036	0.0000
Technology gap ($TechGap_{ikjt}$)	-0.0001	0.0000	0.0000
Competition ($Herfindahl_{kjt}$)	-1.4675	0.3117	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*665.8570 (0.0000)*		
Over-identification test (Hansen J statistic)	*0.0040 (0.9524)*		
Endogeneity test (C-statistic)	*21.4290 (0.0042)*		
Model significance test (F-statstic)	*101.9400 (0.0000)*		
No. of obs	*20,715*		

Notes: p-values for the tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

In fact, as shown in the theoretical model in Section 4.2.1 (Chapter 4), it is possible that the impact of FDI firms is negative, as foreign presence generates two contrasting effects on the expected average wage. On the one hand, FDI affects domestic firms via productivity spillovers (a direct channel), and on the other hand, it creates an indirect impact via the cut-off capability (an indirect channel). If FDI generates positive productivity spillovers (namely the direct channel being positive), which tends to increase firms' average wages due to increase in the marginal product of labour, it lowers the cut-off capability. Subsequently, firms that

previously cannot survive will now enter the industry, which lowers firms' expected average wages. Similarly, if there are negative productivity spillovers that lower firms' average wages, the cut-off capability will be raised and expected firm average wages will be increased. The significantly negative estimate in Table 5.20 occurs as one channel dominates the other.

Similar to the analyses in Sections 5.2.2 and 5.3.3, conventional diagnostic procedure is conducted to examine the reliability of the econometric model, estimation approach and findings. The reported *F*-statistic and *C*-statistic confirm the overall model significance and the existence of endogeneity problem. Additionally, the *Kleibergen-Paap rk LM* test statistic and Hansen *J* statistic indicate the relevance and validity of the constructed instruments (i.e., foreign employment share in the leather and related products manufacturing and in the computer, electronic and optical products manufacturing at time *t* in region *j* non-neighbouring to domestic accommodation and food service firms). Finally, based on diagnostic results (Tables A5.7 and A5.8 in the Appendices), it is unlikely that serious multicollinearity problem occurs, which, otherwise, will result in misleading estimates for the adopted model.

Table 5.20 also indicates that most control variables have considerable influence on domestic firms' average wages in the examined industry. Compared to the estimation for the overall sector, the signs of the estimated coefficients are relatively consistent whereas the magnitude varies significantly, implying the importance of firm-level characteristics to this specific industry. For example, firm size (*lnSize*) also has a positive but more important impact as a one per cent increase in this variable leads to a 0.13 per cent increase in average wages, of which the magnitude is nearly twice that of the average sector (0.07 per cent). Nonetheless, firm age (*lnAge*) and capital intensity (*lnK_intensity)* exert positive but slightly less important influence on local wages in this industry, having their respective coefficients smaller than those of the overall sector. Furthermore, ownership structure (*Own*) appears unimportant in

explaining wage differentials among domestic firms in the accommodation and food service industry while this factor is crucial at sectoral analysis.

5.4.3 Heterogeneity of FDI impact on domestic firms' wages

The negative wage spillovers from FDI firms to local counterparts in the low-wage accommodation and food service industry is contrary to the positive effect of the overall sector result. This warrants further investigation. Thus, the empirical model is then estimated for subgroups of domestic firms to examine whether all domestic firms in this low-wage industry are negatively impacted to the same extent or FDI-linked spillovers are heterogeneous and conditional upon specific characteristics of domestic and FDI firms. Arguably, domestic firms with different features will respond differently to the presence of FDI and different types of FDI can generate various impact on local counterparts (Hoi & Pomfret, 2010; D. T. H. Nguyen & Sun, 2012; Smeets, 2008). Therefore, extended analyses of firm heterogeneity can provide deeper insights into the FDI impact on domestic firms' average wages.

5.4.3.1 Privately-owned versus state-owned firms

Table 5.21 provides the estimation results by domestic firms' ownership, indicating substantial wage spillovers to privately-owned firms. Meanwhile, state-owned firms' average wages appear not to be affected by FDI firms. This finding can be attributed to the rigid wage setting of state-owned firms in Vietnam, which may reduce flexibility in wage adjustment. Furthermore, state-owned firms account for less than one per cent and about 10 per cent of total firm number and total employment in the examined industry, respectively. This modest presence together with less flexible compensation mechanism makes state-owned firms, on average, less likely to face fierce competition from FDI counterparts, causing insignificant variation in their average wages.

Table 5.21: FDI wage spillovers by ownership structure of domestic firms

Variable	Privately-owned firms		State-owned firms	
	Estimated coefficient	Robust standard error	Estimated coefficient	Robust standard error
Foreign presence (FDI_{kjt})	-2.0791***	0.3878	-3.7271	2.4269
Firm size ($lnSize_{ikjt}$)	0.1301***	0.0055	0.0214	0.0429
Firm age ($lnAge_{ikjt}$)	0.0232**	0.0091	-0.0449	0.0442
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0363***	0.0037	0.0180	0.0243
Technology gap ($TechGap_{ikjt}$)	-0.0001***	0.0000	-0.0011***	0.0003
Competition ($Herfindahl_{kjt}$)	-1.5482***	0.3165	-0.0262	2.3844
Regional dummies ($dRegion_j$)	Yes		Yes	
Industry dummies ($dIndustry_k$)	Yes		Yes	
Year dummies ($dTime_t$)	Yes		Yes	
Kleibergen-Paap rk LM statistic	*656.3360****		*27.178****	
Hansen J statistic	*0.0820*		*0.0240*	
C-statistic	*22.1600****		*0.9660*	
F-statistic	*105.4900****		*5.700****	
No. of obs	*20,251*		*426*	

*Notes: *** and ** denote one and five per cent levels of significance, respectively; the estimations accounted for firm-fixed effects.*

5.4.3.2 Small versus large firms

As shown in Table 5.22, both small and large firms' average wages experience negative wage spillovers from FDI, with a more pronounced effect for the former. Domestic firms of small scale are less likely to benefit from FDI-linked productivity spillovers and compete with higher-paying FDI firms (and large domestic firms alike) for competent workers in the local labour market (Pittiglio et al., 2015; Sjöholm & Lipsey, 2006; Villarreal & Sakamoto, 2011). Hence, this group is more likely to be left with less skilled and lower paid workforce given increased FDI presence. The sample reveals that small domestic firms are the lowest paying firms, with the average wage being only 38 per cent of FDI firms, and 73 per cent of large domestic firms.

Table 5.22: FDI wage spillovers by size of domestic firms

Variable	Small firms		Large firms	
	Estimated coefficient	**Robust standard error**	**Estimated coefficient**	**Robust standard error**
Foreign presence (FDI_{kjt})	-3.4280***	1.1357	-1.3101***	0.3916
Ownership structure (Own_{ikjt})	-0.3851	0.2428	-0.0547	0.0553
Firm age ($lnAge_{ikjt}$)	0.0416***	0.0145	0.0273**	0.0125
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0101*	0.0060	0.0509***	0.0053
Technology gap ($TechGap_{ikjt}$)	-0.0039***	0.0003	-0.0002***	0.0000
Competition ($Herfindahl_{kjt}$)	-0.8820	0.9381	-0.8017**	0.3810
Regional dummies ($dRegion_j$)	Yes		Yes	
Industry dummies ($dIndustry_k$)	Yes		Yes	
Year dummies ($dTime_t$)	Yes		Yes	
Kleibergen-Paap rk LM statistic	*243.1580****		*375.0010****	
Hansen J statistic	*0.1190*		*2.1980*	
C-statistic	*4.6450***		*10.1940****	
F-statistic	*43.8300****		*39.2700****	
No. of obs	*8,492*		*10,313*	

*Notes: (i) A small firm has the size of less than or equal to the sample mean; (ii) A large firm has the size greater than the sample mean; (iii) ***, ** and *denote one, five and ten per cent levels of significance, respectively; (iv) the estimations accounted for firm-fixed effects..*

5.4.3.3 Young versus old firms

The estimations by market experience of domestic firms are presented in Table 5.23. While FDI presence exerts negative and significant influence on wages of both groups, the effects are more profound for newly established firms. Young firms tend to be more exposed to external forces, including the entry of foreign affiliates in the host labour market. They might be less able to compete with FDI firms (and well-established domestic firms) to attract and build up a productive workforce via high wages. Besides, the data suggest that on average, young domestic firms pay about 10 per cent and 57 per cent less than old domestic and FDI firms, respectively. These factors might explain stronger negative spillovers from FDI to young domestic firms.

Table 5.23: FDI wage spillovers by age of domestic firms

Variable	Young firms		Old firms	
	Estimated coefficient	**Robust standard error**	**Estimated coefficient**	**Robust standard error**
Foreign presence (FDI_{kjt})	-3.3704***	0.9277	-1.3748**	0.5483
Firm size ($lnSize_{ikjt}$)	0.1285***	0.0106	0.1265***	0.0070
Ownership structure (Own_{ikjt})	0.1206	0.1818	-0.0454	0.0551
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0369***	0.0068	0.0340***	0.0050
Technology gap ($TechGap_{ikjt}$)	-0.0002***	0.0001	-0.0002***	0.0000
Competition ($Herfindahl_{kjt}$)	-0.6093	0.8251	-1.1590***	0.3909
Regional dummies ($dRegion_j$)	Yes		Yes	
Industry dummies ($dIndustry_k$)	Yes		Yes	
Year dummies ($dTime_t$)	Yes		Yes	
Kleibergen-Paap rk LM statistic	*147.7190****		*281.2820****	
Hansen J statistic	*0.3580*		*0.2920*	
C-statistic	*10.1290****		*4.6490***	
F-statistic	*33.8300****		*54.0100****	
No. of obs	*7,213*		*10,728*	

*Notes: (i) A young firm has the age of less than or equal to the sample mean; (ii) An old firm has the age greater than the sample mean; (iii) *** and ** denote one and five per cent levels of significance, respectively; (iv) the estimations accounted for firm-fixed effects.*

5.4.3.4 Wholly foreign-owned versus partially foreign-owned firms

Table 5.24 reveals the empirical findings across two main types of FDI, namely wholly foreign-owned and partially foreign-owned firms (or joint ventures with local partners). The estimations suggest that only wholly foreign-owned firms can generate significant influence on domestic counterparts' average wages. Whereas, there is no evidence of such spillover effects from partially foreign-owned firms in the examined industry. Compared to joint ventures, firms with full foreign equity might possess greater ownership advantages (including superior management, marketing and hiring practices) extensively transferred from their parent companies, enabling them to compete and exert stronger impact on the host labour market. While this finding provides preliminary insights, more in-depth analysis is

warranted to better understand the role of heterogeneous FDI in determining the extent of wage spillovers.

Table 5.24: FDI wage spillovers by type of foreign firms

Variable	Wholly foreign-owned firms		Partially foreign-owned firms	
	Estimated coefficient	Robust standard error	Estimated coefficient	Robust standard error
Foreign presence (FDI_{kjt})	-2.7831***	0.6424	0.1717	0.1198
Firm size ($lnSize_{ikjt}$)	0.1302***	0.0061	0.1323***	0.0054
Ownership structure (Own_{ikjt})	-0.0330	0.0567	-0.0154	0.0486
Firm age ($lnAge_{ikjt}$)	0.0083	0.0106	0.0253***	0.0089
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0367***	0.0041	0.0390***	0.0036
Technology gap ($TechGap_{ikjt}$)	-0.0002***	0.0001	-0.0001***	0.0000
Competition ($Herfindahl_{kjt}$)	-0.9899***	0.3620	-1.4546***	0.3168
Regional dummies ($dRegion_j$)	Yes		Yes	
Industry dummies ($dIndustry_k$)	Yes		Yes	
Year dummies ($dTime_t$)	Yes		Yes	
Kleibergen-Paap rk LM statistic	*69.3310****		*751.3710****	
Hansen J statistic	*2.2660*		*26.9070****	
C-statistic	*26.3020****		*2.9820*	
F-statistic	*86.1900****		*101.3400****	
No. of obs	*20,715*		*20,715*	

*Notes: *** and ** denote one and five per cent levels of significance, respectively; the estimations accounted for firm-fixed effects.*

5.5 Summary

This chapter reports empirical findings and relevant analyses for wage spillovers from FDI firms to domestic counterparts in Vietnam's services sector. Data of the whole sector indicate that domestic privately-owned firms account for dominant presence in all two-digit industries, ranging from 78 per cent to 99 per cent. While FDI firms are present in all 15 service industries, their relative importance varies substantially. The regional distribution shows that Southeast (including the economic hub of Ho Chi Minh City) is largest region

for both domestic and FDI firms. Notably, FDI firms pay much higher than domestic counterparts in all two-digit industries with an average wage premium of 3.4 times (foreign-domestic private firms) and 1.86 times (foreign-domestic state firms).

The estimation results confirm the existence of positive wage spillovers from FDI firms to domestic firms in the whole services sector in Vietnam. A one per cent increase in foreign presence in the industry-region will induce domestic firms to raise average wages by 1.15 per cent. Furthermore, the findings also suggest that larger, state-owned, more capital intensive, well-established domestic firms tend to pay higher wages. Increased competitive pressure appears to put upward pressure on local wages. Two-digit industries, notably in the services sector, are heterogeneous in a wide array of aspects, including average wage level. The graphical overview and econometric results suggest differences in FDI-linked wage spillovers by industry wage level. While positive wage spillovers are found for domestic firms operating in high-wage service industries, a negative estimate is found for the low-wage group.

Further insights are provided for a high-wage industry (i.e., financial, banking and insurance) and a low-wage industry (i.e., accommodation and food service). The estimation indicates the existence of positive wage spillovers in the former industry with a one per cent increase in foreign presence resulting in the average wages of domestic firms to rise by 4.65 per cent. Compared to the estimation for the whole sector, the magnitude of wage spillovers in this high-wage industry is more profound. There are negative spillovers in the low-wage industry, implying the dominance of the negative channel over the positive one. Additional analyses on this industry reveal that wage spillover effect is only for private firms but not for state-owned ones. Besides, small and newly-established domestic firms encounter more pronounced negative wage spillovers from FDI. Finally, FDI typologies also play an important role as fully foreign-owned firms are the key players in affecting local firms' wages whereas joint ventures show insignificant impact.

Chapter 6: FDI Impact on Domestic Firms' Female Employment – Empirical Results and Analyses

6.1 Introduction

This chapter reports the estimation results and related analyses on the impact of FDI on domestic firms' female employment, using comprehensive panel data of firms in Vietnam's services sector. Section 6.2 presents findings for the whole sector. It first provides descriptive statistics of the data at the sectoral level that are related to female employment, including average female-to-male labour ratio by two-digit industry and ownership, average female-to-male labour ratio by region and ownership, and summary statistics of key variables. Next, this section reports the empirical results and analyses, which consist of diagnostic testing, the existence of FDI-linked spillovers and other determinants of domestic firms' female employment for the whole sector. Besides, Section 6.2 presents differences of the FDI impacts between female-intensive and male-intensive service industries, suggesting further analyses based on female intensity level.

Sections 6.3 and 6.4 extend the evidence on FDI-induced spillovers on local gendered employment from a female-intensive and a male-intensive service industry. The former is the education industry and the latter is the professional, scientific and technical service industry. This section then presents key findings on the FDI impact and other determinants of domestic firms' female employment, including comparison with the overall sector findings. Extended analyses are carried out to further examine the heterogeneity of FDI impact on domestic firms' female employment. Finally, Section 6.5 summarises this chapter.

6.2 FDI impact on domestic firms' female employment: Evidence from the whole sector

6.2.1 Data description

6.2.1.1 Female employment by two-digit industry and ownership

Table 6.1 presents the average female-to-male labour ratio by ownership across 15 two-digit industries in the services sector. The calculated ratios vary markedly across activities and types of ownership structure, indicating heterogeneous gender mixture in the sample. Among the domestic firms, the top three male-dominant industries include electricity, gas, steam and air conditioning supply (D35); construction (F41-43); and transportation and storage (H49-53), having on average six to eight male workers in every 10 workers. Among foreign firms, activities classified in Sections D and F are also the top two male-intensive industries and the third one is information and communication (J58-63).

On the contrary, some service industries are more female dominant. Among domestic firms, the top three female-intensive industries are education (P85); human health and social work activities (Q86-88); and accommodation and food service activities (I55-56). On average in these industries, the share of women approximately doubles that of men in the total labour force. Furthermore, privately-owned firms tend to hire more women than state-owned counterparts in the sector. Among FDI firms, activities classified in Sections P and Q also employ largest proportions of female workers while the other industry in the top three is financial and insurance activities (K64-66), having the share of women about twice and three times larger than the share of men in the workforce.

Notably, the data in Table 6.1 show much higher female-to-male labour ratios by FDI firms, as compared to domestic firms in almost all two-digit service industries, except accommodation and food service (I55-56). At the industry average, the female-to-male labour ratio in foreign firms is more than 1.4 times that of domestic counterparts. The substantial differences between foreign and domestic firms exist in professional, scientific

and technical activities (M69-75) and transportation and storage (H49-53), of which the ratios are 2.04 and 2.4 times higher for FDI firms, respectively.

Table 6.1: Female employment by two-digit industry and ownership in the whole sector

VSIC Code	Two-digit service industry	Average female-to-male labour ratio			
		State-owned	Privately-owned	All domestic firms	FDI firms
D35	Electricity, gas, steam and air conditioning supply	0.222	0.203	0.205	0.255
E36-39	Water supply, sewerage, waste management and remediation activities	0.721	0.937	0.889	1.051
F41-43	Construction	0.252	0.301	0.300	0.511
G45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles	0.834	0.748	0.749	1.236
H49-53	Transportation and storage	0.366	0.461	0.459	1.115
I55-56	Accommodation and food service activities	1.544	1.664	1.662	1.467
J58-63	Information and communication	0.830	0.760	0.762	0.792
K64-66	Financial and insurance activities	1.123	1.015	1.019	1.826
L68	Real estate activities	0.526	0.776	0.770	0.944
M69-75	Professional, scientific and technical activities	0.399	0.644	0.642	1.310
N77-82	Administrative and support service activities	1.617	1.023	1.030	1.434
P85	Education	1.377	2.027	2.025	2.948
Q86-88	Human health and social work activities	2.186	1.775	1.776	3.163
R90-93	Arts, entertainment and recreation	0.996	0.997	0.997	1.266
S94-96	Other service activities	0.722	1.408	1.405	1.423
	Industry average	**0.914**	**0.983**	**0.979**	**1.383**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

6.2.1.2 Female employment by region and ownership

Table 6.2 reports the average female-to-male labour ratio by ownership and region for firms in the entire services sector. Compared to the industry average, the regional data indicate a rather different pattern regarding the gender workforce composition among types of ownership. In particular, in all regions, both domestic privately-owned and state-owned firms are overwhelmingly male dominant in their employment. None of the six regions has an equal or greater share of female relative to male workers. Of these, domestic firms of both ownership types employ the smallest proportion of women in Mekong River Delta. State-owned firms have the highest share of women in Northern Midland and Mountain (0.88) whereas it is Red River Delta among privately-owned counterparts (0.74).

Table 6.2: Female employment by region and ownership in the whole sector

Region	Average female-to-male labour ratio			
	State-owned	Privately-owned	All domestic firms	FDI firms
Red River Delta	0.703	0.741	0.740	1.122
Northern Midland and Mountain	0.877	0.653	0.657	1.418
Central Coast	0.645	0.730	0.728	1.194
Central Highlands	0.686	0.674	0.674	1.094
Southeast	0.657	0.711	0.711	1.232
Mekong River Delta	0.477	0.589	0.588	0.843
Regional average	**0.674**	**0.683**	**0.683**	**1.151**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

In contrast, FDI firms show consistently higher female intensity across six regions. Except the least female-intensive location of Mekong River Delta, foreign firms employ the share of women greater than that of men in their workforce across other five regions. Notably, Northern Midland and Mountain is the most female-dominant region among FDI firms in the services sector, having the highest female-to-male ratio of 1.42. Finally, similar to industry pattern, FDI firms consistently demonstrate higher female intensity in their

workforce than domestic counterparts across regions. The differences between the two groups of firms range from 1.43 times (in Mekong River Delta) to 2.16 times (in Northern Midland and Mountain). On regional average, the female-to-male labour ratio by FDI firms (1.15) is slightly smaller than that of the industry average (1.38) but the foreign-domestic gap is larger at 1.7 times (as compared to 1.4 times on industry average).

6.2.1.3 Summary statistics – Female employment estimation for the whole sector

Table 6.3 presents the summary statistics of key variables in the econometric model specified in Equation 4.3.13 (Section 4.3, Chapter 4) for the empirical study of the entire services sector. Overall, the data suggest significant heterogeneity for the continuous variables. Furthermore, the mean of ownership structure (a dummy variable) indicates that domestic privately-owned firms account for the dominant proportion of 98.87 per cent. For the key variable of interest, foreign presence, it shows that FDI firms comprise more than 3.15 per cent of total employment in the industry-region. The minimum employment share of FDI firms is zero, implying no FDI in a specific two-digit service industry *k* in region *j* (for example, in water supply, sewerage, waste management and remediation industry in Central Coast). Whereas, foreign firms contribute the highest employment share of 53.42 per cent in arts, entertainment and recreation industry in Northern Midland and Mountain.

Table 6.3: Summary statistics – Female employment estimation for the whole sector

Variable	Obs	Mean	Std. Dev.	Min	Max
Female-to-male labour ratio (*lnFMR*)	847,122	-0.6724	0.8611	-6.4036	6.0379
Foreign presence (*FDI*)	915,844	0.0315	0.0482	0.0000	0.5342
Firm size (*lnSize*)	906,046	7.2360	2.2651	-2.7202	18.7037
Capital intensity (*lnK_intensity*)	778,390	3.8151	1.5313	-6.3042	13.4354

Ownership structure (*Own*)	906,403	0.9887	0.1057	0.0000	1.0000
Competition level (*Herfindahl*)	915,844	0.0106	0.0258	0.0009	0.1826
Gender wage gap (*lnWageGap*)	906,403	0.1471	0.0464	-0.0120	0.2584
Industry female intensity (*lnIndFemale*)	915,844	-1.8338	0.9355	-5.4486	-0.9427

6.2.2 Estimation results and analyses

6.2.2.1 Diagnostic testing

Similar to the analyses conducted to investigate FDI impact on domestic firms' wages (Chapter 5), standard diagnostic testings are performed to warrant the reliability of the model and estimation results for the FDI impact on domestic firms' female employment in the services sector. As a rule of thumb (Alin, 2010; Dormann et al., 2013; Fox, 1991; Morrow-Howell, 1994), multicollinearity considered problematic if the correlation matrix shows that absolute correlation coefficient between two variables is greater than 0.7 and/or the value of VIF for individual explanatory variable is greater than 10 (equivalently to SQRT VIF greater than 2.0 or tolerance less than 0.2). Hence, the figures reported in Table 6.4 on correlation matrix and Table 6.5 on collinearity measures suggest the absence of serious multicollinearity.

Table 6.4: Correlation matrix – Female employment estimation for the whole sector

	FDI	lnSize	lnK_intensity	Own	Herfindahl	lnWageGap	lnIndFemale
FDI	1						
lnSize	-0.1044	1					
lnK_intensity	-0.0287	0.0800	1				
Own	-0.0301	-0.1781	-0.0579	1			
Herfindahl	0.2912	-0.0881	-0.0299	-0.0477	1		
lnWageGap	0.0984	0.0658	-0.0060	-0.0042	0.0135	1	
lnIndFemale	-0.5203	0.2465	0.0052	0.0717	-0.4512	0.0256	1

Table 6.5: Collinearity measures – Female employment estimation for the whole sector

Regressor	Variance inflation factor (VIF)	Square root of the VIF (SQRT VIF)	Tolerance
FDI	1.40	1.18	0.7122
lnSize	1.12	1.06	0.8917
lnK_intensity	1.01	1.01	0.9895
Own	1.05	1.02	0.9519
Herfindahl	1.27	1.12	0.7904
lnWageGap	1.02	1.01	0.9786
lnIndFemale	1.69	1.30	0.5907

Table 6.6 shows the empirical results for FDI impact on domestic firms' female employment in the whole services sector. To determine the overall model significance, the reported *F*-statistic of 5335.15 with $p<0.01$ implies that the estimated coefficients are jointly significant at the one per cent level. More importantly, the *C*-statistic for the endogeneity test is 13.98 ($p<0.01$), which rejects the null hypothesis of absence of endogeneity at the one per cent level of significance. That is, the test result confirms that foreign presence (*FDI*) violates the exogeneity condition. Thus, the estimation for the services sector requires to the use of the IV-GMM estimator and appropriate excluded instrumental variables.

Table 6.6: Estimation results – Female employment model for the whole sector

Variable	Estimated Coefficient	Robust Standard Error	p-value
Foreign presence (*FDI*)	2.1756	0.4578	0.0000
Firm size (*lnSize*)	-0.0472	0.0006	0.0000
Capital intensity (*lnK_intensity*)	0.0156	0.0009	0.0000
Ownership structure (*Own*)	0.0504	0.0132	0.0000
Competition level (*Herfindahl*)	-0.6296	0.1254	0.0000
Gender wage gap (*lnWageGap*)	0.0311	0.1637	0.8490
Industry female intensity (*lnIndFemale*)	0.2115	0.0212	0.0000
Regional dummies (*dRegion*)	Included		

Industry dummies (*dIndustry*)	Included
Year dummies (*dTime*)	Included
Underidentification test (Kleibergen-Paap rk LM statistic)	*4229.9860 (0.0000)*
Overidentification test (Hansen J statistic)	*1.4980 (0.2210)*
Endogeneity test (C-statistic)	*13.9760 (0.0002)*
Model significance test (F-statstic)	*5335.1500 (0.0000)*
No. of obs	*847,122*

Notes: p-values for the tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

Based on the IVs construction procedure presented in Section 4.4.3 (Chapter 4), this empirical analysis utilises two instruments, namely the employment share of FDI firms in the beverage manufacturing industry in region *j* at time *t* (i.e., IV1), and the employment share of FDI firms in the furniture manufacturing industry in region *j* at time *t* (i.e., IV2). Notably, region *j* is not a neighbouring region where domestic service firms are located. Next, the underidentification and overidentification tests are conducted to examine the relevance and validity of these constructed instruments.

As shown in Table 6.6, the *Kleibergen-Paap rk LM* statistic (for underidentification test) of 4229.99 ($p<0.01$) suggests that the null hypothesis (i.e., excluded instruments are irrelevant) can be rejected at one per cent level. Additionally, the reported *Hansen J* statistic for the overidentification test is 2.66 ($p>0.1$), implying a failure to reject the null hypothesis (i.e., selected instruments are valid). Overall, the test results affirm the appropriateness of the model and estimation method, including the relevance and validity of the instruments for the dataset of the entire services sector.

6.2.2.2 Evidence of FDI impact on domestic firms' female employment in the whole sector

The estimation results in Table 6.6 indicate that the presence of FDI firms (*FDI*) exerts a positive and significant impact on domestic firms' female employment in Vietnam's services sector. As such, foreign firms not only hire greater proportions of female workers across 15 two-digit service industries and six regions, they also induce domestic counterparts in the sector to employ more women in the labour force. Specifically, a one per cent increase in foreign presence leads to a 2.18 per cent increase in the average female-to-male labour ratios of domestic service firms. In other words, a one per cent increase in foreign presence is associated with 0.54 per cent increase in the share of female labour in the domestic firms' total workforce.

The theoretical modelling in Chapter 4 (Section 4.3.1) demonstrates that the net impact of foreign presence depends on the relative strength of the two contrasting channels through which FDI firms influence domestic firms' female employment. The coefficient estimate in the estimation captures the net impact of FDI, and as such a positive coefficient estimate arises if the positive channel dominates the negative channel. For example, if FDI firms exert a positive impact, the direct channel (i.e., asymmetric spillovers) dominates the indirect one (i.e., cut-off effect), putting an upward pressure on the conditional expectation of domestic firms' female employment. Intuitively, local firms tend to hire more females relative to males as they realise beneficial spillovers from foreign firms to enhance productivity of female workers in the services sector.

6.2.2.3 Other determinants of domestic firms' female employment in the whole sector

The reported results in Table 6.6 also suggest that firm-specific characteristics play a crucial role in determining domestic firms' female employment. Of these, firm size *(lnSize)* shows a statistically significant and negative impact, with a one per cent increase in the size of domestic firms being associated with a nearly 0.05 per cent decrease in their female-to-

male labour ratios. This result is consistent with previous literature suggesting that larger firms tend to be more male-intensive in their workforce composition. Compared to small and medium firms, large firms have better resources to attract and retain high-skilled and high-paid workers who are more likely to be male in many developing countries (Arai, 2003a; Bridges, 1980; Ozler, 2000).

On the contrary, the estimation results indicate that the more capital-intensive domestic firms are, the more female-intensive they are. The estimated coefficient of the variable *lnK_intensity* suggests that a one per cent increase in the capital intensity of domestic firms is associated with their female-to-male ratios that are a 0.02 per cent higher. This finding contrasts with those of previous empirical works, asserting that higher capital intensity, as a proxy of technological upgrading, could depress female employment (Caraway, 2007; Kucera & Tejani, 2014; Ozler, 2000; Seguino, 2005; Tejani & Milberg, 2016). Nevertheless, the negative correlation is mostly found in manufacturing industries, evidence for service industries is scarce. In fact, service employers might prefer to hire female because of their advantageous skills or traits (e.g., communication skills, patience, empathy, and attention to details) that are crucial to service jobs (Belt, Richardson, & Webster, 2002; Bridges, 1980).

The estimation also reveals the impact of firms' ownership structure (*Own*) on their female employment. Notably, domestic privately-owned firms tend to employ more females than state-owned counterparts with the difference in female-to-male labour ratio being 0.05 per cent. Hence, while the state sector is presumably more favourable for women to work (Hewlett & Rashid, 2010; Ibrahim, 1989), they may experience greater disadvantages than male fellows in entering this sector. As asserted by Çağatay and Berik (1990), the nature of patron-client relationships in job allocations is likely to dampen labour regulation enforcement, and sector downsizing might also disadvantage women in state firms. In fact, the

sample description in the previous subsections shows that in the services sector, privately-owned firms have a higher female-to-male labour ratio than state-owned firms.

Furthermore, Table 6.6 indicates the role of industry-specific characteristics. Notably, competition level (*Herfindahl*) and industry female intensity (*lnIndFemale*) are significant determinants of female employment by domestic firms in the services sector. Accordingly, one per cent increase in the competition level (i.e., a one per cent decrease in Herfindahl index) and industry female intensity causes domestic firms to raise the female-to-male-ratio by 0.63 per cent and 0.21 per cent, respectively. Finally, while the estimated coefficient of gender wage gap variable (*lnWageGap*) is positive, it is statistically insignificant, which suggests negligible impact of this factor on female-to-male labour ratios by domestic firms in the services sector.

6.2.3 Female-intensive versus male-intensive industries

As observed in the sample description (Section 6.2.1), average female-to-male labour ratios by both domestic and foreign firms vary substantially across 15 two-digit industries of the services sector. Figures 6.1 and 6.2 present the scatterplots of the sector dataset for two groups of service industries by their female intensity level, which enables one to first graphically examine the different FDI impacts. The graphs show dissimilar patterns of FDI-induced spillovers on female employment, displaying an insignificant impact in the female-intensive group while exhibiting a positive impact in the male-intensive group. Thus, it is of analytical and policy interest to conduct additional empirical investigation on this respect so as to shed light on potential distinctions in the FDI impact on domestic firms' female employment.

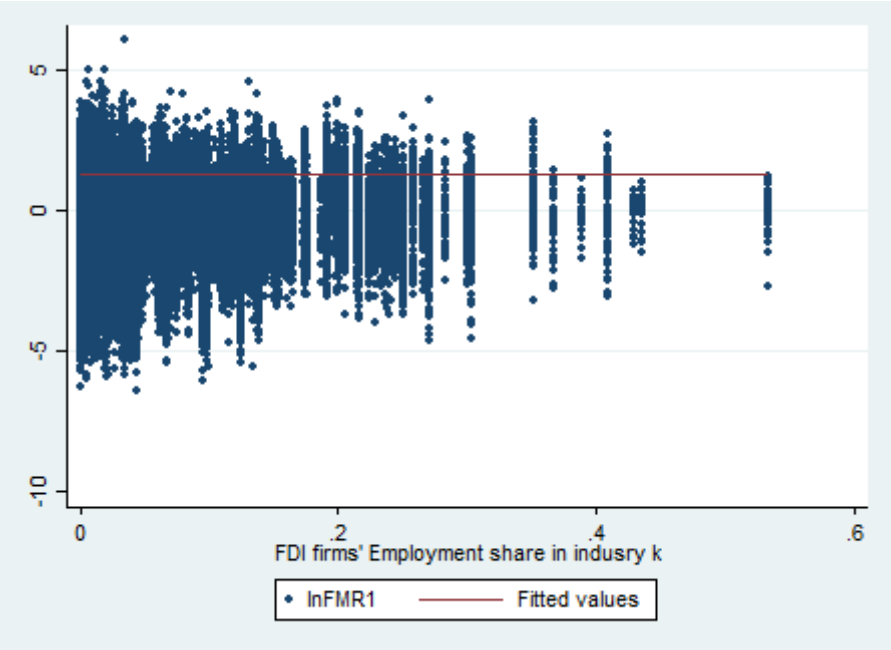

Figure 6.1: Scatterplot of foreign presence and domestic firms' female-to-male labour ratio in female-intensive service industries

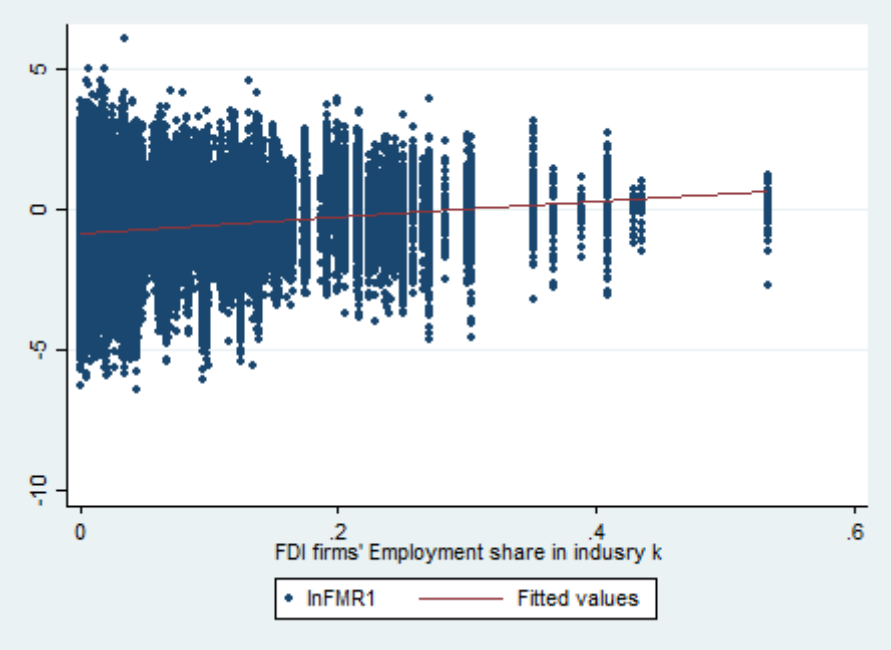

Figure 6.2: Scatterplot of foreign presence and domestic firms' female-to-male labour ratio in male-intensive service industries

Accordingly, the sample of the whole services sector is divided into two subsets of two-digit industries. Of these, female-intensive group has the average female-to-male labour ratio greater than sample mean for all domestic firms. Male-intensive group has average female-

to-male labour ratio equal or less than sample mean. The list of two-digit service industries by female intensity level is presented in Table 6.7. The female-intensive group includes nine industries whereas the male-intensive group consists of seven industries.

Table 6.7: List of two-digit industries by female intensity level in the services sector

VSCI Code	**Female-intensive group**
E36-39	Water supply, sewerage, waste management and remediation activities
I55-56	Accommodation and food service activities
K64-66	Financial and insurance activities
L68	Real estate activities
N77-82	Administrative and support service activities
P85	Education
Q86-88	Human health and social work activities
R90-93	Arts, entertainment and recreation
S94-96	Other service activities
VSCI Code	**Male-intensive group**
D35	Electricity, gas, stream and air conditioning supply
F41-43	Construction
G45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H49-53	Transportation and storage
J58-63	Information and communication
L68	Real estate activities
M69-75	Professional, scientific and technical activities

Table 6.8 reports the estimations for two subsets of the data to explore heterogeneous impacts of foreign entry on local firms' gender workforce composition. Notably, the econometric results reinforce the patterns observed in Figures 6.1 and 6.2. For female-intensive industries, the estimated coefficient of foreign presence variable (FDI_{kjt}) is statistically insignificant, indicating negligible influence of foreign entry on this group of domestic firms. For male-intensive industries, however, FDI firms are found to exert a positive and statistically significant effect with a one percent increase in foreign entry

causing domestic firms in this group to raise their female/male employment by 3.13 percent (or equivalent to a 0.769 percent increase in the share of women in total workforce).

Table 6.8: Estimation results: Female-intensive versus male-intensive service industries

	Female-intensive service industries			Male-intensive service industries		
Variable	**Estimated coefficient**	**Robust standard error**	**p-value**	**Estimated coefficient**	**Robust standard error**	**p-value**
Foreign presence (FDI_{kjt})	0.5382	0.4490	0.2310	3.1251	0.5157	0.0000
Firm size ($lnSize_{ikjt}$)	-0.0178	0.0006	0.0000	-0.0618	0.0006	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	-0.0334	0.0009	0.0000	0.0609	0.0009	0.0000
Ownership structure (Own_{ikjt})	0.0785	0.0149	0.0000	0.0143	0.0138	0.2980
Competition level ($Herfindahl_{kjt}$)	0.2532	0.1497	0.0910	-1.2935	0.1243	0.0000
Gender wage gap ($lnWageGap_{jt}$)	-0.0705	0.1799	0.6950	0.7536	0.1592	0.0000
Industry female intensity ($lnIndFemale_{kt}$)	-0.0322	0.0249	0.1960	0.2667	0.0199	0.0000
Regional dummies ($dRegion_j$)	Included			Included		
Industry dummies ($dIndustry_k$)	Included			Included		
Year dummies ($dTime_t$)	Included			Included		
LM statistic	*1322.5110 (0.0000)*			*3331.5260 (0.0000)*		
Hansen J statistic	*4.1540 (0.0415)*			*3.9590 (0.0466)*		
C-statistic	*0.7960 (0.3723)*			*45.5780 (0.0000)*		
F-statistic	*764.3300 (0.0000)*			*2067.0000 (0.0000)*		
No. of obs	*466,311*			*380,811*		

Notes: (i) Female-intensive group is defined to have average female-to-male labour ratio greater than sample mean, and male-intensive group has average ratio equal or less than sample mean;
(ii) p-values for tests statistics are in parentheses;
(iii) The estimations accounted form firm-fixed effects.

The above findings might be attributed to several factors. First, the potential of foreign entry in boosting the employment of women among the male-intensive group is greater than that among the female-intensive one. In other words, female labour is more likely to be under-utilised and/or discriminated in the male-intensive group in which foreign firms with

female-friendly hiring practices and experience in efficiently utilising female workforce can play a more prominent role in promoting job prospect for women among local firms in these industries. Second, the increased entry of FDI firms might push up competitive pressure and thereby driving domestic counterparts to hire a larger share of relatively cheaper female workers as a cost-effective strategy. Indeed, the expectations of positive impact of widening gender wage gap (*lnWageGap*) and rising competition (*Herfindahl*) on local firms' female employment are only valid in the male-intensive group as indicated by the estimated coefficients of these two variables in Table 6.8. Therefore, it is plausible that foreign entry can exert a more profound influence on domestic firms operating in male-intensive industries. These results suggest the need for further examination of FDI impact on female employment at the sub-sector level. Accordingly, Sections 6.3 and 6.4 present empirical findings for a female-intensive industry (i.e., education) and for a male-intensive industry (i.e., professional, technical and scientific services).[19]

6.3 FDI impact on domestic firms' female employment: Evidence from a female-intensive service industry

6.3.1 Data description: FDI and female employment in the education industry

Table 6.9 reports the average female-to-male labour ratio by ownership for six three-digit industries providing education services, which are all classified within VSIC Section P. While being the most female-intensive industry in the entire services sector, the education industry also shows considerable variations in female employment intensity across subgroup of activities and types of ownership structure. Differing from the sector data, this industry exhibits notably modest participation of state-owned firms as surveyed economic entities, being absent in three out of six industries (i.e., P852, P856, P856). In fact, unlike other services,

[19] The choices of industries for the sub-sector analyses are based on the data in Table 6.1. Accordingly, education is the most female-intensive industry in the sector while the professional, technical and scientific services industry is highly male-intensive and has the largest gap with the domestic firms in this regard.

education at different levels are generally provided by the government as public services, which are operated as non-profit entities and hence are not included in national enterprise surveys. Meanwhile, privately-owned education firms are present in all three-digit activities.

Table 6.9: Female employment by three-digit level and ownership in the education industry

VSIC Code	Three-digit education industry	Average female-to-male labour ratio			
		State-owned	Privately-owned	All domestic firms	FDI firms
P851	Pre-primary education	13	6.726	6.738	7.207
P852	Primary education	_____	5.055	5.055	2.587
P853	Secondary education	0.556	1.231	1.227	1.580
P854	Higher education	_____	1.405	1.405	2.266
P855	Other educational activities	1.377	1.778	1.776	2.286
P856	Educational support services	_____	1.798	1.798	3.147
Three-digit industry average		**4.978**	**2.999**	**3.000**	**3.179**
Sample average (industry-region)		**1.461**	**2.020**	**2.019**	**3.007**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Among domestic firms, both state and private ownership types largely exhibit high female-to-male labour ratios (being greater than one, except secondary education by state-owned firms). Of these, the top-three female-dominant industries comprise pre-primary education (P851); primary education (P852); and educational support services (P856). Particularly, the ratios are more substantial in the top two industries, having about seven women in every eight employees (P851) and five women in every six employees (P852). On average, the female-to-male labour ratio by domestic firms is higher across three-digit education industries (3.000) than that across industry-region (2.019).

Similarly, FDI firms operate in all six three-digit education industries employ women intensively in their workforce. The top three industries also include P851, P856 and P852. Furthermore, compared to domestic counterparts, foreign firms mostly show higher female-

to-male labour ratios, except primary education (P852). The foreign-domestic gaps are sizeable in educational support services (1.75 times) and higher education (1.61 times). On average, the female-to-male labour ratio by FDI firms remain close between those across three-digit industries and across industry-region, having about three women in every four workers. Whereas, the foreign-domestic gap is larger in the sample across industry-region (1.5 times).

Table 6.10 presents the average female-to-male labour ratio by ownership and region for firms in the education industry. Compared to the industry distribution, the regional distribution exhibits a less divergent pattern in female intensity among local firms. Domestic privately-owned firms employ women most intensively in Central Coast and least in Southeast. Meanwhile, state-owned counterparts have the highest female-to-male ratio in Northern Midland and Mountain and lowest in Central Coast. On regional average, domestic firms hire on average two women in every three workers, which is less intensive than that at industry region, resulting in the lower sample average across industry-region data.

Table 6.10: Female employment by region and ownership in the education industry

Region	Average female-to-male labour ratio			
	State-owned	**Privately-owned**	**All domestic firms**	**FDI firms**
Red River Delta	0.639	2.261	2.257	3.719
Northern Midland & Mountain	13.000	2.377	2.437	____
Central Coast	0.580	2.549	2.531	0.925
Central Highlands	____	1.579	1.579	____
Southeast	1.408	1.697	1.697	2.819
Mekong River Delta	____	2.268	2.268	____
Regional average	**3.907**	**2.122**	**2.128**	**2.487**
Sample average (industry-region)	**1.461**	**2.020**	**2.019**	**3.007**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

While FDI firms are present in all three-digit education services, they are concentrated in three out of six regions. Of these, Red River Delta is the most female-intensive region among foreign firms, having nearly four women in every five workers. Similarly, FDI firms also employ women intensively in Southeast, having about three women in every four workers. In contrast, Central Coast shows a more gender-equal ratio. Notably, FDI firms largely show higher female intensity in their workforce compared to domestic counterparts in the two main regions. The difference between the two groups of firms is approximately 1.7 times. This gap at the regional level is 1.2 times lower than that of the sample across industry-region (1.5 times).

6.3.2 Estimation results and analyses

Table 6.11 shows the estimation results for FDI impact on domestic firms' female employment in the education industry. Notably, it suggests that the presence of FDI firms does not have any significant impact on the female-to-male labour ratio of domestic counterparts in the education industry. The estimated coefficient of foreign presence variable (*FDI*) is negative and statistically insignificant. This finding is consistent with that of Section 6.2.3 for the group of female-intensive service industries. Education services, particularly at the pre-primary and primary levels, are largely characterised as highly feminised profession. The feminisation of the education industry is attributable to a complex range of historical and social factors, which tend to emphasise the greater perceived suitability of women for nurturing and teaching roles. Thus, given the female dominance in the examined industry, local firms appear less keen to learn and absorb extra spillovers from foreign counterparts to hire a bigger share of women in their workforce.

Table 6.11: Main estimation results – Female employment model for the education industry

Variable	Estimated coefficient	Robust standard error	p-value
Foreign presence (FDI_{kjt})	-3.8224	2.6354	0.1470
Firm size ($lnSize_{ikjt}$)	0.0051	0.0137	0.7090
Capital intensity ($lnK\_intensity_{ikjt}$)	-0.0605	0.0168	0.0000
Ownership structure (Own_{ikjt})	-0.0993	0.2615	0.7040
Competition level ($Herfindahl_{kjt}$)	-0.7460	0.5242	0.1550
Gender wage gap ($lnWageGap_{jt}$)	-3.2784	1.5631	0.0360
Industry female intensity ($lnIndFemale_{kt}$)	-0.4340	0.2876	0.1310
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*22.3990 (0.0000)*		
Overidentification test (Hansen J statistic)	*1.2350 (0.2665)*		
Endogeneity test (C-statistic)	*3.9020 (0.0482)*		
Model significance test (F-statstic)	*4.6200 (0.0000)*		
No. of obs	*7,163*		

Notes: p-values for tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

The *F*-statistic indicates that the estimated coefficients are jointly significant at the one per cent level. The reported *C*-statistic confirms the endogeneity problem associated with the key variable of foreign presence, which requires the use of the IV-GMM estimator. Moreover, the test statistic results confirm the appropriateness of the adopted instruments (foreign employment share in the fabricated metal product manufacturing and in the computer, electronic and optical products manufacturing at time *t* in region *j* non-neighbouring to

domestic education service firms). Finally, as reported Tables A6.2 and 6.3 in the Appendices, it is unlikely for serious multicollinearity to cause misleading results in this estimation.

Compared to the overall sector estimation results, Table 6.11 shows the influence of fewer control variables on female employment by domestic firms in the education industry. Of these, firm-specific characteristics seem less relevant in explaining the intensity of hiring women since only one firm-level variable, namely capital intensity (*K_intensity*), is statistically significant. A one per cent increase in capital intensity by domestic education firms causes them to lower female-to-male labour ratios by 0.06 per cent. Furthermore, gender wage gap ($lnWageGap_{jt}$) exerts a negative and statistically significant impact on firms' female employment, with a one per cent increase in the regional male-to-female pay gap resulting in a 3.28 per cent decrease in female-to-male labour ratios of domestic firms.[20]

While these findings are divergent from those of the average services sector, they might capture a different underlying preference among education service firms in gendered employment given their existing dominance of female workforce. In fact, as asserted by Seguino (2005) and Tejani and Milberg (2016), the more capital intensive firms become, the lower incentives they have to employ relatively cheaper female labour, given a smaller fraction of labour cost in total cost. In this case, substantial feminization among education service firms might appeal for a change in gendered workforce composition in favour of higher paid male workforce, which capital-intensive firms are more financially capable to realise.

[20] Note that due to data constraint, *lnWageGap* is measured by male-to-female wage gaps, which vary across regions and years. The negative effect of this variable might imply a growing demand for higher-skilled and high-paid males in this predominantly female-intensive industry given widening gender pay gap.

6.4 FDI impact on domestic firms' female employment: Evidence from a male-intensive service industry

6.4.1 Data description: FDI and female employment in the professional, scientific and technical service industry

Table 6.12 presents the average female employment by type of ownership in the three-digit industry that supplies professional, scientific and technical services. They consist of 13 activities categorised in VSIC Section M. The female-to-male labour ratios differ considerably across industries for both groups of domestic firms. State-owned firms are largely more male dominant, having the average share of women as half that of men in the total workforce. Notably, the top male-intensive industries among state-owned firms are head office services (M710) and specialised design activities (M741), having female share as one third that of male. While employing more women than state-owned counterparts, privately-owned firms remain largely male dominant, showing the average female-to-male labour ratio less than one in 10 out of 13 three-digit industries. The average domestic firms' female intensity in the examined industry is notably lower than that in the entire sector and particularly the education industry.

Table 6.12: Female employment by three-digit level and ownership in the professional, scientific and technical service industry

VSIC Code	Three-digit industry	Average female-to-male labour ratio			
		State-owned	Privately-owned	All domestic firms	FDI firms
M691	Legal services	_____	1.008	1.008	1.786
M692	Accounting, book keeping, auditing and tax consultancy services	1.007	1.542	1.540	3.632
M701	Head office services	0.275	0.823	0.793	1.750
M702	Management consultancy	0.707	0.947	0.946	1.691
M711	Architectural and engineering services	0.352	0.430	0.429	0.772
M712	Technical testing and analysis	0.316	0.551	0.542	1.937

M721	Research and experimental development on natural sciences and engineering	0.615	0.578	0.579	0.415
M722	Research and experimental development on social sciences and humanities	_____	0.831	0.831	_____
M731	Advertising	0.820	0.722	0.722	1.625
M732	Market research and public opinion polling	0.897	1.063	1.063	1.723
M741	Specialized design activities	0.299	0.568	0.568	1.576
M742	Photographic activities	_____	0.888	0.888	1.044
M749	Others	0.549	0.857	0.853	0.858
Three-digit industry average		**0.584**	**0.831**	**0.828**	**1.567**
Sample average (Industry-region)		**0.403**	**0.644**	**0.642**	**1.339**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Similar to the reported sector pattern, FDI firms hire female workforce more intensively than domestic firms in almost all three-digit industries that FDI is present. One exception is research and experimental development on natural sciences and engineering (M721), which show closely female-to-male labour ratios for both domestic and foreign firms. While being more male dominant in three industries (M711, M721, and M749), FDI firms employ notably overwhelming proportions of women in remaining industries. Compared to the entire sector and education industry, foreign-domestic differences in female employment in this industry are more substantial, notably in technical testing and analysis (M712) (3.6 times) and accounting, book keeping, auditing and tax consultancy services (M692) (2.4 times). The foreign-domestic gap is similar across three-digit industry average and industry-region average, showing the female-to-male labour ratio by FDI firms roughly twice that of domestic firms.

Table 6.13 reports the average female-to-male labour ratio by type of ownership across six regions for professional, scientific and technical service firms. Compared to the industry data, the regional data show greater male dominance among domestic firms, notably

privately-owned firms. The average female-to-male labour ratios are largely lower than one in all regions. Of these, all domestic firms employ men most intensively in Central Highland. In contrast, they employ men least intensively in Red River Delta (state-owned firms) and Northern Midland and Mountain (privately-owned firms). The average regional female intensity by domestic firms in this service industry is markedly lower than that in the education industry and the whole sector alike.

Table 6.13: Female employment by region and ownership in the professional, scientific and technical service industry

Region	Average female-to-male labour ratio			
	State-owned	**Privately-owned**	**All domestic firms**	**FDI firms**
Red River Delta	0.440	0.683	0.680	1.095
Northern Midland and Mountain	0.534	0.499	0.499	6.393
Central Coast	0.344	0.493	0.492	0.925
Central Highlands	0.230	0.441	0.439	_____
Southeast	0.296	0.680	0.679	1.510
Mekong River Delta	0.309	0.484	0.483	3.070
Regional average	**0.359**	**0.547**	**0.545**	**2.599**
Sample average (industry-region)	**0.403**	**0.644**	**0.642**	**1.339**

Source: Calculations based on Enterprise Surveys 2009-2013, GSO database

Compared to the education industry, FDI firms in the professional, scientific and technical service industry operate at larger geographical area as they are present in five out of six regions (except Central Highlands). While being relatively gender equal in employment in Central Coast, foreign firms are more female intensive in other regions, having female-to-male labour ratios greater than one. More importantly, foreign firms exhibit much higher female-to-male labour ratios than domestic counterparts across regions. The foreign-domestic gaps are most sizeable in Northern Midland and Mountain (12.8 times)

and Mekong River Delta (6.4 times). This regional difference (4.8 times) is higher than that of the three-digit industry average and industry-region average (approximately twice).

6.4.2 Estimation results and analyses

Table 6.14 reports the main findings for FDI spillovers on female employment by domestic firms in the professional, scientific and technical service industry. The estimation results suggest that the presence of FDI firms generates positive and statistically significant impact on female employment by domestic counterparts in Vietnam's professional, scientific and technical service industry over the study period. Specifically, a one per cent increase in foreign presence causes the average female-to-male labour ratio of domestic firms to go up by 17.08 per cent (equivalent to a 3.93 per cent increase in the share of female labour in the total workforce). The evidence of positive FDI impact on domestic female employment is consistent with those from the entire services sector (Section 6.2.2) and the group of male-intensive service industries (Section 6.2.3).

More importantly, the magnitude of FDI impact in the professional service industry is much more sizeable than previous estimations (Sections 6.2.2 and 6.2.3). In fact, the coefficient of variable FDI_{kjt} is nearly 8 times and 5.5 times higher than that of the overall sector and the average male-intensive industry group, respectively. This finding implies more profound spillovers from foreign firms to female employment in this highly male-dominant service industry.[21] This might imply that domestic firms exhibit greater potential and stronger incentive to absorb spillover effects from FDI counterparts to enhance the employment of under-utilised female workforce in the local labour market.

[21] Given the existence of more sizable spillovers from FDI firms to domestic counterparts' female employment in this male-intensive industry compared to the sectoral average, the sub-sample analyses for this industry are conducted in Section 6.4.3.

Table 6.14: Estimation results – Female employment model for the professional, scientific and technical service industry

Variable	Estimated Coefficient	Robust Standard Error	p-value
Foreign presence (FDI_{kjt})	17.0788	6.6513	0.0100
Firm size ($lnSize_{ikjt}$)	-0.0156	0.0023	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0233	0.0039	0.0000
Ownership structure (Own_{ikjt})	0.2088	0.0943	0.0270
Competition level ($Herfindahl_{kjt}$)	0.5273	0.2408	0.0290
Gender wage gap ($lnWageGap_{jt}$)	-0.9320	0.2926	0.0010
Industry female intensity ($lnIndFemale_{kt}$)	4.7194	1.3470	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*19.5010 (0.0000)*		
Overidentification test (Hansen J statistic)	*0.2590 (0.6109)*		
Endogeneity test (C-statistic)	*11.2380 (0.0008)*		
Model significance test (F-statstic)	*29.8300 (0.0000)*		
No. of obs	*71,430*		

Notes: p-values for tests statistics are in parentheses; the estimation accounted for firm-fixed effects.

Regarding the diagnostic results, the *F*-statistic and *C*-statistic indicate the significance of overall model and the existence of endogeneity problem. Hence, the IV-GMM estimator is preferred with both statistics for overidentification and underidentifiction tests confirming the relevance and validity of selected instruments (i.e., foreign employment share in the textile manufacturing and in the rubber and plastic manufacturing at time *t* in region *j* non-

adjacent to domestic professional service firms). Besides, severe multicollinearity problem is unlikely to occur (as reported Tables 6.5 and 6.6 in the Appendices).

Table 6.14 also shows the importance of firm-level differences in determining domestic firms' female employment, which is largely consistent with the whole sector estimation results, notably regarding the signs of coefficients. Of these, larger firms tend to hire more male workers, with a one per cent increase in this variable (*lnSize*) leading to a 0.016 per cent decrease in female-to-male labour ratios. Meanwhile, capital intensity (*lnK_intensity*) exerts positive and statistically significant influence, with a one per cent increase in this variable causing a 0.023 per cent increase in female-to-male labour ratios. Moreover, compared to the overall services sector, ownerships structure (*Own*) appears more important in explaining female employment among domestic firms in the professional service industry. While privately-owned firms tend to employ more females than state-owned counterparts, the difference in female-to-male labour ratio for the examined industry (0.21 per cent) is more than four times higher than that for the entire sector (0.05 per cent).

Compared to the estimation for the entire sector, Table 6.14 suggests rather different findings on the impact of non-firm-level variables on female employment of domestic firms in the professional service industry. Notably, increased competitive pressure (*Herfindahl*) and widening gender wage gap (*lnWageGap*) tend to dampen female employment as a one per cent increase in these two variables lower the female-to-male-ratio of domestic firms by 0.53 per cent and 0.93 per cent, respectively. Whereas, similar to the sector estimation, the industry female intensity (*lnIndFemale*) is found to have a highly significant and positive effect on domestic firms' female employment, with a one per cent increase in this variable leading to a 4.72 per cent increase in female-to-male labour ratios of domestic firms.

While the findings on competition level and gender wage gap are inconsistent with those for the average sector, they might reveal distinct characteristics by this high-skilled and high-

paid service industry. Under increased competitive pressure, domestic firms in the examined industry prefer to promote a more competent workforce by attracting high-skilled and high-paid workers (Hoi & Pomfret, 2010), which is more favourable to males (Arai, 2003a). In addition, the sample shows the existence of gender wage gaps across regions and years. On average, males are paid approximately 10 per cent higher than females. The result may imply that local firms in this highly skilled service industry consider a widening gender wage gap as a signal of differences in labour quality or productivity. Therefore, they are more likely to hire males if the pay gap in favour of males increases.

6.4.3 Heterogeneity of FDI impact on domestic firms' female employment

6.4.3.1 State-owned versus privately-owned firms

Table 6.15 presents the estimation results of FDI-linked spillovers on female employment by ownership structure of domestic firms. There is strong evidence of positive impact from FDI firms to privately-owned counterparts in the industry. Specifically, a one percent increase in foreign presence leads to a 16.87 per cent increase in average female-to-male labour ratio of privately-owned firms (or equivalent to 3.89 per cent increase in female share of total workforce). Meanwhile, there is no evidence of FDI spillover effect on domestic state-owned firms' female employment as the estimated coefficient of FDI_{kjt} is statistically insignificant. This result might be due to greater flexibility of privately-owned firms (as opposed to greater rigidity of state-owned firms) in employment decisions. Thus, state-owned firms are less likely to encounter significant influence of local labour market changes, including the increased presence of FDI firms.

Table 6.15: FDI impact on domestic firms' female employment by ownership structure of domestic firms

Variable	Domestic privately-owned firms			Domestic state-owned firms		
	Estimated coefficient	Robust standard error	p-value	Estimated coefficient	Robust standard error	p-value
Foreign presence (FDI_{kjt})	16.8727	6.5455	0.0100	-4.5425	10.5236	0.6660
Firm size ($lnSize_{ikjt}$)	-0.0153	0.0023	0.0000	-0.0222	0.0263	0.3980
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0240	0.0039	0.0000	-0.0052	0.0287	0.8560
Competition level ($Herfindahl_{kjt}$)	0.5634	0.2497	0.0240	-0.0460	0.8653	0.9580
Gender wage gap ($lnWageGap_{jt}$)	-0.9431	0.2932	0.0010	0.5307	1.4628	0.7170
Industry female intensity ($lnIndFemale_{kt}$)	4.6724	1.3296	0.0000	22.9142	52.1880	0.6610
Regional dummies ($dRegion_j$)	Included			Included		
Industry dummies ($dIndustry_k$)	Included			Included		
Year dummies ($dTime_t$)	Included			Included		
LM statistic	*20.0520 (0.0000)*			*3.0720 (0.2153)*		
Hansen J statistic	*0.2720 (0.6018)*			*1.9570 (0.1619)*		
C-statistic	*11.2160 (0.0008)*			*0.0060 (0.9405)*		
F-statistic	*30.9300 (0.0000)*			*1663.3600 (0.0000)*		
No. of obs	*70,891*			*539*		

Notes: p-values for tests statistics are in parentheses; the estimations accounted for firm-fixed effects

6.4.3.2 Small versus large firms

Table 6.16 reports the estimation results of FDI-induced spillovers on local female employment given the size of domestic firms. Notably, FDI firms exert a positive and statistically significant impact on small firms. Accordingly, a one per cent increase in foreign presence induces small firms to push up average female-to-male labour ratio by 32.66 per cent (or equivalent to a 7.02 per cent increase in the share of women in total employment). The magnitude of FDI spillovers is much more pronounced compared to that of the average firms

in the professional service industry (i.e., 3.934 per cent). On the contrary, domestic large firms are not affected by the increased entry of FDI counterparts in determining gendered workforce composition. In fact, the findings for this industry (Table 6.14) and the entire sector (Table 6.6) suggest that compared to large firms, small firms tend to employ higher rates of women. This might explain stronger incentives and capacity among small firms in learning and absorbing spillovers from FDI to enhance employment of female workers in their workforce.

Table 6.16: FDI impact on domestic firms' female employment by size of domestic firms

Variable	Domestic small firms			Domestic large firms		
	Estimated coefficient	**Robust standard error**	**p-value**	**Estimated coefficient**	**Robust standard error**	**p-value**
Foreign presence (FDI_{kjt})	32.6598	13.3284	0.0140	-2.9461	8.9831	0.7430
Capital intensity ($lnK\_intensity_{ikjt}$)	-0.0081	0.0115	0.4800	0.0375	0.0048	0.0000
Ownership structure (Own_{ikjt})	-0.4616	0.3503	0.1880	0.0665	0.0932	0.4750
Competition level ($Herfindahl_{kjt}$)	1.1592	0.6049	0.0550	-0.1974	0.2488	0.4280
Gender wage gap ($lnWageGap_{jt}$)	-1.1725	0.6818	0.0850	-0.7651	0.3587	0.0330
Industry female intensity ($lnIndFemale_{kt}$)	6.4034	2.5142	0.0110	1.3019	1.7958	0.4680
Regional dummies (*dRegion*)	Included			Included		
Industry dummies (*dIndustry*)	Included			Included		
Year dummies (*dTime*)	Included			Included		
LM statistic	*10.0320 (0.0066)*			*7.4440 (0.0242)*		
Hansen J statistic	*0.0090 (0.9237)*			*0.3050 (0.5810)*		
C-statistic	*17.7880 (0.0000)*			*0.0060 (0.8058)*		
F-statistic	*5.2900 (0.0000)*			*28.2900 (0.0000)*		
No. of obs	*30,646*			*40,784*		

Notes: (i) A small firm has the size of less than or equal to the sample mean; (ii) A large firm has the size greater than the sample mean; (iii) p-values for tests statistics are in parentheses; (iv) the estimations accounted for firm-fixed effects.

6.5 Summary

This chapter presents empirical results and relevant discussion for spillover effects from FDI firms to domestic firms' female employment in Vietnam's services sector. The overall sample shows that female-to-male labour ratios vary markedly across 15 two-digit service industries and six regions, suggesting heterogeneous gender mixture in the sector. In addition, privately-owned firms exhibit larger shares of women in total workforce than state-owned counterparts. Notably, the sample shows higher female-to-male labour ratios by FDI firms, as compared to domestic firms in almost all two-digit industries and regions. The ratio in foreign firms is approximately 1.4 times and 1.2 times that of domestic counterparts at industry and region average, respectively.

The estimation results indicate that the presence of FDI firms exerts a positive and statistically significant influence on domestic firms' female employment in whole services sector. A one per cent increase in foreign presence induces domestic firms to raise the average female-to-male labour ratio by 2.18 per cent. Furthermore, the findings also suggest that smaller, privately-owned, more capital-intensive domestic firms tend to hire women more intensively. Increased industry competition and female intensity positively affect female employment among local firms in the sector. Service industries at the two-digit level differ substantially in many respects, including average female-to-male labour ratios. The scatterplots and econometric results suggest divergent patterns in FDI-linked spillovers on local female employment by industry female intensity level. While positive spillovers are found for domestic firms in male-intensive group, it is insignificant among female-intensive group.

This chapter provide further insights for a female-intensive service industry (i.e., education) and for a male-intensive service industry (i.e., professional, scientific and technical services). There is insignificant impact from FDI firms to female employment of domestic education firms. Meanwhile, there is evidence of a positive and statistically significant effect

from FDI to domestic female employment in the professional service industry, with a one per cent increase in foreign presence leading to a 17.08 per cent increase female-to-male labour ratio (equivalent to a 3.93 per cent increase in the share of female workers). Extended analysis for the male-dominant service industry reveals that FDI-induced spillovers on local female employment is found only for privately-owned firms but not for state-owned ones. Besides, FDI firms exert a positive and statistically significant impact on domestic small firms but there is no evidence of such an effect on domestic large firms in the examined industry.

Chapter 7: Conclusions

7.1 Introduction

This final chapter concludes the thesis by firstly summarising key findings in Section 7.2. This section sequentially present major results of the impacts of FDI firms on average wages and female employment of domestic firms in Vietnam's services sector. Based on the empirical findings, Section 7.3 provides relevant implications for local workforce, firms and policymakers. Lastly, Section 7.4 discusses limitations of the thesis and future research directions.

7.2 Key findings

7.2.1 FDI impact on domestic firms' wages

The first two objectives of this thesis were to investigate, both theoretically and empirically, the impact of FDI firms on domestic firms' wages. In Chapter 4, I constructed a theoretical model to illustrate channels via which the presence of foreign firms can influence average wage levels of domestic counterparts, resulting in so-called wage spillovers. The model indicates that foreign presence affects the expected average wage directly through productivity spillovers and indirectly through cut-off capability. These two channels exert contrasting forces so that if positive productivity spillovers take place, the direct effect of an increase in foreign presence on the domestic firm's wage is positive. Whereas, the indirect effect is negative as it diminishes the cut-off capability, lowering the expected average wage. Hence, the net impact of FDI presence on the domestic firm average wage is conditional upon the relative strength of these two forces.

Based on the theoretical setup, I specified the econometric model to empirically test and estimate spillover effects from FDI to domestic firms' wages, using large panel datasets of

firms in Vietnam's services sector over the period 2009-2013. Empirical results and analyses were presented in Chapter 5. Of these, key findings are summarised as follows:

(iii) Not only do FDI firms pay much higher wages across 15 two-digit industries and six regions, they also induce domestic firms in Vietnam's services sector to pay higher. The estimation results confirm the existence of positive wage spillovers from FDI with a one per cent increase in foreign presence in the industry-region causing domestic firms to raise average real wages by 1.15 per cent.

(iv) The estimation results also suggest the importance of firm-and industry-specific characteristics in determining wages of domestic firms in the services sector.

- Compared to small firms, large firms tend to pay higher with a one per cent increase in firm size resulting in a 0.07 per cent increase in its average real wage.
- On average, privately-owned firms pay 0.19 per cent lower than state-owned counterparts in the entire sector.
- Compared to newly established firms, well-established firms are more likely to offer higher wages with a one per cent increase in firm age causing domestic firms' average real wage to rise by 0.04 per cent.
- Input intensity also plays a significant role as a one per cent increase in capital intensity leading to a 0.05 per cent increase in average real wage.
- Fierce competition in the product market tends to put upward pressure on wages with a one per cent increase in competitive pressure induces domestic firms to push up average real wage level by 1.10 per cent.

(v) Both econometric results and scatterplots of the data indicate diverging patterns of FDI-linked wage spillovers by industry wage level. The analyses at the two-digit VSIC level suggest that:

- FDI firms exert a positive and statistically significant effect on average real wages of domestic firms operating in high-wage service industries with a one per cent increase in foreign presence causing domestic firms in the high-wage group to raise average real wages by 3.34 per cent.
- On the contrary, FDI-linked wage spillover effect is found to be negative and statistically significant in the low-wage group, with a one per cent increase in foreign presence lowering domestic firms' average real wages by 0.85 per cent.

(vi) Further analyses at the three-digit VSIC level reveal deeper insights for a high-wage industry (i.e., financial, banking and insurance) and a low-wage industry (i.e., accommodation and food service).

- The estimations show the existence of positive wage spillovers in the financial, banking and insurance industry with a one per cent increase in foreign presence resulting in the average real wages of domestic firms to go up by 4.65 per cent.
- Meanwhile, the results indicate negative wage spillovers in the accommodation and food service industry with a one per cent increase in foreign presence lowering domestic firms' average wages by 2.03 per cent.

(vii) Enriched analyses shed light on the heterogeneity of FDI-linked wage spillovers in the low-wage industry of accommodation and food service.

- Wage spillover effect only exists from FDI firms to domestic privately-owned firms but not to state-owned counterparts.
- Compared to large and well-established domestic firms, small and newly established domestic firms encounter more pronounced negative wage spillovers from FDI.

- FDI typologies also play an important role in influencing FDI-linked wage spillovers as fully foreign-owned firms show considerable impact whereas partially foreign-owned firms have insignificant impact.

7.2.2 FDI impact on domestic firms' female employment

The other two objectives of the thesis were devoted to theoretical and empirical examination of FDI impact on domestic firms' female employment. To realise the third objective, in Chapter 4, I constructed a theoretical model to explain how foreign firms can influence domestic counterparts' decisions in employing women. The model shows that FDI firms can affect domestic firms' female employment (measured by female-to-male labour ratio), directly via augmented female productivity spillovers and indirectly via the cut-off effect. The two channels work contrastingly, namely if an increase in foreign presence results in positive asymmetric spillovers to the productivity of female workers, domestic firms tend to employ more females relative to males via the direct channel. Meanwhile, the positive productivity spillovers from FDI lower the cut-off capability, allowing less capable firms to enter the industry and thereby putting downward pressure on the expected female-to-male labour ratio. The net impact of foreign presence on domestic firms' female employment depends on whether the direct channel dominates the indirect one or vice versa.

Guided by the theoretical framework, I then specified the econometric model to empirically test and estimate spillover effects from FDI to domestic firms' female employment, using large panel datasets of firms in Vietnam's services sector during 2009-2013 period. Empirical results and analyses were reported in Chapter 6. The main findings are summarised below:

(i) The overall sector sample shows higher female-to-male labour ratios by FDI firms, as compared to domestic firms across two-digit service industries and regions. More importantly, the estimation results indicate that FDI firms exert a

positive and statistically significant influence on domestic firms' female employment with a one per cent increase in foreign presence inducing domestic firms to raise the average female-to-male labour ratio by 2.18 per cent.

(ii) The estimation results reveal the significant impact of control variables on female employment of domestic firms in Vietnam's services sector.

- Intense competition in the product market is likely to induce domestic firms in the sector to hire women more intensively, with a one per cent increase in competition level leading to a 0.63 per cent increase in the average female-to-male-ratio.
- Firms operate in female-intensive service industries tend to prefer to hire more women as the industry female intensity goes up by one per cent, domestic firms' female-to-male labour ratios will rise by 0.21 per cent.
- Gender wage gap has negligible impact on female-to-male labour ratios by domestic firms in the services sector.
- Firm size has a statistically significant and negative impact, with a one per cent increase in the size of domestic firms causing a nearly 0.05 per cent decrease in their female-to-male labour ratios.
- The more capital-intensive domestic firms are, the more female-intensive they are, with a one per cent increase in the capital intensity of domestic firms pushing up in their female-to-male ratios by 0.02 per cent increase.
- Privately-owned firms tend to employ more females than state-owned firms with the difference in female-to-male labour ratio being 0.05 per cent.

(iii) The analyses at the two-digit VSIC level, including scatterplots of the data and econometric results, suggest differences in FDI impacts across two groups of female-intensive and male-intensive industries.

- For female-intensive group, the presence of FDI firms shows insignificant impact on the female employment of domestic firms.
- For male-intensive group, FDI firms are found to have a positive and statistically significant effect on domestic firms with a one per cent increase in foreign presence causing domestic firms in this group to boost average female-to-male labour ratio by 3.13 per cent.

(iv) The analyses at the three-digit VSIC level provide further insights for a female-intensive industry (i.e., education) and a male-intensive industry (i.e., professional, scientific and technical services).

- The results indicate insignificant impact from FDI firms to female employment of domestic counterparts in the education industry.
- Meanwhile, FDI firms are found to have a positive and statistically significant impact on domestic female employment in the professional service industry, with a one per cent increase in foreign presence leading to a 17.09 per cent increase female-to-male labour ratio (equivalently a 3.93 per cent increase in the share of female workers).

(v) Extended estimations for the male-dominant professional service industry reveal that FDI-induced spillovers on local female employment is found only for privately owned firms but not for state-owned ones. Moreover, FDI firms exert a positive and statistically significant impact on small firms but there is no evidence of such an effect from foreign presence to domestic large firms.

7.3 Implications

7.3.1 Implications for local workforce

The findings from this thesis can have significant implications for the workforce in the local labour market, particularly female labour force. At the sectoral average level, local

workers can expect to be better off from the growing presence of foreign firms in the services sector since FDI firms pay much higher and simultaneously induce domestic firms to pay higher. Apart from income improvement, local female workers can also expect to benefit from increased services FDI inflows as foreign firms in this sector are in favour of hiring women, and more importantly stimulating domestic counterparts to push up the employment of female workforce.

Enriched analyses from the thesis carry deeper implications for local workers in the services sector. They are likely to experience widening wage gap and income inequality because rising foreign presence tends to push up wages of workers in the high-pay industries while dampening wages of workers in the low-pay industries. This outcome would worsen the income of the most vulnerable proportion of local workforce (i.e., those in low-wage activities). Regarding female workers, if they are currently working in female-intensive service industries, it is unlikely that they would find more employment opportunities in local firms due to stronger foreign presence. Whereas, female workers in male-intensive industries can expect to improve their employment prospect following increased services FDI inflows.

The results of this research can provide meaningful implications for local workers, assisting their job decision making. If the primary objective is to earn high wages, those who are about to participate in the local labour market (e.g., university graduates) may choose to apply for jobs in the types of service firms/industries that pay higher and receive beneficial FDI-induced wage spillovers. For workers currently working in types of firms/industries negatively impacted by foreign presence, they may determine to switch to firm/industry types gaining positive wage spillovers. Regarding female workforce, university graduates can improve their employment prospect by self-selecting to enter male-intensive industries. For existing workers in female-intensive industries, they may also consider switching to male-intensive industries. It is, however, worth noting that the transition is likely to incur

switching costs if existing (female) workers are required to change or adapt their skill sets to work in other types of firms/industries.

7.3.2 Implications for local firms

The findings from this thesis have considerable implications for domestic firms in the local labour market. As compared to local workers, local firms could confront with contrasting and more challenging situations given the increased presence of FDI firms in the services sector. At the sectoral average level, positive FDI-induced wage spillovers imply upward pressure on domestic firms' labour costs. For less financially capable firms, they may struggle to boost profitability due to growing foreign presence. Foreign firms, especially large multinationals, may poach the best workers (via higher wages) and drive up domestic firms' production costs (via positive wage spillovers). Meanwhile, for more financially capable firms, the finding of positive wage spillovers from FDI presents a valuable opportunity to compete with foreign firms in the market. These local firms can strengthen competitiveness in attracting and retaining high-quality workforce via higher wages.

Results from different levels of data aggregation reveal further implications for local firms. For domestic firms in low-pay service industries, the finding of negative wage spillovers from FDI is somewhat less detrimental (as compared to the worker perspective) since local firms encounter downward pressure on labour cost. Hence, they can take advantage of this impact to lower production costs and thereby gradually push up profitability in the long run. Whereas, domestic firms in high-pay industries should formulate viable compensation strategies since rising foreign presence will exert even stronger pressure on domestic wages. As local firms in high-pay industries may find it extremely competitive to attract and incentivise competent personnel via wage offers, they may choose to capitalise on non-wage forms of compensation (e.g., profit-sharing payments, promotion schemes, stock options, family-friendly benefits).

Furthermore, the findings carry strong implications for local firms that are in male-intensive service industries to take proactive strategies in learning from FDI firms to stimulate the employment of female talent. Domestic firms should firstly conduct thorough analysis on existing gendered employment policies to identify potential of efficient labour utilisation and productivity. In this regard, they should take into account beneficial experience and competitive strategy of foreign counterparts in the industry and region.

For the attraction and retention of women, local firms could learn from FDI firms to adopt changes in enhancing workplace practices. Of these, domestic firms could foster female-friendly policies, capturing key areas of childcare support, carers leave, flexible working arrangements, promotion prospect and professional development. Given the nature of male-intensive industries and the prevalence of gender stereotyping in the local economy, domestic firms' managers at various levels must demonstrate strong and visionary leadership in changing workplace culture to promote female-friendly practices and realise female labour potential.

7.3.3 Implications for local policymakers

The findings from this research also have important implications for local governments concerning inward FDI and labour market. At the sectoral average level, positive impacts from FDI firms to wages and female employment of local service firms in Vietnam could justify massive incentives and efforts by the government so far to attract FDI inflows into the economy. Moreover, revealed findings provide policymakers with new perspectives on possible externalities of foreign firms. This would enable local governments to take informed decisions to optimise services FDI's contributions to the host economy in the long run.

If policymakers essentially aim to improve domestic firms' wages and female employment prospect, they might seek to attract services FDI as well as strengthen linkages between domestic and foreign firms in the sector. To boost services FDI inflows, policies

should facilitate progressive removal of foreign entry barriers in major service industries, including telecommunication; transportation; finance and banking. This requires local governments to accelerate the privatisation of SOEs, reducing market distortion, and thereby encouraging FDI projects in the sector. Besides, policymakers would have to address other obstacles to attracting services FDI (as discussed in Chapter 2). These policies should prioritise to improve infrastructure (critical in logistics, telecommunication, tourism, and transportation investment), increase the supply of skilled labour specialised in services, simplify and strengthen legal system and regulations governing services investment and operation.

Nonetheless, future policies regarding inward FDI and expected labour market outcomes in the services sector should be developed and implemented in a cautious and selective manner as the findings reveal heterogeneous effects at industry- and firm-levels. This means that one policy does not fit all. First, policy intervention related to FDI impact on wages and female employment might only be meaningful in the private sector as there is no evidence of foreign influence on domestic state-owned sector. Second, policy efforts should be directed towards domestic firms operating in low-wage service industries to mitigate adverse impact on the most vulnerable share of local workforce. Finally, policy intervention should focus on male-intensive service industries only if targeting to attract services FDI as a viable strategy to promote employment opportunities for the local female workforce.

7.4 Limitations and future research

While this thesis has accomplished stated research objectives and made both theoretical and empirical contributions to the existing literature, it has a number of limitations that need to be acknowledged. These limitations would be helpful for future research to enrich the

analysis, providing broader and deeper insights into potential FDI-linked impacts on the host labour market.

First, given the availability of appropriate data, future work would be able to extend the empirical exercise by exploring the role of institutional labour market factors in influencing local wages and female employment as well as spillover channels. Potential variables might capture the possible impacts of unionisation and major supply/demand-side labour market reforms.

Second, the econometric models left workers' characteristics in error terms since they are unobserved. Given available data, it would be valuable to examine the influence of worker specific characteristics (e.g., skill, tenure, age, gender, occupation, marital status) on wages and female employment as well as the heterogeneity of FDI-linked impacts at worker-level (i.e., what type of workers/female workers are more/less affected by foreign presence).

Third, enriched analysis of FDI heterogeneity (e.g., entry mode of greenfield or acquisition, specific threshold of foreign equity, services export intensity) would help identify which groups of foreign firms can generate dominant spillovers in the host labour market.

Fourth, data constraint did not allow the examination of competition and selection effects in interpreting findings on negative FDI impact in low-wage industries. It is possible that more productive, higher-paid workers self-select to move from domestic firms to multinationals. The availability of matched firm-worker dataset could enable future work to address this issue.

Fifth, the theoretical and empirical models did not fully capture the impact of possible regional labour movement on local labour market and FDI-linked spillovers. Future work might explore adequate data and adopt relevant methodologies (e.g., spatial econometrics) to yield better insights into spatial interactions among firms across regions.

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Appendices

Table A2.1: Industry distribution of workers by educational attainment

Service industry	Educational attainment			
	No formal degree (%)	Vocational training degree (%)	Bachelor degree (%)	Advanced degree (%)
Electricity, gas, stream and air conditioning supply	15.28	55.29	28.31	1.13
Water supply, sewerage, waste management and remediation activities	52.12	32.42	15.10	0.35
Construction	56.92	30.17	12.54	0.36
Wholesale and retail trade; repair of motor vehicles and motorcycles	32.36	42.04	24.83	0.78
Transportation and storage	24.80	56.82	17.72	0.66
Accommodation and food service activities	43.97	41.02	14.44	0.57
Information and communication	7.10	39.21	51.10	2.59
Financial and insurance activities	6.52	23.23	66.59	3.66
Real estate activities	29.26	31.03	37.53	2.18
Professional, scientific and technical activities	16.65	31.53	48.91	2.91
Administrative and support service activities	50.38	32.09	16.91	0.62
Education	8.53	30.77	51.76	8.94
Human health and social work activities	8.16	57.55	26.85	7.44
Arts, entertainment and recreation	45.36	34.17	19.91	0.56
Other service activities	40.68	41.48	17.30	0.54

Source: Calculations based on GSO's enterprise survey 2012

Table A2.2: Gender gap in educational attainment across service industries

Service industry	Gender gap in educational attainment (Male/Female)			
	No formal degree (%)	Vocational training degree (%)	Bachelor degree (%)	Advanced degree (%)
Electricity, gas, stream and air conditioning supply	81/19	83/17	79/21	78/22
Water supply, sewerage, waste management and remediation activities	52/48	68/32	62/38	70/30
Construction	84/16	81/19	75/25	83/17
Wholesale and retail trade; repair of motor vehicles and motorcycles	68/32	60/40	60/40	68/32

Transportation and storage	82/18	79/21	60/40	79/21
Accommodation and food service activities	45/55	46/54	48/52	59/41
Information and communication	61/39	65/35	63/37	73/27
Financial and insurance activities	68/32	46/54	40/60	53/47
Real estate activities	70/30	63/37	59/41	75/25
Professional, scientific and technical activities	74/26	66/34	66/34	75/25
Administrative and support service activities	69/31	69/31	51/49	60/40
Education	46/54	45/55	38/62	56/44
Human health and social work activities	40/60	27/73	48/52	62/38
Arts, entertainment and recreation	49/51	50/50	51/49	61/39
Other service activities	54/46	47/53	59/41	65/35

Source: Calculations based on GSO's Enterprise Survey 2012

Table A2.3: Gender gap in average wages across service industries

Service industry	Average wages (million VND/month)			
	Total	**Male**	**Female**	**Male/female wage gap**
Electricity, gas, stream and air conditioning supply	5,253	5,345	4,733	1.13
Water supply, sewerage, waste management and remediation activities	3,769	4,239	3,037	1.40
Construction	3,369	3,403	3,067	1.11
Wholesale and retail trade; repair of motor vehicles and motorcycles	3,774	3,928	3,521	1.12
Transportation and storage	4,660	4,694	4,443	1.06
Accommodation and food service activities	3,248	3,845	2,880	1.34
Information and communication	5,880	6,014	5,643	1.07
Financial and insurance activities	6,855	6,823	6,880	0.99
Real estate activities	6,973	7,549	5,869	1.29
Professional, scientific and technical activities	5,814	5,953	5,575	1.07
Administrative and support service activities	4,765	4,564	3,569	1.28
Education	4,260	4,681	4,083	1.15
Human health and social work activities	4,422	5,121	4,060	1.26
Arts, entertainment and recreation	3,852	4,080	3,583	1.14
Other service activities	2,795	2,946	2,628	1.12

Source: Calculations based on GSO's Labour Force Survey 2012

Table A5.1: First stage regression – Wage spillovers for the whole sector

Variable *Dependent variable (FDI_{kjt})*	**Estimated coefficient**	**Robust standard error**	**p-value**
Firm size ($lnSize_{ikjt}$)	0.0003	0.00002	0.0000
Ownership structure (Own_{ikjt})	-0.0018	0.0006	0.0020
Firm age ($lnAge_{ikjt}$)	0.0003	0.00006	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	-0.0006	0.00003	0.0000
Technology gap ($TechGap_{ikjt}$)	0.0000	0.0000	0.0780
Competition ($Herfindahl_{kjt}$)	0.1482	0.0082	0.0000
Instrumental variable 1 *(IV1)*	0.3597	0.0028	0.0000
Instrumental variable 2 *(IV2)*	-0.0497	0.0009	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*19622.3600 (0.0000)*		
Model significance test (F-statstic)	*11106.0000 (0.0000)*		

Note: p-values for tests statistics are in parentheses.

Table A5.2: Summary statistics – Wage spillover estimation for the financial, banking and insurance industry

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Average wage ($ln\overline{w}$)	7,556	3.3025	0.8883	-1.4524	6.7689
Foreign presence (*FDI*)	7,884	0.0501	0.0824	0.0000	0.8793
Firm size (*lnSize*)	7,536	6.5970	2.9831	-0.4177	18.3505
Ownership structure (*Own*)	7,556	0.9602	0.1956	0	1
Firm age (*lnAge*)	7,311	1.7732	0.8687	0.0000	7.6079
Capital intensity (*lnK_intensity)*	6,321	3.4916	1.4885	-3.3496	10.8553
Technology gap (*TechGap)*	6,434	2499.418	13899.67	-1034988	8334
Competition (*Herfindahl*)	7,884	0.1065	0.0968	0.0266	1.0000

Table A5.3: Correlation matrix – Wage spillover estimation for the financial, banking and insurance industry

	FDI	lnSize	Own	lnAge	lnK_intensity	TechGap	Herfindahl
FDI	1						
lnSize	0.0945	1					
Own	-0.0254	-0.3837	1				
lnAge	0.0081	0.2976	-0.121	1			
lnK_intensity	-0.1146	0.2392	-0.1483	-0.0179	1		
TechGap	0.0251	-0.1768	0.065	0.0973	-0.1472	1	
Herfindahl	0.1197	-0.1332	-0.0795	-0.0093	-0.1513	0.001	1

Table A5.4: Collinearity measures – Wage spillover estimation for the financial, banking and insurance industry

Regressor	Variance inflation factor (VIF)	Square Root of the VIF (SQRT VIF)	Tolerance
FDI	1.05	1.02	0.9544
lnSize	1.44	1.20	0.6949
Own	1.21	1.10	0.8291
lnAge	1.14	1.07	0.8802
lnK_intensity	1.12	1.06	0.8907
TechGap	1.07	1.04	0.9322
Herfindahl	1.08	1.04	0.9286

Table A5.5: First stage regression – Wage spillovers for the financial, banking and insurance industry

Variable *Dependent variable (FDI_{kjt})*	Estimated coefficient	Robust standard error	p-value
Firm size ($lnSize_{ikjt}$)	0.0023	0.0012	0.0670
Ownership structure (Own_{ikjt})	-0.0063	0.0060	0.3010
Firm age ($lnAge_{ikjt}$)	0.0051	0.0023	0.0280
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0017	0.0012	0.1650
Technology gap ($TechGap_{ikjt}$)	0.0000	0.0000	0.5270
Competition ($Herfindahl_{kjt}$)	0.0287	0.0239	0.2310
Instrumental variable 1 *(IV1)*	-0.3791	0.0520	0.0000
Instrumental variable 2 *(IV2)*	0.1127	0.0175	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*60.6100 (0.0000)*		
Model significance test (F-statstic)	*32.1900 (0.0000)*		

Note: p-values for tests statistics are in parentheses.

Table A5.6: Summary statistics – Wage spillover estimation for the accommodation and food service industry

Variable	Obs	Mean	Std. Dev.	Min	Max
Average wage ($ln\overline{w}$)	33,211	2.7876	0.5279	-4.2658	6.5977
Foreign presence (*FDI*)	33,738	0.1334	0.0981	0.0000	0.3801
Firm size (*lnSize*)	33,195	6.2469	1.7391	-1.5578	14.6265
Ownership structure (*Own*)	33,211	0.9860	0.1175	0	1
Firm age (*lnAge*)	32,313	1.4383	0.7505	0.0000	4.1897
Capital intensity (*lnK_intensity)*	24,970	3.8370	1.8750	-4.1825	11.3806
Technology gap (*TechGap)*	32,694	154.0922	660.7731	-99427.35	590.0299
Competition (*Herfindahl*)	33,738	0.0288	0.0723	0.0059	0.6347

Table A5.7: Correlation matrix – Wage spillover estimation for the accommodation and food service industry

	FDI	lnSize	Own	lnAge	lnK_intensity	TechGap	Herfindahl
FDI	1						
lnSize	-0.1239	1					
Own	-0.0313	-0.2246	1				
lnAge	0.0983	0.2195	-0.1569	1			
lnK_intensity	0.0407	-0.0174	-0.0843	0.1481	1		
TechGap	0.0804	-0.2056	0.0038	0.0213	0.0421	1	
Herfindahl	-0.1635	0.0527	0.0156	-0.0982	-0.077	-0.1018	1

Table A5.8: Collinearity measures – Wage spillover estimation for the accommodation and food service industry

Regressor	Variance inflation factor (VIF)	Square Root of the VIF (SQRT VIF)	Tolerance
FDI	1.06	1.03	0.9443
lnSize	1.18	1.08	0.8497
Own	1.08	1.04	0.9293
lnAge	1.11	1.06	0.8976
lnK_intensity	1.03	1.02	0.9662
TechGap	1.06	1.03	0.9433
Herfindahl	1.05	1.02	0.9545

Table A5.9: First stage regression – Wage spillovers for the accommodation and food service industry

Variable *Dependent variable (FDI_{kjt})*	**Estimated coefficient**	**Robust standard error**	**p-value**
Firm size ($lnSize_{ikjt}$)	-0.0011	0.0003	0.0010
Ownership structure (Own_{ikjt})	0.0025	0.0033	0.4500
Firm age ($lnAge_{ikjt}$)	0.00004	0.0006	0.9520
Capital intensity ($lnK\_intensity_{ikjt}$)	-0.0005	0.0003	0.0650
Technology gap ($TechGap_{ikjt}$)	-0.00002	0.0000	0.0000
Competition ($Herfindahl_{kjt}$)	-0.0374	0.0270	0.1650
Instrumental variable 1 *(IV1)*	-0.0676	0.0024	0.0000
Instrumental variable 2 *(IV2)*	0.0029	0.0012	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*665.8600 (0.0000)*		
Model significance test (F-statstic)	*387.7800 (0.0000)*		

Note: p-values for tests statistics are in parentheses.

Table A5.10: Main estimation results of FDI-linked wage spillovers in the wholesale and retail industry

Variable	Estimated Coefficient	Robust Standard Error	p-value
Foreign presence (FDI_{kjt})	-4.4886	0.8562	0.0000
Firm size ($lnSize_{ikjt}$)	0.0444	0.0011	0.0000
Ownership structure (Own_{kjt})	-0.1251	0.0509	0.0200
Firm age ($lnAge_{ikjt}$)	0.0640	0.0036	0.0000
Capital intensity ($lnK\_intensity_{ikjt}$)	0.0636	0.0014	0.0000
Technology gap ($TechGap_{ikjt}$)	0.0000	0.0000	0.0600
Competition ($Herfindahl_{kjt}$)	0.2664	0.0639	0.0000
Regional dummies ($dRegion_j$)	Included		
Industry dummies ($dIndustry_k$)	Included		
Year dummies ($dTime_t$)	Included		
Endogeneity test	30.764^{***}		
First-stage F-test	587.260^{***}		
Underidentification test	583.576^{***}		
Model significance test	513.570^{***}		
Endogeneity test	30.764^{***}		

Notes: $^{***}p<0.01$, $^{**}p<0.05$, and $^{*}p<0.1$; estimation is based on an alternative approach to construct IVs, also known as a 'shift-share' or 'supply-push' approach (Bartik, 1991; McLaren & Yoo, 2017; Moretti, 2010).

Table A6.1: First stage regression – Female employment model for the whole sector

Variable *Dependent variable (FDI_{kjt})*	**Estimated Coefficient**	**Robust Standard Error**	**p-value**
Firm size (*lnSize*)	0.0002	0.0000	0.0000
Capital intensity (*lnK_intensity*)	-0.0004	0.0000	0.0000
Ownership structure (*Own*)	-0.0019	0.0006	0.0010
Competition level (*Herfindahl*)	0.1677	0.0071	0.0000
Gender wage gap (*lnWageGap*)	-0.2510	0.0032	0.0000
Industry female intensity (*lnIndFemale*)	-0.0396	0.0006	0.0000
Instrumental variable 1 *(IV1)*	-0.0753	0.0022	0.0000
Instrumental variable 2 *(IV2)*	0.0054	0.0002	0.0000
Regional dummies (*dRegion*)	Included		
Industry dummies (*dIndustry*)	Included		
Year dummies (*dTime*)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*4229.9900 (0.0000)*		
Model significance test (F-statstic)	*2186.6700 (0.0000)*		

Note: p-values for the tests statistics are in parentheses.

Table A6.2: Correlation matrix – Female employment model for the education industry

	FDI	**lnSize**	**lnK_intensity**	**Own**	**Herfindahl**	**lnWageGap**	**lnIndFemale**
FDI	1						
lnSize	0.152	1					
lnK_intensity	-0.0939	-0.0006	1				
Own	0.0117	-0.008	-0.0171	1			
Herfindahl	0.2995	0.0889	-0.0314	0.015	1		
lnWageGap	0.2812	0.0845	-0.0806	0.0106	0.1159	1	
lnIndFemale	0.0494	0.1075	0.085	-0.0287	-0.4914	-0.0127	1

Table A6.3: Collinearity measures – Female employment model for the education industry

Regressor	Variance inflation factor (VIF)	Square Root of the VIF (SQRT VIF)	Tolerance
FDI	1.26	1.12	0.7910
lnSize	1.05	1.03	0.9514
lnK_intensity	1.02	1.01	0.9772
Own	1.00	1.00	0.9987
Herfindahl	1.56	1.25	0.6422
lnWageGap	1.09	1.05	0.9150
lnIndFemale	1.44	1.20	0.6923

Table A6.4: First stage regression – Female employment model for the education industry

Variable *Dependent variable (FDI_{kjt})*	**Estimated Coefficient**	**Robust Standard Error**	**p-value**
Firm size (*lnSize*)	0.0013	0.0011	0.2370
Capital intensity (*lnK_intensity*)	-0.0046	0.0007	0.0000
Ownership structure (*Own*)	0.0141	0.0199	0.4800
Competition level (*Herfindahl*)	-0.0390	0.0521	0.4540
Gender wage gap (*lnWageGap*)	-0.1722	0.1196	0.1500
Industry female intensity (*lnIndFemale*)	-0.0987	0.0096	0.0000
Instrumental variable 1 *(IV1)*	-0.0682	0.0214	0.0010
Instrumental variable 2 *(IV2)*	0.0244	0.0061	0.0000
Regional dummies (*dRegion*)	Included		
Industry dummies (*dIndustry*)	Included		
Year dummies (*dTime*)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*22.4000 (0.0000)*		
Model significance test (F-statstic)	*10.6700 (0.0000)*		

Note: p-values for the tests statistics are in parentheses.

Table A6.5: Correlation matrix – Female employment model for the professional, scientific and technical service industry

	FDI	lnSize	lnK_intensity	Own	Herfindahl	lnWageGap	lnIndFemale
FDI	1						
lnSize	0.152	1					
lnK_intensity	-0.0939	-0.0006	1				
Own	0.0117	-0.008	-0.0171	1			
Herfindahl	0.2995	0.0889	-0.0314	0.015	1		
lnWageGap	0.2812	0.0845	-0.0806	0.0106	0.1159	1	
lnIndFemale	0.0494	0.1075	0.085	-0.0287	-0.4914	-0.0127	1

Table A6.6: Collinearity measures – Female employment model for the professional, scientific and technical service industry

Regressor	Variance inflation factor (VIF)	Square Root of the VIF (SQRT VIF)	Tolerance
FDI	1.26	1.12	0.7910
lnSize	1.05	1.03	0.9514
lnK_intensity	1.02	1.01	0.9772
Own	1.00	1.00	0.9987
Herfindahl	1.56	1.25	0.6422
lnWageGap	1.09	1.05	0.9150
lnIndFemale	1.44	1.20	0.6923

Table A6.7: First stage regression – Female employment model for the professional, scientific and technical service industry

Variable *Dependent variable (FDI_{kjt})*	**Estimated Coefficient**	**Robust Standard Error**	**p-value**
Firm size (*lnSize*)	-0.00002	0.00008	0.8150
Capital intensity (*lnK_intensity*)	0.0001	0.0001	0.1870
Ownership structure (*Own*)	-0.0052	0.0036	0.1530
Competition level (*Herfindahl*)	-0.0235	0.0068	0.0010
Gender wage gap (*lnWageGap*)	0.0086	0.0105	0.4110
Industry female intensity (*lnIndFemale*)	-1.1934	0.0151	0.0000
Instrumental variable 1 *(IV1)*	-0.0085	0.0028	0.0000
Instrumental variable 2 *(IV2)*	0.0051	0.0069	0.4660
Regional dummies (*dRegion*)	Included		
Industry dummies (*dIndustry*)	Included		
Year dummies (*dTime*)	Included		
Underidentification test (Kleibergen-Paap rk LM statistic)	*19.5000 (0.0001)*		
Model significance test (F-statstic)	*9.7600 (0.0001)*		

Note: p-values for the tests statistics are in parentheses.