

**Foreign Labour Policy and Labour Demand in Manufacturing:
The Case of Malaysia***

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Abstract

There are calls for Malaysia to align its foreign labour policy with labour market demands due to the over-dependence of the manufacturing sector on foreign unskilled labour. Despite the use of price restrictions to control the influx of foreign workers in the country, there is no clear indication of how these policy instruments have influenced foreign labour demand. The paper therefore estimates industry-level foreign labour demand in manufacturing, paying special attention to the role of the levy system, to provide an outlook on labour market administration. Based on estimates from a panel data set of 23 manufacturing industries for the period 1985 to 2009, upward revisions in the levy over the period of review are found to be a significant deterrent to the use of foreign workers. The finding is robust to different sub-periods and different econometric specifications. The paper posits that a dynamic levy system that enables the government to appropriately price labour market needs is indeed a desirable instrument to align immigration to the objectives of the country. However, some fine-tuning is needed to the existing levy system to ensure that this policy instrument becomes a real ‘game-changer’ to limit the use of foreign workers in manufacturing.

Keywords: foreign labour policy; unskilled foreign workers; manufacturing; Malaysia.

1. INTRODUCTION

Malaysia has the fourth-largest number of foreign workers in the East Asia-Pacific, according to a 2015 World Bank report. Foreign workers from 13 countries constitute approximately 2.1 million (The Edge, 14 January 2017) of the country's workforce of 15.4 million. Indonesians made up the largest share (39 percent) of foreigners, followed by the Nepalese (24 percent) and Bangladeshis (13 percent). However, the number of undocumented¹ (unregistered – illegal) foreign workers, in the tune of 2 million to 4.6 million based on different reporting, is deemed to be larger than their legal counterpart. The large inflow of foreign workers is contrary to the goals of the nation as the 11th Malaysia Plan (2016-2020) stipulates that the ratio of foreigners in the country's labour market must not exceed 15 per cent, or 2.1 million. The current statistics on the foreign presence (both legal and illegal workers) in the Malaysian economy has already exceeded the unrealistic target. More importantly, it has raised criticisms that the numbers are far beyond what the labour market requires.

Many of the economic sectors are excessively dependent on foreign workers. Specifically for manufacturing, there are calls for Malaysia to align its foreign labour policy with labour market demands (World Bank, 2015). This follows from the over-dependence of the sector on foreign unskilled labour, which in turn has delayed economic upgrading and adversely affected the performance of this sector. Being the largest employer of foreign workers, the manufacturing sector is also a focal point of the country given its contribution to gross domestic product (GDP) and job creation (Hooi, 2016). The Malaysian government has therefore instituted a wide range of policies, coupled with frequent policy reversals, to regulate unskilled foreign labour since they were first permitted into the manufacturing sector in the early 1990s. Many of those policy instruments have been considered partially effective. Consequently, foreign labour management policies have drawn severe criticisms (Pillai, 1995; World Bank, 1995; Kanapathy, 2001). To date, it still remains unclear how those policy changes² have affected foreign labour demand. Previous related studies on foreign labour in Malaysia have not addressed this issue directly. Instead, the focus has largely been on the wage, labour productivity, and labour substitution effects of immigration (Nur Sabrina et al., 2016; World Bank, 2015; Tham and Liew, 2014; Narayanan and Lai, 2014; Athukorala and Devadason, 2012; Idris and Rahmah, 2006; among others). This paper therefore seeks to address the following questions: What impacts have changes in the regulatory environment (public policies, laws and law enforcement strategies) had on the utilization of foreign labour in manufacturing? Which instruments are needed to control the influx of foreign workers?

This paper has a two-pronged objective. First, it reviews the key policy changes related to foreign labour in manufacturing since 1985 to set the background of the study. Demand-side policies are the focus of attention in this paper. Second, it estimates the demand for labour in manufacturing, taking into account the prominent shifts in foreign labour policy, to provide an outlook on labour market administration. For the industry-level analysis, the paper draws from unpublished returns to the Annual Survey of Manufacturing Industries, canvassed by the Department of Statistics (DOS), Malaysia. A panel data set of 23 manufacturing industries at the aggregated 3-digit-level of the national industry classification, spanning the period 1985-2009, is assembled for the overall analysis. For comparison, the empirical analysis is also conducted separately on a data panel constructed at the detailed 5-digit level covering the sub-periods 1985-1999 and 2000-2008. The sub-period analyses are governed by the change in the national industry classification in 2000 and 2009.

¹ The presence of a large number of undocumented foreign workers can complicate many policy initiatives, such as the implementation of minimum wages and sector specific levies (Del Carpio et al., 2015).

² Labour markets are a key consideration in migration policy, to ensure that migrants meet the labour market needs in the host economies

The paper proceeds as follow. Section 2 describes the foreign labour policy in which the analysis is framed, giving a detailed account of key policy issues. Migrant patterns are also briefly elucidated in this section. Section 3 illustrates the theoretical framework, model specification and data. Section 4 presents the results and some robustness checks. Section 5 concludes with the main policy implications of the findings.

2. MIGRATION: POLICY AND CONTEXT

2.1 Migration Governance and Policy Changes

The inflow of migrant workers in Malaysia is governed by foreign labour policies and related foreign worker employment policies. The Malaysian government is known for its unpredictable and ‘flip-flop’ policies on foreign labour (ILO, 2016; Devadason and Chan, 2014; Kanapathy, 2001). A recent decision in February 2017 to ban foreign workers in four major sectors of the economy, resulted in disastrous backlash to the economy. Subsequently, the government lifted the ban in May 2017. Likewise, the government postponed its January 2017 mandatory imposition of foreign workers’ levy payment on employers until 2018 after calls from employers to provide a proper ecosystem under the newly introduced Employer Mandatory Commitment (EMC). The deferment came merely 10 days after the new rule was announced under the EMC. These are just a few examples of policy turnarounds due to the pushback from the private sector. Two noteworthy observations can be made here. First, the awkward policy shifts reflect Malaysia’s ambivalence about the role of foreign workers in its development strategy. Second, a policy lesson emerges in that it is squarely impossible to wean out foreign workers completely as they have become entrenched in the economy. Consequently, it is acknowledged that effective immigration management should take priority in the national agenda.

Policies are undoubtedly important to regulate immigration, as evidenced by the recent policy shift to increase the cost of employing foreign workers. It has already resulted in employers taking coping measures such as moving towards automation to economize on foreign labour (Yoshida, 2017). Table 1 provides a chronological account of key foreign labour policies and changes made since 1985. The discussion herein will focus on three key policies that have implications on the pricing of labour, namely the levy system, the recruitment system and the minimum wage.

The Malaysian Government imposed an annual levy on employment of foreign workers since 1992. Initially, it was payable by migrant workers but was shifted to employers in 2009 to encourage economic restructuring and reduce the dependency on foreign workers. In 2013, employers were granted permission to transfer the levy back to workers. The justification provided was that it would not represent a significant financial burden for migrants given the salary increase they would receive under the Minimum Wage Order. Foreign workers pay the levy since 2013 through deductions in their monthly salaries by employers. The system has undergone shifts in responsibility for paying the annual levy, from the worker to the employer and then back to the worker, coupled with several upward revisions (1995, 1998, 1999, 2005, 2012 and 2016) in the levy from RM900 (for the unskilled) in 1992. The current levy for the manufacturing sector is RM1,850 per worker. The sector-specific levy system³ for unskilled foreign workers in Malaysia appears to be more of a vehicle to deal with demand pressures. Notwithstanding that, as the number of foreign workers in Malaysia has continued to increase

³ The system does not have dependency quotas; it is therefore argued that in some lines of activity, the workforce could become totally foreign (Ahmad et al., 2014).

since the levy was introduced, the indications are that it has had no clear impact on decreasing dependency (World Bank, 2015).

The recruitment agency placement of migrant workers was enforced in all economic sectors in 1995 (except for domestic work) and it was noted that the use of recruitment services had become an “unstoppable trend” (ILO, 2016). An important change in policy occurred in July 2005 when a guideline was issued by the Cabinet Committee on Foreign Workers requiring that companies intending to hire fewer than 50 migrant workers must use the services of “labour outsourcing companies” (Nurlina, 2016). For companies hiring over 50 migrant workers, either direct recruitment in countries of origin or use of an outsourcing company were allowed. The policy quickly spawned a massive new recruitment industry within Malaysia, growing from 277 (MEF, 2014) to over 400 outsourcing companies at its peak (ILMIA, 2013). The outsourcing companies negotiate contracts, arrange workers’ visas, pay workers and provide accommodation, food and insurance. Even for “direct recruitment” of migrant workers, outsourcing companies were often heavily involved, acting as the employer’s representative to source workers in countries of origin and handling the administrative requirements. Under this system, the outsourcing company is the direct employer of the worker. The new outsourcing system therefore does not attach workers permits to a particular employer. This dilutes the control of the government. Regulatory action followed in 2011, halting the issuance of licenses and work permits to outsourcing companies due to major problems with misconduct, namely, the scale of fees⁴ charged by the agents to the workers and companies. It remains to be seen whether the shift towards the new recruitment system has affected foreign labour demand.

A minimum wage law came into effect on 1 January 2013 for employers hiring more than five workers, which was extended to all employers six months later. The law requires that workers be paid a minimum wage rate of not less than RM900 per month in Peninsular Malaysia and RM800 for Sabah, Sarawak and Labuan. Part of the Government’s motivation for establishing the minimum wage was to decrease dependency on migrant workers by making low-skilled jobs more desirable to nationals. According to employers, the average basic wage of migrants was between RM450 – RM600 per month prior to enactment of the Order. It is estimated that the application of the minimum wage law increased wages of migrant workers by about 16–78 per cent. Although compliance remains incomplete, setting a legal minimum has had a meaningful effect on the wages of low-skilled migrants. In July 2016, the minimum wage was increased to RM1,000 per month in the Peninsular and RM920 in Sabah, Sarawak and Labuan.

As pointed out by World Bank (2015), Malaysia employs a hybrid system to manage immigration flows, combining (static) quantity-oriented dependency ceilings⁵ and price-oriented levies.

⁴Recruitment fees in Malaysia are regulated under the Private Employment Agencies Act 1981 (No. 246), where placements fees of not more than 20% of the initial month’s pay are charged to foreign workers. Due to lack of enforcement, the foreign workers and companies are paying exorbitant placement and recruitment fees to outsourcing companies, respectively (Nurlina, 2016; World Bank, 2015). However, most companies surveyed continued to recruit foreign workers through recruiting agencies (MEF, 2014).

⁵ The dependency ceiling for manufacturing is calculated based on the number of local workers.

Table 1: Chronology of Foreign Labour Policies, 1985-2017 (May)

Year	Policy/ Regulation
First Sub-Period: 1985-1999	
1985-86	Signing of the MoU between Malaysia and the Philippines – for domestic workers; Permission given for employers to recruit workers from Bangladesh and Thailand for the plantation and construction sectors.
1987	Legalized the use of Indonesian workers in the plantation sector.
1989	Regularization programme.
Jan-90	Freeze on labor importation from Indonesia.
1991	Formation of Cabinet Committee on Foreign Workers.
Oct-91	Introduction of an annual migrant-worker levy, which varies by sector and skill category (general, semi skilled and unskilled). Agriculture (RM360, RM540 and RM720); Construction (RM420, RM600 and RM900); Manufacturing (RM420, RM600 and RM900); Services (RM360, RM540 and RM720).
Dec-91	Launching of Ops Nyah I (Operation Expunge I - to stop illegal infiltration).
Jun-92	Launching of Ops Nyah II (Operation Expunge II - to weed out illegal immigrants).
Jul-92	(i)Permission given for employers to recruit workers from Indonesia, Thailand, Philippines, Bangladesh and Pakistan for manufacturing and services sectors. (ii) Introduction of the levy system, varying by sector and skill; RM420, RM600 and RM900 for the general worker, semi-skilled and unskilled in manufacturing, respectively.
Apr-93 –Jan-94	Ban on unskilled worker recruitment. Ban lifted for manufacturing sector. Ban re-implemented on unskilled and semi-skilled workers for all sectors.
Oct-95	Special Task Force on Foreign Labor (the sole agency for recruitment - a one-stop-agency to deal with the processing of immigrants).
Dec-95	All levies increased by 100%, except for agriculture and domestic service. It was raised to RM1200 for construction and manufacturing and RM720 for services.
Jan-96	Freeze on the importation of skilled and unskilled labor except for critical sectors in manufacturing and recreation/ tourist industries.
Apr-96	Hari Raya Amnesty for Indonesian illegal workers.
Aug-96 – Jan-97	Freeze on labor importation (employers were instructed to recruit directly from the immigration detention depots) – eventually cancelled the exercise due to the lukewarm response from employers.
Mac-97	Task Force disbanded – functions taken over by the Foreign Workers Division of the Immigration Department.
Aug-97	Ban on new recruitment on migrant workers due to the AFC. Second regularization exercise for illegal migrants from Indonesia, Thailand, the Philippines, Bangladesh and Pakistan.
Jan-98	Annual levy per worker raised to RM1500 for the construction, manufacturing and services sector. It was maintained at RM360 for the plantation and domestic services sector. Mandatory contribution to EPF (12% and 11% of monthly wages by employers and employees respectively).
Jul-98	Ban on the renewal of work permits for the services sector lifted.
Oct-98	Ban on new recruitment lifted – 120,000 new work permits approved for migrant workers in plantation and construction sectors.
Nov-Dec-98	Freeze on the importation of migrant workers lifted.
Feb-99	Levies are lowered for all categories (from RM1500 to RM1200), except domestic workers. New hirings of mostly Indonesian workers.
Oct-99	Recruitment of Sri Lankans in the manufacturing sector.

Table 1 contd.

Year	Policy/ Regulation
Second Sub-Period: 2000-2008	
2001	Mandatory contribution to EPF revoked.
May-01	Ban on intake of Bangladeshis – following clashes with locals.
Oct-01	Maximum limit of temporary work pass limited from 5 years to 3 years.
Feb-02	Maximum work permit extended to a 3+1+1 ruling (except for domestic services). Ban on new recruitment of Indonesian workers in all sectors, except for domestic services.
Mac-Jul-02	Amnesty programme.
Jul-02	Recruitment of Cambodians in the agri-plantation, manufacturing and construction sectors.
Jan-03	Restrictions lifted on Indonesian workers in the manufacturing and construction sectors.
Apr-03	Freeze on hiring of migrant workers from SARs related countries.
Sept-03	Signing of MoU between Malaysia and China – for workers in ceramics and furniture.
Oct-03	Amendment to Immigration Act 2002 – higher penalty for illegal immigration. Mandatory whipping of up to six strokes of the cane for irregular migrants and their employers.
Dec-03	Signing of the MoU between Malaysia and Vietnam.
Mac-04	New requirement – migrant workers to attend classes on Malaysian language and culture.
Oct-04	Illegal workers allowed to return on official permits.
2005	Permission granted to migrant workers whose contracts have expired to change employers within the same economic sector as long as their work permits are still valid.
Mac-05	Signing of the MoU between Malaysia and Pakistan.
Aug-05	(i) The foreign worker intake procedure via the Foreign Worker One-Stop Approval Centre of the Ministry of Home Affairs came into effect. (ii) RELA, or the People's Volunteer Corps given power to arrest unauthorized migrants until mid-2009 - provided opportunities for extortion. (iii) Levies are revised: RM1200 (RM960) for manufacturing and construction in Peninsular (East Malaysia); RM540 for plantations; and RM1800 (RM1440) for non-domestic services in Peninsular (East Malaysia).
Jan-06	(i) Employers may use the services of outsourcing companies to supply and manage the foreign workers. Ministry of Home Affairs licensed 270 outsourcing companies to recruit mainly South Asian migrants (ii) Electronic Labour Exchange (ELX) created at the MOHR – mandatory for employers in plantation, construction, manufacturing and services to advertise vacancies in the ELX before they can apply to bring in migrant workers.
Nov-06	Signing of the MoU between Malaysia and Indonesia – Malaysian employers are asked to pay RM2,415 to a local agent while the domestic worker has to pay her Indonesia-based agent RM1,228.
Jul-07	Major operation to round up an estimated 500,000 irregular migrants.
Oct-07	Ban on the recruitment of Bangladeshi workers because of problems arising from agents (both recruiting agencies in their home country and outsourcing companies in Malaysia).
Jan-08	Unskilled migrant workers will not have their work permits extended if they have been in the country for five years or more.

Table 1 contd.

Year	Policy Regulation
Third Sub-Period: 2009-2016	
2009	Freeze on the issuance of new licenses for labour outsourcing companies.
Jan-09	Freeze on labour importation to the manufacturing sector.
Apr-09	Cost of levy to be borne by employers, instead of workers.
Oct-09	Protests by migrant workers that employers continued deducting wages to cover the levy charges.
Jul-09	Freeze on the importation of migrant workers lifted for specific industries.
Jan-11	Compulsory medical insurance policy for migrant workers (excluding domestic maids); Annual premium of RM120 per worker.
July-11	Amnesty programme to legalize illegal migrants under a biometric identification system.
Jan-13	(i) Minimum wage law implemented to workers in all sectors (except for domestic workers. It was fixed at not less than RM900 per month in Peninsular Malaysia and RM800 for Sabah, Sarawak and Labuan. (ii) Reversal of 2009 policy; cost of levy to be borne by workers.
Feb-16	(i) New system of charging levies on foreign workers based on two different categories of sectors workers are employed in: Category one which consists of manufacturing, construction and services sectors with a levy of RM1,850; and Category two which includes plantations and agriculture with a levy of RM640. (ii) Ban on foreign workers in manufacturing, construction, plantation and furniture-making industries. (iii) Rehiring programme to legalize at least 2 million illegal foreign workers.
July-16	The minimum wage was increased to RM1,000 per month in the Peninsula and RM920 in Sabah, Sarawak and Labuan.
Jan-17	(i) Under the Employer Mandatory Commitment (EMC), employers are fully accountable for their foreign worker's levy and can no longer deduct their employees' salaries to pay the levy (postponed to January 2018). (ii) Temporary passes (E-Card or enforcement card) to be issued to illegal foreign workers in Peninsular Malaysia if the employer registers them.
Feb-17	Signing of a MoU with the Bangladeshi government for an additional 1.5 million workers over the next three years.
May-17	Lifting a freeze on hiring of foreign workers in manufacturing, construction, plantation and furniture-making industries.

Sources: Devadason and Chan (2014); and updated from official publications and press releases.

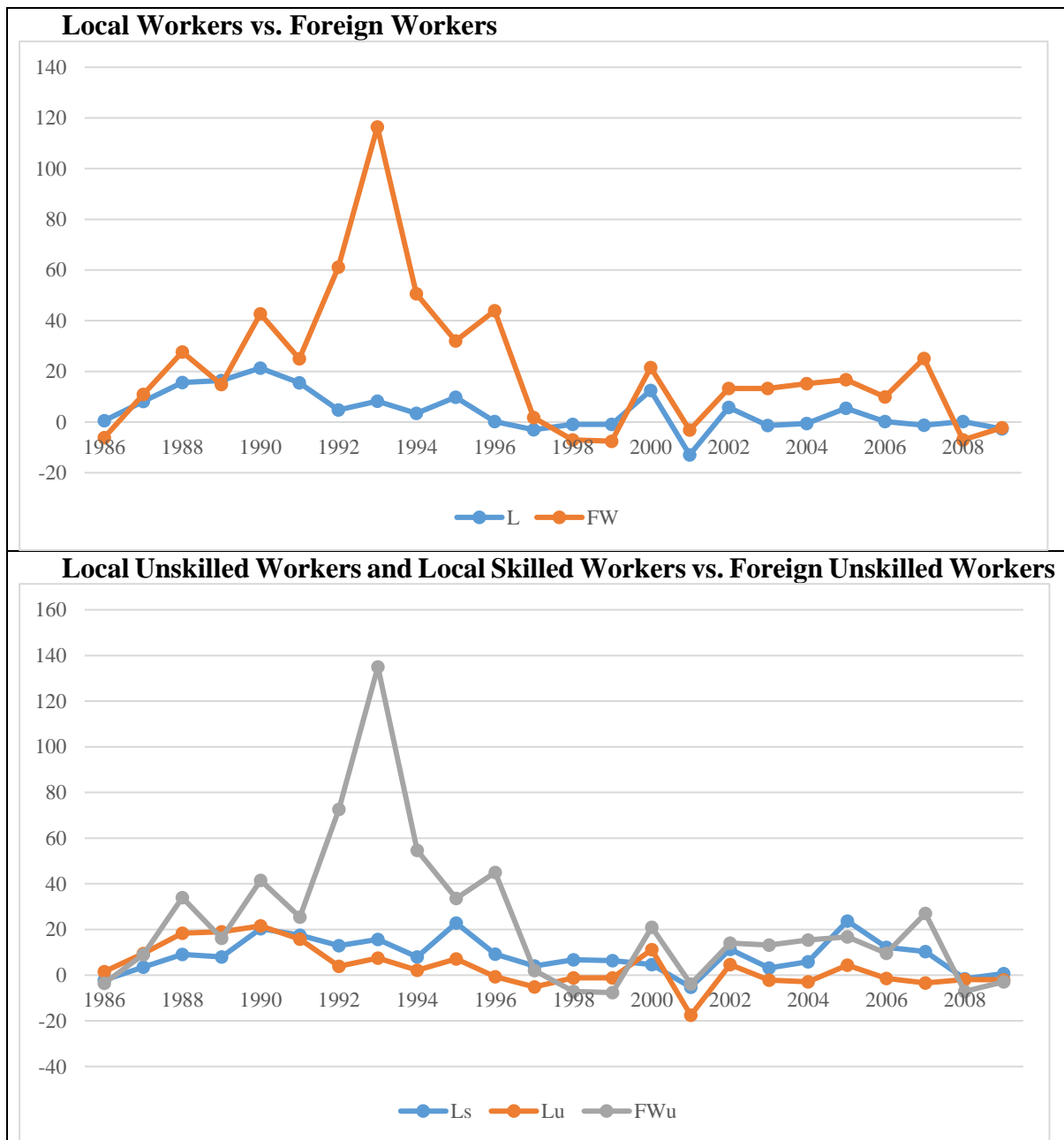
2.2 Migrant Growth and Patterns

Figure 1 presents the growth in manufacturing employment, by local- and foreign workers, over the period 1985 to 2009. Foreign workers started to grow rapidly since 1992 (when they were officially permitted to work in the manufacturing sector) and by 1996, they accounted for 14.4 percent of total employment in manufacturing and reached 27.5 percent of total employment in 2009. Foreign workers recorded an average growth rate of 21.2 percent relative to a mere 4.4 percent growth in employment of local workers between 1985 and 1992. This was attributed to the rapid increase in demand for workers following high growth in this sector, the reluctance of locals to work for the same type of jobs, due to either the remuneration, poor working conditions or the nature of the job, or the employers preference for foreign employees (MEF, 2014), as well as the relatively ineffectiveness of the government policy in restraining inflows of foreign labour (Tham and Liew, 2002). During the period of review, the general increasing trend of foreigners reverted in the crises periods, the 1997-1998 Asian financial crisis (AFC) and 2008-2009 global financial crisis (GFC), and the 2000-2009 technology bubble burst that affected the electrical and electronics (E&E) industry. Of the three external shocks, foreign workers bore the brunt of the adjustment in the labour market in the aftermath of the AFC relative to local workers (see also Horton and Mazumdar, 2001; Narayanan and Lai, 2014).

Based on the second panel of Figure 1, it is noted that the growth trends in unskilled foreign workers track closely that of total foreign workers in the first panel. This reflects the concentration of foreign workers mainly in unskilled jobs. The percentage of foreign unskilled workers in total foreign employment in manufacturing was 73.1 percent in 1992 and 95.3 percent in 2009. More importantly, unskilled foreigners comprised 37.9 percent (an increase from 1.6 per cent in 1992) of the unskilled workforce in manufacturing in 2009. Foreign workers continue to be employed mainly as production operators (see also Kassim, 2001) in manufacturing due to a significant and continuous shortage in this category of workers (Shamsulbahriah Ku, 1998). Conversely, though the average growth of local unskilled workers at 3.6 percent falls short of that of local skilled workers at 8.6 percent, the former comprised 59.1 percent of total local workers. The World Bank (2015) study found complementary effects between the foreign unskilled and local skilled workers.

In fact, the employment of foreign workers is uniformly high across all manufacturing industries, with the exception for petroleum (see Appendix Figure 1). By entire economic sector, even the smaller and labour intensive manufacturing industries, such as wood, food and transport equipment, were found to be significant employers of foreigners (Narayanan and Lai, 2014; Del Carpio, et al., 2015).

Figure 1: Malaysia: Employment Growth in Manufacturing, 1986-2009



Notes: L – total local workers; FW – total foreign workers; Lu – unskilled local workers; Ls – unskilled local workers; FWu – unskilled foreign workers.
 Source: Unpublished data from Annual Survey/ Census Manufacturing Industries, Department of Statistics, Malaysia.

3. THEORY, MODEL AND DATA

3.1 Theoretical Setting and Model Specification

The theoretical apparatus is a model of the demand side of the labour market. The standard labour demand function based on cost minimisation (Hamermesh, 1993) can be written as:

$$L = L(W, Q, X), \quad (1)$$

where L is the labour demand function, W stands for the real wage, Q is production (or sales) and X are other relevant control factors.

Following Basu et al. (2005), equation (1) takes the following form:

$$FW_{it} = \alpha + \beta_1 W_{it} + \beta_2 Q_{it} + \beta_3 L_{it} + \beta_4 X_{it} + \beta_5 R_{it} + \beta_6 Z_{it} + \delta_t + \mu_{it} \quad (2)$$

where i = industry, t = years, and μ is the error term. FW corresponds industry-level foreign labour demand, which is the growth of foreign workers; W to the growth of real wages per employee; Q to growth of real output. X comprises industry characteristics (capital intensity, industry size and export orientation); R captures specific policy instruments (levy, recruitment system and minimum wage), and Z refers to the external shocks.

In examining the policy effects on foreign labour demand, it is important pay attention to the unskilled group given their dominance in the labour market. In that case, the impact of foreign labour policies should be reflected more on the demand for the unskilled (see specification (2) below). It is also perceived that the demand for unskilled foreign workers responds directly to the availability of the local manpower (both the skilled and the unskilled) (see specification (3) below) (see World Bank, 2015; Narayanan and Lai, 2014; Idris and Rahmah, 2006). In the case of the unskilled, the most vulnerable group in Malaysia, the locals in this category are deemed to compete directly with foreign workers in the same job scope. Alternatively, unskilled foreign labour demand is said to complement the demand for locals in the skilled category.

$$FWu_{it} = \alpha + \beta_1 Wu_{it} + \beta_2 Q_{it} + \beta_3 Lu_{it} + \beta_4 X_{it} + \beta_5 Z_{it} + \beta_6 R_{it} + \delta_t + \mu_{it} \quad (3)$$

$$FWu_{it} = \alpha + \beta_1 Wu_{it} + \beta_2 Q_{it} + \beta_3 Lu_{it} + \beta_4 Ls_{it} + \beta_5 X_{it} + \beta_6 Z_{it} + \beta_7 R_{it} \delta_t + \mu_{it} \quad (4)$$

The choice of capital intensity (KL), average industry size ($Size$) and export orientation (EO) is based on the empirical literature. Capital intensive industries, those with high capital-labour ratio, rely less on foreign workers than labour intensive industries. In manufacturing, large firms are found to rely more on foreign workers (Del Carpio et al., 2015). Alternatively, both domestic-oriented and export-oriented industries utilize foreign workers.

Core to this analysis is the regulatory framework for managing foreign workers. For this purpose, dummy variables are included to account for each of the key policy changes/revisions. $DI992$ represents the year in which migrant workers were formally permitted to manufacturing. $DLevy$ represents the revisions to the levy made in 1995, 1998, 1999, 2005, 2012 and 2016, while 2009 and 2013 refer to the shifting responsibilities of paying the levy between the worker and the employer. DRS refer to the changes in the recruitment system in 2005 and 2011. Finally, DMW represents the minimum wage order in 2013, and the revision in minimum wage in 2016.

Finally, the economic crises of 1997/98 (Asian financial crisis) and 2008/09 (global financial crisis) reflect a period of economic contraction.

3.3 Data Description

Data on industry-level manufacturing employment, yearly wages, output, fixed assets and exports are compiled from unpublished returns to the *Annual Survey of Manufacturing Industries* (ASMI) conducted by the Department of Statistics (DOS), Malaysia. The survey/census data are available from 1985, but it is not possible to consistently match the data after 1999 with those for the preceding years at the five-digit level of the national industry classification because of major changes in the classification system introduced with effect from 2000 and from 2009. Moreover, the data file for the years prior to the introduction to 2000 do not contain export data. For these reasons, the study focuses primarily on a data panel constructed for 23 industries at the three-digit level spanning the period 1985-2009. However as a rough check on the estimates coming from the overall period, the estimations are also conducted for two sub-periods, 1985-1999 (first sub-period) and 2000-2008 (second sub-period), using panel data sets constructed at the five-digit level of the national industry classification. All three data panels are balanced⁶.

The DOS database provides employment (local and foreign) and wage data for full-time employees under five major occupational categories: managerial and professional, technical and supervisory, clerical and related workers, general workers, and production workers and operatives (directly employed and through labour contractors). For the purpose of this study, production workers and operatives are defined as unskilled workers (U), while the professional and managerial workers are treated as skilled (S) technocrats. The wage bill includes both regular wage/salary and all other payments in cash to workers, other than the employer's contribution to provident funds. The wage (W) measures used for the study are the real annual full-time wages divided by the number of full-time employees while industry output (Q) is based on real value-added (gross output at ex-factory price – cost of intermediate inputs). W and Q are expressed in real terms. Wages and salaries and nominal value added are deflated by the consumer price index and producer price index at 1980 constant price, respectively.

Other variables such as capital intensity (KL), is taken as real fixed assets divided by the number of full time employees. Nominal fixed assets are deflated by the implicit deflator for gross fixed capital formation. Industry size ($Size$) refers to the number of full-time employees per establishment and export orientation (EO) is calculated as the share of exports in gross output.

There are several limitations of the DOS data that are worth noting. First, the data have an inherent “large firm bias” because of the employment cut off point (which varies across industries) used in conducting the survey. However, this does not pose a major problem in the inter-industry analysis of labour demand patterns as the survey/ census data cover more than 90 percent of manufacturing employment. Therefore the ASMI is considered a representative nationwide survey of manufacturing establishments. Second, no manufacturing survey was conducted for the years 1998 and hence the gap in data series is filled with the average of 1997 and 1999. The possible data error for a single year is unlikely to distort the coefficient estimates. Third, the DOS database does not provide wage data for local and foreign workers separately. Therefore the wage series used in the analysis is a composite variable of local and foreign worker wages. As in other previous studies of inter-industry labour demand, relevant industry characteristics are incorporated as control variables to minimize any possible estimation bias.

⁶ In cases where there are no data for a specific year, an unbalanced panel is estimated.

Appendix Table 1 contains the descriptive statistics for the full sample and sub-periods, while Appendix Table 2 presents the correlation matrices.

4. RESULTS AND DISCUSSION

4.1 Empirical Estimates

Equations (2) – (4) are estimated using the fixed-effects (FE) and random-effects (RE) estimators and the results are compared using the Hausman test. The test fails to reject the null hypothesis that the unobserved explanatory variables (the unobserved effects) are not distributed independently of the explanatory variables. Since the results do not favour the use of the FE estimator, Table 2 reports the output of both the FE and RE estimators for comparison.

The negative sign for the coefficient estimates for wages and the positive sign for the output coefficients conform to theoretical predictions. The results further indicate that an increase in unskilled locals reduces the demand for unskilled foreign workers, while the opposite holds true in the case of skilled locals (see also World Bank, 2015). This suggests that foreign workers compete with the local unskilled but complement the local skilled. These results should however be interpreted with caution, as the sub-period analysis (Table 3) does not provide any evidence of competing effects between the unskilled foreigners and the locals in the same category. The empirical findings on the competing and complementary effects between foreign-local workers in Malaysia remains at best mixed.

In terms of the impact of structural characteristics of the industry on foreign labour demand, the coefficient estimates for capital-labour intensity and industry size bear the expected signs. The demand for foreign labour is higher among capital intensive industries and larger firms. However, there is no evidence of higher labour demand among export-oriented industries (see Table 3).

The formalization of foreign workers in the manufacturing sector in 1992 has without doubt increased the utilization of foreign workers in manufacturing. The upward revisions in the levy in 1995 and 1999 have consistently reduced the growth of foreign workers, while the 2005 revision has increased the usage of migrant workers (albeit the limited evidence). The year 2005 did not only see another round of revisions in levy but also the implementation of the new outsourcing system. In this respect, it is difficult to distinguish the individual impact of both governing measures. Overall, the larger coefficient estimates for the levy in specification (3) relative to specification (2) are not surprising given that the policy instrument is relatively important for the unskilled category. Interestingly, the shifting of the responsibility for paying the annual levy from the migrant worker to the direct employer in 2009 has no significant bearing on reducing foreign labour demand. A plausible reason for this is that most of the employers resorted to paying the levy by deducting the wages of foreign workers.

The 1997/1998 AFC had reduced migrant labour usage, as expected. This highlights the structural nature of the demand for foreign workers, wherein the government treats foreign workers as an itinerant labour force (disposable workers), and specific to filling the gaps in the manpower needs.

Table 2: Fixed Effects and Random Effects Estimates of Labour Demand

Regressors	Fixed Effects			Random Effects		
	(2)	(3)	(4)	(2)	(3)	(4)
<i>W</i>	-0.418 (0.316)	-0.819** (0.342)	-0.780** (0.348)	-0.451 (0.308)	-0.791** (0.323)	-0.747** (0.327)
<i>Q</i>	0.466*** (0.133)	0.432*** (0.137)	0.335** (0.119)	0.469*** (0.137)	0.434*** (0.132)	0.327*** (0.115)
<i>L</i>	-0.008* (0.004)	-0.018** (0.008)	-0.018** (0.009)	-0.008** (0.004)	-0.018** (0.008)	-0.017** (0.008)
<i>Ls</i>			0.317 (0.212)			0.340 (0.209)
<i>lnKL</i>	-0.099* (0.050)	-0.038 (0.092)	-0.032 (0.089)	-0.043*** (0.104)	-0.053*** (0.019)	-0.050** (0.019)
<i>lnSize</i>	0.118*** (0.038)	0.160*** (0.053)	0.148** (0.056)	0.035** (0.015)	0.073*** (0.020)	0.068*** (0.021)
<i>D92</i>	0.576*** (0.079)	0.940*** (0.150)	0.928*** (0.150)	0.575*** (0.078)	0.958*** (0.150)	0.945*** (0.150)
<i>DLevy95</i>	-0.227** (0.085)	-0.545*** (0.139)	-0.560*** (0.143)	-0.291*** (0.078)	-0.600*** (0.132)	-0.610*** (0.136)
<i>DLevy98</i>	0.065 (0.073)	0.086 (0.114)	0.085 (0.110)	0.059 (0.072)	0.089 (0.115)	0.088 (0.111)
<i>DLevy99</i>	-0.297*** (0.084)	-0.379*** (0.130)	-0.358** (0.133)	-0.294*** (0.081)	-0.371*** (0.122)	-0.348*** (0.124)
<i>DLevy05</i>	0.057 (0.034)	0.086** (0.039)	0.054 (0.045)	0.050 (0.031)	0.062** (0.029)	0.029 (0.030)
<i>DLevy09</i>	-0.080 (0.127)	-0.208 (0.199)	-0.199 (0.207)	-0.072 (0.128)	-0.198 (0.198)	-0.189 (0.206)
<i>D9798</i>	-0.325*** (0.064)	-0.349*** (0.082)	-0.336*** (0.080)	-0.335*** (0.062)	-0.358*** (0.080)	-0.343*** (0.078)
<i>D0809</i>	-0.057 (0.072)	0.001 (0.090)	0.037 (0.076)	-0.053 (0.072)	0.002 (0.089)	0.040 (0.075)
constant	0.637 (0.559)	-0.178 (1.038)	-0.206 (1.004)	0.411*** (0.108)	0.382** (0.183)	0.359* (0.188)
R-squared overall	0.261	0.233	0.240	0.287	0.242	0.248
No. of observations	552	552	552	552	552	552
No. of groups	23	23	23	23	23	23

Notes: The dependent variable is *FW* for equation (2) and *FWu* for equations (3) and (4). Standard errors adjusted for arbitrary heteroskedasticity and intra-group correlation are given in parentheses. ***, **, * denote statistical significance at the 1% level, 5% level and 10% level, respectively.

4.2 Robustness Checks

The estimations based on the FE and RE are repeated for the sub-periods of 1985-1999 and 2000-2008, and the results are presented in Table 3. Since the Hausman test is rejected for all specifications in Table 3, only the FE results are reported. The sub-period results are fairly robust in terms of the policy effects of foreign labour demand. The upward revisions in the levy in 1998 and 1999 are found to be significant and negative. The revisions in the levy for the other years do not seem to significantly matter for foreign labour demand.

An alternative to estimating a static labour demand model is to estimate a dynamic labour demand which explicitly accounts for short-term dynamics. The results of the dynamic panel-data estimators with the Arellano–Bover (1995) /Blundell–Bond (1998) system

estimator are reported in Table 4. The estimator is only applied to the sub-period data as it is designed for datasets with many panels and few periods. The estimation results do not present evidence that the model is misspecified since it fails to reject the null hypothesis of no serial correlation at order two in the first-differenced errors. The variable of interest, the levy, is again found to consistently have a negative impact on foreign labour demand, except for the upward revision in 2005.

Table 3: Fixed Effects Estimates of Labour Demand, by Sub-Periods

Regressors	First sub-period: 1985-1999			Second sub-period: 2000-2008		
	(2)	(3)	(4)	(2)	(3)	(4)
<i>W</i>	-0.242 (0.199)	-0.456** (0.192)	-0.467** (0.188)	-0.487*** (0.139)	-0.434** (0.213)	-0.381* (0.206)
<i>Q</i>	0.010 (0.094)	0.248** (0.098)	0.199** (0.100)	0.273*** (0.072)	0.337*** (0.095)	0.239** (0.104)
<i>L</i>	0.793*** (0.135)	0.226 (0.158)	0.107 (0.168)	0.576*** (0.104)	0.374*** (0.122)	0.278** (0.121)
<i>Ls</i>			0.301** (0.143)			0.288** (0.119)
<i>lnKL</i>	0.122** (0.048)	0.095 (0.084)	0.082 (0.083)	-0.182** (0.073)	-0.211** (0.090)	-0.213** (0.088)
<i>lnSize</i>	0.206*** (0.049)	0.465*** (0.093)	0.448*** (0.093)	0.127* (0.069)	0.102 (0.116)	0.095 (0.110)
<i>EO</i>				-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
<i>D92</i>	0.156* (0.082)	0.371*** (0.140)	0.374*** (0.140)			
<i>DLevy95</i>	0.098** (0.045)	0.142* (0.085)	0.133 (0.084)			
<i>DLevy98</i>	-0.088 (0.061)	-0.155** (0.071)	-0.155** (0.071)			
<i>DLevy99</i>	-0.370*** (0.043)	-0.417*** (0.061)	-0.404*** (0.060)			
<i>DLevy05</i>				0.011 (0.032)	0.022 (0.038)	-0.005 (0.041)
<i>D9798</i>	-0.249*** (0.035)	-0.234*** (0.048)	-0.237*** (0.049)			
<i>D0809</i>				-0.165*** (0.047)	-0.192*** (0.055)	-0.162*** (0.053)
constant	-2.042*** (0.576)	-2.768*** (1.011)	-2.557** (1.011)	1.654* (0.975)	2.102 (1.293)	2.139* (1.212)
R-squared overall	0.066	0.064	0.070	0.155	0.092	0.104
No. of observations	1597	1218	1218	1335	1315	1315
No. of groups	120	120	120	169	169	169
Hausman test ^(a)	$\chi^2(11) = 23.59$	$\chi^2(10) = 22.54$	$\chi^2(11) = 20.94$	$\chi^2(8) = 20.59$	$\chi^2(8) = 12.41$	$\chi^2(9) = 12.84$

Notes: The dependent variable is *FW* for equation (2) and *FWu* for equations (3) and (4). Standard errors adjusted for arbitrary heteroskedasticity and intra-group correlation are given in parentheses. ^(a)Null hypothesis is rejected at 1% level for equation (2) and at the 5% level for equations (3) and (4). ***, **, * denote statistical significance at the 1% level, 5% level and 10% level, respectively.

Table 4: Dynamic Labour Demand Estimates, by Sub-Periods

Regressors	First sub-period: 1985-1999			Second sub-period: 2000-2008		
	(2)	(3)	(4)	(2)	(3)	(4)
$FW_{i,t-1}$	-0.111*** (0.031)	-0.090** (0.044)	-0.090** (0.043)	-0.129** (0.059)	-0.162** (0.051)	-0.164*** (0.048)
W_t	0.168 (0.229)	-0.188 (0.208)	-0.205 (0.202)	-0.462** (0.204)	-0.558** (0.264)	-0.535** (0.251)
$W_{i,t-1}$	0.003 (0.146)	0.414** (0.172)	0.392** (0.169)	0.025 (0.222)	-0.131 (0.206)	-0.146 (0.206)
Q_{it}	0.109 (0.095)	0.305** (0.134)	0.211 (0.132)	0.318*** (0.084)	0.426*** (0.100)	0.348*** (0.105)
$Q_{i,t-1}$	-0.065 (0.068)	-0.093 (0.089)	-0.108 (0.089)	0.139* (0.080)	0.197** (0.092)	0.197** (0.091)
L_{it}	0.801*** (0.173)	0.371** (0.161)	0.212 (0.160)	0.486*** (0.114)	0.305** (0.139)	0.203 (0.143)
LS_{it}			0.429*** (0.155)			0.250* (0.148)
KL_{it}	-0.329*** (0.107)	-0.552*** (0.128)	-0.594*** (0.134)	-0.100 (0.067)	-0.151 (0.093)	-0.159* (0.095)
$SIZE_{it}$	0.087 (0.080)	0.179 (0.113)	0.173 (0.116)	0.230** (0.107)	0.152 (0.192)	0.161 (0.180)
EO				-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)
$D92$	0.027 (0.090)	0.311* (0.161)	0.322** (0.162)			
$DLevy95$	-0.377*** (0.115)	-0.583*** (0.127)	-0.607*** (0.129)			
$DLevy98$	-0.231*** (0.077)	-0.355*** (0.094)	-0.353*** (0.095)			
$DLevy99$	-0.447*** (0.047)	-0.376*** (0.070)	-0.348*** (0.070)			
$DLevy05$				0.054 (0.050)	0.073 (0.049)	0.041 (0.059)
$D9798$ (a)	-0.317*** (0.037)	-0.316*** (0.057)	-0.313*** (0.056)			
$D0809$				-0.185*** (0.049)	-0.187*** (0.068)	-0.166*** (0.065)
constant	0.399*** (0.039)	0.534*** (0.058)	0.524*** (0.058)	0.133*** (0.031)	0.137*** (0.032)	0.136*** (0.032)
No. of observations	1470	1073	1073	1162	1142	1142
No. of groups	120	119	119	169	168	168
Wald chi-squared	273.98	177.92	188.69	166.94	194.81	225.91
Autocorrelation ^(a)	$z = -0.502$	$z = -1.026$	$z = -1.168$	$z = -1.597$	$z = -1.693$	$z = -1.724$

Notes: The dependent variable is FW for equation (2) and FWu for equations (3) and (4). Standard errors adjusted for arbitrary heteroskedasticity and intra-group correlation are given in parentheses. ^(a)The null hypothesis of no autocorrelation at order two is not rejected at the 1% level for all specifications. ***, **, * denote statistical significance at the 1% level, 5% level and 10% level, respectively.

5. CONCLUSION

A key issue for effective immigration management is to have *desirable* policy instruments that align immigration to the needs of the labour market. Malaysia, uses a mix of quantity and price restrictions (quotas by sector, levies and minimum wage) to control the influx of foreign workers in the country. Quotas are generally found to be static and do not respond quickly to labour market needs, while levies are considered a more flexible instrument.

In this paper, industry-level foreign labour demand is analysed, paying particular attention to the role of the levy system. It is observed that the upward revisions in the levy are a significant deterrent in the use of foreign workers. The finding, in general, is shown to be robust to different sub-periods and different econometric specifications. However, worth mentioning here is that for the levy system to be effective, it is extremely important to adjust the levels based on labour market signals. A dynamic levy system that enables the government to appropriately price labour market needs is indeed a desirable instrument to align immigration to the objectives of the country (see also World Bank, 2015). Further, shifting the responsibility of paying the annual levy to the employer *per se* is only going to be effective with proper enforcement to ensure that the levy is not deducted through foreign workers' wages. Strong government policies can therefore be a 'game-changer' and limit the use of foreign workers in manufacturing.

Appendix Table 1a: Summary Statistics (Full Sample, 1985-2009)

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>FW</i>	552	0.187	0.447	-1.234	3.807
<i>FWu</i>	552	0.229	0.714	-4.094	5.150
<i>W</i>	552	0.019	0.103	-0.999	0.633
<i>Wu</i>	552	0.015	0.133	-1.113	1.057
<i>Q</i>	552	0.073	0.241	-2.244	1.548
<i>L</i>	552	5.023	4.757	-0.911	12.353
<i>Lu</i>	552	4.808	4.594	-4.393	12.106
<i>Ls</i>	552	0.076	0.179	-1.004	0.901
<i>lnKL</i>	575	11.211	1.111	8.952	15.353
<i>lnSize</i>	575	4.308	0.814	2.187	6.416

Appendix Table 1b: Summary Statistics (First Sub-Period, 1985-1999)

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>FW</i>	1597	0.221	0.660	-2.909	3.807
<i>FWu</i>	1218	0.266	0.830	-3.332	4.595
<i>W</i>	1680	0.026	0.122	-0.999	0.704
<i>Wu</i>	1680	0.024	0.157	-1.169	1.605
<i>Q</i>	1680	0.098	0.306	-3.097	3.203
<i>L</i>	1680	0.046	0.211	-0.964	1.871
<i>Lu</i>	1680	0.042	0.244	-1.068	2.474
<i>Ls</i>	1680	0.072	0.259	-1.792	3.045
<i>lnKL</i>	1800	10.925	1.020	8.236	15.390
<i>lnSize</i>	1800	4.352	0.981	1.602	7.091

Appendix Table 1c: Summary Statistics (Second Sub-Period, 2000-2008)

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>FW</i>	1335	0.127	0.522	-2.850	3.850
<i>FWu</i>	1315	0.133	0.609	-4.073	4.430
<i>W</i>	1352	0.008	0.134	-1.572	0.958
<i>Wu</i>	1352	-0.001	0.160	-1.957	1.113
<i>Q</i>	1352	0.011	0.355	-3.161	2.446
<i>L</i>	1352	0.004	0.266	-2.262	1.742
<i>Lu</i>	1352	-0.011	0.316	-2.576	2.451
<i>Ls</i>	1352	0.061	0.347	-2.565	3.497
<i>lnKL</i>	1521	11.158	0.864	8.325	15.353
<i>lnSize</i>	1521	4.135	1.040	0.318	7.439
<i>EO</i>	1521	27.929	20.539	0.000	94.768

Appendix Table 2a: Correlation Matrix (Full Sample, 1985-2009)

	<i>FW</i>	<i>FWu</i>	<i>W</i>	<i>Wu</i>	<i>Q</i>	<i>L</i>	<i>Lu</i>	<i>Ls</i>	<i>lnKL</i>	<i>lnSize</i>
<i>FW</i>	1									
<i>FWu</i>	0.787	1								
<i>W</i>	-0.056	-0.018	1							
<i>Wu</i>	-0.053	-0.092	0.834	1						
<i>Q</i>	0.296	0.190	0.020	-0.019	1					
<i>L</i>	-0.002	-0.030	-0.052	-0.035	0.044	1				
<i>Lu</i>	0.006	-0.027	-0.060	-0.037	0.046	0.998	1			
<i>Ls</i>	0.311	0.196	-0.027	-0.091	0.432	-0.007	-0.008	1		
<i>lnKL</i>	-0.109	-0.077	0.058	0.028	-0.017	-0.016	-0.042	-0.050	1	
<i>lnSize</i>	0.148	0.154	0.052	0.047	0.144	0.077	0.077	0.094	0.059	1

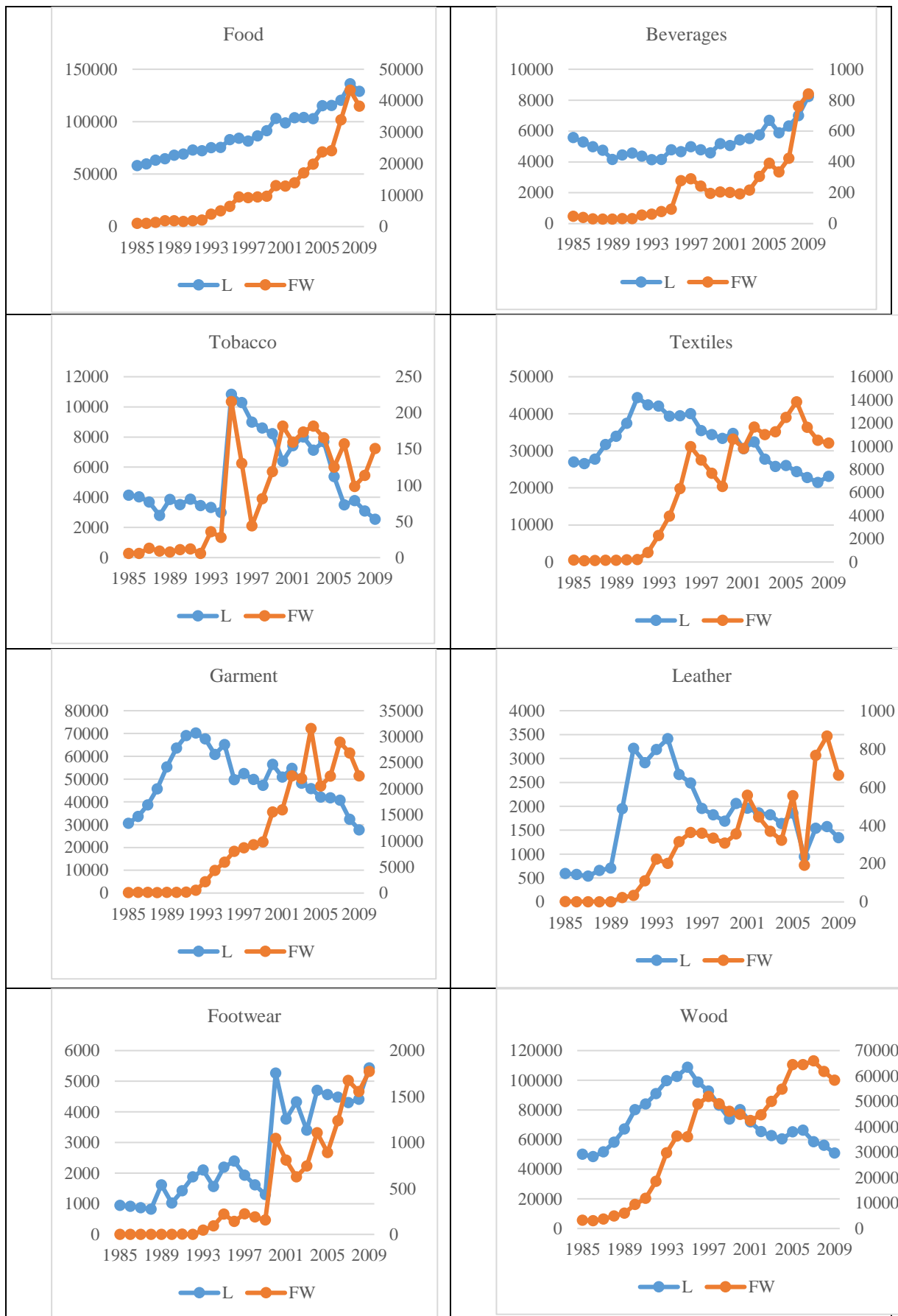
Appendix Table 2b: Correlation Matrix (First Sub-Period, 1985-1999)

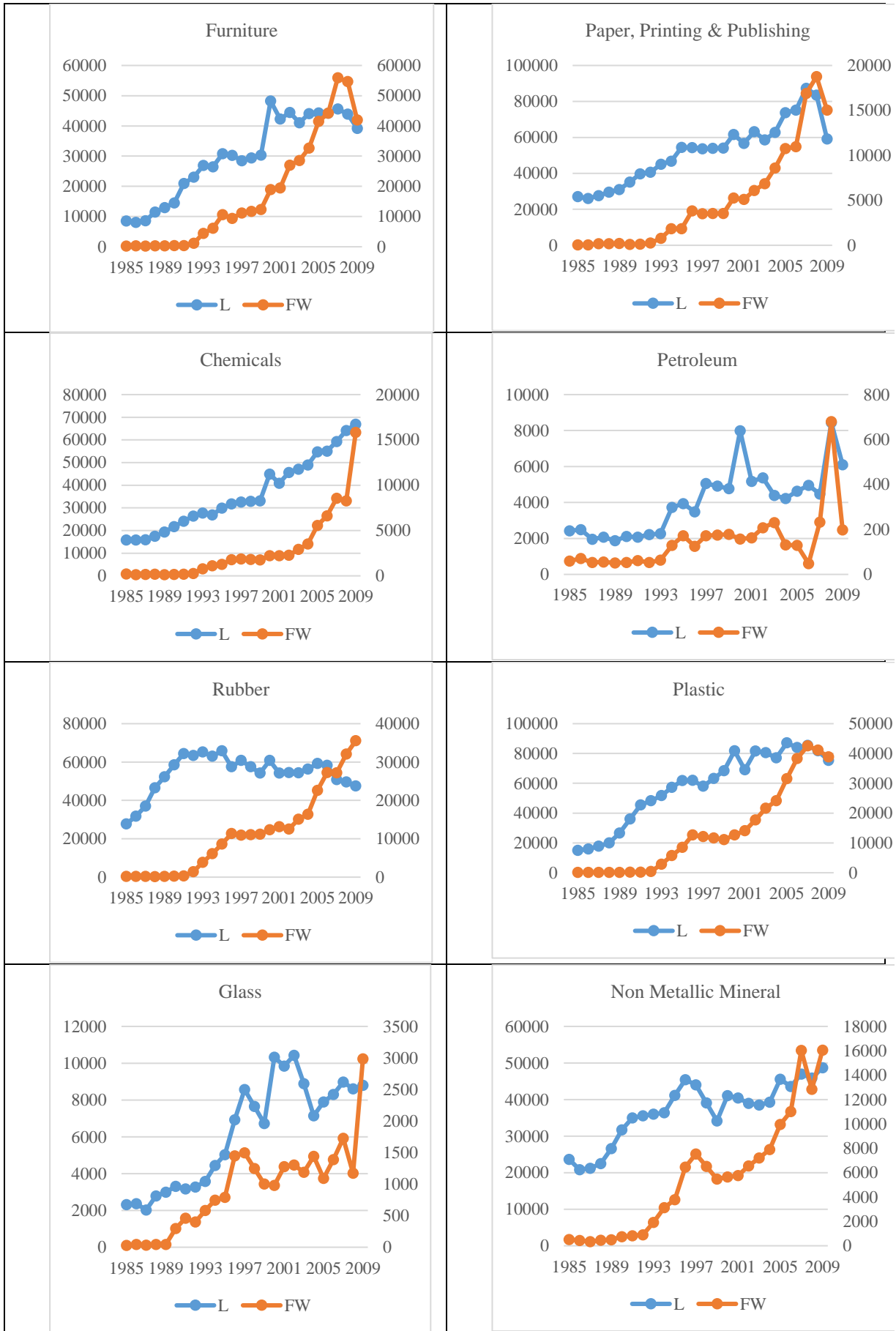
	<i>FW</i>	<i>FWu</i>	<i>W</i>	<i>Wu</i>	<i>Q</i>	<i>L</i>	<i>Lu</i>	<i>Ls</i>	<i>lnKL</i>	<i>lnSize</i>
<i>FW</i>	1									
<i>FWu</i>	0.853	1								
<i>W</i>	-0.074	-0.052	1							
<i>Wu</i>	-0.068	-0.040	0.872	1						
<i>Q</i>	0.221	0.168	0.138	0.131	1					
<i>L</i>	0.290	0.208	-0.275	-0.198	0.489	1				
<i>Lu</i>	0.248	0.179	-0.326	-0.249	0.425	0.953	1			
<i>Ls</i>	0.226	0.175	0.012	-0.020	0.392	0.589	0.468	1		
<i>lnKL</i>	-0.064	-0.028	-0.008	0.002	-0.032	-0.010	-0.020	-0.009	1	
<i>lnSize</i>	0.131	0.159	0.008	0.033	0.089	0.133	0.121	0.100	0.164	1

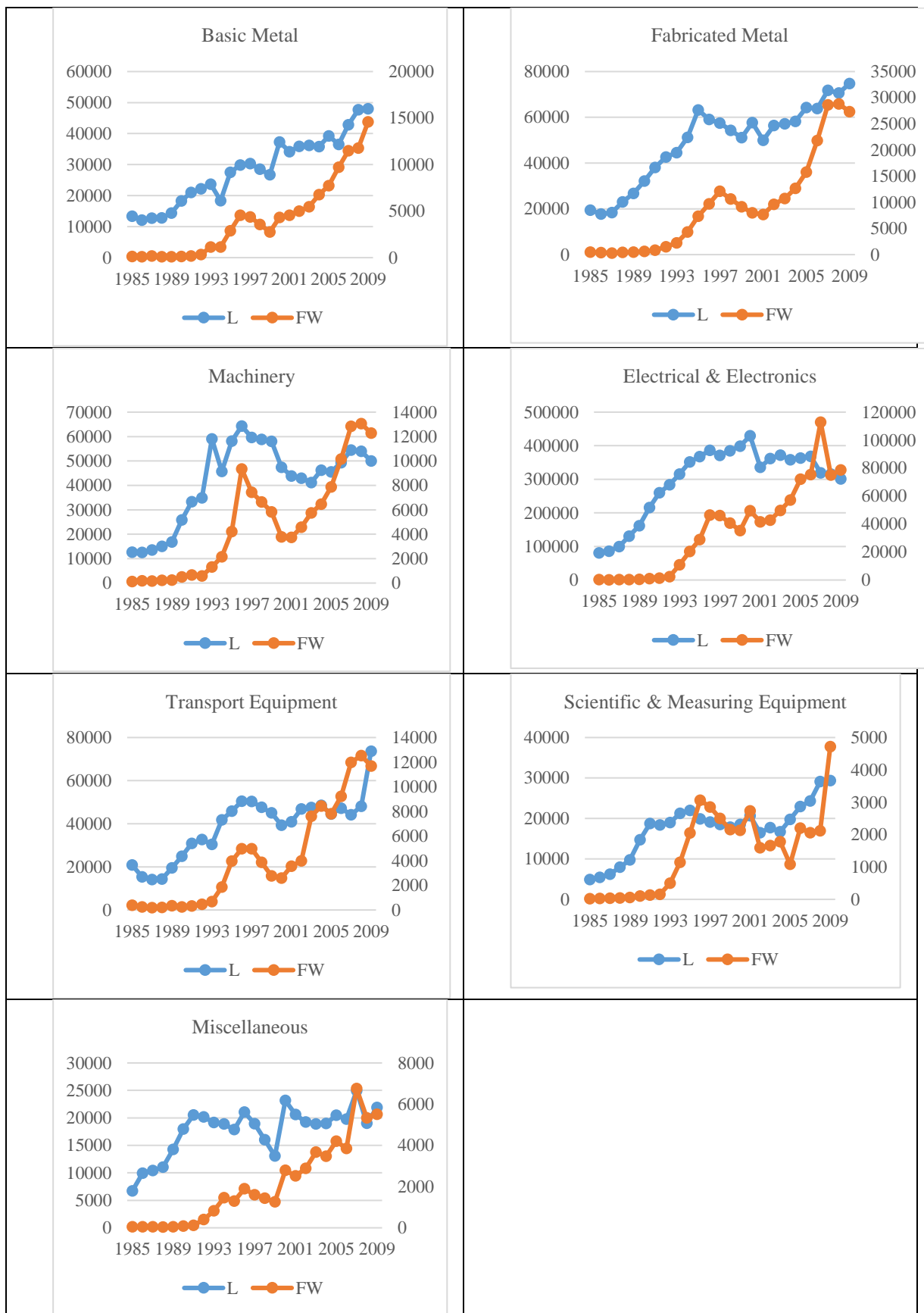
Appendix Table 2c: Correlation Matrix (Second Sub-Period, 2000-2008)

	<i>FW</i>	<i>FWu</i>	<i>W</i>	<i>Wu</i>	<i>Q</i>	<i>L</i>	<i>Lu</i>	<i>Ls</i>	<i>lnKL</i>	<i>lnSize</i>	<i>EO</i>
<i>FW</i>	1										
<i>FWu</i>	0.924	1									
<i>W</i>	-0.099	-0.113	1								
<i>Wu</i>	-0.046	-0.069	0.788	1							
<i>Q</i>	0.353	0.293	0.278	0.242	1						
<i>L</i>	0.457	0.392	-0.067	-0.006	0.662	1					
<i>Lu</i>	0.379	0.335	-0.123	-0.006	0.576	0.923	1				
<i>Ls</i>	0.387	0.331	0.079	-0.003	0.549	0.714	0.550	1			
<i>lnKL</i>	-0.007	0.011	0.079	0.042	0.070	0.008	0.009	-0.006	1		
<i>lnSize</i>	0.025	0.018	0.041	0.024	0.032	0.042	0.039	0.034	0.260	1	
<i>EO</i>	-0.088	-0.082	0.013	-0.011	-0.079	-0.092	-0.079	-0.061	-0.056	0.392	1

Appendix Figure 1: Employment in Manufacturing, by Industry, 1985-2009







Note: The number of local workers and the number of foreign workers refer to the left-axis and right-axis, respectively.

Source: Unpublished data from Annual Survey/ Census Manufacturing Industries, Department of Statistics, Malaysia.

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