GLOBALISATION AND LABOUR DEMAND IN THE MALAYSIAN MANUFACTURING SECTOR

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Abstract

The intensity of globalisation can be measured through the indicators of export-import to Gross Domestic Product (GDP) ratio, inflow and outflow of foreign direct investment (FDI), investment portfolio and payment made for transfer of technology. The current scenario indicates that the industrial activities have undergone major changes caused by globalisation through progress in communication and information technology (ICT). Consumption of modern technology and rapid changes in the production process from being labour- intensive to capital- intensive has contributed to several issues in labour market. This situation has brought about changes in the composition of the competent labour and increase in demand for skilled labour. This article has the objective to analyse the impact of globalisation on demand for skilled labour, namely, professional and management; and technical and supervisory in the manufacturing sector in Malaysia. Analysis is based on panel data from the Industrial Manufacturing Survey data collected by the Department of Statistics, Malaysia of 1985-2008. Analysis is done on the entire manufacturing sector and six subsectors, namely, manufacturing of sieved petroleum products; manufacturing of valves and electronic tubes and other electronic components; production, processing and preserved meat, fish, fruits, vegetables, oil and fats, manufacturing office equipment, accounting tools and calculators; manufacturing basic chemicals; and manufacturing basic iron based and metal products. Findings of the study demonstrate that FDI has positive and significant impact on the demand for both categories of labour, nonetheless, the economic openness and the number of technological agreements have negative impact.

Key words: globalisation, labour demand, professional and management labour, technical and supervisory labour, manufacturing sector

1.Introduction

Globalisation has narrowed the gap between countries and move towards a new level of economy, politics and culture in the modern era. In the ensuing process, globalisation has opened borders and changed the world into one unit. In this process, whatever that happens in one area has repercussions on the society in other parts of the world. This shows that the world is becoming more borderless. Globalisation enhances the dependency of countries through the value of trade crossing borders and inflow of international capital, and the rapid and wider transfer of technology. Globalisation also enhances interaction and integration of activities, especially in the economies of societies throughout the world. This on the other hand, expands the international trade, finance and information flow into the globally integrated market (International Monetary Fund 1997, Ajai 2001).

A more comprehensive and detailed picture is given by Duncan (2000), who defined globalisation as the process of economic integration between countries, integration of traded goods and services and in investment (both the fixed investment and investment portfolio). It can be summarised that globalisation as the distribution of global goods, services and capital including information and ideas. In this aspect, globalisation opens the economy, moves goods, services, capital, labour and technology physically. Economic globalisation is characterised by production, exchanges, distribution, and consumption of goods and services. Through the globalisation process, the capital moves with ease between countries, companies that manage production on a global scale in sourcing for cheaper cost and higher profit margin across the border. This results in global economic relations expansions that exist through international trade, investment, production, financial exchanges, labour migration, organisational practices and international collaborations (Waters 1995).

Hoogvelt (1997) characterised the concept of globalisation from the aspect of world compression as countries' interdependence on trade, ties and collaboration between countries and presence of international organisations and global awareness manifested through the exposure of the global community towards union of communication through spatial and time compression. Nevertheless, the reality faced by many developing countries is the capital barriers to generate growth and enhance development process. Capital interdependence on the capable parties has mooted the outflow of capital. FDI crossing borders mirrors the degree of involvement in globalisation in the manufacturing sector and the other sectors of the economy.

Globalisation has changed the production process of the manufacturing industry in Malaysia from the import-oriented industry to the export-oriented industry. The demands and commitment towards trade liberalisation and capital flow also move towards the establishment of the production system to fulfil the international demands. Liberalisation policy has enhanced trade and boosted the economic growth, technology transfer and the increase in productivity and competency in the international level. FDI inflow has contributed to Malaysian economic growth as a whole and specifically in the manufacturing sector. FDI has also directly brought in technology and expertise to the recipient countries. But the real problem is the capability of the host country to absorb and replace existing technology with the one brought in by FDI, seen through the angle of human capital, physical capital and the economic environment.

In this aspect demand for skilled labour in the country also changes with the globalisation process. FDI inflow can be a complement or substitute of the domestic skilled labour. In general,

technology coming in with FDI requires higher skills and complements existing higher level labour force. Nevertheless, this situation can change for varying subsectors due to difference in technological needs. Choice of suitable technology is crucial in ensuring its entrance does not jeopardise the domestic labour force absorption ratio. The Malaysian manufacturing sector is volatile as it is exposed to foreign influences; it is the highest FDI recipient and contributes the most towards export and import.

This article has the objective to analyse the impact globalisation on demand for skilled labour, namely, professional and management; and technical and supervisory in the manufacturing sector in Malaysia. Analysis is based on panel data from the Industrial Manufacturing Survey collected by the Department of Statistics, Malaysia between1985-2008. The paper is organised into five sections, with the following section discussing literature review, followed by methodology and model specification. This is preceded by a discussion on the impact of globalisation on demand for labour for the entire manufacturing sector and the selected six subsectors. Summary and conclusion of the findings are deliberated in the final section of this paper.

2. Literature Review

Globalisation indicator can generally be categorised into three important aspects, namely, economic openness, capital inflow and technology advancement. Previous studies that show the impact of economic openness include Fedderke et al. (1999), Alleyne and Subramanian (2001), and also Devadason and Wai Meng (2007). Empirical evidence on the impact of FDI towards labour demand can be found in the literatures of Devadason and Wai Meng (2007, Marián Dinga and Andiel Münich (2007), Pompei (2008), Elia et al. (2008), meanwhile, technological impact can be seen from studies by Berman et al. (1994), Learner (1994), Lewis and Ong (2001), Pappas (1998), and Chu (2003) .

Trade Liberalisation and Labour Demand

Fedderke et al. (1999) uses the dynamic panel data of South Africa in 1970-1997 to study the influence of trade liberalisation in the labour market. They concluded that liberalisation enhanced the demand for labour force in South Africa. Trade also made positive economic growth and labour earnings. Nevertheless, technology advancement contributed towards negative labour earnings. A more recent study by Alleyne and Subramanian (2001) looked at the relationship between trade in South Africa and labour market between 1989 and 1997. They concluded that trade in South Africa had capital spill over effects and the country became a net exporter of capital intensive goods. The higher ratio of capital-labour in commodity production showed the higher the possibility of the country becoming a net exporter. The results also show that a higher ratio of skilled workers is needed when the capital increases.

Using the industry data by selected states, Ramaswamy (2003) found that trade liberalisation had an impact on the elasticity of labour demand in India. Besides that, he also found that the elasticity for labour was higher in states with a less stringent labour rules and the impact of trade reformation. Finally, the researcher also found that after the reformation, productivity and output instability brought about higher wages due to higher elasticity of demand for labour. Yasmin and Khan (2005) studied trade liberalisation and elasticity of demand for labour in Pakistan using the panel data analysis for the three digit level of the manufacturing sector during the period before the trade liberalisation (before 1989-1990) and after the trade liberalisation (after 1989-1990). Results shows that trade liberalisation enhance elasticity of demand for

labour significantly. Study by Devadason and Wai Meng (2007) in the manufacturing sector in Malaysia using the time series data between 1983 and 2000 found that export has negative impact on the demand for skilled labour, but increased the demand for unskilled labour. Nevertheless, import has the impact of increase in the demand for both the skilled and unskilled labour.

FDI Inflow and Labour Demand

Devadason and Wai Meng (2007) showed that FDI does not have a significant impact on the demand for the labour. But study by Marián Dinga and Andiel Münich (2007), show different results. They found that the FDI inflow into Kolin district, Republik Czech between 1993 and 2006 reduced unemployment by 1.7 percent and increased work force by 3.7 percent. On the contrary, Perugini and Pompei (2008) using the panel data of 14 European countries, 8 industrial sectors and 7 years time series from 1995 to 2001 found that FDI is significant and negative in influencing demand for skilled labour. Elia et al. (2008) found that the FDI by Italian MNCs had negative impact on the demand for unskilled labour in the host country.

Technological Change and labour Demand

Berman et al. (1994) conducted a study on the labour market structure in the United States of America for the period 1960s to the 1980s. The results of their study show that technological change is skill augmented has contributed to the shift of labour demand from unskilled labour to skilled labour. In other studies Berman et al. (1994); and Lewis and Ong (2001) on the other hand, investigated if the changes of labour market structure in Australia between 1976 and 1996. It was found that as a whole the change in technology is the main contributor to the increase in demand for skilled labour and decrease in demand for unskilled labour. Leamer (1994) also notes that a change in technology will impact demand for labour and it will be biased towards sector and not skill. Using the same argument,

Pappas (1998) classified labour in Australia into three stages, cognitive, interactive and motor skills. The study found that technology is skill augmented which increasing demand for cognitive and interactive labour, and decreasing demand for motor skilled labour. In the long term, technological changes are expected to have de-skilling effect on the labour market, that is, the substitution of labour with machines (Acemoglu, 2002). Chun (2003) differentiated between technological change impact on labour demand in the short and long term labour market using the United States of America's data from the 1960s to the 1990s. Chun concluded that when technology is utilised wholly, firms would substitute skilled labour with unskilled labour to minimise cost.

ICT and Labour Demand

Other studies using specific technology indicators (Falk & Koebel 2004, O'Mahony, Robinson & Vecchi, 2007 and Falk & Koebel, 2004) show the impact of utilising office and computing machinery (OCM) towards demand for labour for workers with different levels of educational background in Germany. The education level was classified into three categories, university education, certificate and dual vocational system and those without any degrees from formal education. Sample studied was time series data for 35 industries (24 manufacturing industries and 11 non manufacturing industries) in West Germany from 1978 to 1994 obtained from the National Account. Input demand system equation was formulated and estimated whereby the three types of workers and the intermediate goods as variable factors, meanwhile,

two types of models, namely, the OCM model and a general model were used as a fixed-quasi input.

The results of the study show that the use of computers in both the manufacturing and the non-manufacturing industries had increased demand for skilled labour compared to unskilled labour. On the other hand, increase in computer usage in the non-manufacturing industry had decreased unskilled labour demand significantly. Besides that, the results also show that unskilled labour in the non-manufacturing sector using the OCM model was a substitute input. Nevertheless, there is no evidence to show substitution relationship between unskilled labours with the OCM model in the manufacturing industry.

Study by O'Mahony, Robinson and Vecchi (2007) gave an insight into the comparative perspective of information communication technology impact in the demand for skilled labour. They used the panel data for USA, England and France, comprising various skilled categories between the 1980s and the 1990s. The study considered whether the problem of skilled bias was temporary or permanent using the changes in time and differentiating highly skilled in the information communication technology work and other related jobs. The results show that the technological impact towards demand for skilled labour is positive, but it is negative for the unskilled labour.

Globalisation impact analysis on labour demand in this article takes into consideration all indicators above and focuses on high level labour, namely professional and management; and technical and supervisory. Both of these categories are important as they are skilled labour, possess highest level of human capital and contribute significantly to the Malaysian economic growth. Although inflow of foreign labour is an indicator of globalisation, nevertheless, in this paper it is not analysed separately as the labour force data, which act as dependent variable includes foreign labour.

3. Research Methodology

Discussion in this paper is focused on six main industries in the manufacturing sector with the three digit code sector selected based on the highest gross output, namely, manufacturing of sieved petroleum products (232); manufacturing of valves and electronic tubes and other electronic components (321); production, processing and preserved meat, fish, fruits, vegetables, oil and fats (151); manufacturing office equipment, accounting tools and calculators (300); manufacturing basic chemicals (241); and manufacturing iron based and metal products (271). The study also analyses the types of work according to the category of the manufacturing sector. The demand analysis focuses on professional and management; and technical and supervisory. All the types of work are analysed and estimated according to labour demand model.

Data used in this research is based on series data collected from the Industrial Manufacturing Survey, Department of Statistics, Malaysia for the years 1985 to 2008. The analysis uses panel data method for all the observations according to the industrial category (cross section analysis) and time series analysis. The combined data consists of 23 time series observations, starting from 1985 to 2008, and 6 cross sectional observations (subsectors).

In this study the dependent variable is the number of employment in the manufacturing sector. Meanwhile, the independent variables are the value of output, wages and globalisation indicators comprising export-import to GDP ratio, FDI, and total agreements for transfer of technology in the services sector. Estimation of the labour demand has also used two dummy variables. The first dummy variable is for the capital- intensive industry. The interaction term of

this dummy with FDI is also included to see whether FDI within the capital-intensive industry has different impact on labour demand. The second dummy is time after 1995, the year when Malaysia entered *World Trade Organization* (WTO) in 1995.

Labour Demand Function

The demand function for labour can be derived by minimising costs subject to the production function or the level of output given (Nicholson and Snyder 2008), as follows:

$$\text{Min } C = wL + rK \quad \ldots(1)$$

Subject to;

$$Q = f(K,L) \quad \ldots(2)$$

$$£ = wL + rK + \lambda [\, Q - f(K,L)] \quad \ldots(3)$$

Where, C as total costs, Q is the total output, L is the labour quantity, K is the value of capital, w is wages and r is the price of capital. The input demand functions is obtained by differentiating equation (3) above with respect to capital, labour and output and equate them to zero. In general, the labour demand function can be written as:

$$L = f(w, r, Q) \quad \ldots(4)$$

In term of model in logarithm form, equation (4) can be written as,

$$\ln L = \beta_0 + ln\beta_1 Y + ln\beta_2 r + ln\beta_3 w + \mu \quad \ldots(5)$$

In this study, price of capital is not estimated as the price of capital is assumed to be constant for all the industries. The labour demand model in the manufacturing sector including the globalisation indicators and the dummy variables is shown as:

$$\ln L_{it} = \beta_{10} + \beta_{11} \ln Y_{it} + \beta_{12} \ln w_{it} + \beta_{13} \ln KE_{it} + \beta_{14} \ln FDI_{it} + \beta_{15} \ln T_{it} + \quad \ldots(6)$$

$$\ln L_{Pit} = \beta_{20} + \beta_{21} \ln Y_{it} + \beta_{22} \ln w_{Pit} + \beta_{23} \ln w_{TKit} + \beta_{24} \ln KE_{it} + \beta_{25} \ln FDI_{it} + \quad \ldots(7)$$

$$\ln L_{TKit} = \beta_{30} + \beta_{31} \ln Y_{it} + \beta_{32} \ln w_{TKit} + \beta_{33} \ln w_{Pit} + \beta_{34} \ln KE_{it} + \quad \ldots(8)$$

Where, L as the total number of workers in the manufacturing sector, Y is the nominal value of output. W is nominal wages, KE is the level of openness of the economy measured by the nominal export-import to manufacturing output ratio. FDI is the nominal value of FDI for the manufacturing sector indicated by the number of projects approved by MIDA according to industry at the nominal value. T is technology measured by the number of agreements by foreign investors with the government. P is the category of professional and managerial workers. Professional workers are those with professional certificates like engineers, architects, and accountants, meanwhile, managerial workers are department workers, finance accounting, marketing and related workers. TK is the category of technical and supervisory workers. Finally, *it* is the sub industry and *i is the year t* , D1 is the capital intensive industrial category dummy variable, D1FDI is the FDI interaction with dummy variable and D2 is the time dummy variable after the year 1995.

Three models can be estimated, *pooled least squares* model, *fixed effect mode*l and *random effect model*. Pooled model assumes intercept for the industry is identity, whereby:

$\alpha_{it} = \alpha$

The weakness in the estimation with the *pooled least square model* is the assumption that the intercept is always the same. Meanwhile, the fixed effect model assumes the intercept to be different for the *cross-section* unit, whereby:

$\alpha_{it} = \alpha_{i, \text{ with } E(\alpha i} \varepsilon_{it}) \neq 0$

Random effect model assumes that the intercept as a random variable for all the pooled data until:

$\alpha_{it} = \alpha_{+ ui}$, with $E(u_i \varepsilon_{it}) = 0$

In this analysis, random effect model cannot be used as the total cross sections of the sectors (6) are smaller than the total regressor (9).

The first step to test the estimation model is to estimate the pooled model using the pooled least square with the assumption that the intercept is the same. The next step is the estimation of the model using the fixed effect model using different intercepts between industries. Fixed effect model is estimated using generalised least square. To test which model is best between the mixed and fixed effect model, F-test is done, whereby, the null hypothesis and the alternative hypothesis are as follows:

$H_0 : \alpha_{it} = \alpha$

$H_1 : \alpha_{it} = \alpha_i$

F-test statistics is given as (Greene 2003: 562):

$$\mathbf{F} = \frac{\left(\mathbf{R}_{fe}^2 - \mathbf{R}_p^2\right)}{\left(\mathbf{1} - \mathbf{R}_{fe}^2\right)} \frac{(nT - n - k)}{(n - \mathbf{1})} : \mathbf{F}_{n-1, nT-n-k}$$

If the null hypothesis is rejected, the fixed effect model is better than the pooled model.

4. Estimation Results

Table 1 shows descriptive statistics of the variables used in the estimation. The yearly mean number of labour is 48,270.93 and their mean wages is RM902, 013. The mean output value is RM 28,110 million. Ratio of economic openness has an annual mean value of 1.51 and FDI has a mean valve of RM14, 383.24 million per year. Meanwhile, the mean of technological agreements are 825 per year.

Table 1 Descriptive Statistics of Variables

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	N
L	48270.93	21452.60	306330.0	1408.000	68087.38	144
W	902013.1	400709.5	5191536	976.2270	1225021	144
Y	28110.13	17221.32	121979.3	1847.851	27546.29	144
KE	1.516181	1.508897	1.657013	1.382244	0.063702	144
FDI	14383.24	13107.01	46098.77	959.2916	9668.871	144
T	825.3333	857.0000	1101.000	333.0000	176.7990	144

Estimation Results for Total Labour Demand Model

Table 2 shows the estimation results of the pooled model and the fixed effect model. Test to choose appropriate model is done using the Redundant Fixed Effects Test - Likelihood Ratio. The results of the tests demonstrate that the cross section fixed effect statistics in the equation (a) and (b) are 2.724 and 2.294. The values are significant at the significance level of 5 percent. Therefore, H_0 is rejected, indicating that the fixed effect model is better than the pooled model.

In the estimation model, autocorrelation problem is detected through the low value of Durbin Watson. To overcome this problem, White Cross Section method is used and the autocorrelation problem still occurs, therefore, the estimation model incorporates the auto regression variable (AR). Besides that, to overcome the heteroskedasticity problem, the Cross Section Weights method is used.

Table 2 Estimation Results of the Demand for Labour

	A		b	
Variable (log-linear function)	**Pooled Model (6.1)**	**Fixed Effect Model (6.2)**	**Pooled Model (6.3)**	**Fixed Effect Model (6.4)**
C	6.003 (1.7702)*	5.8038 (1.8351)	6.9902 (1.9770)*	6.7536 (2.0945)**
Y	0.2195 (2.0201)**	0.2206 (2.0377)**	0.2042 (1.9884)**	0.2054 (1.9842)**
w	-0.0278 (-1.1696)	-0.0255 (-1.1340)	-0.0309 (-1.2816)	-0.0285 (-1.247)
D1	0.3697 (0.3941)	0.3859 (0.4019)	0.0530 (0.0620)	0.0644 (0.0734)
D2	0.0534 (1.7423)*	0.0565 (1.9359)*	0.0609 (2.6300)***	0.0624 (2.9904)***
FDI	0.0794 (2.1333)**	0.0802 (2.1604)**	0.1092 (2.6300)***	0.1087 (2.6271)***
D1FDI	-0.0142 (-0.3520	-0.0148 (-0.3594)	-0.0014 (-0.0379)	-0.0018 (-0.0497)
T	-	-	-0.1622 (-2.9857)**	-0.1595 (-3.0506)***
CS Effect 1		0.4404		0.3906
CS Effect 2		-1.5457		-1.6602
CS Effect 3		-0.3087		-0.2811
CS Effect 4		-0.1310		-0.1189
CS Effect 5		0.1067		0.1808
CS Effect 6		1.4383		1.4888
R^2	0.97	0.97	0.97	0.97
R^2 Adjusted	0.96	0.96	0.96	0.96
N	132	132	132	132

Note: numbers in brackets show the t value
* Significant at 10 significance level
**Significant at 5% significance level
***Significant at 1% significance level

Cross Section Fixed Effects Test: a. (P value:0.023);b. (P value:0.049)
CS Effect_1 (151); CS Effect_2 (241); CS Effect_3 (232); CS Effect_4 (271); CS Effect_5 (300); CS Effect_6 (321).

The R^2 value for the fixed effect model estimation, (6.2) and (6.4) is 0.97 which is 97 percent of variation in the demand for labour can be explained by the independent variable, meanwhile, the balance 30 percent is explained by factors not included in the model. The results of the estimation equation (6.2) illustrates that output is significant and positive at the significance level of 5 percent in influencing demand for labour. This means that every one percent increase in output, increases labour demand by 0.2206 percent. Meanwhile, the wages variable is found to be insignificant in influencing labour demand. FDI variable is found to be significant and positive at a 5 percent significance level. It shows that a one percent increase in the FDI will increase labour demand by 0.0802 percent. The results illustrate that technology brought by FDI will contribute to an increase demand for labour.

Dummy variable for the capital intensive industry is found to be insignificant, showing no difference between the capital intensive and labour intensive industry in influencing the demand for labour. The dummy interaction in with FDI also shows no difference in effect of FDI in the capital intensive and labour intensive industry in influencing the demand for labour. Meanwhile, the dummy variable for the time category (D2) is significant and positive in influencing the demand for labour. This means that the rapid globalisation process after the year 1995 in Malaysia has higher influence towards the demand for labour in the manufacturing sector compared with the period before the year 1995.

The results of the fixed effect model (equation 6.2) also shows the sixth industry, namely, industry (321) manufacturing valves and tubes for the electronic and other electronic components has higher influence towards demand for labour in the manufacturing sector compared with the other five industries in the study sample. Meanwhile, the chemical-based manufacturing industry (241) is an industry that has the least influence in demand for labour.

To investigate the significance of the globalisation variable in affecting labour demand, the agreement of technology variable is included in the estimation equation (6.4). The results of the estimation show the same results as the equation (6.2) showing output variable, FDI and time after the year 1995 still significant positively in influencing labour demand in the manufacturing sector. Nevertheless, the contrasting result is shown by the agreement of technology variable, which has a significant negative impact on demand for labour. This might be due to the measurement of technology by using the total number of agreements and some of these technological agreements have not been implemented fully.

Estimation Results for the Demand for Professional and Managerial Labour

Table 3 shows the estimation results of the pooled model and the fixed effect model for the professional and managerial labour demand model. The Redundant Fixed Effects Test shows that the statistics value by cross section fixed effect in the equation (a) is 1.048 and in the equation (b) is 1.031. The P value that is insignificant at the significance level of 5 percent. Therefore, the H_0 is accepted, meaning that the pooled model is accepted. Therefore, the analysis of the estimation results for the demand for professional and managerial labour will take from the pooled model of equations (7.1) and (7.3) with the assumption that the intercept for each industry in the research is constant. Estimation results for the demand for professional

and managerial labour show autocorrelation problem indicated by the Durbin Watson value nearing zero. Therefore the White Cross Section method and auto regressive variable (AR) are performed to overcome this problem.

Table 3 Estimation Results of the Demand for Professional and Management Labour

	A		b	
Variable (log-linear function)	**Pooled Model (7.1)**	**Fixed Effect Model (7.2)**	**Pooled Model (7.3)**	**Fixed Effect Model (7.4)**
C	20.0278 (0.9691)	20.3740 (0.8850)	18.0036 (1.2570)	17.9164 (1.1905)
Y	0.0103 (0.1399)	0.0201 (0.2757)	-0.0283 (-0.3958)	-0.0172 (-0.2456)
Wp	-0.3497 (-8.0393)***	-0.3486 (-8.0815)***	-0.3578 (-8.4522)***	-0.3572 (-8.5786)***
Wt	0.3707 (2.3567)**	0.3695 (2.3519)**	0.3063 (2.1619)**	0.3166 (2.2312)**
D1	-0.2318 (-0.1526)	-0.2627 (-0.1579)	-0.1494 (-0.0892)	-0.2102 (-0.1160)
D2	-0.0206 (-0.5316)	-0.0354 (-0.8552)	-0.0194 (-0.6223)	-0.0354 (-1.0938)
FDI	0.0709 (1.4661)	0.0706 (1.4558)	0.1203 (2.2864)**	0.1181 (2.2364)**
D1FDI	0.0106 (0.1576)	0.0119 (1.1613)	0.0065 (0.0874)	0.0090 (0.1122)
T	-	-	-0.0889 (-1.7264)*	-0.0923 (-1.8258)*
KE	-	-	-0.8704 (-3.1291)***	-0.8184 (-2.9720)***
CS Effect_1		-0.9753		-0.9463
CS Effect_2		-2.2326		-2.1186
CS Effect_3		0.0842		0.1001
CS Effect_4		-0.5117		-0.5408
CS Effect_5		2.0662		1.9843
CS Effect_6		1.5693		1.5214
R^2	0.98	0.98	0.98	0.98
R^2 Adjusted	0.97	0.97	0.97	0.97
N	132		132	132

Note: numbers in brackets show the t value

* Significant at 10% significance level

**Significant at 5% significance

***Significant at 1% significance level

Cross Section Fixed Effects Test: a (P value:0.392); b (P value: 0.402)

CS Effect_1 (151); CS Effect_2 (241); CS Effect_3 (232); CS Effect_4 (271); CS Effect_5 (300); CS Effect_6 (321).

The R^2 value for the equations (7.1) and (7.3) is 0.98, indicating that 98 percent of variation in the demand for labour is explained by the listed independent variables, meanwhile, the balance 0.2 percent is explained by other factors not included in the model. Results from the

equation (7.1) show that output is not significant in influencing demand for professional and managerial labour. Meanwhile, the wages of the professional and managerial labour are significant at the one percent significance level. The coefficient value is negative, corresponding to the economic theory that wages and demand for labour have a negative relationship. The results show that one percent increase in wages will reduce demand for labour by 0.3497 percent. On the other hand, wages for the technical and supervisory variable is significant at the 5 percent level and positively influences demand for professional and managerial labour. This shows that technical and supervisory labour is substitute with the professional and managerial labour (Nicholson and Snyder 2008:186).

The industrial category dummy variable is insignificant. This shows that there is no difference between capital intensive and labour intensive industry in influencing demand for professional and managerial labour. The dummy FDI interaction variable also shows no difference between FDI in the capital intensive and labour intensive industry in influencing demand for professional and managerial labour. The same result is also demonstrated for the dummy variable time (D2), showing no difference before and after 1995 in influencing demand for professional and managerial labour.

Estimation results of the pooled model equation (7.3) by incorporating the agreement of technology variable and openness of the economy are the same. The estimation results show that output is insignificant in influencing demand for professional and managerial labour but wages of professional and managerial labour is significant. Nevertheless, FDI is positive and significant. This shows that one percent increase in FDI approved by MIDA will increase demand for professional and managerial labour by 0.12 percent. The results show that technology brought in by FDI has positively influenced demand for professional and managerial labour. This indicates that FDI brings technology and expertise and can increase demand for professional and managerial labour by 0.12 percent.

The contradicting results indicate that the technology variable is significant at the significance level of 10 percent and negatively influences demand for professional and managerial labour. This is due to the weakness of the technology agreements data as a measure of technology, not specifying technology used in the manufacturing sector, possibly due to only a few technology agreements not fully implemented. The openness of the economy variable is also significant at one percent level and negatively influences demand for professional and managerial labour. This shows that export and import in the manufacturing sector in Malaysia has negative impact on demand for skilled labour as shown by Devadason and Wai Meng (2007).

Analysis of the Estimation Results for the Demand for Technical and Supervisory

Table 4 shows estimation results of the pooled model and fixed effect model impact for technical and supervisory labour demand function. As in other models before, tests to choose an appropriate model is done using the Redundant Fixed Effects Test - Likelihood Ratio method. The results show statistics value by cross section fixed effect in equation (a) is 1.774 with P value 0.12, which is insignificant at the significance level 5 percent. Therefore, the H_0 is accepted, indicating that the results from the pooled model (8.1) are used in the analysis. Meanwhile, the equation (b) test results show statistics value for cross section fixed effect is 1.774 with a P value of 0.09, significant at the significance level of 10 percent. Therefore, H_0 is rejected; indicating the results from the fixed effect model (8.4) are used in the analysis.

Table 4 Estimation Results of the Demand for Technical and Supervisory Labour

	A		b	
Variable (log-linear function)	**Pooled Model (8.1)**	**Fixed Effect Model (8.2)**	**Pooled Model (8.3)**	**Fixed Effect Model (8.4)**
C	10.3008 (4.2498)***	10.5185 (4.3763)***	12.0869 (7.4298)***	12.3581 (8.0398)***
Y	-0.0005 (-0.0068)	-0.0062 (-0.0822)	-0.0647 (-1.2996)	-0.0713 (-1.4116)
Wt	-0.1874 (-1.3992)	-0.1889 (-1.4283)	-0.32655 (-2.8409)***	-0.3323 (-2.9375)***
Wp	0.0934 (1.2016)	0.0939 (1.1895)	0.0738 (1.0633)	0.0722 (1.0214)
D1	1.0954 (0.7542)	0.9900 (0.6876)	0.8054 (0.5407)	0.6461 (0.4400)
D2	-0.0583 (-0.9799)	-0.0583 (-0.9692)	-0.0557 (-2.7886)***	-0.0573 (-2.8518)***
FDI	0.0542 (0.8403)	0.0511 (0.8061)	0.1463 (2.4137)**	0.1440 (2.4118)**
D1FDI	-0.0446 (-0.6950)	-0.0399 (-0.6285)	-0.0342 (-0.5194)	-0.0272 (-0.4197)
T	-	-	-0.2611 (-4.3548)***	-0.2629 (-4.5232)***
KE	-	-	-0.9973 (-3.8109)***	-1.0190 (-3.8729)***
CS Effect 1		-0.4044		-0.5854
CS Effect 2		-1.1963		-1.2044
CS Effect 3		0.1299		0.2399
CS Effect 4		-0.6935		-0.8410
CS Effect 5		0.7693		1.0986
CS Effect 6		1.3950		1.2923
R^2	0.96	0.96	0.97	0.97
R^2 Adjusted	0.96	0.96	0.96	0.96
N	132	132	132	132

Note: numbers in brackets show the t value

* Significant at 10% significance level

**Significant at 5% significance level

***Significant at 1% significance level

Cross Section Fixed Effects Test: a. (P value:0.12); b.(P-value:0.09)

CS Effect_1 (151); CS Effect_2 (241); CS Effect_3 (232); CS Effect_4 (271); CS Effect_5 (300); CS Effect_6 (321).

The estimation of equations (8.1) and (8.4) also encountered autocorrelation problem and it is solved by estimating auto regression models. R^2 values of equations (8.1) and (8.4) show that 96 percent of variation in demand for labour is explained by the listed independent variables, while the balance 40 percent is explained by factors not included in the model. The estimation results of the pooled model for the demand for technical and supervisory labour function in equation (8.1) show that output, wages of technical and supervisory labour, wages

of professional and managerial labour, and FDI is insignificant in influencing demand for technical and supervisory labour. Dummy variables are also insignificant in influencing demand for technical and supervisory labour. There is no difference between the capital intensive and labour intensive industry in influencing demand for technical and supervisory labour. FDI impact also has no difference between the capital intensive and labour intensive industry. The same result is found for the industry and interaction variable. Time dummy variable is also insignificant towards influencing demand for technical and supervisory labour. This shows that there is no difference in the time period before and after 1995 influencing demand for technical and supervisory labour.

To test the significance of the globalisation variable in influencing demand for technical and supervisory labour, in the fixed effect model equation (8.4) variable technology agreement and openness of the economy variable is included. The results of the estimation show that output is still insignificant in influencing demand for technical and supervisory labour. Meanwhile, variable wages of technical and supervisory labour is significant and negative at the significance level of one percent. The coefficient value is negative, showing an inverse relationship between price of labour (wages) and total number of workers or demand for labour. The results show that one percent increase in wages will decrease demand for technical and supervisory labour by 0.3265 percent. FDI variable is also found to be significant at the significance level of 5 percent and positively influences demand for technical and supervisory labour. The results show that one percent increase in FDI approved by MIDA will increase demand for technical and supervisory labour by 0.14 percent. This is ensured by the fact that the level of technology and expertise brought by FDI in high. Therefore, the demand for technical and supervisory labour is high to operate and manage technology and absorb the expertise brought in by FDI.

Contrasting results are shown for technological agreement variable, which is significant at the significance level of 1 percent, but negatively influences demand for technical and supervisory labour. The results indicate that increase in technological agreement variable will reduce demand for technical and supervisory labour. The contradicting results are due to the weak technology agreement data estimated in the equation and technology agreement did not reflect the actual use of technology in the manufacturing sector.

The results also found that economic openness variable was significant at the significance level of 1 percent and negatively influences demand for technical and supervisory labour. This means that one percent increase in economic openness, will decrease demand for technical and supervisory labour by 0.99 percent. This is due to the fact that export and import are assumed to increase demand for unskilled labour as noted by Devadason and Wai Meng (2007). They found that export has positive impact on demand for unskilled labour, while import has positive impact on both skilled and unskilled labour.

The dummy variable for time (D2) is found to be significant and negative, indicating that the period after 1995 has less influence on the demand for technical and supervisory labour compared to the period before 1995. This is because several industries estimated in the study after 1995 did not utilise technology that required technical and supervisory labour.

5. Conclusions and Implications

The FDI inflow brought in technology and expertise from the host countries has influenced the demand for labour in the manufacturing sector in Malaysia, specifically demand for professional and managerial labour; and demand for technical and supervisory labour. This

means that technology and expertise brought by FDI is biased towards expertise and capital. The question is why unemployment in still prevalent among the graduates in Malaysia? One of the crucial factors of unemployment is job mismatch.

It cannot be denied that FDI in the manufacturing sector has increased the capability of export oriented industries and contributed to increase in private investment. FDI inflow in the manufacturing sector also has impact on the increase in labour demand as a whole in the manufacturing sector in Malaysia. Technology and expertise brought in by FDI to the manufacturing sector shows positive impact in the increase of demand for professional and managerial labour and technical and supervisory labour. This means that technology and expertise via FDI is at optimum level and able to absorb skilled labour in tandem.

On the other hand Malaysia still faces the problem of unemployment of more than 80,000 graduates. To overcome this, the government has to relook into the curriculum of the institutions of higher learning to suit the needs of the technology and expertise brought in by the FDI. This will help absorb more labour force and reduce unemployment rate among the graduates.

The implication of the labour market approach must be used as a main reference for education policy reformation especially at the tertiary level. In light of the fact that FDI has positive impact in increasing growth of the manufacturing industry, and increasing demand for skilled labour then FDI inflow should be encouraged through specific FDI policies, that is tax incentives, zero tax for certain industries, etc.. Liberalisation in stages for market entry, regulations for recruiting expatriates, equity ownership and relaxing the rules and monitoring, and innovations in strategies in administration and processes to minimise costs to establish and conduct business in Malaysia. At the same time, the government should find ways to develop domestic technology, reducing costs and dependence on foreign technology. Development of local technology can also be a source for increasing employment opportunities and increasing the competitiveness level in Malaysia.

To achieve this objective, development of human resource must be emphasised as a main strategy in producing highly skilled labour that is innovative and competitive. In this aspect, the policy makers should ensure that priority is given to increase quality and relevant education and training opportunities especially in the science and information technology field. As mentioned earlier, firstly, the curriculum must be relevant to the current needs of the market. Therefore, a mechanism must be in place to establish a relationship and link institutions of higher learning, the industry and centre for research and development. This will also facilitate smooth technology transfer while the industry helps to ensure that the institutions of higher learning and research and development centres keep the potential labour relevant for the labour market.

To eliminate the negative impact from the economic openness, the government must increase export and reduce import. The current scenario shows that import of intermediate goods is high. When the government increases export, this will reduce the problem of payment imbalances and increase the openness of the economy. Furthermore, this will give a positive impact on the demand for labour.

Nevertheless, human resource development needs to be emphasised as the thrust of the strategy is to produce highly skilled labour that is more innovative and competitive. Through the highly skilled labour management, FDI technology and expertise absorption will be managed easily and furthermore facilitate developing more advanced domestic technology to reduce cost and level of dependency on foreign technology in light of globalisation.

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