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The Impact of Foreign Workers on Labour Productivity in Malaysian Manufacturing Sector

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ABSTRACT

The growing presence of foreign workers in Malaysia can be explained by excess demand for labour combine with rapid economic growth, as well as the cheaper cost of foreign workers. Besides, industrialization also brought the foreign workers into Malaysia. Thus, when the foreign workers enter the labour force, they have many possible outcomes on labour market issues and productivity. This study determines the impact of foreign workers on labour productivity. Besides, the relationship between domestic and foreign workers as well as their contribution on Malaysian Manufacturing sector growth also investigated. The Cobb-Douglas production function is used to derive the model specification in this study. The results in this study show that foreign labours have positive and significant impact on labour productivity. Further, the study also reveals that foreign labours are neither substitutes nor complements for domestic labours.

Keywords: Foreign worker, domestic worker, labour productivity, manufacturing sector, Malaysia

INTRODUCTION

Evolution of labour force has been influenced by many factors, for example changes in population size and labour force participation rate. However, population growth depends on rate of natural increase and net migration. The rate of natural increase is determined by both fertility and mortality rate. Net migration is determined by outward (emigration) and inward migration. Until recently, migration has not been important in providing labour force to the country until the nineties. Foreign workers from migrants to Malaysia then helped ease the tight labour condition, especially in the manufacturing sector.

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The demographic situation changed rapidly in Malaysia during the seventies and this trend has continued ever since (Zaleha, 2007). As can be seen in Table 1, the population in Malaysia has been increasing steadily from 1965 to 2005. This has provided the source of labour force for the economy. Labour force has also increased steadily during this period.

Table 1 Population, Labour Force and Unemployment Rate, 1965-2005 ('000)

	1965	**1970**	**1975**	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**
Population	9320.0	10777.0	12249.0	13879.2	15791.1	18010.2	20262.7	23490.0	26130.0
Labour force	3246.0	3606.8	4225.0	5109.9	639.1	746.5	8114.0	9571.6	10422.0
Unemployment rate	6.1	7.4	7.0	5.7	6.9	6.0	4.5	3.1	3.5

Source: Zaleha, 2007

Unemployment rate was quite high during the seventies; this was caused by the shortfall in job creation, and acceleration of labour force. This has made employment creation a challenge to the government. Many development strategies were introduced and implemented to create more jobs, especially in modern sectors such as manufacturing and service sectors.

In the nineties, the labour situation started to change where labour market was tight. This was when the government started to encourage the employment of foreign workers, especially from around the South East Asia regions to solve the problem of labour shortage. The growing presence of foreign workers in Malaysia can be explained by excess demand for labour associated with rapid economic growth, as well as the relatively cheaper cost of foreign labour. Currently there are about 1.8 million legal foreign workers who constitute 16% of the labour force as shown in Table 2. When the foreign workers enter the labour force, they brought many possible outcomes. These foreign workers will not only be competing with domestic workers for the same jobs but they could be a liability if their presence and entry are not controlled. Therefore, the aims of this paper is first to study the impact of foreign workers on labour productivity in Malaysian manufacturing sector. Next, the second objective is to look at the relationship between domestic and foreign workers, whether they are complements or substitutes to each other.

The rest of the paper is organized as follows; the next section will give the overview of Malaysian manufacturing sector, followed by some review of literature on the topic in section three. Methodology will be given in section four, while the results of the analysis will be shown in section five. Section six concludes and gives some policy recommendations.

Table 2 Labour force growth, Malaysia 2000-2010

	2000 (000)	2005 (000)	2010 (000)
Labour force	9,571.6	11,290.5	12,406.8
Local labour	8,820.6	9,512.9	10,864.3
Foreign labour	751.0	1,777.6	1,542.5
Foreign worker with permit	732.6	1,742.1	1,500.0
Expatriate	18.4	35.5	42.5
Unemployment	297.0	395.7	430.8
Unemployment rate (%)	3.1	3.5	3.5
Labour force participation rate (%)	65.7	66.7	67.3

Source: Economic Planning Unit (various years)

Overview of Malaysian Manufacturing Sector

It has been recognized that one of the ways to achieve development and progress is through industrialization. Industrialization process in Malaysia has experienced five distinctive phases (Jomo, 1993). The first phase was during the British colonial rule but the industrialization only limited to export and import processing and packaging of food and simple consumer items. After independent in 1957, the second phase took place through the introduction of import substitution strategy (1957 - 1968) that protected industrial estate by high tariffs. Realizing the limits of the import substitution, industrialization process move to the third phase of export-oriented industrialization (1968 – early 1980's). These new labor intensive industries generated employment opportunities though at generally lower wage levels. The fourth phase (1983 – 1986) focused on promotion of selected heavy industries without abandon the export-oriented industrialization. The fifth and current phase of industrialization focused on the recovery of manufacturing industry due to economic crisis though realignment of international currency. The effective massive depreciation of the ringgit, which has lowered production cost, especially labor, deregulation and new investment incentives have contributed to increase in manufacturing investment especially Foreign Direct Investment (FDI).

The policy introduced by government in the Second Malaysia Plan that encouraged FDI led the manufacturing industry to be the engine of growth of the Malaysian economy. The manufacturing sector grew by 19.1% and accounts for 32.3 of Malaysia's Gross Domestic Product (GDP) in 2000 compared to 2005 by 10.5% and 31.8%. However, currently in Malaysia the economy is undergoing a structural shift from manufacturing-based to service-oriented economy, with the share of the service sector to GDP is highest compared others sector. The service sector is increasing from 53.6% in 2000 and forecast to 58.5% in 2010. Table 3 also shows the growth and the share of GDP of others selected economy sector.

Table 3 GDP growth by selected economy sector 1970-2010

Sector	Annual growth (%)						Share of GDP (%)					
	1970	1980	1990	2000	2005	2010f	1970	1980	1990	2000	2005	2010f
Agriculture	5.3	3.9	1.8	2.0	2.8	2.5	32.0	20.8	18.7	8.6	8.3	7.6
Mining	5.0	5.1	2.1	1.9	5.0	1.1	6.0	10.4	9.7	7.5	7.1	7.9
Manufacturing	11.7	8.6	13.3	19.1	10.5	1.7	12.0	19.7	27.0	32.3	31.8	26.2
Construction	8.7	3.6	13.9	1.0	0.5	3.2	4.0	4.8	3.5	3.3	3.0	3.2
Services	8.5	6.6	8.4	5.7	6.0	3.6	46.0	46.0	42.0	53.6	57.1	58.5

Source: Economic Reports (various issues)
* *f* = forecast

LITERATURE REVIEW

Studies on impact of foreign workers have been looking at areas such as; the effect on economic issues, social aspect, labour productivity or total factor productivity as well as substitution or complementary relationship between local and foreign labour.

From the macroeconomic view point, in term of economic theory, the immigration of foreign workers brings a good impact to the receiving countries. For example; the improvement of labor productivity, or the total factor productivity (TFP). But, there will also be some negative effects, in term of the rise in wage differentials between high income group and low income group from the microeconomic view point (Aizawa, *et al*., 2001).

Many studies found either positive or negative impact of immigrants on productivity. For instance, Tsao (1985) found that the TFP growth was very low in Singapore manufacturing industries because of the low wages policy combined with influx of low-skilled foreign labour. A recent paper by Llull (2008) suggests a negative impact of immigrants on productivity. As the consequences, any increase in the immigration rate will reduce the average wage. Moreover, the result for Spain also shows that the domestic workers are more productive than foreign workers. Some researchers have also found positive impact of immigration on the receiving economies. Recent study by Kangesniemi *et al*. (2007) finds that foreign workers are more productive than domestic workers in the United Kingdom (UK).

Numerous researches have also been carried out investigating the relationship between domestic and foreign workers, whether they are substitutes or compliments. A study by Dupuy and DeGrip (2003) estimates the elasticity of substitution between labour in Denmark. They divide the workers by their educational level and occupation skills. They found skilled workers with all other labour inputs and capital had a higher elasticity of substitution in larger firms than smaller firms. Besides, the elasticity of substitution between skilled and unskilled workers was also larger in the large firms. Next, Idris and Rahmah (2006) investigate the substitutability between local and foreign workers at different job categories. They divide the job categories in Malaysia by the skill consisting semi-skilled local and

foreign workers, unskilled local and foreign workers. They found that both local and foreign workers are substitutes at various job categories.

Recent study by Parasnis (2010) investigates the relationship between natives labour, migrants labour and capital. In general, he finds migrant workers are substitute for native workers. He estimates the elasticities of substitution and indicates that native labour and capital are substitute, while migrants labour and capital are complement.

There are many studies on the consequences of impact of immigrants on different angle and the relationship between domestic and foreign workers, but currently it is important to recognize more about the economic impact of foreign workers on labor productivity especially in Malaysian manufacturing sector. Additionally, it is also important to investigate the relationship between domestic labor and foreign labor; whether their substitute or complement. Policy recommendations regarding the effect of minimum wage on the demand of foreign labour have been based on such studies. For example Meier (2004) and Shimada (2004) found that the introduction or the increase of minimum wage will decrease the demand of foreign workers in Germany and Hong Kong respectively.

METHODOLOGY AND DATA

Model Specification

Generally, the estimation of labour productivity is analyzed using the neoclassical production function (Mahmood, 2008). Hence, a basic functional form can be formulated through by using a Cobb-Douglas production function. This analysis employs the Cobb-Douglas production function with three inputs given by;

$$Y_t = AK_t^{\alpha} L_t^{\beta} Mat_t^{\theta} \quad [1]$$

Where Y is aggregate output (total gross of output), K is capital input (total of physical capital stock), L represents as labour input (total numbers of workers), Mat represents as intermediate input (material), A is efficiency parameter, α is the elasticity of output with respect to the capital input, β is the elasticity of output with respect to labour input and θ represents the elasticity of output with respect to intermediate input, and *t* is a time index (1972-2005). Based on Rahmah (2009), they used the effective labour which education level as a proxy for labour input (See also Corvers, 1997).

The time period covered by the data in this analysis is from 1972 until 2005. In this analysis, labour is made up of two types of labour, which is domestic workers (LD) and foreign workers (LF). Intermediate input (material) also adding into the model as an additional input (see Ahmed, 2006).

$$Y_t = AK_t^{\alpha} LD_t^{\beta_1} LF_t^{\beta_2} Mat_t^{\theta} \quad [2]$$

Based on equation [2], if we divide the equation with the total number of workers (L), we will obtain the labour productivity equation:

$$\frac{Y}{L} = A\left(\frac{K}{L}\right)^{\alpha}\left(\frac{LD}{L}\right)^{\beta_1}\left(\frac{LF}{L}\right)^{\beta_2}\left(\frac{MAT}{L}\right)^{\theta} \quad [3]$$

Equation [3] shows the labour productivity depends on the contribution of two types of labour, domestic and foreign as well as capital and intermediate input contribution in the model. Thus, the estimation model for the first objective that is to study the impact of foreign workers on labour productivity is based on Equation [3] as follows,

$$\ln y_t = A + \alpha \ln k_t + \beta_1 \ln ld_t + \beta_2 \ln lf_t + \theta \ln mat_t + U_t \quad [4]$$

Where,

y = Y / L = value added per number of person engaged

k = K / L = value of capital per total of labour

ld = LD / L = number of domestic labour per total of labour

lf = LF / L = number of foreign labour per total of labour

mat = MAT / L = value of real material per total of labour

Next, we use Granger Causality Test to determine the causality between the domestic and foreign labour. Equation [4] will be used as an estimation model for the second objective in this research.

Empirical Estimation and Data

Equation [4] will be tested using the vector autoregressive (VAR) model. Before proceeding with further analysis, the data must be tested for the existence of the time series problem using the Unit Root Tests. Next, we proceed with Multivariate Cointegration Test and Granger Causality Test within vector-error correction model (VECM). Data for this study is obtained from the Manufacturing sector survey conducted by the Department of Statistics of Malaysia. The annual times series data was used in this empirical analysis. The year 2000 was used as a base year.

RESULTS AND ANALYSIS

In this study, the application of the ADF and PP Unit Root test for the five variables were applied to detect if the variables are stationary or non-stationary. The results reveal the null hypothesis of the existence of a unit root cannot be rejected. However, the presence of a second unit root was rejected at the standard significance levels. With these, we can conclude that the series are behaving as

I(1). The series are then subjected to the Johansen cointegration test to see whether they are cointegrated. The results show that all of the variables under study are cointegrated, and there is only one cointegrating equation. Therefore we can now proceed to test our hypothesis by running the VECM to equation [4]. The results are given below;

$$\ln y_t = 1.0653 - \underset{(-3.9788)}{0.0794 \ln \kappa_t} + \underset{(5.6618)}{1.9390 \ln ld_t} + \underset{(8.1378)}{0.1719 \ln lf_t} + \underset{(51.2068)}{1.0645 \ln mat_t} \quad [5]$$

The equation above reveals that the domestic labour, foreign labour and material yield positive influence on the labour productivity of the manufacturing industries. 1% increase in the usage of domestic labour will increase labour productivity by 1.93%, while the productivity will increase 0.172% if foreign labour increased by 1%. While an increased of 1% of the material will increase productivity by 1.06%. We can see that labour productivity in Malaysian manufacturing sector is still very much depending on labour, and domestic labour is more important compared with foreign labour. From this we can also conclude that the foreign labour has a significant and positive impact on labour productivity in Malaysian manufacturing sector. To reduce the dependency on foreign labour, it need a long time to helped the government achieved their aims.

On the contrary, the increase of capital labour ratio seems to cause a decrease in labour productivity. An increasing the capital labour ratio by 1% will decrease the labour productivity by less than 0.1%. We can conclude from this result that the Malaysian manufacturing sector is still labour intensive in nature, because any increase in capital usage, which will increase the capital labour ratio, will lead to a decrease the labour productivity.

The causal relationship in [5] is obtained by running the Granger causality test to determine the causal relationship between domestic and foreign workers. The relationship is shown by Table 4.

Table 4 Results of Granger causality test

Null hypothesis	Observation	F-statistic
lf does not Granger cause ld	32	2.2946 (0.1201)
ld does not Granger cause lf	32	2.7997 (0.0785)

Notes: Numbers in parenthesis are corresponding to *p*-values.

From Table 4, the results reveal that there is no causality between domestic and foreign labour. We accept both null hypotheses which state that foreign labour does not Granger cause domestic laborurand vice versa. This means that domestic and foreign labour have no significant relationship. Thus, we can conclude that foreign labours are neither substitutes nor complements for domestic labours.

Increasing the influx of foreign labour will not affect the domestic labour. This was due to smaller percentage of foreign labour from total workforce in Malaysian manufacturing sector. Besides, domestic labour consists of unskilled, semi-skilled and professional, while majority of foreign labour are unskill woerkers. Thus, foreign workers are not complement for domestic labour among their skills.

SUMMARY AND CONCLUSION

The aim of this paper is to examine the economic impact of foreign workers on labour productivity in Malaysian manufacturing sector using annual time series data which covers 1972 to 2005 periods. Besides, the relationship between foreign and domestic workers was also investigated. Econometric methodology has been employed in this paper to examine the impact of foreign labor on labour productivity and causal relationship between the two types of labour. Prior to testing for causality, the ADF, PP and Johansen cointegration test were used to examine for unit roots and cointegration.

Our estimation results indicate increasing the domestic labour, foreign labour and material will yield positive influence on the labour productivity of the manufacturing industries. But, the capital labour ratio tends to show negative relationship on the labour productivity. Since foreign labour has positive relationship and significant impact on the labor productivity we can conclude that the government will need a long time to reduce the dependency on foreign workers. Further, the study found that there is no causal relationship between domestic and foreign labour. The results exhibit that domestic and foreign workers are neither substitute nor complement to each other. Therefore, reducing the number of foreign workers will not affect the performance of domestic workers.

In order to reduce the dependency on foreign workers, the study suggests that the problem should be tackled from the root especially to face the presence and entry of illegal workers. Policies such as the minimum wage will discourage employers from hiring foreigners, as there will be no wage differences between local and foreign workers. Studies by Meier (2004) and Shimada (2004) have come up with the same recommendations.

For future research, we also recognized that more meaningful results can be obtained if we can analyze data from each sub-industry in the manufacturing sector and more detailed policy recommendation could be made.

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