Full Paper

The Effect of The Influx of Foreign Labour in Malaysia by Augmented MRW Model

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Abstract

There are pros and cons in hiring foreign labour on the economy. The influx of foreign labour is a common phenomenon, but when their involvement is unlimited it will be one serious issue. Malaysia is one of the developing countries where industrial and construction sectors are in need of labour and this has opened up opportunities for foreign labour. Their inflow into Malaysia is increasing every year and this has caused problems such as time-consuming construction due to low-skilled labour and crime problems caused by problematic labour. We augmented Mankiw-Romer-Weil model by isolating the foreign labour element in human capital to find the effect of the influx of foreign labour in Malaysian economic growth. The results from our model show that the employment of foreign labour increases the rate of human capital but decreases the rate of physical capital. Therefore, the level of the production function also decreases.

Keywords: Mankiw-Romer-Weil model, human capital, production function, economic growth, foreign labour

Abstrak

Terdapat pro dan kontra dalam pengambilan buruh asing ke atas ekonomi. Kemasukan buruh asing adalah satu fenomena biasa, tetapi apabila penglibatan mereka adalah tidak terhad ia akan menjadi satu isu yang serius. Malaysia merupakan salah satu daripada negara-negara yang membangun di mana sektor industri dan pembinaan memerlukan buruh dan ini telah membuka peluang kepada pekerja asing. Aliran masuk mereka ke Malaysia semakin meningkat setiap tahun dan ini telah menyebabkan masalah seperti memakan masa pembinaan yang lama kerana buruh yang berkemahiran rendah dan masalah jenayah yang disebabkan oleh pekerja bermasalah. Kami menambah baik model Mankiw-Romer-Weil dengan mengasingkan elemen buruh asing dalam modal insan untuk mencari kesan kemasukan buruh asing dalam pertumbuhan ekonomi Malaysia. Keputusan dari model kami menunjukkan pengambilan pekerja asing meningkatkan kadar modal insan tetapi menurunkan kadar modal fizikal. Oleh itu, tahap fungsi pengeluaran juga menurun.

Kata kunci: Mankiw-Romer-Weil model, modal insan, fungsi pengeluaran, pertumbuhan ekonomi

1.0 INTRODUCTION

The influx of foreign labour in Malaysia has increased over the past decades due to labour shortage to sustain its developing economy. Dependency on foreign labour give negative impacts to the nation from the social and cultural perspective, and the salaries that are sent back to their countries cause the increasing of money outflow to foreign economies [1]. The reason for hiring foreign labour is because Malaysia experiences a critical shortage of labour especially in construction, manufacturing and industrialisation sectors. Domestic labour is not interested in works that require them to use physical strength and they prefer working in offices and they abhor the 3D (dirty, dangerous and demeaning) works [1]. Other than that, the salary of foreign labour is cheaper than domestic labour even though with the minimum wage act practised in Malaysia [2]. However, by employing foreign labour, it increases the low-skilled labour and this leads to low productivity and poor quality of work [3].

The Malaysian economy is the scope of this study. Total employment in Malaysia increases steadily every

year. Table 1 shows the data of total labour force in Malaysia from 2009 to 2013.

Table 1 Type of labour force

Year, t	Total Labour Force, $L(t)$	Domestic Labour, $L_{dw}(t)$	Foreign Labour, $L_{fw}(t)$
2009	11,315,300	9,829,365	1,067,935
2010	12,303,900	10,221,671	1,677,830
2011	12,675,800	10,589,153	1,695,247
2012	13,119,600	11,005,568	1,717,632
2013	13,634,600	11,439,860	1,770,140

Source: Department of Statistics Malaysia

From Table 1, the influx of foreign labour increases the size of labour force in Malaysia. Here we developed a new model by isolate the foreign labour element in human capital to find the effect of hiring foreign labour in Malaysia. We augmented Mankiw-Romer-Weil model by adding the variable of foreign labour. Mankiw-Romer-Weil model developed by Mankiw, Romer and Weil and known as MRW model [4] where they introduced the human capital as a separate input in the capital stock. Human capital is a stock of knowledge and skills. Findings from this study demonstrate that foreign labour does contribute to the economic growth of a country. To generate and sustain the economic growth, Malaysia requires a high rate of investment for capital accumulation [5]. Capital accumulation consists of human capital and physical capital accumulation. This study focuses on human capital and the employment of foreign labour.

The main purpose of MRW model is to explain the processes of economic growth. Economic growth is an increase in the level of national output. Human capital is an economic factor in economic growth as well as physical capital, labour force and technological progress. The increase in investment in either of these economic factors increases the national output hence generates the high rate of economic growth.

In this paper, Section 2.0 is the methodology in augmenting MRW model. In Section 3.0 is the data analysis that is used to determine capital accumulation and production function and in Section 4.0 the result and discussion are presented. Section 5.0 is the summary and conclusion.

2.0 AUGMENTED MRW MODEL

MRW model includes the variable of human capital as an input in capital stock. Therefore, we augmented MRW model by isolating the foreign labour element as an input in human capital. Though foreign labour has the potential in producing more human capital, they are, however, are not imposing much impact on the volume of physical capital [6]. Human capital consists of skilled labour and low-skilled labour. We assumed

that domestic labour is skilled labour and foreign labour is low-skilled labour.

We assumed the domestic labour is skilled labour by looking at their educational attainment in Malaysia from primary to tertiary levels. While, for foreign labour, the employers are not considering their educational attainment during the hiring, and we assumed the foreign labour is low-skilled labour.

Economic growth refers to the increase in the level of production function. The equation for production function is,

$$Y(t) = K(t)^a H(t)^b \left[A(t)L(t) \right]^{1-a-b} \qquad (1)$$

where,

$Y(t)$ output,
$K(t)$ physical capital,
$H(t)$ human capital,
$A(t)$ level of technology,
$L(t)$ labour force,
a capital share, and
b labour share.

In Equation (1) physical capital, human capital, level of technology and labour force are inputs of economic growth. The increased in one of the inputs increased the level of production function. In this study, we divided Equation (1) with effective labour, $A(t)L(t)$ where

$$y(t) = \frac{Y(t)}{A(t)L(t)},$$

$$k(t) = \frac{K(t)}{A(t)L(t)}, \text{ and}$$

$$h(t) = \frac{H(t)}{A(t)L(t)}.$$

The production function per effective labour in Equation (1) becomes,

$$y(t) = k(t)^a h(t)^b. \qquad (2)$$

To find the effect of foreign labour, we injected the variable of foreign labour from human capital, $h_{fw}(t)$ in Equation (2).

$$y(t) = k(t)^a \left[h_{dw}(t) h_{fw}(t) \right]^b \qquad (3)$$

where $h_{dw}(t)$ is the human capital for domestic labour.

Physical capital and human capital is accumulated when the representative agents (households) save the output to have more capital (either physical or human capital).

The equations of capital accumulation are,

physical capital accumulation,

$$\dot{k}(t) = s_K y(t) - (m+n+g+\delta)k(t), \qquad (4)$$

human capital accumulation,

$$\dot{h}_{dw}(t)\dot{h}_{fw}(t) = s_H y(t) - (m+n+g+\delta)\left[h_{dw}(t)h_{fw}(t)\right] \qquad (5)$$

where,

s_K saving rate of physical capital,

s_H saving rate of human capital,

m rate of population growth for domestic labour,

n rate of population growth for foreign labour,

g rate of technological progress, and

d capital depreciation rate for physical and human capital.

It is noted that human capital and physical capital depreciate at the same rate [4].

3.0 DATA ANALYSIS

To determine the human capital, we identified the rate of labour participation and human development index (HDI). The rate of labour participation is the rate of employed labour while HDI is an average measure of human development; a healthy life, being knowledgeable and a decent standard of living [7]. Table 2 shows the data of percentage of human capital for domestic and foreign labour.

Table 2 Percentage of human capital for domestic and foreign labour

Year (t)	Domestic Labour Participation Rate (%)	Foreign Labour Participation Rate (%)	Human Development Index (HDI)	Human Capital Domestic Labour (H_{dw})	Human Capital Foreign Labour (H_{fw})
2009	90.2	9.8	0.76	0.6855	0.0745
2010	85.9	14.1	0.76	0.6855	0.0745
2011	86.2	13.8	0.77	0.6614	0.1086
2012	86.5	13.5	0.77	0.6637	0.1063
2013	86.6	13.4	0.77	0.6661	0.1040

Source: Department of Statistics Malaysia and UNDP

Human capital for domestic labour is given by,

$$H_{dw}(t) = \frac{L_{dw}}{L(t)} * HDI \qquad (6)$$

human capital for foreign labour is given by,

$$H_{fw}(t) = \frac{L_{fw}}{L(t)} * HDI . \qquad (7)$$

In determining human capital for domestic and foreign labour Equations (6) and (7) are used. From Table 2, the rate of human capital for domestic labour decreases from 2010 to 2013 because of the participation rate of domestic labour is decreases while the rate of human capital for foreign labour increases due to sharply increasing the participation rate of foreign labour. Data Table 3 shows the physical capital in Malaysia.

Table 3 Constructing physical capital

Year, t	Gross Fixed Capital Formation, GFCF (RM million)	Consumption of Fixed Capital, COFC (RM million)	Physical Capital, $K(t)$, (RM million)
2009	141,584	99,767	1,866,888
2010	158,397	103,502	1,925,518
2011	168,393	108,026	1,990,409
2012	200,773	114,113	2,083,156
2013	217,879	121,802	2,186,922

Source: Department of Statistics Malaysia

Table 3 consists of the data for the Consumption of Fixed Capital (COFC) that represents the depreciation of physical capital and Gross Fixed Capital Formation (GFCF) that represents the accumulation of investment in physical capital. We also use Gross Fixed Capital (GFK) data to have the initial value of physical capital. By using the following equation, we constructed the physical capital data in Table 3.

$$K(t) = K(t-1) - COFC(t-1) + GFCF(t). \qquad (8)$$

To determine the effective labour, $A(t)L(t)$ we need the data for the level of technology, $A(t)$.

By using Cobb Douglas [8] production function form,

$$Y(t) = AK(t)^a L(t)^{1-a}$$

$$A(t) = \frac{Y(t)}{K(t)^a L(t)^{1-a}} \qquad (9)$$

where capital share is $a = 0.33$ [9] and labour share is $1 - a = 0.67$. Table 4 shows the data of the level of technology and effective labour.

Table 4 Calculating level of technology

Year, t	Gross Domestic Product (GDP, RM billion), $Y(t)$	Level of Technology, $A(t)$	Effective Labour, $A(t)L(t)$
2009	629.9	1106.63	12657905758.18
2010	676.7	1110.82	13763807115.85
2011	711.8	1131.14	14179834543.45
2012	751.9	1147.97	14676293194.61
2013	787.6	1150.77	15252400011.53

From Table 4, data in the second column is the output of production in Malaysia and the data from the Department of Statistics Malaysia [10]. Data of the level of technology that is referring to knowledge in the third column produces the data for effective labour in the fourth column [6, 9]. Data of effective labour is obtained from the multiplication of total labour in Table 1 with the level of technology.

Table 5 Parameters of the model

Year (t)	n	m	s_K	s_H	g	d
2009	0.5645	0.0355	0.3400	0.5513	0.0038	0.0360
2010	0.0083	0.3882	0.3540	0.5504	0.0183	0.0370
2011	0.0125	0.0386	0.3570	0.5543	0.0149	0.0440
2012	0.0316	0.0405	0.3300	0.5568	0.0024	0.0570
2013	-	-	0.3120	0.5597	-	0.0670
Average	0.12338	0.10056	0.3386	0.5545	0.00788	0.0482

Source: Department of Statistics Malaysia and The World Bank

Table 5 shows the average data of labour growth rate, saving rate for domestic and foreign labour, rate of technological progress and rate of capital depreciation in Malaysia.

We assumed these parameters were at a constant rate, and we determined their average rate and used these parameters to determine the capital accumulation per effective labour.

4.0 MAXIMUM VALUES FOR FOREIGN LABOURS

Table 6 Accumulation of capital and production function of the model

Year, t	Physical Capital Accumulation per Effective Labour, $\dot{k}_1(t)$	Physical Capital Accumulation per Effective Labour, $\dot{k}_2(t)$	Human Capital Accumulation per Effective Labour, $\dot{h}_{dw}(t)$	Human Capital Accumulation per Effective Labour, $\dot{h}_{dw}\dot{h}_{fw}(t)$	Production Function per effective labour, $y_1(t)$	Production Function per effective labour, $y_2(t)$
2009	3.5051	3.0655	3.0266	3.1055	2.2055	2.1274
2010	3.4999	3.0610	2.9126	2.9767	2.1886	2.1083
2011	3.5070	3.0682	2.9190	2.9843	2.1908	2.1109
2012	3.5135	3.0741	2.9172	2.9824	2.1908	2.1109
2013	3.5158	3.0756	2.9089	2.9729	2.1889	2.1088

Table 6 shows the differences in the presence and the absence of data rate of foreign labour growth in the accumulation of physical capital per effective labour in Malaysia. In the third column, the presence

of foreign labour growth reduces the rate of physical capital accumulation. According to Solow [9], an increase in the population growth rate is one of the reasons why a country is poor. The influx of foreign labour increases the rate of population growth in Malaysia. From Table 6, it shows that employment of foreign labour increases every year and the average rate of foreign labour growth is higher than domestic labour. This has made the growth rate of population growth increased in Malaysia.

The fourth and fifth columns are human capital accumulation per effective labour with the presence and the absence of foreign labour. Based on the difference, it shows that the influx of foreign labour increases the human capital accumulation. In 2009, the employment of foreign labour from Table 1 increased sharply, but the rate of human capital accumulation decreased from 3.1055 to 2.9767 in 2009 to 2010. It shows that there should be a limitation to the hiring of foreign labour and Malaysia has to increase the domestic labour that is higher skilled and more knowledgeable.

The sixth and seventh columns show the data of production function per effective labour in Malaysia. Data in the sixth column is the production function without the addition of human capital from foreign labour. Meanwhile, the seventh column represents the production function with the addition of human capital from foreign labour.

Based on the above table, the level rate of the production function in the absence of foreign labour is higher than the level rate of the production function with the presence of foreign labour. Even though the influx of foreign labour increases the rate of human capital labour, it however reduces the level of the production function in Malaysia. From the table, it shows that, the influx of foreign labour decreases the production function. The employment of foreign labour increased the rate of human capital accumulation as per the fifth column but they decrease the rate of physical capital accumulation, which leads to the decrease of the level of production. This significantly shows that the economic growth is more prolific with the absence of foreign labour than its presence.

Table 7 Human capital per effective labour

Year, t	Human Capital per Effective Labour for Domestic Labour, $h_{dw}(t)$	Human Capital per Effective Labour for Foreign Labour, $h_{fw}(t)$
2009	0.7600	0.7602
2010	0.7980	0.5284
2011	0.7673	0.7870
2012	0.7673	0.7874
2013	0.7692	0.7761

From Table 7, in 2009, it shows that the rate of human capital per effective labour for domestic labour is 0.7600 and human capital per effective labour for foreign labour is 0.7602. In that year, the total labour for foreign labour is 1,067,935. It suggests that the employment of foreign labour should be around 1.1 million, as a raise in low-skilled labour would negatively affect developing economy [1].

5.0 CONCLUSION

To generate and sustain economic growth, the level of production function must increases. By hiring foreign labour, the rate of human capital accumulation increased whereas the rate of physical capital accumulation decreased. Due to the reduction of the physical capital accumulation rates, the level of production function is also reduced. The relationship between skilled labour and low-skilled labour plays a significant role in generating higher production rates. The data for human capital for domestic and foreign labour (Table 2) and human capital per effective labour (Table 7) shows that the increase in low-skilled labour does not help in generating higher production rates. Thus, in order to boost higher production rates and have higher quality goods and services, Malaysia ought to increase the level of employment of higher skilled labour that is domestic instead. Construction is the main sector in Malaysia where in reality, the demand for foreign labour and dependency on their contribution exists. This high demand will maintain if domestic labour is not interested in working at construction sites and is not willing to receive similar salary paid to foreign labour [11].

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