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Heterogeneous Effects of Employment on Growth in Malaysia

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Abstract

Motivation and aim: This study examines the relationship between employment and economic growth in Malaysia, with the emphasis on the heterogeneous effects in the labour market. These effects relate to sectoral employment, citizenship, and the skill levels that influence changes in this growth nexus.

Methods and materials: Three main tests are conducted, to deliver empirical evidence on the impact of heterogenous effects in the labour market on economic growth. Time-series econometric approaches are applied to a growth model, involving data ranging from 1971 to 2018.

Key findings: Heterogenous effects in the labour market significantly influence economic growth. On the whole, the findings indicate that labour has a significant positive impact on sectoral economic growth. It is also uncovered that the growth-driven employment of foreign workers, led to the disproportionate displacement of local workers. This in turn can prove to be a negative situation, when it comes to the development of highly-skilled workers.

Policy implication: It is imperative, that the status quo of the current labour market structure be revisited. Considering the current worrying situation, steps need to be taken to reduce the dependency on foreign workers, while implementing re-skilling and up-skilling initiatives, to enhance the performance and contribution of local workers.

JEL classification
J08, O41, O47

Keywords
employment, economic growth, foreign workers, Malaysia

Heterogeneous Effects of Employment on Growth in Malaysia

1. INTRODUCTION

According to the growth theory, economic growth expansion is influenced by labour utilisation, alongside other inputs such as capital, raw materials, and technology. As the economy moves towards modern industrialisation, structural shifts have led to advances in technology and innovation, expansion in terms of infrastructure, and reductions of transaction costs. All these mechanisms provide feedback which can be harnessed by the labour market, to implement structural adjustments in compliance to the immediate situation.

The adjustments in the labour market, affect the other factor markets either directly or indirectly, in terms of both supply and demand. In a well-functioning economy, the use of labour is efficient if the labour market mechanism can adjust freely, in response to shocks, thus leading to market correction to restore growth. However, recent evidence in relevant literature suggests an intricate connection between the labour market and economic growth, highlighting the influence of heterogeneous effects.

It has been established that the heterogeneous effects in the labour market that instigate changes in economic growth, can be separated into the sectoral effect, and the composition effect. The sectoral effect has to do with the economic transformation, which is driven by structural changes, particularly in relation to sectoral contribution towards economic growth. In this regard, the use of labour in the economy is adjusted to meet changes in demand, either by increasing labour productivity (Park et al., 2016), or through migrations (Uno & Kobayashi, 2013; Zhao & Li, 2020). The composition effect, however, is less straightforward, and is dependent on the composition of employment in the labour market. Among others, this effect is associated to education level (Razzak & Timmins, 2010), skill types (Hulten & Ramey, 2015), citizenship, (Steinhardt, 2012) and ethnicity (Muange & Kiptoo, 2020).

This paper delves into the impact of heterogeneous effects in the labour market on the Malaysian economic growth. In comparison to other industrialised economies with a similar initial circumstance, Malaysia case is unique as its economic progress is marked by overly extended development periods, which served to render its sluggish transformation into a developed nation. In the context of Malaysia's labour market, our work focuses on uncovering the extent to which Malaysia economic growth is affected in three aspects: (a) the sectoral effect of the labour market (b) foreign labour effects, and (c) the effects of different skills.

The contribution of this paper to the existing literature is two-fold. Firstly, from the knowledge perspective, we provide an empirical assessment on the impact of different labour market structures on the Malaysian economic growth. Aggregate measures are used to gauge a "helicopter view", regarding the extent to which labour market behaviour can influence economic progress, which is then very informative for the development of a macroeconomic policy. Secondly, when it comes to policy decision making, a good understanding of the heterogenous effects in the labour market, on economic performance, is imperative. This information is useful for determining intervention strategies, which can serve to improve labour market conditions, and contribute towards better growth.

This paper is organised as follows. In Section 2, we refer to relevant literature, for a discussion on the evolution of Malaysia's economic development and labour market. In Section 3, we describe the materials and methodology used for conducting the empirical assessment. In Section 4, we discuss the findings. Finally, in Section 5 we draw the conclusion with policy recommendations.

2. ECONOMIC BACKGROUND AND PAST STUDIES ASSESSMENT ON MALAYSIA LABOUR MARKET

The past sixty years has seen the transformation of Malaysia from an agriculture-based into a manufacturing-based nation. The rapid pace of industrialisation in Malaysia, which began during the 1980s, contributed towards economic prosperity, which in turn improved the way of life of its citizens. The economic structure transformation (from rural-based agricultural sectors to modern and urban-based industrialisation) has emphasised on the importance of sectoral transformation towards economic growth. Theoretically, the structural changes are driven by resources re-allocation from the agricultural to industrialised sectors, as well as by changes in the patterns of consumption (Kuznet, 1973), involving a complex interaction between demand and supply factors (Chenery & Syrquin, 1989).

As shown in Table 1, for over two decades, the shares of value-added in the five main sectors have been varying, whereby the Agriculture, Forestry and Fishing (herewith Agriculture) sectors, as well as the Mining and Quarrying (herewith Mining) sectors, have exhibited a declining contribution to the gross domestic products (GDP). While the Manufacturing and Construction sectors have remained stagnant, the services sector has portrayed expanding contribution patterns, which is an indication of the significance of this sector, in terms of economic growth.

Although Malaysia remains a resource dependent nation, due to its natural resource-rich and arable land with large-scale commodity plantations (Gylfason & Zoega, 2006; Olaniyi et al., 2011), the declining contribution of the resource-based sectors to the GDP, has realigned the focus of sectoral development (MITI, 2006). In response to move up the value chain, economic planning has involved the re-direction of economic development towards high value production, and services intensification. Thus, the economic shift has altered the human capital requirement in the economy. Such a development facilitates labour migration to non-agricultural employment, marking a shift in employment from production

activities, to services activities. This is made evident by the decline in the share of employment in the Agriculture sector, from 17.87% (1995-2001) to 11.57% (2013-2019), while the share of employment in the Services sector rose from 50.23% to 61.74%, within the same period.

In terms of the structural effect, it is normal for structural change to be associated with the shifting of workforce, between different sectors in the economy. Many studies have uncovered positive correlations, between the aggregate growth and economic transformation, whereby the proliferation of Manufacturing and Services sectors accelerates the demand for employment. This development contributes directly to the country's GDP. Such relationships are directly related to the improvement in economic productivity, creating more opportunities for economic diversifications (Maroto-Sánchez & Cuadrado-Roura, 2009; McMillan et al., 2011; Lee & McKibbin, 2018).

Changes in the economic structure have brought about an inevitable labour shortage situation. The employment of foreign workers has become a short-term solution, which could curtail long-term growth without an adequate institutional quality. Though it is widely debated in economic literature, the findings with regards to this composition effect remain inconclusive. Despite a negative public perception towards the presence of foreign workers, there are studies suggest that their contribution do accelerate economic progress. On the other hand, undesirable effects prevail as the issue of substitutability exists between local and foreign workers.

On the positive side, several studies indicate that foreign workers contribute towards Malaysia's economic progress and growth (Tham and Liew, 2014; World Bank, 2015). It is argued that the employment of foreign workers reduces the cost of production, enhances productivity, and increases wages. Kanapathy (2001) observed that during the high growth period of the 1980s and 1990s, the participation of foreign workers led to an elevation in wages. It is notable, that the presence of foreign workers does not cause a dip in the wages of local workers. The positive effects of

foreign workers in terms of Malaysia's productivity, are also supported by Jordaan (2017), Noor et al. (2011), and Palel et al. (2016).

On the flip side of the coin, foreign workers have been negatively associated to skill effects that impede labour productivity, suppress wage rates and disincentive technological adoption. Ang et al. (2018) and Rasiah et al. (2015) opined that the employment of foreign workers causes a loss in productivity due to low-skilled labour, while corporations are less inclined to invest in technology, which requires high capital investment. In a similar vein, Ismail (2015, 2014) forwarded that in the context of Malaysia's economic growth, the impact of unskilled foreign workers can be considered negative, while the impact of skilled and semi-skilled foreign workers can be considered positive.

Table 1: Share of value added and employment by sector (%).

	1995-2001	2001-2007	2007-2013	2013-2019
Agriculture, Forestry & Fishing				
Value added (% of GDP)	11.56	10.46	9.56	7.90
Employment (% of total employment)	17.87	14.70	13.23	11.57
Mining & Quarrying				
Value added (% of GDP)	15.50	14.55	10.62	8.20
Employment (% of total employment)	0.37	0.34	0.55	0.65
Manufacturing				
Value added (% of GDP)	23.09	24.53	23.00	22.32
Employment (% of total employment)	23.00	20.77	17.73	17.12
Construction				
Value added (% of GDP)	4.90	3.64	3.73	4.70
Employment (% of total employment)	8.54	9.06	9.24	8.93
Services				
Value added (% of GDP)	43.38	45.83	52.18	55.68
Employment (% of total employment)	50.23	55.13	59.26	61.74

Source: Authors' computation from the Department of Statistics Malaysia dataset.

Other negative consequences of foreign labour dependency include the suppression of the wage rate, as well as an unfavourable skill composition effect in the economic activities. Athukorala and Devadason (2012) indicate that the presence of foreign workers hinders the increase of unskilled-worker wages. On the other hand, Ismail et al. (2014) revealed that foreign workers have a significantly negative effect on the overall wages of a firm. According to the results, among the skilled, semi-skilled and unskilled workers, only the semi-skilled and unskilled foreign workers have negative effects on the overall wages. However, the presence of foreign workers has positive effects on the wages of managers; professionals; and technical and associate professionals. But when it comes to the wages of clerical and general workers, the presence of foreign workers represents a negative effect. Ismail et al. (2014) also uncovered that the effect of foreign workers on wages is greater in the services sector, than in the manufacturing sector. Also, the effect of foreign workers on wages is more evident in large-sized, rather than in small-sized firms.

According to Rasiah et al. (2015), the slow wage growth registered by the manufacturing sector is attributed to the heavy dependence on low-skilled foreign workers, since the late 1990s. It is also apparent that the trade performance of Malaysia's manufacturing sector has declined, while labour productivity has slowed down. Ang et al. (2018) also observed that industries with low productivity have a higher share of low-skilled foreign workers. The firms that employ foreign workers tend to be labour-intensive, with extended working hours. Such firms have been observed to be less efficient, in comparison to firms that employ automation and technologically advanced production methods. Malaysia is currently considered a labour-intensive and low-cost destination country. As a consequence, foreign investors are inclined to relocate their lower value-added processes to Malaysia.

The substitution effect with regards to local workers, due to the influx of foreign workers, is another area of concern. A study conducted by Jajri and Ismail (2006) on the Malaysian manufacturing sector revealed that foreign workers are increasingly the cause of job displacement among local

workers. This is made evident by the fact that the wage rate and technological uptakes remain low in the economy (Jegathesan et al., 1997; Ibrahim & Said, 2015). In constrast, studies conducted by Noor et al. (2011) and Tan and Ng (2018), disclosed that foreign labour is neither a substitute, nor a complement for local workers. While these studies have, in one way or another, indicated the effects of the presence of foreign workers on local workers, more comprehensive investigations are required for a more conclusive outcome.

3. METHODOLOGY AND DATA SOURCES

Based on the standard growth model specifications, the impact of total employment on economic growth in Malaysia can be estimated by way of the following model:

$$GDP_t = f(EMP_t, Capital_t, control_t) \quad (1)$$

where GDP_t is measured by the real gross domestic product (GDP), EMP_t is the number of employments, $Capital_t$ is a domestic direct investment (proxied by real net capital stock per capita). The control variables are FDI_t (foreign direct investment, proxied by the ratio of FDI inflows to GDP), education level (proxied by educational attainment as defined by Barro and Lee), industrialisation (proxied by CO2 intensity, measured using carbon dioxide emission per kilogram (kg) of oil equivalent energy use), globalisation (proxied by KOF index of globalisation), fertility is the total fertility rate (measured by the number of births per woman), financial development (measured by ratio of domestic credit to private sector to GDP), and openness (proxied by ratio of total trade to GDP).

With regards to the application of control variables, it is important that the estimation process in this study involve separate regressions. These regression models are distinguished according to the labour market heterogenous effects mentioned above. Namely, these are citizenship (local and foreign), broad sector (Agriculture, Mining & Quarrying, Manufacturing, Construction and Services), and skill levels (9 job

categories[1]). Each of these is regressed with the use of different models. Twenty-seven regression models are estimated, with each of them using different control variables, which are selected based on robust estimates.

Apart from Equation (1), we also extend our analysis to investigate the displacement of local workers in Malaysia, by foreign workers. This substitution effect can be estimated by way of the following model:

$$Local_t = f(Foreign_t, control_t) \quad (2)$$

where $Local_t$ is the number of local workers, and $Foreign_t$ is the number of foreign workers. The control variables included in the estimation of Equation (2) are the same selection of variables as mentioned for Equation (1).

In line with Wang (2010), we interpret the substitutability or complementarity of local workers for foreign workers by the indicator of the estimated coefficient of the foreign workers. A negative coefficient for foreign workers suggests that foreign workers are substitutes, while a positive coefficient indicates that foreign workers and local workers are complements. If the estimated coefficient of the foreign workers is negative or positive, but is not statistically significant, then it can be deduced that foreign employment is "neutral".

Table 2 summarises the data sources for all the variables used in the empirical estimations. Data on GDP_t, EMP_t, and $Capital_t$ at the sectoral levels, are gathered from the Department of Statistics, Malaysia, via various publications. Meanwhile, data for the control variables, namely, financial development, openness, fertility, and CO2 intensity, are compiled from the World Development Indicators database. Data on globalisation and FDI inflows are sourced from the KOF index of globalisation and UNCTAD databases, respectively. Data used in the analysis range from 1971 to 2018.

[1] Nine job categories are defined based on 1-digit level of Malaysia Standard Classification of Occupations (MASCO)

Generally, the local (Local) and foreign worker (Foreign) figures are obtained from official statistics, which are based on data collection from formal establishments. As such, some informal activities, which also involve the employment of large workforces, are not included in the data collected. Meanwhile, underestimation in the number of foreign workers could be an issue, due to the existence of undocumented or illegal migrants. However, for this study, this discrepancy in data is not taken into account.

Table 2: Variables for empirical analysis and respective data

Variable	**Data**	**Time series**
GDP	Real GDP	1971-2018
Emp	Number of employments	1971-2018
Capital	Real net capital stock per capita	1971-2018
Local	Number of local workers	1971-2018
Foreign	Number of foreign workers	1971-2018
Control variables		
Education	Educational attainment as defined by Barro and Lee	1971-2018
FDI	FDI inflows to GDP	1971-2018
Industrialisation	Carbon dioxide emission per kilogram (kg) of oil equivalent energy use	1971-2018
Globalisation	KOF index of globalisation	1971-2018
Fertility	Number of births per woman	1971-2018
Financial development	Domestic credit to private sector to GDP	1971-2018
Openness	Total trade to GDP	1971-2018

4. RESULTS AND DISCUSSION

As mentioned earlier, the main aim of this study is to examine the impact of employment on economic growth, by considering the heterogeneous effects in the labour market. The discussion on empirical results is separated into four areas. Firstly, we present the impact of total employment on economic growth. Secondly, we elaborate on the comparative impact of local and foreign workers on economic growth. Thirdly, we discuss our results on the substitutability between local and foreign workers. And lastly, we explain the results acquired, regarding the impact of different skill types on economic growth. Sectoral issues are also discussed, depending on the availability of relevant results.

4.1 IMPACT OF TOTAL EMPLOYMENT BY SECTOR

Table 3 portrays the impact of employment on economic growth, at the national and the sectoral levels. The first column exhibits the overall results of employment, which affects the national economic growth. Clearly, labour plays a vital role in economic production, besides the use of capital and other control determinants. At the sectoral level (Columns 2-6); the relationship between employment and economic growth appears to vary across sectors, despite it being corroborated with the national level estimation. Again, these results emphasise that the role of labour, with regards to sectoral growth, is significant.

Amongst all broad sectors, the Construction sector is the most likely to be labour-intensive. According to the results, this sector has the highest relationship between employment and sectoral growth. We suggest two compelling explanations to support this view. Firstly, the rapid pace of infrastructure development, in Malaysia, accelerates the growth of the Construction sector. This rapid growth situation calls for a substantial amount of manpower, of which, 69% are made up of foreign workers (Abdul-Rahman et. al, 2012). Secondly, in comparison to the Services sector, which employs over 60% of the total workforce, the Construction sector only employs 8% of the total workforce. However, it has been

observed that the employment structure of the former sector, is proportionate to its 56% value-added contribution to the GDP (Table 3, Column 4), while the employment structure of the latter, is somewhat disproportionate to its value-added contribution to the GDP. This is an indication that the Construction sector's overdependence on labour could prove to be a significant obstacle to its growth, should there occur an acute labour shortfall.

4.2 IMPACT OF LABOUR CITIZENSHIP BY SECTOR

Previous empirical results reveal that labour is a key factor for Malaysian economic growth. Given its important role, a deeper investigation is necessary, to understand the extent to which labour composition affects growth, with the emphasis on the dispersion effects between local and foreign worker employment. Table 4 illustrates the impact of local and foreign workers on economic growth. Generally, according to the results shown in Table 3, the positive and significant impact of employment on economic growth can be considered long-lasting, particularly for the national level estimation. As can be gathered from the first column of Table 4, both local and foreign employment is significant for Malaysia's economic growth, with the former delivering a greater impact.

However, the magnitude, to which local and foreign labour roles diverge, should be the main focus of investigations, especially at the sectoral levels. According to the results, with the exception of the Manufacturing sector, foreign labour in all the other economic sectors has a positive impact on sectoral growth. A greater magnitude of foreign employment effect on growth is observed for the Agriculture and Construction sectors. This is to be expected, as these sectors employ a significant number of foreign workers, to facilitate their growth. A study conducted by Del Carpio et al. (2015) reveals that the Agriculture sector in Malaysia, especially the large plantations, employ a staggering 69% of foreign workers, with about 98% of the workforce comprising unskilled workers. Similarly, the Construction sector is largely dependent on foreign workers, with the

majority of them in the unskilled category (Han et. al., 2008 and Del Carpio et. al, 2015).

On the other hand, the local workforce plays a significant role, in the long-term growth of the Manufacturing and Services sectors. This finding is anticipated, as most of the total local workforce is concentrated in these two sectors.

Table 3: Impact of employment on economic growth by sectors

Independent Variables	Dependent variable: Real GDP by sectors					
	National (1)	Agriculture (2)	Mining & Quarrying (3)	Manufacturing (4)	Construction (5)	Services (6)
Constant	-0.0092	3.0174***	1.8843	3.9788***	1.7880**	-0.8882
	(-0.0069)	(3.9235)	(1.0881)	(6.4772)	(2.2712)	(-0.8203)
Employment, by sectors	0.5188***	0.4013***	0.2694***	0.5576***	0.7298***	0.7228***
	(2.8643)	(3.2115)	(4.2731)	(2.9551)	(26.383)	(3.8679)
Capital, by sectors	0.2928***	0.2119**		0.2918*	0.4026***	
	(4.6036)	(2.2833)		(2.0163)	(3.8297)	
Education		2.2209***				
		(17.136)				
FDI						0.0323**
						(2.4606)
Industrialisation	0.1892***			0.4362***	0.8489***	0.4310***
	(4.5834)			(3.3551)	(2.9262)	(3.3663)
Globalisation	1.2924***					1.7035***
	(6.6597)					(3.5211)
Fertility	-0.3847***			-1.5352***		-0.6550***
	(-2.7517)			(-10.895)		(-3.4277)
Financial Development			0.5808***			
			(6.7028)			
Openness			0.5796***	0.2117**		
			(2.9256)	(2.3698)		
$\underline{R}^2$	0.9984	0.9747	0.9033	0.9956	0.9684	0.9957
SER	0.0306	0.0551	0.1340	0.0704	0.1205	0.0603
Diagnostic tests:						
OLS: LM$\chi^2(1)$	[0.015]**	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
OLS: ARCH$\chi^2(1)$	[0.391]	[0.013]**	[0.035]**	[0.165]	[0.003]***	[0.018]***
N	44	47	48	44	44	44

Notes: All models have been estimated using OLS with robust standard error following Newey and West (1987) that correct for both autocorrelation and heteroscedasticity. Asterisks ***,**,* denote statistically significant at 1%, 5% and 10% level, respectively. LM$\chi^2(1)$ and ARCH$\chi^2(1)$ denote the Lagrange multiplier test for serial correlation of order one and heteroscedasticity of order one in the OLS equations, respectively. Figures in round brackets (…) are *t*-statistics, while figures in square brackets […] are *p*-values. $\underline{R}^2$ and SER denote adjusted R-squared and standard error of regression, respectively. N is the number of observations. All variables are in logarithm.

Table 4: Impact of local and foreign workers on economic growth by sectors

Independent Variables	Dependent variable: Real GDP by sectors					
	National	Agriculture	Mining & Quarrying	Manufacturing	Construction	Services
Constant	12.166***	5.6685	11.540***	9.5367***	-48.600***	4.2444***
	(20.133)	(1.1042)	(89.989)	(8.6484)	(-4.2650)	(5.2455)
Local Employment,	0.1861***	0.3623	-0.0428	0.6372***	-0.1236	0.7870***
by sectors	(3.3131)	(0.5773)	(-1.5125)	(5.1467)	(-0.8301)	(10.687)
Foreign Employment,	0.0377***	0.3325*	0.0318***	-0.0061	0.2494***	0.1272***
by sectors	(4.4403)	(2.4311)	(3.4804)	(-0.3179)	(4.0304)	(6.6027)
Education	0.7010***					
	(12.983)					
FDI			0.0374*			
			(1.9716)			
Industrialisation		1.1301				1.0941***
		(1.6710)				(4.0919)
Globalisation					13.375***	
					(5.0118)	
Fertility				-2.6432***		
				(-8.2668)		
$\underline{R}^2$	0.9931	0.2917	0.4036	0.9485	0.9497	0.9066
SER	0.0164	0.0690	0.0393	0.0341	0.0700	0.0607
Diagnostic tests:						
OLS: LM$\chi^2(1)$	[0.684]	[0.670]	[0.123]	[0.332]	[0.052]*	[0.612]
OLS: ARCH$\chi^2(1)$	[0.218]	[0.880]	[0.516]	[0.446]	[0.311]	[0.231]
N	14	10	14	13	12	10

Notes: All models have been estimated using OLS with robust standard error following Newey and West (1987) that correct for both autocorrelation and heteroscedasticity. Asterisks ***,**,* denote statistically significant at 1%, 5% and 10% level, respectively. LM$\chi^2(1)$ and ARCH$\chi^2(1)$ denote the Lagrange multiplier test for serial correlation of order one and heteroscedasticity of order one in the OLS equations, respectively. Figures in round brackets (…) are *t*-statistics, while figures in square brackets […] are *p*-values. $\underline{R}^2$ and SER denote adjusted R-squared and standard error of regression, respectively. N is the number of observations. All variables are in logarithm.

4.3 SUBSTITUTABILITY BETWEEN LOCAL AND FOREIGN WORKERS

The empirical results attained support the fact that Malaysia's economic growth is dependent on labour, whether in the form of local human capital or foreign immigrants. The impact of both workforces varies according to the type of economic activity under scrutiny. The influx of foreign labour can lead to the displacement of local employment, either through substitution, or the shifting of locals to a higher value-added economic activity. It has been established that most foreign workers are employed to perform low-skilled tasks. While this situation serves to reduce costs, it comes at the expense of local wages suppression.

Table 5 presents the impact of foreign workers on local employment. The main objective here is to estimate the substitutability between both workforces, at the aggregate level, across the main sectors.

Based on Table 5, three important findings are worth discussing. Firstly, at the national level, our results show that the presence of foreign workers may induce a negative impact on local workers (see first column of Table 5). In the context of local employment opportunities, the substitution of local workers for foreign workers can lead to adverse effects (Hassan, 2008). Secondly, the substitution effects are more apparent at the Services and Agriculture sectors, while the complementary effects are presented at the Manufacturing and Construction sectors.

The use of aggregate measures in our analysis makes it difficult to empirically verify that local and foreign workers are substitutes in the Services sector. However, previous studies have revealed that foreign workers are needed to fill the employment gap in certain sectors, which are frequently shunned by locals (Aziz et al., 2017). Furthermore, firms in non-tradable sectors, such as those involved in service-based activities, persistently turn to foreign labour to cushion the effects of rising labour costs (Athukorala, 2006). Also, in order to maintain a steady economic growth, it is essential that a sufficient supply of unskilled and semi-skilled

workers be readily available. Otherwise, this circumstance has led to the rising demand for foreign workers (Del Carpio et al., 2015).

In the Manufacturing sector scenario, the complementary effect between local and foreign workers is somewhat restrained. According to Awad et al. (2018), complementarity prevails, when the inflow of skilled migrant workers complements the existing domestic human capital in the host country. Such a situation facilitates an increase in innovation activities in the host country.

Devadason (2021) provides an empirical analysis, which suggests the existence of the complementary effect between local and foreign workers in the Manufacturing sector. This effect is apparent for both skilled and unskilled workers in this sector. Meanwhile, there is also a viewpoint that the prevalence of the complement effect between foreign and local workers is due to the fact that they are not in direct competition with each other. While the unskilled jobs are taken up mostly by migrants, the locals tend to gravitate towards jobs that call for more refined skills (Ng & Tan, 2019).

And thirdly, other than in the Construction sector2, the use of capital seems to complement the local workers. It has been established that the substitution effect exists among local and foreign workers for some sectors. Meanwhile, the impact of capital on local workers appears to be rather promising. This can be attributed to the fact that the magnitude, to which the capitals complement local workers is relatively high. For example, the Services sector portrays the greatest substitution effect of foreign workers, in comparison to other sectors. However, capitals are significantly involved in the diminishing of this effect, which indicates their major contribution towards the complementing of local workers' tasks, in the production activities of the sector.

Table 5: Impacts of foreign workers on local employment by sectors

Independent Variables	Dependent variable: Local workers by sectors					
	National (1)	Agriculture (2)	Mining & Quarrying (3)	Manufacturing (4)	Construction (5)	Services (6)
Constant	-0.9437*	8.5399***	-5.6746***	1.8842	2.6791***	-3.3449***
	(-1.9614)	(21.724)	(-7.9797)	(1.0988)	(6.1416)	(-4.7165)
Foreign workers by sectors	-0.2375***	-0.2445***	-0.0701**	0.0955**	0.4461***	-0.2754***
	(-12.261)	(-3.5651)	(-3.0511)	(2.8918)	(14.719)	(-23.993)
Capital, by sectors	1.0758***	-0.0028	1.0718***	0.5575**		1.2977***
	(21.289)	(-0.0924)	(14.006)	(2.8432)		(18.655)
Industrialisation					1.7181**	
					(3.4383)	
$\underline{R}^2$	0.9653	0.4583	0.8977	0.6312	0.9532	0.9539
SER	0.0305	0.0668	0.1220	0.0579	0.0793	0.0486
Diagnostic tests:						
OLS: LM$\chi^2(1)$	[0.705]	[0.159]	[0.266]	[0.013]**	[0.376]	[0.756]
OLS: ARCH$\chi^2(1)$	[0.554]	[0.772]	[0.368]	[0.806]	[0.634]	[0.769]
N	13	14	13	13	10	13

Notes: All models have been estimated using OLS with robust standard error following Newey and West (1987) that correct for both autocorrelation and heteroscedasticity. Asterisks ***,**,* denote statistically significant at 1%, 5% and 10% level, respectively. LM$\chi^2(1)$ and ARCH$\chi^2(1)$ denote the Lagrange multiplier test for serial correlation of order one and heteroscedasticity of order one in the OLS equations, respectively. Figures in round brackets (…) are *t*-statistics, while figures in square brackets […] are *p*-values. $\underline{R}^2$ and SER denote adjusted R-squared and standard error of regression, respectively. N is the number of observations. All variables are in logarithm.

4.4 SKILL REQUIREMENTS AND ECONOMIC GROWTH

As previously observed, the capitals represent the core input for complementing the local workforce. As such, we can assume that skill requirements are a significant factor, when it comes to the boosting of economic growth. This is in line with the growth theory, which puts forward that higher capitalisation enhances economic growth, through the improvement of productivity and skills (Deng & Zhao, 2018; Yuhn & Kwon, 2000). Table 6 displays the impact of skill types on economic growth. In a nutshell, the results attained verify that all skill categories, significantly contribute towards economic growth, although the scale of contribution may vary across skill types.

It is our view that the impact of high-skilled workers, on economic growth, is lesser to that of medium-skilled workers. Generally, high-skilled workers are represented by managers, professionals, and technicians, while medium-skilled workers are represented by clerical staff, as well as plant and machine operators. According to the results attained, skilled agricultural workers deliver the greatest impact on economic growth, followed by clerical workers. While it has been established that capital plays an imperative role in economic growth (as shown in Table 5), this does not necessarily commensurate with the need for higher-skilled workers, as what the conventional growth theory may suggest. This serves to explain the lesser impact of a high-skilled workforce on economic growth.

Furthermore, the high dependency on foreign labour 'dilutes' the concentration of skill requirement in the economy, which in turn reduces its impact on economic growth. For example, Awad et al. (2018) opine that the long-term effect of a substantial increase in migrant workers could alter the skill components of the labour market, and make it dominated by relatively unskilled workers.

Table 6: Impact of workers on economic growth by skill types

Type of skilled workers:	Constant	Number of workers	Control variable:	$\underline{R^2}$	SER	Diagnostic tests: OLS: LM$\chi^2(1)$	OLS: ARCH$\chi^2(1)$	N
			Capital					
Managers	4.7692***	0.1120***	0.7758***	0.952	0.040	[0.0810]*	[0.541]	13
	(7.6218)	(3.2551)	(13.005)					
			Fertility					
Professionals	16.564***	0.0660***	-4.0706***	0.983	0.023	[0.699]	[0.865]	13
	(117.20)	(4.6153)	(-27.636)					
			Education					
Technicians	6.9096***	0.1256***	2.7321***	0.971	0.033	[0.241]	[0.658]	14
	(41.086)	(3.5563)	(19.601)					
			Capital					
Clerical workers	6.7602***	0.1385***	0.5951***	0.954	0.039	[0.250]	[0.466]	13
	(14.072)	(3.4274)	(12.609)					
			Education					
Service & sales workers	13.749***	0.0762**	0.6934***	0.992	0.017	[0.704]	[0.142]	14
	(80.419)	(3.0546)	(12.026)					
			Capital					
Skilled agricultural	0.6508	0.1474***	1.1138***	0.947	0.042	[0.071]*	[0.377]	13
	(0.4722)	(4.5119)	(9.8875)					
			Education					
Craft & trade workers	13.862***	0.0680***	0.7856***	0.992	0.017	[0.657]	[0.783]	14
	(104.55)	(3.1264)	(24.434)					
			Education					
Plant & machine operators	9.5431***	0.0926***	2.2873***	0.964	0.037	[0.044]**	[0.447]	14
	(52.125)	(3.1897)	(20.656)					
			Education					
Elementary occupations	13.762***	0.0687***	0.7593***	0.993	0.015	[0.763]	[0.184]	14
	(109.53)	(4.1832)	(20.031)					

Notes: All models have been estimated using OLS with robust standard error following Newey and West (1987) that correct for both autocorrelation and heteroscedasticity. Asterisks ***,**,* denote statistically significant at 1%, 5% and 10% level, respectively. LM$\chi^2(1)$ and ARCH$\chi^2(1)$ denote the Lagrange multiplier test for serial correlation of order one and heteroscedasticity of order one in the OLS equations, respectively. Figures in round brackets (…) are *t*-statistics, while figures in square brackets […] are *p*-values. $\underline{R^2}$ and SER denote adjusted R-squared and standard error of regression, respectively. N is the number of observations. All variables are in logarithm.

4.5 LINKING THE LABOUR MARKET LONG-TERM EFFECT TO THE CURRENT ECONOMIC CRISIS

This investigation focuses on the long-term effect of the labour market on economic growth. The results attained indicate that (a) labour plays a significant role in economic growth at the sectoral level, (b) while growth is driven by local and foreign labour, the resistance to local employment remains, and (c) the growth effect of high-skilled workers remains low.

The occurrence of the novel coronavirus (Covid-19) pandemic has imposed a relook at the labour market structure in the economy, due to serious disruptions in both the supply and demand chains. As a labour-intensive economy, Malaysia is not exempted from this dire situation, which affects the job security and livelihood of its workforce. Moreover, the prolonged and unresolved distribution issues have been exacerbated during the crisis, bringing further tension on the policy-makers to juggle between economic progress and people's welfare.

In the context of the labour market, the realisation of reliable solution to an anticipated dismal post-crisis situation will be difficult. Taking into consideration our empirical findings, two areas urgently call for appropriate policy measures.

First, dependency on foreign labour post a challenge to reverse, especially due to presence of substitutability effect and perpetuated long-term growth-driven foreign employment. We have elaborated earlier that labour is key for economic growth, either they are local or migrant workers. Though it is acceptable to ascertain this positive relationship because the use of labour could bring better return to the economy, yet more alarming concern lies on the substitutability effect of foreign worker for local workers. It seems imperative to look deeper into this effect as it could lead to diverse economic and social implications, including lower technological adoption, scarce innovation, talent brain-drain, wage stagnancy, which then crowding out local talents as well lead to underemployment.

Second, the increase in the number of higher education graduates signifies the presence of sufficient if not over-supply of high-skilled local talent pools in the economy. According to our findings, the growth impact of high-skilled workers is lesser than that of medium-skilled workers. This is an indication that the limited economic gains can be attributed to the underutilisation of high skills. This situation can be linked to the high dependency on foreign workers, which, as mentioned earlier, hinders capital intensive production. Therefore, in the midst of the current pandemic, the prevalence of skill mismatches and underemployment needs to be addressed, so that local talents can be optimised through active labour market policy interventions. This will serve to ensure market efficiency and rectify imbalances.

5. CONCLUSIONS AND POLICY IMPLICATIONS

The heterogeneous effects in the labour market can influence economic growth in several ways. This study approaches these effects from three perspectives.

Firstly, we assess the components of sectoral employment. According to the results, labour is an important factor for growth, at both the national and sectoral levels. Labour-intensive activities characterised the growth of economic sectors, putting the performance of these sectors at risk, should a labour shortage situation emerge. This state of affairs is rendered even direr, if the employees are migrant workers assigned to menial tasks, as this would bring about adverse effects on the country's skill and wage premiums.

Secondly, we investigate the impact of worker citizenship on economic growth. Malaysia's economic growth is highly dependent on both local and foreign workers. Generally, local workers play a greater role in the country's economic growth than foreign workers. However, the role played by foreign workers cannot by any means be considered minimal. For instance, when it comes to sectoral growth, foreign workers play a more significant role than local workers. In terms of the substitutability

between local and foreign workers, this is observed to be significant for some sectors. The substitutability between foreign and local workers comes with the potential to displace the local workforce, particularly in the area of low-skilled jobs.

Thirdly, we delve into the role of skill levels in economic growth. It is well-argued that high-skilled jobs, go hand in hand, with the development of a high-income nation. While the findings verify the importance of foreign workers in terms of Malaysia's economic growth, the impact of the high-skilled workforce in this area is deemed marginal in comparison to the medium-skill workforce. This not only indicates a lopsided dependency on low-skilled jobs, but also lack of high-skilled job creation in the economy.

The findings from this study clearly indicate the need for a reassessment on the status quo of the current labour market structure in order to realise a comprehensive reformation. According to these findings, there are two concerns with regards to policy implication. Firstly, in order to achieve the status of a developed nation, the sectoral development should include the availability of a high-skilled workforce, in coexistence with high-quality investment, to support the fast-changing and complex industrialisation processes. Secondly, high-dependency on cheap labour, comprising mostly of migrant workers, is deemed unsustainable for the facilitation of further growth, especially when they disproportionately crowd-out local talents. Given that substantial investments are allocated towards human capital development, particularly towards tertiary education, such effects would serve to devalue the returns on education.

In the current pandemic-led economic crisis, the Malaysian government has undertaken active measures to reduce foreign workers dependency, while at the same time executing upskilling initiatives to empower local human capital. Malaysianization (job replacement for local), reskilling and upskilling programmes are among the current initiatives carry by the government to tackle the labour market structural issues. However, bear in mind that, our empirical evidence proves the existence of workforce

substitutability in the economic sectors, which to a greater extent, any measures to reduce foreign workers shall be selective and well-targeted. This is to avoid supply shock due to massive labour supply shortage, which could prove to be critically unfavourable for the post-crisis economic recovery.

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