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An empirical study in assessing the impact of foreign workers on labour productivity in the Malaysian manufacturing sector

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ABSTRACT

This study investigates the impact of foreign workers on labour productivity within the manufacturing industry of Malaysia. The study utilized panel data from 297 manufacturing firms registered with the Federation of Malaysian Manufacturers (FMM), covering the ten-year period from 2008 to 2017, and analysed it using static panel data regression to measure the effect of foreign workers on labour productivity. The findings of the study indicate that the employment of foreign workers, particularly those with low skills, has a negative impact on labour productivity. Low-skilled foreign workers often possess a restricted level of education and skills that may not be compatible with the demands of modern industries. Consequently, they may face challenges in adjusting to novel technologies, procedures, or intricate assignments, thereby impeding their overall productivity. It can be concluded that the employment of low-skilled foreign workers in Malaysia's manufacturing sector negatively affects labour productivity. The limited education and skills of these workers hinder their ability to adapt to new technologies and complex tasks, leading to diminished productivity levels. The findings are useful in highlighting to regulators, employers, and workers the effect of foreign workers on labour productivity. The study implies that necessary skills should be provided to low-skilled foreign workers. By enhancing their skills, these workers can better meet the demands of modern industries and contribute more effectively to the manufacturing sector in Malaysia.

Contribution/ Originality: The productivity of foreign workers is the study's primary focus. Since there is a dearth of research on the impact of foreign labor on productivity, this study's findings are clearly unique, especially when considering Malaysia's manufacturing industry.

1. INTRODUCTION

Over the past few decades, Malaysia's economy has grown remarkably, making it one of Southeast Asia's top rising countries. This advancement has been largely attributed to the significant contribution of foreign workers, who have been vital to Malaysia's economic success. These overseas workers are now a vital part of the Malaysian labour market, helping to reduce labour costs, enhance labour flexibility, and fill labour shortages.

According to the Department of Statistics Malaysia (2022), there were 2.1 million documented foreign workers in the country as of June 2022, accounting for approximately 14% of the total workforce. Foreign labour is mostly employed in industries such as manufacturing, construction, plantation, and services, with the majority of foreign workers coming from countries such as Indonesia, Nepal, Bangladesh, Myanmar, and India.

Previously, in the early years of hiring foreigners, most of the labour migration came from Indonesia. However, foreign workers' hiring has been expanded to other Asian regions, such as Bangladesh, Thailand, and the Philippines. The composition of workers in each sector is relatively segmented by which country the workers come from. Workers from Bangladesh are mainly in manufacturing; Indonesians are predominantly in maid services and agriculture; while Vietnamese are heavily concentrated in the construction sector. Table 1 shows the number of migrant workers in Malaysia by country of origin.

Table 1. Number of migrant workers in Malaysia by country of origin.

Country of origin	Year		
	1999	2008	2016
Indonesia	269,194	1,085,658	754,487
Bangladesh	110,788	316,401	252,365
Thailand	2,130	21,065	12,374
Philippines	7,299	26,713	58,366
Pakistan	2,605	21,780	62,745
Others	17,644	591,481	726,032
Total	409,660	2,063,098	1,866,369

Source: Ministry of Home Affairs Malaysia (2017).

However, the influence of foreign workers on labour productivity in Malaysia remains a topic of debate. Concerns have been raised about the consequences of an over-reliance on low-skilled foreign workers. The influx of these workers, driven by the availability of cheap foreign labour, has potentially resulted in local unemployment and suboptimal productivity levels. Some argue that it contributes to social and economic problems such as crime, poverty, and social unrest. On the contrary, advocates argue that the presence of foreign labour is essential for Malaysia's economic growth and advancement, as it helps to alleviate labour shortages in specific industries.

In recent years, Malaysia has introduced several policies aimed at regulating the utilization of foreign labour within the country. These policies involve the implementation of a levy on employers who hire foreign workers and the enforcement of stricter regulations related to the recruitment and employment of foreign workers (Ministry of Home Affairs, 2022). Despite these regulations, concerns persist regarding the potential exploitation of foreign workers in Malaysia. These concerns encompass issues such as unfavourable working conditions, low wages, and limited access to healthcare and social services. Efforts are underway to address these concerns, including initiatives specifically designed to improve the living and working conditions of foreign workers and enhance their access to social services.

The objective of this study is to examine the impact of foreign workers on labour productivity in Malaysia, focusing on the manufacturing sector. The manufacturing sector in Malaysia comprises both export-oriented and domestic-oriented sub-sectors. Export products encompass electrical and electronics goods, chemicals and chemical products, rubber and plastic products, as well as textiles and apparel. Meanwhile, transport equipment, machinery equipment, basic metals, food products, and beverages are among the domestic-oriented sub-sectors.

The manufacturing sector is an important component of the Malaysian economy, accounting for approximately 22% of the country's gross domestic product (GDP) in 2020 (Department of Statistics Malaysia, 2021). The sector is diverse, encompassing a range of industries including electronics, chemicals, food processing, and textiles. In terms of employment, manufacturing has the largest number of employed people as compared to other industries. Table 2 presents the number of employed persons by industry in Malaysia from 2012 to 2021.

Table 2. Employed persons by industry, Malaysia, 2012-2021 ('000).

Year	Agriculture	Mining	Manufacturing	Construction	Education
2012	1,628.2	80.8	2,263.7	1,174.7	784.9
2013	1,758.9	87.9	2,315.8	1,292.1	816.6
2014	1,694.2	84.7	2,372.5	1,277.7	871.4
2015	1,753.9	104.4	2,322.7	1,309.9	899.0
2016	1,609.9	96.3	2,390.6	1,251.7	928.7
2017	1,635.0	97.2	2,513.3	1,258.9	880.3
2018	1,570.3	90.8	2,499.9	1,257.8	988.7
2019	1,541.1	91.0	2,681.5	1,276.4	962.3
2020	1,566.0	82.2	2,498.0	1,173.4	937.6
2021	1,550.0	81.9	2,501.4	1,159.6	924.3

Source: Department of Statistics Malaysia (2022).

Recognized as a leading producer of domestic appliances, Malaysia was ranked in third place as the world's largest producer of integrated circuits in 1990. The expansion of manufacturing in Malaysia has attracted many large corporations from other countries, such as Microsoft from the US and Mitsubishi from Japan, to open their offices and factories in Malaysia.

Today, manufacturing is the second-largest contributor to the Malaysian economy after services. The sector's contribution to GDP and international trade is evidence of its importance. The inspiring growth of Malaysian exports in manufacturing goods has further enhanced the economy. The high output of the manufacturing sector's sub-sector is a factor in its high performance. Table 3 represents the performance of selected manufacturing sub-sectors in 2017.

Table 3. Performance of selected manufacturing sub-sector for 2017.

Sub-sector	Gross output (MYR billion)	Number of persons engaged	Salaries & wages (MYR billion)
Petroleum, chemical, rubber and plastic products	340.4	391,763	14.6
Electrical, electronic and optical products	361.8	556,149	21.6
Vegetable and animal oils & fats and food processing	214.0	273,933	8.1
Non-metallic mineral products, basic metal and fabricated metal products	157.5	352,151	11.5
Transport equipment, other manufacturing and repair	100.5	214,127	7.5

Source: Department of Statistics Malaysia (2018).

According to the Department of Statistics Malaysia (2017), manufacturing has recorded a sturdy growth of 6 percent in the second quarter of 2017. Electrical and electronic products are the dominant sub-sector in manufacturing, with 15.4 percent of total sales value contributed by the industry in June 2017. Petroleum, chemical, rubber, and plastic products are among the significant sub-sectors that contribute to the strong development and expansion of the manufacturing sector in Malaysia.

Despite the high performance and contribution, the manufacturing sector has received competition from other countries, particularly China and Vietnam, which have lower labour costs and have been able to attract foreign

investment in the manufacturing sector. In addition to these challenges, the manufacturing sector in Malaysia has also been impacted by the COVID-19 pandemic, with disruptions to global supply chains and reduced demand for certain products.

The COVID-19 pandemic has also caused unemployment and led foreign workers to return to their home country (Khanna, 2020). The reduction in foreign workers has affected the performance of the industry, as those workers are the major components of the total workforce, particularly in low-skilled jobs. Hence, this study was conducted to analyze the effect of foreign workers on productivity in the manufacturing sector of Malaysia.

This study aims to address the critical issue of assessing the impact of foreign workers on labour productivity within the Malaysian manufacturing sector. By utilizing panel data from the manufacturing firms registered with the Federation of Malaysian Manufacturers (FMM), this study examines the relationship between foreign workers and labour productivity during the period of 2008 to 2017. By employing static panel data regression techniques, a comprehensive analysis is conducted to uncover the multifaceted effects of foreign workers on labour productivity in Malaysia's manufacturing industry.

This study is organized into five sections. Section 1 presents the introduction, which emphasizes the study's background and objectives; Section 2 consists of a literature review; Section 3 explains the methodological parts; Section 4 comprises the results and the empirical findings; Section 5 presents the discussion; Section 6 consists of limitations and recommendations for future research; and Section 7 summarize the conclusion.

2. LITERATURE REVIEW

The Malaysian economy has had a high dependency on foreign labour over the last two decades. According to the Ministry of Home Affairs Malaysia (2017), the registered number of foreign workers in 1990 was 400,000. The number has been increasing drastically, reaching 1.8 million people in 2016. The significant reliance on labour migration made Malaysia the largest labour importer in Asia in 2010, with migration accounting for 21% of the workforce. The main reason Malaysia has a high demand for foreign labour is the cheap labour provided by the workers, who are mostly employed in neighbouring countries.

Massive industrialization, which was initiated in the 1980s, has increased the demand for labour by the employers. However, a shortfall in the local labour supply, particularly in low-skilled jobs, has made the Government rely on foreign workers. According to the Ministry of Home Affairs Malaysia (2017), the number of legal migrant workers in the 1990s was only around 400,000. However, the number increased five times to 2 million in 2018. Manufacturing records the highest numbers of foreign workers employed as compared to other sectors.

The effects of foreign workers have been the subject of extensive research in various countries. In the context of the Malaysian labour market, several studies have explored this relationship, highlighting both the positive and negative impacts of employing foreign workers. Some argue that foreign workers contribute positively to the economy by filling labour shortages in certain industries, while others argue that they lead to lower wages for local workers and increase social problems such as crime and congestion.

A study by Gu, Liu, and Shen (2020) has analyzed the impact of foreign workers on the wages of local workers in China. Based on the 2016 data from the National Migrant Population Dynamic Monitoring, the study found that the presence of foreign workers had a negative impact on the wages of local workers, particularly for low-skilled workers. However, the study also discovered that the presence of unions and the implementation of minimum wage policies lessened the impact. Higher labour costs due to the minimum wage would cause employers to replace their low-skilled foreign workers with productive local workers (Tajuddin, Hasan, Muhamad, & Sulaiman, 2021).

Devadason (2021) has emphasized that the Malaysian manufacturing sector has experienced a negative correlation between employing foreign workers and local employment. When there is an excessive influx of low-skilled foreign workers, it can displace local workers and contribute to higher unemployment rates. The study

suggested that policy interventions have to consider and focus on enhancing the employability of local workers and promoting a balanced labour market.

Meanwhile, Anderson (2021) has analysed the effect of foreign workers on the Malaysian economy. The study suggested that foreign workers contribute to economic growth and development, particularly in industries like construction, manufacturing, and agriculture. Liao, Wu, and Zhang (2022) supported these findings by examining the relationship between foreign workers and economic growth using nationally representative migrant survey data. They discovered a positive correlation between the two variables. These studies highlight the importance of treating foreign workers fairly and equitably to maximize their potential contributions to the economy.

Using economic data from the Association of Southeast Asian Nations (ASEAN) countries, Chong, Li, and Yip (2021) have examined the impacts of COVID-19 on the economies. The study suggested that Singapore, which has a significant number of foreign workers, experienced a relatively moderate increase in its unemployment rate. The fact that other economies are also experiencing job losses may be a contributing factor in this. However, it is crucial to acknowledge that countries that are heavily reliant on exporting labour, such as Indonesia, Malaysia, and the Philippines, would face significant challenges in terms of unemployment as the pandemic affects economies with a high concentration of foreign workers. The labour market in ASEAN is interconnected, which means that countries that supply foreign labour are susceptible to the transmission of unemployment across borders.

In the context of productivity, Malaysia has emerged as a growing economy with sustained economic growth over the past few decades. However, there have been concerns among policymakers and researchers due to the relatively sluggish productivity growth observed in recent years.

Previous studies have examined the favourable effects of employing high skilled foreign workers. The results of these studies have consistently shown a positive correlation between high skilled workers and labour productivity (Baharin, Syah Aji, Yussof, & Mohd Saukani, 2020; Jordaan, 2018). Skilled workers bring advanced technical knowledge and expertise to the manufacturing sector, leading to heightened innovation and improved productivity. By accessing a diverse skill set and leveraging specialized knowledge, these workers have a positive influence on productivity levels within the organizations.

Furthermore, Utami and Vioreza (2021) have emphasized the beneficial influence of foreign workers on labour flexibility and the resulting productivity gains. The presence of foreign workers allows manufacturing firms to adeptly adapt to shifts in demand, modify production requirements, and optimize resource allocation. This enhanced flexibility plays a pivotal role in improving productivity and bolstering competitiveness within the manufacturing sector.

In contrast, a study by Arain, Bhatti, Ashraf, and Fang (2020) has highlighted potential drawbacks related to an excessive reliance on low-skilled foreign workers. These workers, frequently involved in low-wage and repetitive tasks, may possess limited skills and qualifications, leading to stagnant or even declining levels of productivity. The findings underscored the significance of achieving a balance in the employment of low-skilled foreign workers by implementing measures to enhance productivity through skill development and upskilling programs.

Efficient government policies have a vital role in effectively managing the employment of foreign workers and maximizing their beneficial impact on labour productivity. The findings presented by Liu, Dou, Li, and Cai (2020) highlight the significance of implementing robust regulations, enforcement mechanisms, and monitoring systems to ensure the optimal utilization of foreign workers while safeguarding the interests of local workers. Policies should prioritize skill development programs for both foreign and local workers as a means to enhance productivity and foster competitiveness within the manufacturing sector. For instance, studies by Tajuddin, Muhamad, Hasan, and Sulaiman (2023) have suggested that a minimum wage would increase labour productivity. Higher wages would motivate the workers to be more effective and productive.

Overall, the literature on the current foreign workers in Malaysia is mixed, with some studies highlighting the positive impact of foreign workers on the economy and others highlighting the negative social and economic

implications of their presence. Additionally, the existing literature provides evidence of both positive and negative effects of foreign workers on labour productivity in the Malaysian manufacturing sector. Hence, this study was conducted to examine the impact of foreign workers on labour productivity within the Malaysian manufacturing sector.

3. RESEARCH METHODOLOGY

This study used data gathered from manufacturing firms registered with the Federation of Malaysian Manufacturers (FMM) in Peninsular Malaysia to analyze the effect of foreign workers on productivity. FMM has been an economic organization representing the manufacturing and services industries in Malaysia since 1968. From the FMM Directory 2017, we selected 297 manufacturing firms from a total of 1292 firms with 75 or more employees. The sample size was calculated based on the Raosoft (2021) sample size calculator (Raosoft, 2021). The sample was selected by using probability-sampling techniques, which involve cluster sampling and simple random sampling. We have conducted a survey of each human resource division of 297 firms that could provide the necessary firms and employee's data via face-to-face interactions. We have acquired 10 years of data spanning from 2008 to 2017, and all the data provided was treated as highly confidential.

3.1. Model and Measurement

In this study, we have applied a panel data regression model to examine the effect of foreign workers on productivity. The model is derived as follows:

$$LNPROD_{it} = \beta_0 + \beta_1 LNFOREIGN_{it} + \beta_2 CONTROLS_{it} + \varepsilon_{it} \quad (1)$$

In the model, LNPROD is the natural log of productivity. Productivity is measured by dividing total output by the total number of employee (Malaysia Productivity Corporation, 2019). Foreign workers are represented by natural log of total foreign workers.

In addition, the study has chosen four controlled variables (CONTROLS), which include the firm's size, profit, age, and zones. The study has only included medium and large manufacturing firms, and the firm's sales turnover determines its size. According to the Small and Medium-sized Enterprises (SME) Corporation, a medium firm has a sales turnover between MYR15 million and MYR50 million, while a large firm has a sales turnover greater than MYR50 million (MYR is the symbol for the Malaysian Ringgit, which serves as the national currency of Malaysia). Profit refers to the amount of profit the firm generates in a given year, while age refers to the number of years the firm has been in operation. Location is divided into four zones: Klang Valley (which includes Kuala Lumpur and Selangor), the southern zone (Negeri Sembilan, Melaka, and Johor), the northern zone (Kedah and Perlis), and the eastern zone (Pahang, Terengganu, and Kelantan). All variables are described in Table 4.

This study first used the pooled ordinary least squares (OLS) estimation model to test the effect of foreign workers on productivity Equation 1. Later, we applied the fixed effect model to Equation 1, in order to observe the outcome predictors without bias by controlling time-invariant factors (vit), as shown in Equation 2 (Torres-Reyna, 2007).

$$LNPROD_{it} = \beta_0 + \beta_1 LNFOREIGN_{it} + \beta_2 CONTROLS_{it} + (v_{it} + \varepsilon_{it}) \quad (2)$$

In order to control the issues of heteroscedasticity and autocorrelation, we have also applied Driscroll-Kraay robust standard error to the model as suggested by Hoechle (2007) and Zainul Abidin, Hashim, Ariff, and Al-ahdal (2022). Driscoll and Kraay (1998) methodology applies a Newey-West type correction to the cross-sectional average sequence of moment states. Adjusting the estimated standard error in this way guarantees that the estimator of the covariance matrix is consistent, independent of the cross-sectional dimension.

Table 4. Variable's description.

Variable	Description	Measurement
Independent variable		
LNFOREIGN	Foreign workers	Natural log of total numbers of foreign workers
Dependent variable		
LNPROD	Labour productivity	The natural log of productivity
Controlling variable		
Size	Firm's size	Dummy variable for large and medium firms
AGE	Firm's age	Number of years the firm's operated
LNPROFIT	Firm's profitability	Natural log of the firm's profit
Zone	Zone	Dummy variable for four zones
Industry	Industry	Dummy variable for industry fixed effect
Year	Year of observation	Dummy variable for the year-fixed effect
Additional variable		
LNSALES_worker	Sales per worker	Natural log of total sales per total number of workers

4. RESULTS

Table 5 shows the descriptive statistics for all continuous variables. First, the mean (median) value of LNPROD is 2.523 (2.526) or 34.281(12.5). The mean (median) value of LNFOREIGN is 4.544(4.407) or 34 (13) foreign workers. Regarding the controlled variables, on average, firms have a mean value of LNPROFIT of 14.267, or MYR 0.007 billion. For a firm's age (AGE), the average age of the firms in the sample is 29.7 years. Meanwhile, Table 6 presents the tabulation of the categorical control variable. Large firms consist of 58.25 percent of the 1730 firms in the total sample, and medium-sized firms consist of 41.75 percent, or 1240 firms. The majority of the firms were in the rubber and miscellaneous plastic product industries, with 15.49 percent, or 460 firms, in the total sample. Meanwhile, firms in lumber and wood, textile and mill products, and tobacco products were the least, with 0.34 percent or 10 firms in each industry. The majority of the firms in the sample are operated in the Klang Valley zone, with 44.78 percent, or 1330 firms. Only 1.35 percent, or 40 firms, were operating in the East Coast Zone.

Table 7 presents the pairwise correlations of all variables. There are negative correlations between LNFOREIGN and LNPROD at the 1 percent significance level. Similarly, AGE, LNPROFIT, and YEAR have a negative correlation with LNPROD, except for FIRM_SIZE, which has a positive correlation. Meanwhile, ZONE and INDUSTRY have no correlation with LNPROD.

Table 5. Descriptive statistics (Continuous variables).

Variable	Obs.	Mean	Std. dev.	Median	Min.	Max.	Vif
LNPROD	2970	2.523	1.518	2.526	-3.951	6.318	-
Productivity	2970	34.281	59.285	12.5	0.019	554.323	-
LNFOREIGN	2970	4.544	1.067	4.407	0.693	10.502	3.24
Foreign worker	2970	295.78	1802.683	82	2	36400	3.89
LNPROFIT	2970	14.267	1.463	14.127	7.735	20.881	2.08
Profit Bil	2970	0.007	0.046	0.001	0	1.17	3.38
Age	2970	29.709	11.399	28	2	86	1.16

In order to test the effect of foreign workers on productivity, we first used panel data regression, as shown in Table 8. There are three estimation methods presented: OLS (column 1), random effect model (column 2), and fixed effect model (column 3). In the first column, foreign workers (LNFOREIGN) are found to have a negative association with productivity (LNPROD) at a 1 percent significant level ($p<.01$). The results of the random effect model (column 2) are similar to those of the OLS model. The fixed effect model (column 3) also yields similar results, as LNFOREIGN has a negative association with LNPROD at a 1 percent significant level ($p<.01$). Since we have applied both the random and fixed models, the Hausman specification test was used to decide the best model. The test has accepted the null hypothesis ($p > 0.05$), therefore the random model is more appropriate.

Table 6. Tabulation of firm_size, industry and zone.

Variables	FREQ.	Percent	CUM.
Firm_size			
Large	1730	58.25	58.25
Medium	1240	41.75	100.00
Total	2970	100.00	-
Industry			
Apparel & finished products from fabric & similar products	80	2.69	2.69
Chemicals and allied products	220	7.41	10.10
Electronic and electrical equipment	380	12.79	22.90
Fabricated metal products	170	5.72	28.62
Food & kindred products	390	13.13	41.75
Furniture and fixtures	130	4.38	46.13
Lumber & wood products	10	0.34	46.46
Machinery and computer equipment	90	3.03	49.49
Miscellaneous	290	9.76	59.26
Paper and allied products	150	5.05	64.31
Petroleum and related industries	30	1.01	65.32
Photographic, medical goods, watches	80	2.69	68.01
Primary metal industries	90	3.03	71.04
Printing, publishing, & allied industries	90	3.03	74.07
Rubber & miscellaneous plastic products	460	15.49	89.56
Stone, clay, glass, & concrete products	110	3.70	93.27
Textile mill products	10	0.34	93.60
Tobacco products	10	0.34	93.94
Transportation equipment	180	6.06	100.00
Total	2970	100.00	-
Zone			
East	40	1.35	1.35
Klang Valley	1330	44.78	46.13
North	800	26.94	73.06
South	800	26.94	100.00
Total	2970	100.00	-

Table 7. Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) LNPROD	1.000							
(2) LNFOREIGN	-0.603***	1.000						
(3) Age	-0.108***	0.104***	1.000					
(4) LNPROFIT	-0.403***	0.593***	0.247***	1.000				
(5) Firm_size	0.462***	-0.672***	-0.151***	-0.506***	1.000			
(6) Zone	0.013	-0.001	-0.143***	-0.103***	0.012	1.000		
(7) Industry	-0.015	0.071***	0.078***	-0.032*	-0.076***	-0.169***	1.000	
(8) Year	-0.039**	0.004	0.252***	0.145***	0.000	0.000	0.000	1.000

Note: *** p<0.01, ** p<0.05, * p<0.1.

In order to control the problems of heteroscedasticity, auto correlation, and serial dependence, we have applied the Dricsroll-Kraay robust standard error estimation method as presented in the fourth column (column 4). The robust estimation also shows LNFOREIGN has a negative association with LNPROD at the 1 percent significant level ($p<.01$).

The findings of the study suggested that foreign workers would reduce labour productivity. While previous studies have had different views on the effects of foreign workers on the labour market, this study focused on the productivity effect of foreign workers in the manufacturing sector of Malaysia. The restricted level of education and skills of the foreign workers, particularly the low-skilled foreign workers, have impeded the labour productivity.

Table 8. Panel data regression between foreign workers and productivity.

DEP VAR: LNPROD	(1)	(2)	(3)	(4)
Variables	**OLS**	**Random**	**Fixed**	**Robust-SE**
LNFOREIGN	-0.759***	-0.759***	-0.754***	-0.761***
	(0.053)	(0.053)	(0.068)	(0.017)
Age	-0.00358	-0.00358	-0.00615	-0.00342**
	(0.005)	(0.005)	(0.008)	(0.001)
LNPROFIT	-0.0145	-0.0145	-0.00736	-0.0260
	(0.032)	(0.032)	(0.039)	(0.020)
Firm_size				
MEDIUM	0.295**	0.295**	Omitted	0.276**
	(0.136)	(0.136)		(0.100)
Zone				
Klang Valley	0.361	0.361	Omitted	0.379
	(0.497)	(0.497)		(0.222)
North	0.273	0.273	Omitted	0.287
	(0.501)	(0.501)		(0.204)
South	0.383	0.383	Omitted	0.396*
	(0.503)	(0.503)		(0.195)
Industry	Included	Included	Omitted	Included
Year	Included	Included	Omitted	Included
Constant	5.441***	5.441***	6.158***	5.605***
	(0.750)	(0.750)	(0.550)	(0.272)
Observations	2,970	2,970	2,970	2,970
R-squared	0.519	0.519	0.060	0.395
F-test	-	-	15.460***	214415***
Wald-chi2	463.450***	463.450***	-	-
Hausman test	-	-	0.140	-
p-val	-	-	0.997	-
Number of firms	297	297	297	297

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

4.1. Additional Analysis

The main result in this study, Table 8, however, might be bias due to the endogeneity problem, where firms with higher productivity might have been self-selected into the sample. To overcome this issue, this paper applied the two-stage least square (2SLS) estimation technique following Amornkitvikai, Harvie, and Sangkaew (2023). As selecting appropriate instrument variables is the main limitation in conducting 2sls (Dam & Scholtens, 2012), we follow Amornkitvikai et al. (2023) and use sales per worker as an instrument variable for their 2sls analysis. Therefore, we chose sales per worker (LNSALES_WORKER) as such a variable can influence productivity and, at the same time, can be affected by foreign workers.

Table 9 presents the 2SLS regression model, where the first column shows the first-stage regression. In this stage, our test variable (LNFOREIGN) was regressed with the controlled variables alongside the exogenous variable, which is sales per worker (LNSALES_WORKER). The residual of the first-stage regression would be included in the second-stage regression model. The result of the second stage shows that LNFOREIGN has a negative association with LNPROD, which is similar to our main findings in Table 6.

5. DISCUSSION

The issue of how foreign workers impact productivity is multifaceted and has been extensively debated in recent years. Studies have yielded varying results, indicating both positive and negative effects depending on factors such as industry type, skill level of foreign workers, and regulatory framework. This study suggests that an excessive reliance on low-skilled foreign workers may result in stagnant or declining productivity levels.

Table 9. Two-staged least square estimation.

Variables	(1)	(2)
	LNFOREIGN	LNPROD
LNFOREIGN	-	-0.759***
		(0.053)
LN_SALEWORKER	-1.001***	-
	(0.001)	
Age	9.85e-06	-0.004
	(0.000)	(0.005)
LNPROFIT	0.999***	-0.014
	(0.001)	(0.032)
Firm_size		
Medium	-0.001	0.294**
	(0.003)	(0.136)
Zone		
Klang valley	0.061***	0.361
	(0.009)	(0.497)
North	0.061***	0.274
	(0.009)	(0.501)
South	0.057***	0.383
	(0.010)	(0.503)
Industry	Included	Included
year	Included	Included
Constant	3.653***	5.443***
	(0.015)	(0.750)
Observations	2,970	2,970
Number of firms	297	297
R-squared	0.940	0.519
F-test	10903***	-
Wald-Chi2	-	462.770***

Note: Standard errors in parentheses *** p<0.01, ** p<0.05.
e indicates exponential notation which multiplies the preceding number by 10 to the nth power.

On the positive side, foreign workers can enhance productivity by addressing labour shortages in specific industries, especially those requiring low-skilled and labour-intensive work like manufacturing, construction, and agriculture. Foreign workers often accept lower wages than local workers, making them favourable to employers, particularly in reducing labour costs.

Moreover, foreign workers can bring unique skills and perspectives to the workplace, particularly in industries demanding specialized knowledge or expertise. Skilled foreign workers in the technology sector, for instance, can drive innovation and contribute to industry growth.

Conversely, concerns arise regarding the potential negative impact of foreign workers on productivity, particularly when they are employed in large numbers or in industries where integration with the local workforce is lacking. Language barriers and cultural differences can hinder effective communication and collaboration with local workers, leading to inefficiencies and misunderstandings.

There are also concerns that the utilization of foreign workers may contribute to social and economic issues such as displacement of local workers, wage suppression, and exploitation. Often, foreign workers experience less favourable working conditions compared to local workers, including long hours, low wages, and limited access to social services.

Government and employers have the opportunity to tackle these issues by implementing policies and initiatives that promote the integration and welfare of foreign workers in the workplace. Such measures could encompass language training, programs to enhance cultural awareness, and ensuring access to healthcare and social services.

Overall, there are many different factors that influence the impact of foreign workers on productivity. Although there are both positive and negative effects, efforts can be made to maximize the positive contributions of foreign workers while mitigating potential negative consequences. Ultimately, a well-regulated and integrated foreign worker program can foster growth and development in many industries while safeguarding the well-being and rights of foreign workers.

6. LIMITATIONS AND RECOMMENDATION

This study focuses mainly on the impact of foreign workers on the labour productivity. Any other effects that can be caused by the foreign workers are not discussed in this study. It is undeniable that foreign workers may affect many factors in the workplace; hence, this study limits the scope of its study to the impact of foreign workers on the labour productivity of manufacturing firms in Peninsular Malaysia.

The target group of the study is the manufacturing firms in Peninsular Malaysia. Manufacturing is chosen in this study as this sector is the largest employment sector in Malaysia. Additionally, East Malaysia's exclusion from the study sample is due to time and financial constraints.

It is recommended for future research to conduct a comprehensive study that considers the broader effects of foreign workers beyond just labor productivity. This could include examining the impact on wages, employment opportunities for locals, skill development, technology transfer, and overall economic growth.

Additionally, future research can compare the impact of foreign workers on labor productivity across different sectors, such as services, agriculture, and construction. This would provide a more holistic understanding of the effects of foreign workers on the Malaysian economy.

7. CONCLUSION

This study examines the effect of foreign workers on labour productivity in the Malaysian manufacturing sector. By using a ten-year period from 2008 to 2017, the study analysis is based on the panel data from 297 manufacturing firms registered with the Federation of Malaysian Manufacturers (FMM).

The findings of this study present a nuanced perspective, revealing a negative influence of foreign workers on labour productivity. The availability of low-skilled foreign workers willing to accept lower wages than local workers has created wage disparities within the manufacturing sector. This disparity can lead to dissatisfaction and demotivation among local workers, ultimately hampering productivity.

Communication and teamwork issues may arise in the workplace due to the significant number of international employees. Cultural and linguistic obstacles can make it difficult for people to work together and coordinate well, which lowers productivity. There are also social and financial consequences associated with the migration of foreign labour. By taking funds and attention away from productivity-boosting projects, issues with social integration, increased demand for public services, and the possibility of exploitation can all have an indirect impact on labour productivity.

Nevertheless, it is essential to recognize the challenges that arise when employing foreign workers. To optimize the positive influence of foreign workers on labour productivity, it is necessary to address relevant issues such as skill improvement and better working conditions. By prioritizing these aspects, the Malaysian government and other relevant stakeholders can ensure that foreign workers continue to enhance labour productivity and make effective contributions to the overall economic growth of the manufacturing sector.

The empirical investigation conducted in this study offers significant insights that hold value for policymakers, industry stakeholders, and researchers. These findings aid in developing evidence-based strategies that harness the potential of foreign workers while effectively managing any potential negative outcomes. The results emphasize the criticality of establishing strong regulations, enforcement mechanisms, and monitoring systems. These measures ensure the optimal utilization of foreign workers while safeguarding the interests and well-being of local workers.

To address these issues, authorities could consider enacting policies that support technology adoption, creating an atmosphere that encourages innovation, and providing training and skill development opportunities for the local labour force. Malaysia's industrial industry may increase labour productivity more broadly by prioritising initiatives that increase productivity and lowering reliance on low-skilled foreign employees.

Overall, this study highlights the complex nature of the impact of foreign workers on labour productivity in the Malaysian manufacturing sector. While high-skilled foreign workers can contribute positively to productivity, careful management of low-skilled foreign workers is crucial to avoid negative effects. Policymakers should focus on implementing effective policies and programs that enhance the skills of both foreign and local workers, regulate the labour market, and ensure the fair treatment of workers to maximize the positive impact of foreign workers on labour productivity.

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