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Analysing Factors Affecting the Industrial Production Sector in Malaysia: Evidence from the Bounds Testing Approach of Cointegration

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ABSTRACT

The main objective of this study is to investigate the factors that affect the Malaysian industrial production sector (IPS) by using the ARDL bounds testing methodology. The analysis is conducted by applying the time series data for the 1970–2020 period. From the ARDL results, all variables significantly influence Malaysian IPS in different manners for both periods; long and short runs, except the financial development (FD) variable, which insignificantly influences IPS. This final result was verified by the ECM estimate, indicating the presence of long- and short-run relationships between IPS and its factors. Although the FD sector does not directly play a significant factor in stimulating Malaysian IPS growth, policymakers must revise their policies to enhance the role of the financial and banking sector in strengthening the IPS performance in the country. This revision can be done by running good financial services to fund and motivate investors to construct new IPS schemes and then enhance the Malaysian economy with a higher growth position in the future.

INTRODUCTION

The industrial production sector (IPS) has played a significant and crucial role in contributing to the gross domestic product (GDP) in each country (Awad et al., 2016). The contribution may depend on several factors that may make its magnitude different among countries (Sankaran et al., 2020). IPS growth mirrors economic development and performance, which differs from a country to another (Öztürk & Agan, 2017).

Malaysian IPS has been transformed since 1970 from a one-based raw material as primary export to a major export-oriented manufacturer and producer of rubber and palm oil, petroleum and natural gas (Lee, 2019). The target is to undeniably increase Malaysian IPS and gross domestic output (Bachtiar et al., 2015). With the comparative advantages of an undervalued currency and relatively cheap export products, Malaysia has attracted many foreign investments into the country, especially from Japan and the US (Choong & Khalifah, 2019). Since the early 1970s, the government has established an economic restructuring strategy, namely, New Economic Policy (NEP) and later as the New Development Policy (Thillainathan & Cheong, 2016). This strategy aimed to develop economic and IPS within training programmes to collect management and entrepreneurship skills (Thillainathan & Cheong, 2016).

Soleymani and Chua (2014) stated that Malaysian IPS has direct and significant contributions to economic growth and job creation and is significant to its investment. According to the small and medium-sized enterprise (SME) Annual Report (2018), the SME industry sector is the catalyst to economic development in Malaysia, as it contributed 38.3% to overall GDP, 17.3% to total exports and 66.2% to employment in the country in 2018. According to the Department of Statistics Malaysia (2020), nearly half of jobs (42.9%) were created in the industry sector in 2020. Thus, IPS growth is beyond doubt critical to employment rate and economic growth and remains the backbone of the economy in a country (Herman, 2015).

Malaysian IPS faces many challenges and problems. For example, Lee (2019) stated that Malaysian IPS is dealing with technological challenges that force it to adapt to technological changes to stay competitive. It focuses less on digital innovation and thus results in being incomparable in the competitive market. In view of these challenges, Prime Minister Mahathir launched Industry 4.0 in 2018 to encourage the industry sector to embrace new technologies in their IPS for productivity growth (Naidu et al., 2017). The Minister of Higher Education also stated that Malaysia faces a huge challenge of the shortage of people skilled in science, technology, engineering and mathematics. Moreover, SME Corporation Malaysia (2020) noted that SMEs are dependent on foreign workers by 39.9% and on practical students from Technical and Vocational Education and Training (TVET) by 41.4%. However, SMEs responded that most graduates from TVET do not meet industry demands due to their lack of technical skills and knowledge in technology (Mee, 2021).

Furthermore, Koen, Asada, Nixon, Rahuman and Arif (2017) affirmed that Malaysia has a growing reliance on external markets, such as the US and China. Thus, Malaysia can be easily hampered by economic external shocks. For example, China's economic slowdown and the US–China trade war that happened in 2009 caused Malaysian IPS growth to be declined; China and the US are Malaysia's largest trading partners (Tham et al., 2019).

From the discussion presented, Malaysian IPS can be driven by many factors that may affect its performance over time, such as financial development, foreign direct investment (FDI), economic stability, tax burden and export, which were selected from overall previous literature to further investigation in this study for the long period of 1970–2020. Thus, from a country-level analysis, the Autoregressive Distributed Lag (ARDL) model is used to analyse the existing cointegrating long-run equilibrium relationships between IPS with its crucial attributes.

The rest of this paper is outlined in the following manner. Section 1 presents a short review of IPS contribution to Malaysian GDP. Section 2 describes the methodology applied and the data used. Section 3 discusses the outcomes attained from the data analysis. Section 4 summarises the analysis results.

1. SHORT REVIEW OF IPS CONTRIBUTION TO MALAYSIAN GDP

This section shortly provides the trend and contribution pattern of IPS role in Malaysian GDP over the 1970–2020 study period. Malaysian IPS has contributed endlessly to GDP per capita growth over time, due to Malaysia being endowed with natural resources that have been diversifying its economy. Malaysia shifted from an agricultural economy to an industrialised economy (Hussin et al., 2017). Prior to the 1970s, IPS contributed to GDP growth, and the economy grew by 8.3%, recorded a sustained high growth before it succumbed to the Asian financial crisis in 1997 (Choong & Khalifah, 2019). Literally, IPS not only contributes to GDP growth but also exports, as the total exports escalate to 81% in 1996. However, the economy contracted by 7.5% in 1998 but recovered quickly and reached the highest 30% of GDP share contribution in 1999 and 2000; moreover, 17% rose in employment (Law, 2016). Lee (2019) found that IPS is significant in its contribution to GDP share. It may be attributed to many policies that drove up Malaysian IPS in GDP share (Sundram et al., 2018). For example, NEP 1970–1990, the National Development Policy (NDP) 1990–2000 and the National Vision Policy 2001 successfully transformed Malaysia from an agricultural sector to an industrialised export country (Yip & Nambiar, 2021). These policies were introduced for developing the sector since 1970, making IPS escalate from 13.7% to 30% in 2000 (Department of Statistics Malaysia, 2021).

Since 2004, IPS in GDP share has begun to fall consistently, until the year 2020 thereafter, IPS started to rise a little (Lee, 2019). This rise owes to the service sector, which started to boom in the year 2000, and to the introduction of the 10th Malaysia Plan, which aims to drive up real annual growth and high investment in the service sector (Sundram et al., 2018). The 10th Malaysia Plan houses the Government Transformation Programme and New Economic Model aspiration, which were performed to produce sustained economic development and structural transformation (Oluwatoyin et al., 2019). However, these transformation plans have resulted in IPS share reduction in GDP.

Furthermore, Malaysia encountered deindustrialisation, which occurred when IPS export activities declined gradually in the global market. The situation was prevailing in parallel to the increment of service sector development in Malaysia, as the service sector has been supported by the government and has become the most contributor to GDP (Baharudin, 2018). The service sector contributes 46.30% of GDP share in 2000 and rose consistently to 54.78% in 2020 (Department of Statistics Malaysia, 2021). In a different manner, IPS contribution to GDP declined substantially from 30% to 22.31% in 2020. Another key point here is that the contribution of the service sector is not only critical to GDP but also critical to Malaysian IPS due to the economic transformation and advanced technology that the country started to implement to boost Malaysian IPS in the world trade; Malaysia used the services of global value chains and global production networks for achieving good sector performance (Yip & Nambiar, 2021).

Malaysian IPS increased during the pandemic in 2019, and its share contribution in GDP rose from 21.44% to 22.3% in 2020. However, the registration of industrial value-added SMEs declined at 2.9% in 2019 and IPS for non-metallic mineral products and metal products plummeted 13.1% in 2019 (Department of Statistics Malaysia, 2021). Nevertheless, petroleum, chemical, rubber, plastic, food, and beverage industries recorded positive growth at 3.2% of the sector contribution to GDP. This positive growth was due to aggregate demand increases during the recession in Malaysia (Liew & Chan, 2018). Overall, the drive for positive IPS growth was contributed by manufacturing production, whereas mining and electrical production dropped in their contribution to the sector, reaching 9.6% and 2.1%, respectively. The reduction in mining production, among other reasons, was due to the reduction in crude oil (Awad et al., 2016).

During the COVID-19 pandemic between 2019 and 2020, the trade and geopolitical tensions overshadowed the global economy that affected Malaysian IPS (Yip & Nambiar, 2021). Malaysian economy plummeted, and unemployment rate rose, resulting in an economic recession and affecting exports (Zakaria & Basah, 2021). Due to this condition, the Malaysian government provided many subsidies to industry sectors and SME sectors for enhancing their IPS to keep improving the economic growth in Malaysia (Lee, 2019; Oluwatoyin et al., 2019).

Based on the review presented, Figure 1 shows the trend of the annual rate of IPS contribution to the GDP of Malaysia over the 1970–2020 period.

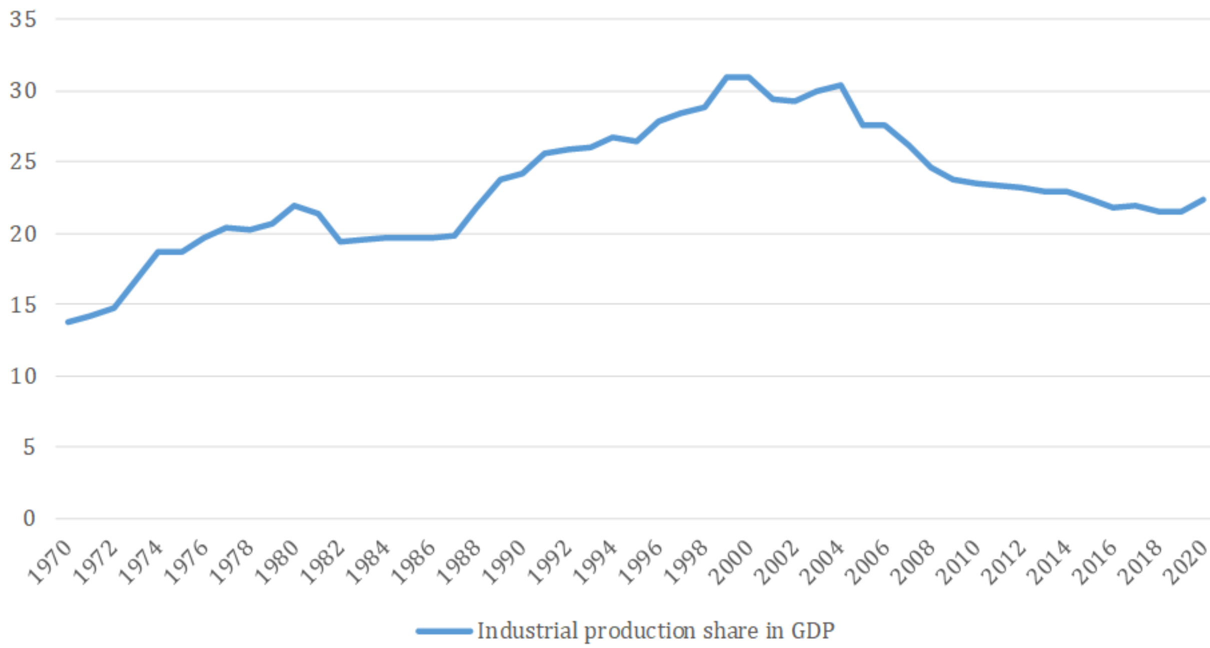

Figure 1. IPS share in Malaysian GDP: 1970-2020

Source: Prepared by the authors based on the data from World Bank (2020).

2. METHODOLOGY AND DATA

In this study, the ordinary model of IPS and its attributes in Malaysia is expressed as follows:

$$InY_t = \alpha + \beta_1 InFD_t + \beta_2 InIFDI_t + \beta_3 InTB_t + \beta_4 ES_t + \beta_5 InX_t + \varepsilon_t \quad (1)$$

where Y_t presents Malaysian IPS at time *t*; FD_t is the financial development in the Malaysian economy at time *t*, which is measured by the credits and loans provided to private sectors; $IFDI_t$ is the inflow of FDI in the country at time *t*; TB_t is the overall average tax burden of the Malaysian economy at time *t*; ES_t refers to the economic stability in the economy at time *t*, which is measured by the movements of the Malaysian exchange rate over time; X_t is the volume of exports for Malaysia at time *t*. α is a constant, and ε_t is the disturbance term. All variables entered the model in their logarithmic forms, except for *ES*, which entered in its actual values. The expected signs of the coefficients of the involved variables are as follows:

$\beta_1, \beta_2, \beta_3$, $\beta_5 > 0$, and $\beta_4 < 0$.

As in the terms of time series data analysis, the classical unit root test by Dickey and Fuller (1979) is employed in its three forms of equations as:

Form 1: Unit root test with intercept,

$$\Delta Y_t = \hat{u}^A + \hat{\beta}^A t + \hat{a}^A Y_{t-1} + \sum_{i=1}^{k} + \hat{C}_i^A \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

Form 2: Unit root test with intercept and trend,

$$\Delta Y_t = \hat{u}^B + \hat{\beta}^B t + \hat{a}^B Y_{t-1} + \sum_{i=1}^{k} + \hat{C}_i^B \Delta Y_{t-i} + \varepsilon_t \quad (3)$$

Form 3: Unit root test without intercept and trend,

$$\Delta Y_t = \hat{a}^C Y_{t-1} + \sum_{i=1}^{k} + \hat{C}_i^C \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

To investigate the cointegrating relationships between IPS and its explanatory variables, this study applies the ARDL bounds testing methodology pioneered by Pesaran et al. (2001). The ARDL model is autoregressive, where yt, the dependent variable, is explained by its lagged values. This model takes the maximum number of lags to obtain the data generating process in a specific modelling framework, such as the one for this study as follows:

$$\Delta lnY_t = \beta_0 + \sum_{i=1}^{n}\beta_{1i}\ln\Delta Y_{t-i} + \sum_{i=0}^{n}\beta_{2i}\Delta\ln FD_{t-i} + \sum_{i=0}^{n}\beta_{3i}\Delta\ln IFDI_{t-i} + \sum_{i=0}^{n}\beta_{4i}\Delta\ln TB_{t-i} + \sum_{i=0}^{n}\beta_{5i}\Delta ES_{t-i} + \sum_{i=0}^{n}\beta_{6i}\Delta\ln X_{t-i} + \delta_7\ln Y_{t-1} + \delta_8\ln FD_{t-1} + \delta_9\ln IFDI_{t-1} + \delta_{10}\ln TB_{t-1} + \delta_{11}ES_{t-1} + \delta_{12}\ln X_{t-1} + \varepsilon_t \quad (5)$$

where Δ refers to the first difference operator, and n is the lag order. ΔlnYt-i describes the changes in the lagged dependent variable. *β0* is the drift term, and *εt* is the residual in the model. The ARDL bounds procedure is performed on Eq. (5), allows a joint significance test of the null hypothesis of no cointegration (H0: δ7 = δ8 = δ9 = δ10 = δ11 = δ12 = 0) against its alternative (H1: δ7 ≠ δ8 ≠ δ9 ≠ δ10 ≠ δ11 ≠ δ12 ≠ 0) that cointegration exists. The ARDL model is used to verify the existence of long-term relationships along with short-run estimates. Therefore, the short-run dynamics for error correction in the ARDL form are represented by the terms with summation signs, whereas long-run relationships are represented by items accompanied by the parameter.

In applying the bounds testing model, this study deals with the critical values of Narayan (2005). Pesaran et al. (2001) and Narayan (2005) proved that the distribution of the Wald test (F-statistic) is non-standard and biased because the values are generated on the basis of a large sample size. Thus, Narayan (2005) introduced two groups of critical values, which are statistically valid and constitute upper and lower bounds for all significance levels with and without a time trend. If the F-statistic is greater than the upper and lower bounds, then the null hypothesis can be rejected, which implies that long-run relationships exist among the test variables. By contrast, if the F-statistic is lower than upper and lower bound values, then the null hypothesis is accepted, which suggests that long-run relationships do not exist. However, if the F-statistic falls between upper and lower bound values, the result is inconclusive (Pesaran et al., 2001).

After specifying its long-run cointegrating relationships, the ARDL analysis is then continued to be employed for obtaining the long- and short-run estimate model. Based on Eq. (5), the coefficients of the variables of δ_8–δ_{12}, normalised by δ_7, represent the dynamic long-run relationships between the IPS model and its independent variables. The coefficients of the variables of β_1–β_6 in their first differences represent short-run dynamic relationships. Eq. (5) provides an estimate of the short-run dynamic error correction model (ECM) as follows:

$$\Delta lnY_t = \beta_0 + \sum_{i=1}^{n}\beta_{1i}\ln\Delta Y_{t-i} + \sum_{i=0}^{n}\beta_{2i}\Delta\ln FD_{t-i} + \sum_{i=0}^{n}\beta_{3i}\Delta\ln IFDI_{t-i} + \sum_{i=0}^{n}\beta_{4i}\Delta\ln TB_{t-i} + \sum_{i=0}^{n}\beta_{5i}\Delta ES_{t-i} + \sum_{i=0}^{n}\beta_{6i}\Delta\ln X_{t-i} + \lambda ECM_{t-1} + V_t \quad (6)$$

From the one-period lagged for the ECM–ARDL model, ECM_{t-1} refers to the residuals obtained from the cointegrating long-run equation, as in Eq. (5), whereas λ denotes that the adjustment speed is running from short-run to long-run equilibrium. From the analysis and for a correct estimation process, the term ECM_{t-1} must obtain its features as obtaining a negative sign, less than the value of one and significant. Finally, the functionality and stability of the model must be examined through a series of diagnostic tests and stability test using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of recursive residual squares (CUSUMSQ), as proposed by Brown et al. (1975).

The data used for all the variables from 1970 to 2020 are gathered from the World Bank Data indicators, except for the tax burden and IPS variables obtained from Bank Negara Malaysia.

3. EMPIRICAL RESULTS

All the analysed results attained from each test of the variables are offered in further detail in this section. The results are stated in the appendix.

3.1 Unit root and cointegration tests

As a preliminary step for conducting the ARDL model, the Augmented Dickey–Fuller (ADF) unit root test is employed for testing the stationarity properties of the series entered in the IPS model. The optimal maximum lag order at *k* = 1 is used for the ADF test, which is selected based on annual data frequency.

Table 1. ADF Test Results

Variables	*T-Statistics (At Level)*	*T-Statistics (At First Difference)*	*Integration Order*
Ln(Y)	-1.08**	-3.94**	I(1)
Ln(FD)	-2.04**	-6.76**	I(1)
Ln(IFDI)	-3.46**	-7.91**	I(1)
Ln(X)	-1.11**	-9.21**	I(1)
Ln(TB)	-1.11**	-9.38**	I(1)
(ES)	-3.22**	-5.68**	I(1)

Notes: 1. Critical values from MacKinnon (1996) are 3.50 and 2.92 at the 5% significance level. 2. ** indicates the 5% significance level. 3. Tests for all the variables are conducted using Eviews 12 with constant and trend.

Source: Authors' calculation

The results indicate that all series are integrated with order zero or I(0) process in their level because the null hypothesis is not rejected at the 5% significance level. However, the null hypothesis is rejected for all tested variables after taking their first differences, suggesting that all series are stationary or integrated with order on or I(1) process. From the results in Table 1, no series deals with the second order or I(2) process. The final conclusion is that ARDL can be used for testing long-run cointegrating relationships between IPS and its proposed factors. For this end, the ARDL bounds testing methodology is used by applying the optimal maximum lag order at k = 6, which is selected based on Akaike information criterion (AIC). The result of the calculated F- statistic value of 3.46 is used by comparing its critical upper bound value of 3.29, indicating that the null hypothesis of no cointegration is rejected at the 10% significance level. It suggests that the existence of long-run cointegrating relationships between IPS and its factors is verified.

Table 2. ARDL Bounds Cointegration Test Result

Model	*Calculated F-Statistic*	
Ln(Y)=F(Ln(FD), Ln(IFDI), ES, Ln(TB), Ln(X))	3.46**	
	K=5, N=51	
Critical value for bounds test: case III: unrestricted intercept and no trend	I(0)	I(1)
10%	2.276	3.297
5%	2.694	3.829
1%	3.674	5.019

Notes: ** refers to the 5% significance level, whereas k is the number of explanatory variables.

Source: Authors' elaboration

3.2 Long-run, short-run estimates and diagnostic tests

Panel A of Table 3 shows the estimation results for the ARDL long-run and short-run ECM associated with its diagnostic statistics tests. From the results presented in Panel A of Table 3, variables of IFDI, TB, X and ES significantly influence IPS in different directions at the 5% significance level, except for ES, which is significant at the 10% significance level. Meanwhile, FD is insignificant. This result corresponds to Zakaria and Basah (2021) who found that FD demonstrates an insignificant effect on IPS and suggested that FD is not a domain factor that has a direct effect on IPS in the long run. Moreover, the coefficient of IFDI negatively affects Malaysian IPS. This result implies that with a 1% increase in IFDI, IPS will decrease by 19% in the long run. It is consistent with Masron and Hassan (2016) who confirmed that IFDI has a negative significant influence on Malaysian IPS. It is attributed to the fact that IFDI in various sectorial outputs generating a positive effect on IPS is uncertain. Masron and Hassan (2016) found that IFDI from the US to Malaysia only has a positive effect on some classes of industries, such as tobacco, furniture and fixture and industrial chemical industries. However, a serious negative effect is observed on other industries, such as manufacturing, petroleum and coal production industry and electrical machinery production industry.

Table 3. Long- and Short-run Estimates

Panel A: ARDL (1, 6, 4, 2, 5, 5) ***Long- Run Estimate Output***					
Cons	*Ln(FD)*	*Ln(IFDI)*	*Ln(TB)*	*Ln(X)*	*ES*
1.01	*-0.26(-1.24)*	*-0.19(-2.41)***	*0.68(3.85)***	*0.44(1.75)***	*-0.12(-1.53)**

Panel B: ARDL (1, 6, 4, 2, 5, 5) ***Short-Run Estimate Output***							
	Lag Order						
Regressors	*0*	*1*	*2*	*3*	*4*	*5*	*6*
ΔLn(Y)		*-0.63(-3.54)***					
ΔLn(FD)	*-0.63(-4.50)***	*0.13(1.11)*	*-0.59(-4.72)***	*0.06(0.55)***	*-0.37(-3.87)***	*-0.02(-1.53)**	
ΔLn(IFDI)	*0.01(0.91)*	*0.09(3.41)***	*0.04(2.29)**	*0.07(4.12)***			
ΔLn(TB)	*0.59(4.86)***	*-0.23(-1.86)***					
ΔLn(X)	*1.08(6.67)***	*0.20(1.27)*	*0.70(4.86)***	*0.02(0.23)*	*0.40(3.85)***		
Δ(ES)	*0.09(3.65)***	*0.05(1.58)**	*0.07(2.41)***	*0.10(3.05)***	*-0.05(-1.83)***		

Panel C: ***Diagnostic Statistics Tests***								
ECM (-1)	$\chi^2_{LM}(1)$	$\chi^2_{H}(1)$	$\chi^2_{R}(1)$	$\chi^2_{N}(6)$	*ADJ.*R^2	*F-Sta/P.V.*	*CUSUM*	*CUSUMSQ*
*-0.63(-5.7)***	*0.35(0.55)*	*2.8(0.09)*	*8.7(0.31)*	*3.8(0.14)*	*0.99*	*0.000*	*S*	*Uns*

Notes: The number in the parentheses, as in Panels A and B, refers to the coefficient value with its t-ratio in the bracket. χ^2_{LM} , χ^2_{H}, χ^2_{R} and χ^2_{N} in Panel C are the serial correlation LM test, heteroscedasticity, misspecification error and normality, respectively. ** and * refer to the 5% and 10% significance levels, respectively. The ARDL approach for cointegration is applied to the IPS model with a maximum lag of 6.

Source: Authors' calculation

Furthermore, the coefficient of TB shows a statistically positive and significant influence on Malaysian IPS. This result comes in line with Law (2016) who argued that TB has a statistically positive impact on IPS. When plausible tax burden increases by 1%, IPS increases by 68%. The logic behind this finding is that once the government revises its policies towards the investment and provides its facilities in restructuring the investment environment to be attractive with a rational taxation burden imposed on investors, investors become motivated to increase their business and be satisfied to pay their tax obligations to the relevant authority. The policy ends up with the collection of high revenues to the government and enhances its ability to fund all programmes that support IPS growth and create a positive economy to build a rise in investment in establishing MNC companies in Malaysia (Tang et al., 2013). However, if TB levies on the import duty or foreign import increases, then a positive effect on driving up Malaysian IPS competitiveness may be created due to the cheaper price of Malaysian IPS output than foreign imports, which may end up with high growth for the industries of this sector (Santheran & Geetha, 2017).

The coefficient of the X variable indicates a positive long-run effect on IPS, which implies that an increase in the demand for exports of goods and services leads to the IPS growth increase. As export demand increases by 1%, the IPS output demand in Malaysia increases by 44%. The result is supported by Yip and Nambiar (2021) who found that the global trade of Malaysia with developed and developing countries leads to a positive direct effect on IPS growth in the country. The coefficient of the economic instability variable has a negative impact on Malaysian IPS at 10% significance level. An economic instability degree in the country reduces Malaysian IPS output by 12%. This finding is consistent with Soleymani and Chua (2014) who indicated that ES has a statistically negative significant effect on IPS growth. The result may be attributed to the Malaysian currency fluctuation, which has depreciated and appreciated over the study period and affected IPS growth.

For short-run estimates, Panel B of Table 3 shows that all variables in their current and different lagged periods affect IPS performance in different directions of influence at the 5% significance level, except for some which are significant at the 10% significance level. The proposed variables drive Malaysian IPS magnitude and performance in the long and short run. The adjusted R^2 takes a considerable value that confirms the fact that Malaysian IPS variation by 99% can be interpreted within its determinant. From the results of the diagnostic tests, the model is well specified and free from any statistical problems that make it valid for IPS performance prediction in the future. From Panel C of Table 3, the result of the one-lag period of ECM shows that it has an expected negative sign and is significant at the 5% significance level, indicating that about 63% of disequilibrium in the last period must be amended towards the equilibrium in the current period. This ECM result confirms the existing long-run cointegrating relationships between IPS and its attributes in Malaysia.

As for the stability test investigation, CUSUM and CUSUMSQ tests are applied and results are reported in Panel C of Table 3.

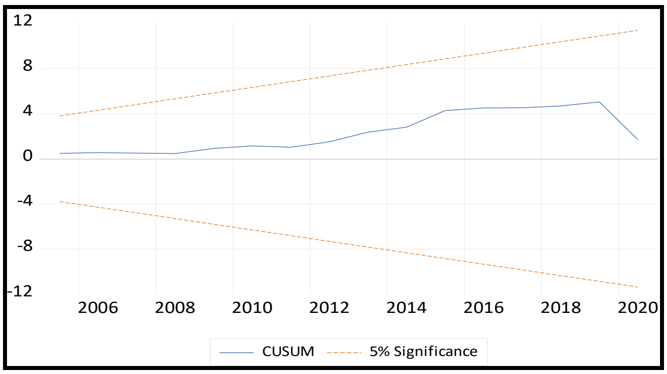

Figure 2. Plot of cumulative sum of recursive residuals for Malaysian IPS model
Source: Authors' estimation

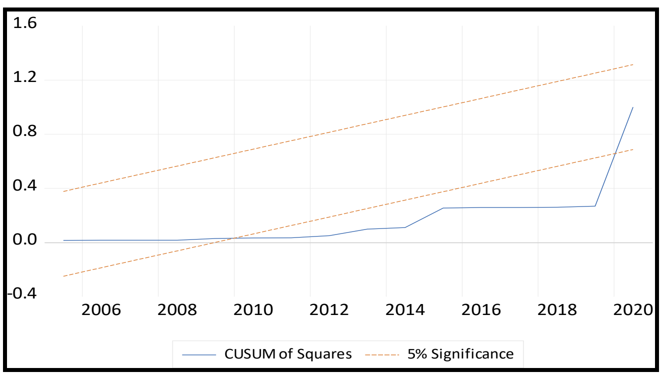

Figure 3. Plots of cumulative sum of squares of recursive residuals for Malaysian IPS model
Source: Authors' estimation

The plot of CUSUM indicates that the model is stable because the blue line is located between its red lines. However, the plot of CUSUMSQ indicates some instabilities for the IPS model from 2009 to 2018. It suggests that the residual variance of the estimated model was unstable from 2009 to 2018, indicating that the estimated model cannot be explained only by its assumed determinants. The instability may occur due to IPS growth, which started to decline when the government gave up its support to the sector for other sectors to be expanded in 2000. Therefore, the policy taken may affect IPS.

CONCLUSION

The main objective of this study was to investigate the factors that affect IPS performance in Malaysia for the 1970–2020 period. ADF test was performed for the unit root investigation, and the ARDL bounds testing approach of cointegration was used to capture the long- and short-run estimates of the IPS model. From the ARDL results, all variables significantly influenced Malaysian IPS in different manners for both periods; long and short runs, except the FD variable, which insignificantly affected IPS. This final result was verified by the ECM estimate, indicating the presence of long- and short-run relationships between IPS and its factors.

Apart from the influential roles of the proposed factors in their reactions to IPS performance in Malaysia, this study empirically ran a new mark for policymakers in the country to support IPS, thereby attracting external and domestic demands for Malaysian IPS production. Although the FD sector does not directly play a significant factor in stimulating Malaysian IPS growth, policymakers must revise their policies to enhance the role of the financial and banking sector in strengthening good IPS performance in the country. This revision can be done by running good financial services to fund and motivate investors to construct new IPS schemes.

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