

A low-angle, night-time photograph of the Petronas Towers in Kuala Lumpur, Malaysia. The towers are illuminated with white and blue lights, and their spires are lit up. The sky is a deep blue. The image is partially obscured by a white curved line on the right side.

INDUSTRIAL DIVERSIFICATION IN MALAYSIA

Rajah Rasiah
Asia-Europe Institute
University of Malaya

**Presentation prepared for the UNIDO Workshop, Promoting Export
Diversification in the CAREC Region, Ulan Bator (Mongolia), 16-17 May 2019**

1. Introduction

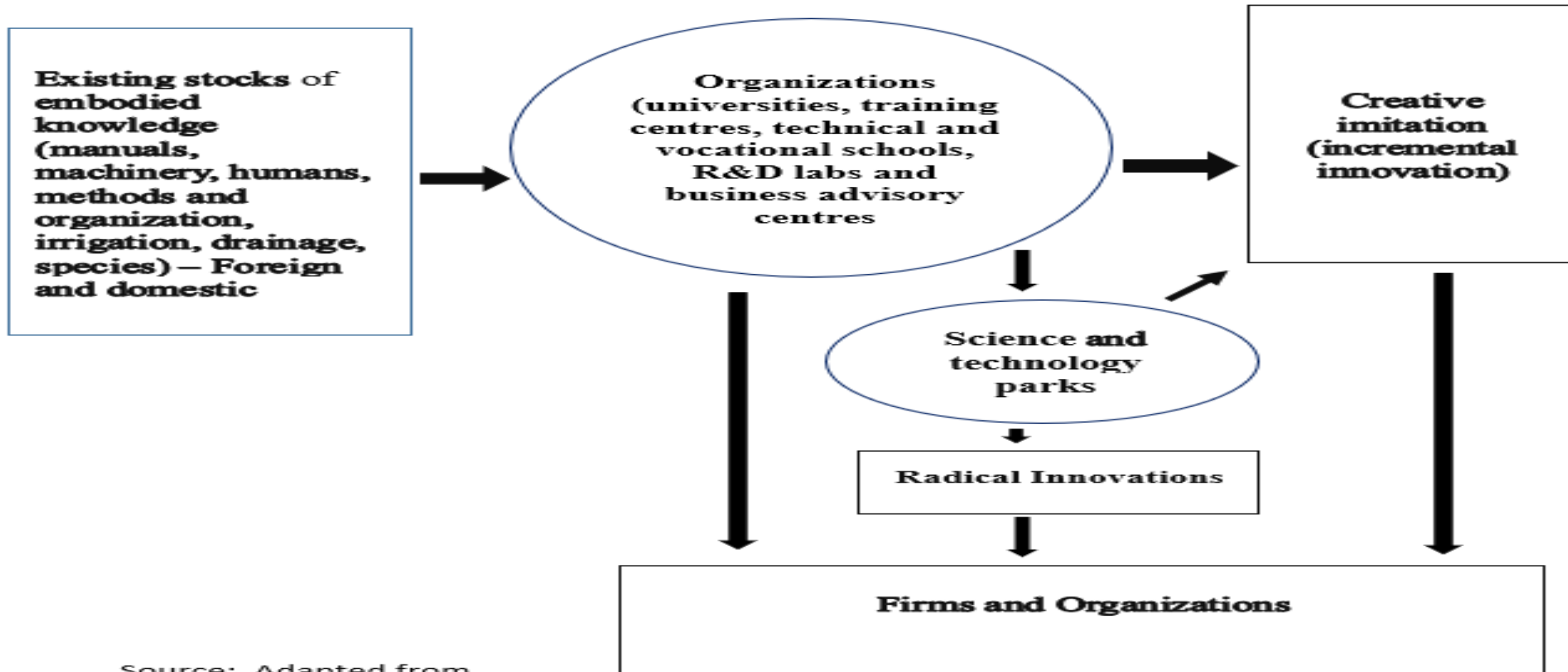
- Malaysia is an interesting case study on economic diversification in general, and a shift to industrialization in particular.
- **The promotion of industrial agglomerations became a major springboard of economic growth** and structural change in Malaysia. Export processing zones (EPZs) mushroomed in the country since 1972 to become major platforms for inflows of foreign direct investment and employment creation. Spatial industrial concentration took four forms- industrial zones, EPZs, science and technology parks, and regional corridors.
- Consequently, the government managed to engender the conditions for reducing **poverty incidence and the Gini coefficient of income inequality from 49.3% and 0.510 in 1970 to 0.4% and 0.399 in 2016** (Malaysia, 2018).
- Dynamic focus on export diversification, including a shift to manufacturing helped stimulate rapid growth to make Malaysia an upper middle income country.
- For a small open and highly trade integrated country, macroeconomic management policies were generally effective, except for the period 1989-97 when Dutch Disease seriously damaged the food and beverage industry.
- While considerable investment
- This presentation discusses first an analytic framework (section 2), macroeconomic management to ensure insulation from crises (Section 3), industrial policies (Section 4), export diversification (Section 5), industrial agglomeration (Section 6), impact of slow technological upgrading (Section 7), and finally the conclusions (Section 8).

2. Tenets of Diversification and Upgrading

- Upgrading within Industries and the speciation (structural) of new industries
- Structural Shift from low to high value added activities using a model to stimulate incremental and radical innovations
 - Figure 1
- Agglomeration synergies – key promotional instruments using the Systemic Quad
 - Figure 2

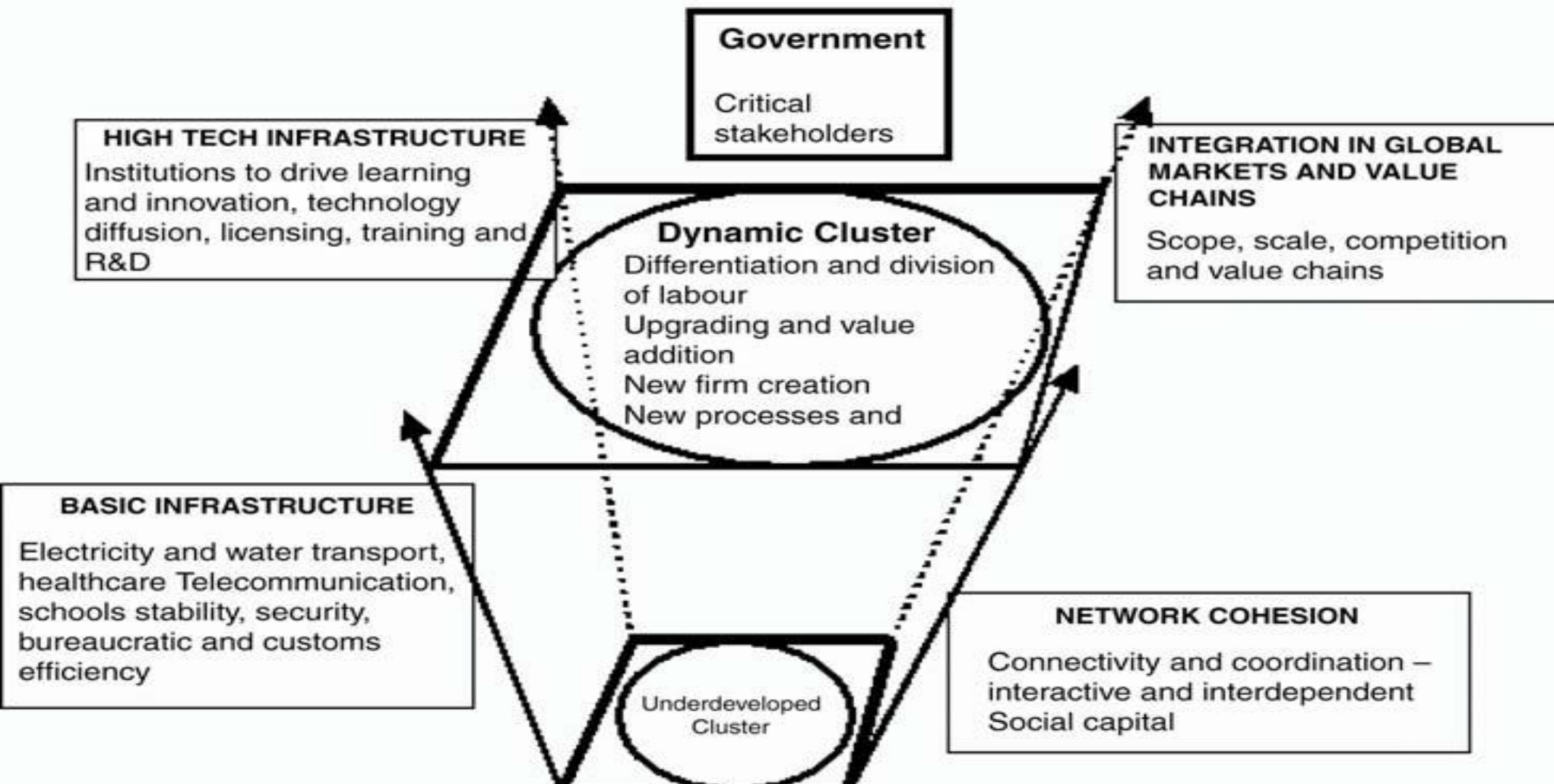
Figure 1: Institutional Framework for Promoting Industrial Upgrading

Institutional change driven through Monetary, Fiscal, and Technological policies



Source: Adapted from
Rasiah (2007)

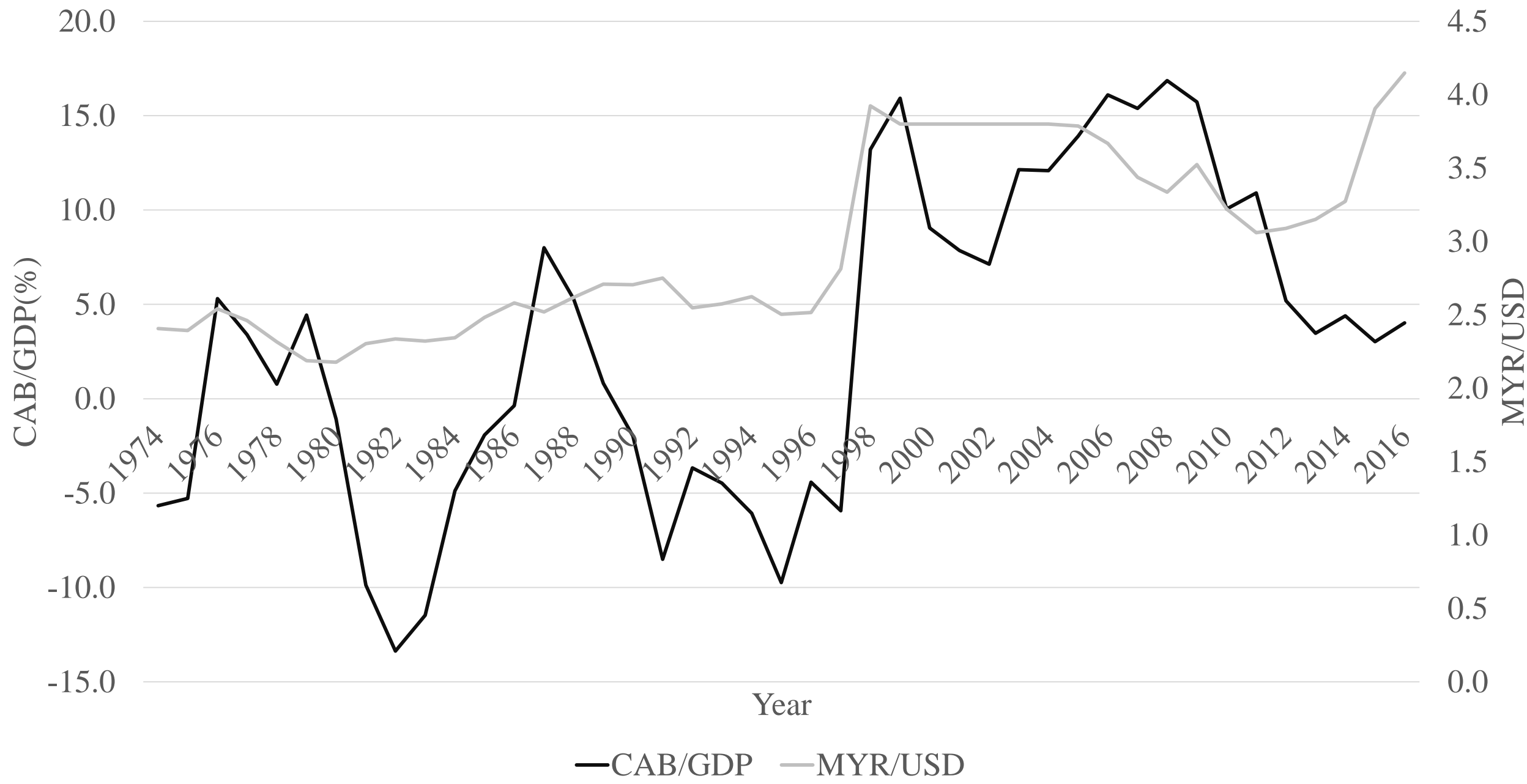
Figure 2: Systemic Quad to Stimulate Effective Industrialization



3. Macroeconomic Management

- Successful industrializers integrated globally ensured that they managed their macroeconomics to avoid succumbing to high inflation and unemployment, and Dutch Disease traps.
- Malaysia has a mixed experience here. Inflation and unemployment were generally lowered and contained. However, the Ringgit appreciated against the USD despite the current account being in the red over the period 1989-97 because of huge inflows of foreign direct investment and portfolio equity flows into the capital account (Figure 3). Its Dutch Disease impact affected badly the domestic food industry.
- Its inward-oriented industries suffered from an overvalued Ringgit in 1989-97, while its export-oriented industries of electric/electronics and textile/clothing escaped the Dutch Disease trap only because imports and exports were handled in US dollars by the foreign firms that dominated ownership in these industries (Rasiah, Yap and Chandran, 2015; Rasiah and Gopi, 2019).

Figure 3: TB in GDP and Ringgit-USD Exchange Rate, Malaysia, 1970-2016



4. Industrial Policies

- Import-substitution 1 (1958-1992) (see Table 1)
 - Tariffs on final consumption goods
- Import-substitution 2 (1981-1992)
 - Tariffs and quotas on protected goods
 - Excise duties, import permits
 - Subsidized credit
 - R&D grants
- Export-orientation 1 (1970-81)
 - Export diversification to reduce dependence on rubber and tin
- Tariff free operations
 - Tax holidays
 - Emphasis on employment generation through FDI inflows
- Export-orientation 2 (1986-)
 - Tariff free operations
 - Tax holidays
 - Emphasis on employment generation through FDI inflows
 - Emphasis on Strategic industries, clustering and technological upgrading

| Phase | Trade Orientation | Period | Policy Instruments | GDP Annual Growth Rate (%) | Exports Annual Growth Rate (%) | Manufacturing Value Added Share of GDP (%) | Unemployment Rate (%) | Poverty Rate (%) |
|----------------------|-------------------|-----------|---|----------------------------|--------------------------------|--|-----------------------|------------------|
| Phase 1 (1958-1990) | IS1 | 1958-1968 | Pioneer Industries Ordinance 1958 | 6.7 | 8.1 | 11.8 | 6.8 | 49.3 |
| | EO1 | 1968-1980 | Investment Incentives Act 1968; Free Trade Zone Act 1971 | 8.1 | 34.2 | 21.9 | 5.6 | 37.4 |
| | IS2-EO1 | 1980-1990 | Heavy Industries Corporation of Malaysia (HICOM), 1980; "Look East" Policy; Industrial Masterplan 1, (1986-1995); Promotion Investment Act 1986; | 5.9 | 20.6 | 24.2 | 4.5 | 16.5 |
| Phase II (1991-2018) | EO2-IS2 | 1991-2005 | Industrial Masterplan 1, (1986-1995); Action Plan for Industrial Technology Development (APITD) 1990; Human Resource Development Act (1992); Industrial Masterplan 2, (1996-2005) | 6.1 | 12.3 | 27.5 | 3.6 | 5.7 |
| | | 2006-2018 | Industrial Masterplan 3, 2006-2020; Regional Corridors –NERC, IRDA, ECER, SDC and SCORE; National Policy on Industry 4.0 | 4.9 | 2.1 | 22.3 | 3.4 | 0.4 |

5. Export Diversification

- Volatile fluctuations in prices of tin and rubber led the independent Malaysian government to diversify exports into oil palm and other agricultural goods, as well as reduce dependence on food imports. The government also promoted export-orientation through attractive incentives to giant foreign TNCs - especially in electronics and textiles/garments from 1971. Manufacturing was earmarked as the engine of economic growth in the Second Malaysia Plan that was launched in 1971.
- Figure 4 shows changes in Manufacturing value added in GDP and manufactured exports in total exports. Figure 5 shows share of palm oil exports (crude and processed) and oil and gas in total exports. All three figures demonstrate the impact of diversification policies on GDP and exports.
- Figures 6 and 7 show export concentration against current account balances (in GDP). The aggressive diversification policies produced a weak link between the two variables (Figure 6). Part of this is also a consequence of external shocks caused by crises in 1973-76, 1984-86, 1997-98 and 2007-09. However, a close look at the relationships by specific periods shows inverse relationships between the two (Figure 7).

Figure 4: Manufacturing Share in Economy, Malaysia, 1960-2017

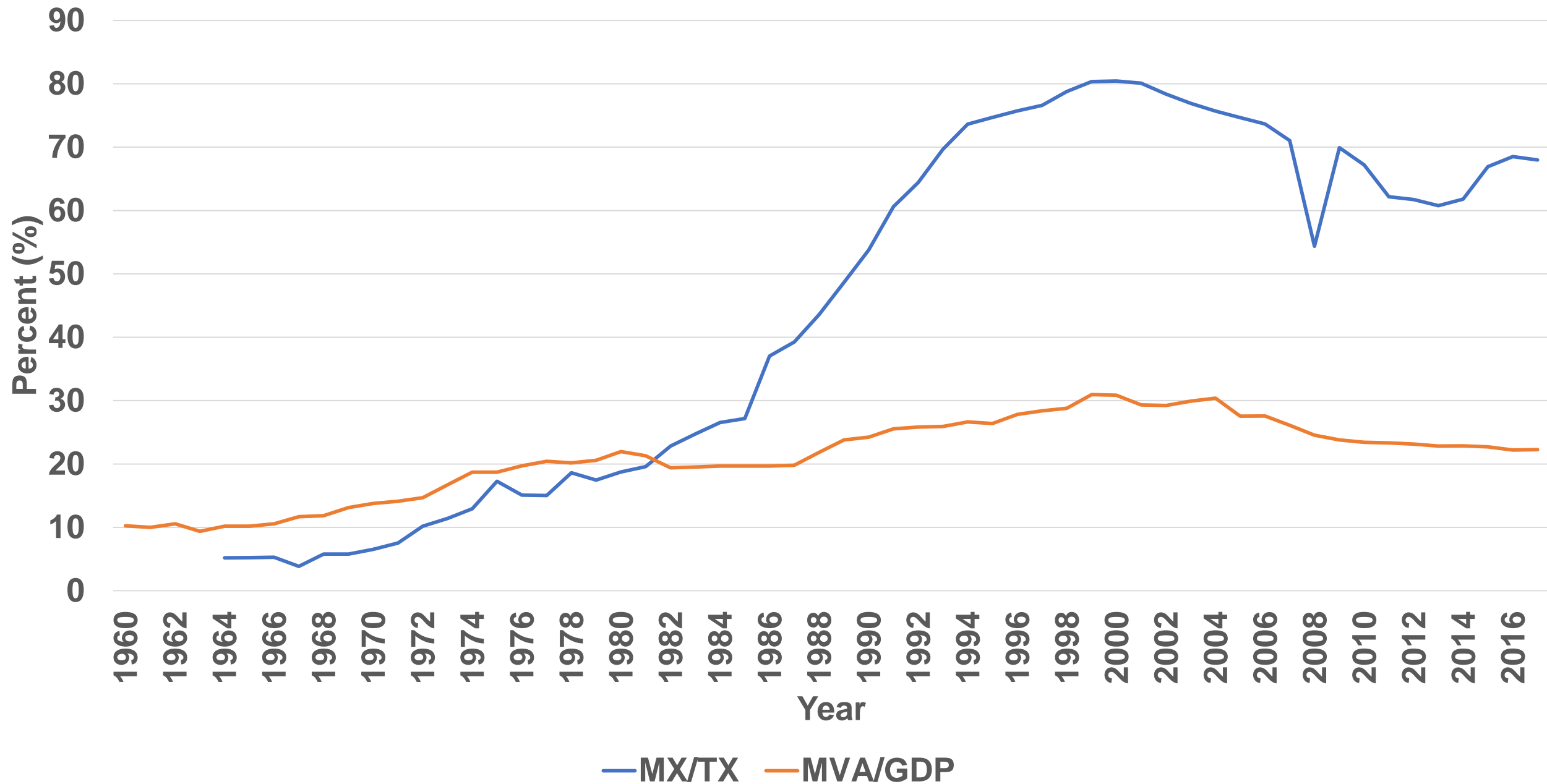


Figure 5: Key Primary Exports in Total Primary Exports, Malaysia, 1975-2018

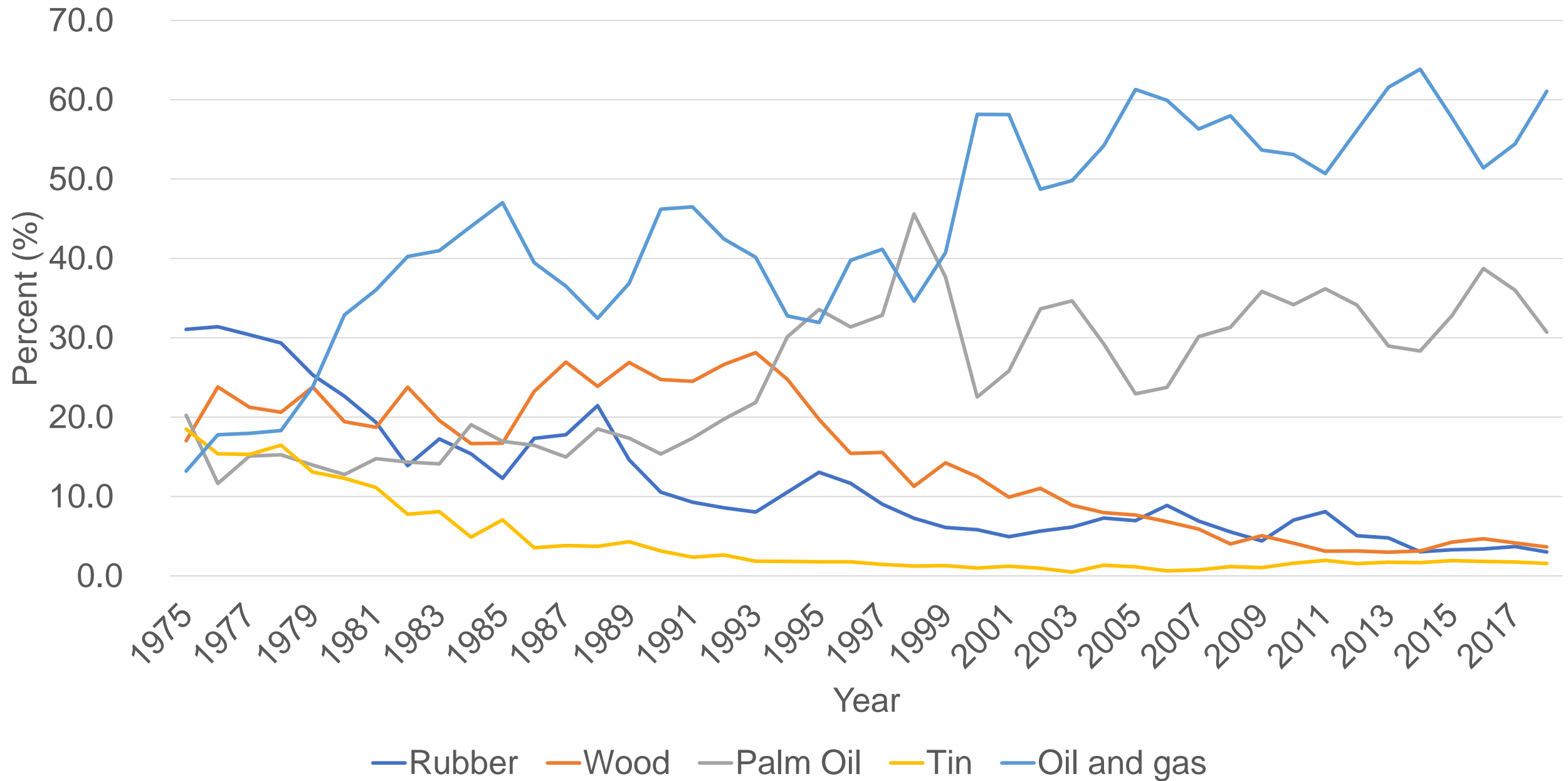


Figure 6: TB and HHIX, Malaysia, 1975-2017

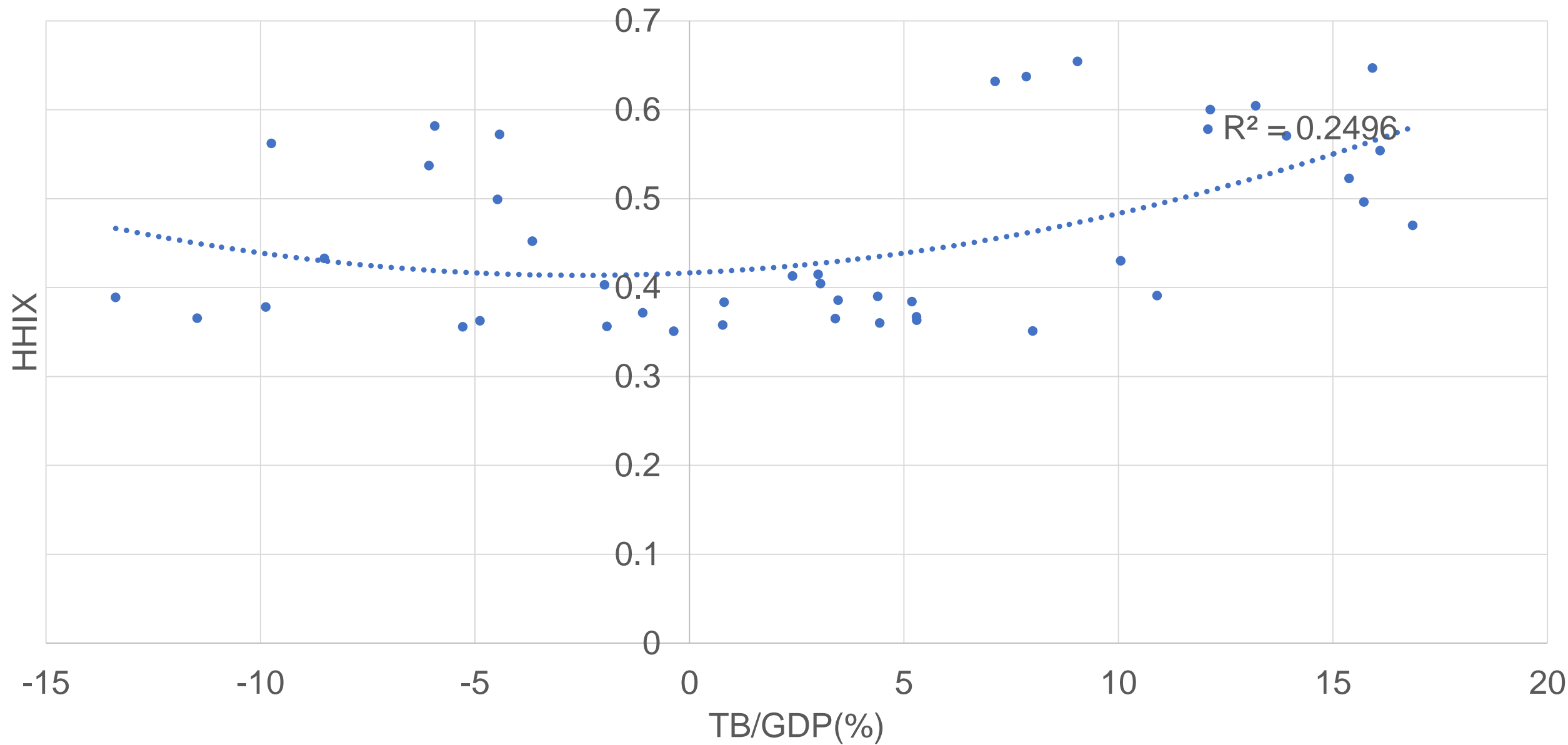
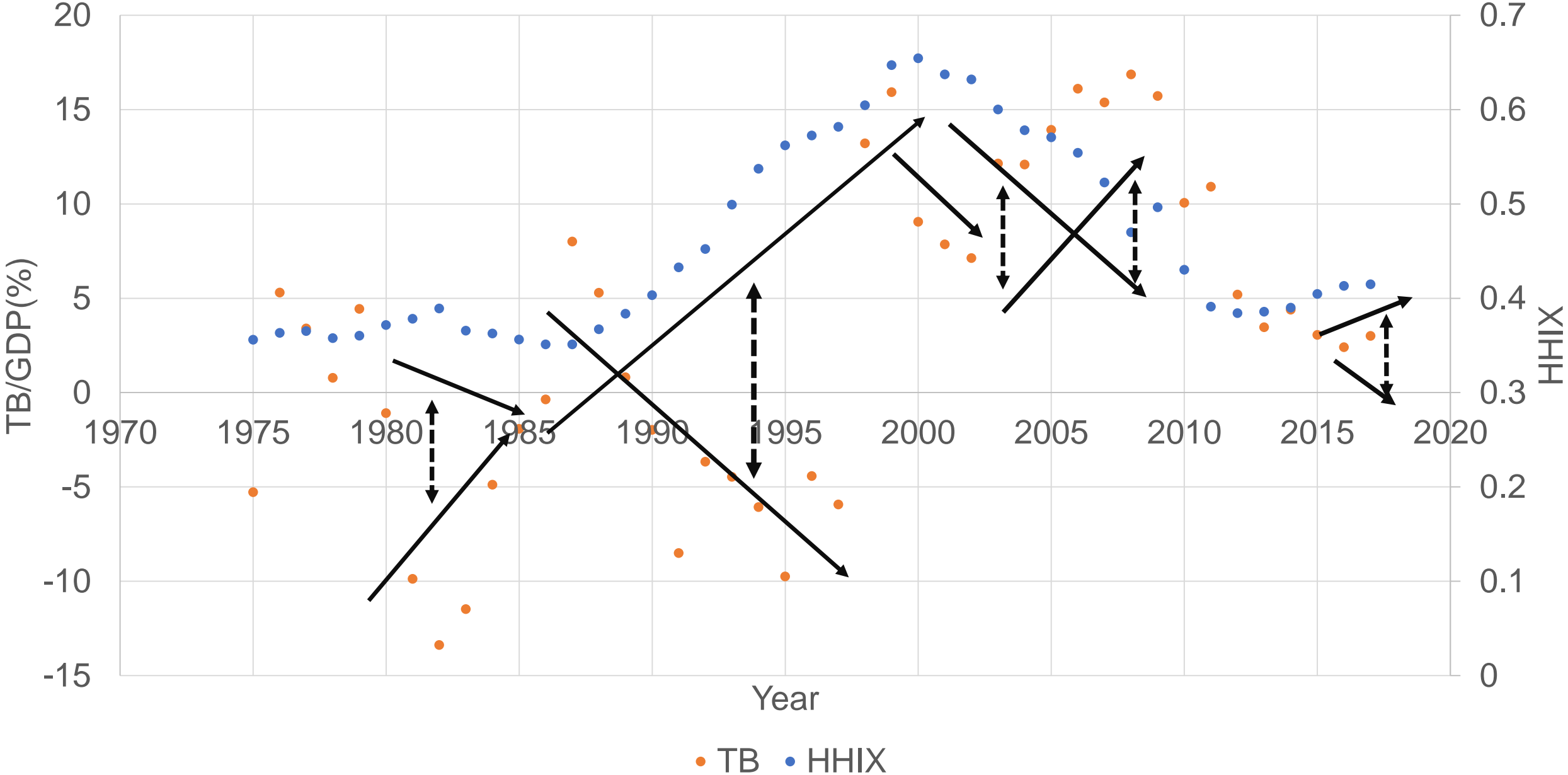


Figure 7: Inverse Link between TB and HHIX, Malaysia, 1975-2017



6. Industrial Agglomerations

- Four major industrial agglomeration strategies were promoted in Malaysia to spearhead industrialization.
- The first emerged with IS industrialization in the 1960s as **industrial parks**.
- **Export processing zones** were created through FTZs and LMWs from 1972.
- **Science and Technology Parks** were launched from the early 1990s as Malaysia sought to promote innovation activities.
- **Regional industrial corridors** were stimulated since 2006 to provide the ecosystem to stimulate agglomeration economies and technological upgrading.

6.1 Industrial Zones

- Industries in Malaysia are mainly located in over 500 industrial estates throughout the country. From that, over 200 industrial estates or parks were developed by government agencies such as State Economic Development Corporations (SEDCs), Regional Development Authorities (RDAs), port authorities and municipalities.
- In addition, new parks are continuously being planned by government agencies and private developers to meet the increasing demand for Industrial Land. These parks are either sold or lease to the industries, vary according to location (MIDA).
- The **initial industrial parks in independent Malaya offered good basic infrastructure and security.** Consumer and intermediate industries, such as toothpaste, consumer electronics tin cans, fabricated steel, and textile mills opened operations under IS that provided protection on final goods. Colgate-Palmolive, Matsushita Electric, Malayawata, and Malayan Weaving Mills were some of the pioneering firms that opened operations in their respective industries (Wheelright, 1965; Edwards, 1975).
- Foreign **capital dominated these industries.** However, these industries stagnated once the domestic market got saturated (Hopfman and Tan, 1980). There was also little technological upgrading in these firms as there was no institutional focus on it.
- Maintenance, smelting of tin, processing, and machinery repair works were begun during British rule to support tin mining, rubber agriculture, and construction and maintenance of ports, roads and railways (Thoburn, 1977; Rasiah, 1995).

6.2 Free Trade Zones

- **FTZs and LMWs were opened in 1972 after the FTZ Act was gazetted in 1971.** Giant TNCs relocated operations, particularly in textiles and electronics manufacturing to become major platforms for employment generation. Recognising that domestic demand was too small to sustain industrialization, the **World Bank and the United Nations Industrial Development Organization (UNIDO) promoted EPZs with exports becoming the major demand outlet to stimulate labour-intensive activities throughout the developing countries.** EPZs were launched earlier in Kaohsiung, Masan, Inchon, and Singapore from the mid-1960s.
- In Malaysia, the development of FTZs and its equivalent instruments, i.e. Licensed Manufacturing Warehouse (LMWs) became the core of export manufacturing strategy. The FTZs was first established in Bayan Lepas, Penang after the government gazetted the Free Trade Zone Act of 1971 (Malaysia, 1971). Among state governments, **Penang participated aggressively in developing FTZs as its economy was ailing following the revocation of its Free Port status (Singh, 2011).** Since land matters fall under the jurisdiction of the state, the State Development Corporations are responsible for developing FTZs. For example, the Penang Development Corporation was entrusted to develop Bayan Lepas FIZ (earlier known as FTZs), and other government initiated industrial parks in the state.
- To be eligible to locate within FTZs and LMWs, firms are required to export 80 per cent of their output (Malaysia, 1976). Penang had the lion share of developed FTZs space in 1989 and accounting for 55 per cent of FTZ firms in 1987 followed by Selangor at 29 per cent and Malacca at 16 per cent (Rasiah, 1993a). Bayan Lepas FTZs, which has been the biggest FTZ in Malaysia had 41 firms in 1987 with fixed assets worth RM 524 million that provided 28, 911 jobs for employees. Ten out of 18 FIZs in Malaysia in 2018 were located in Penang and Selangor.
- There were 22 FTZs/LMWs/FIZs by 2018: Penang- Bayan Lepas I, II,III,IV, Seberang Prai; Selangor – Telok Panglima Garang, Sungai Way I, II, Ulu Klang, Pulau Indah; Malacca- Tanjung Kling and Batu Berendam I, II; Johore- Pasir Gudang, Tanjung Pelepas; Perak- Kinta, Jelapang II; and 1 in Sarawak- Sama Jaya (MIDA, 2018). FTZs in the Eastern Malaysian state of Sarawak established in 1991 with various incentives from the state. The Sama Jaya electronic FIZs began to quickly attract investments from US and Japan, including Toyo Electronics became the first entrant and followed by the US printed circuit manufacturer Sanmina and hard disk manufacturer Komag (Wulandari, 2012).
- Exports of manufactured goods soared from the 1970s as FTZ and LMW firms in Malaysia: **the FTZ share of exports rose from 1 per cent in 1972 to 74.5 per cent in 1979 before moderating to 52.3 per cent in 1982 (Rasiah, 1993).** Similar data are no longer available since the 1990s following the integration of FTZs and LMWs with the principal customs area to form FIZs, though it has been estimated to account for over a third of Malaysia's exports in 2017.

- The development of FTZs and LMWs were one of the **key instruments that helped reduce poverty in the country. Penang is one key state that benefitted from EO**. By 1970, the unemployment rate in Penang was estimated at 16 per cent compared to the national average that was 8.0 per cent (Chet, 2011, Malaysia, 1971). Disadvantaged by being a predominantly Chinese majority state and the incoming government being coopted from the opposition into the ruling National Front government, the state's leadership aggressively sought FDI to alleviate poverty (Rasiah, 1988; Rasiah and Yap, 2017). Indeed, Penang's Bayan Lepas was the first FTZ that was opened in Malaysia in 1972. Consequently, by 1980 Penang's unemployment rate fell to 5.5 percent, which was lower than the national rate of 6.0 per cent (Rasiah, 1993). Penang has since experienced a trend decline in the unemployment rate to 2.1 percent compared the national rate of 3.3 per cent in 2017. These figures are even more exceptional since Malaysia had a formal foreign labour population of 2.1 million with a widely believed illegal population exceeding 5 million in 2017.
- While **Malaysia experienced stellar performance with employment generation**, the period until the 1980s was characterised by little transfer of technology from foreign FTZ firms to local firms limited (Salih and Young, 1985; Rasiah, 1993). Nevertheless, conditions began to improve by the 1980, as many TNCs located in FTZs and LMWs promoted local personnel to managerial positions, including as a managing director. Examples include Intel's Lai Pin Yong, Penfabric's OK Lee and Pen Apparel's YH Tan.
- **Overdependence on external demand subjected Malaysia to the vicissitudes of uncertain and volatile business swings**. For example, the global recession in 1985 saw employment in FTZs contract by 16.4 per cent, even though the overall manufacturing sector in Malaysia was still expanding by 8.2 per cent during the period (Malaysia, 1986). Similarly, during the global Financial Crisis of 2007-09, value added of the manufacturing sector in Malaysia contracted by 8.9 per cent in 2009, but the value added of the E&E industry declined by 19.2 per cent. The absence of unions and weak labour laws exposed workers to serious vulnerabilities during cyclical downswings. For instance, many firms retrenched

6.3 Science and Technology Parks

- **Science and Technology Parks development have been a key instrument to promote technological upgrading in the developed economies, and in Taiwan and Korea (Rasiah, 2010). Following the Way Forward in 1991 and launching of IMP2 in 1996, the government launched STPs in the Western corridor of Peninsular Malaysia. Official industrial policy shifted to promote capital- and knowledge-intensive industrialization in Malaysia (Malaysia, 1996).**
- **The federal government developed the STP infrastructure and offered tax incentives and grants for high-technology investment. The Ministry of Science and Technology and Environment started development of the first technology park in Malaysia in 1988** (Malaysia, 1991), but its incubators and clients were actively sought from 1991. The unit later moved to a permanent location in 1994 and provided facilities, which include a National Testing Centre, laboratories and incubators for advanced materials and flexible manufacturing, and a design and automation technology training centre.
- As with STPs in general, Malaysia launched them to provide commercialization opportunities through the development of incubators to scale up research findings from knowledge-based organizations, such as universities and R&D centres. While the main focus has been on advanced start-ups, other clients were also approved to scale up their operations. They were also launched to connect small and medium enterprises to connect with the knowledge nodes in the country. Geographical proximity could enhance network cohesion between institutions, meso-organisation and firms. Consequently, the government established several STPs in Malaysia, viz., Kulim Hi-Tech Park (Kedah), Seri Iskandar Technology Park (Perak), Technology Park Malaysia (Kuala Lumpur), Selangor Science Park (Selangor), Johor Technovation Park (Johor), Malaysian Technology Development Corporation-Universiti Pertanian Malaysia (MTDC-UPM) Park (Selangor) and Cyberjaya Park (Selangor/Putrajaya).
- **The technology park did attract investment as companies registered at STPs were provided with tax breaks and other incentives** through a scheme known as “Bill of Guarantee” (Ismail and Suhaimi, 2006). Incentives and grants for Research and Development (R&D) attracted over 100 start-ups at incubators located at STPs by 2003 (Felker and Jomo, 2007). MITI opened the Kulim High Technology Park (HTP) in 1995 by collaborating with the Kedah state government. The Kulim HTP was developed to attract TNC operations that qualified for MIDA’s high-technology incentives. By 2002, the Kulim HTP hosted 20 companies with an employment size of 8000 workers. In 2017, the Kulim HTP had 37 industrial firms and 78 supporting firms with an employment size of 28,000 and investment value of USD\$11 billion.
- In 1996, the government unveiled the Multimedia Super Corridor (MSC), which was modelled around the Silicon-Valley framework, though the latter evolved largely with no specific state planning. The MSC offered generous incentives, including tax holidays and subsidized infrastructure to attract R&D from leading global IT and other software companies

6.4 Regional Corridors

- Regional economic corridors were **first mooted in Malaysia through the Ninth Malaysia Plan (2006-2010)**, where the objective of the policy is mainly to promote development with regional balance but with economic propellants based on natural and already evolved endowments in the regions.
- Since the focus of the regional corridors was to evolve the ecosystem to support industrial clustering, inter-connectivity established between firms and organizations, and the geographical terrain defined by inaccessible mountain ranges were part of the dimensions that influenced the selection of the regions.
- The Peninsular regional corridors comprised the Iskandar Malaysia (IM) corridor in South Johor, the Northern Corridor Economic Region (NCER), which comprised four states (e.g. Perlis, Kedah, Penang and Perak), and the East Coast Economic Region (ECER), (which include Kelantan, Terengganu, Pahang and East Johor). The East Malaysia corridors comprised the Sabah Development Corridor (SDC), (which covered almost the entire state of Sabah) and the Sarawak Corridor of Renewable Energy (SCORE), with Kuching at centre.
- Taken together, the initial phase of industrialization did not focus on clustering and network cohesion between firms and organizations. **While the focus of industrial cluster took on clustering since IMP2, the mapping strategy for clustering has remained lacking.** Consequently, **industrial clusters neither connected firms and organizations to achieve its objective** nor had the roadmaps to direct institutional change to support effective clustering.
- The regional corridors were targeted this role through an emphasis on building the embedding ecosystems since 2007, but have yet to show effective clustering. More serious is the gradual stagnation of the science parks with their incubators little linked to the knowledge nodes in the country, including universities and public labs. It is little wonder that Malaysia's science parks have yet to produce a critical mass of commercial innovations.

Table 1: Performance of Regional Corridors, Malaysia, 2016

Investment and Employment in the Regional Corridors, Malaysia

| CORRIDOR | Master Plan Target (2007-2025) | | Achievement (as of 2016) | | |
|---|--------------------------------|-----------------|--------------------------|---------------------------------|--------------------------------|
| | Jobs | Investment | Jobs | Cumulative Committed Investment | Cumulative Realised Investment |
| | (in RM million) | (in RM billion) | (in RM million) | (in RM billion) | (in RM billion) |
| Iskandar Malaysia (IM) | 0.81 | 384 | 0.7 | 208.00 | 106.43 |
| Northern Corridor Economic Region (NCER) ^a | 1.57 | 178 | 1.03 | 79.90 | 79.90 |
| East Coast Economic Region (ECER) | 0.56 | 110 | 0.11 | 111.60 | 54.30 |
| Sabah Development Corridor (SDC) | 0.90 | 113 | 0.59 | 158.89 | 58.18 |
| Sarawak Corridor of Renewable Energy (SCORE) | 1.60 | 334 | 0.06 | 104.50 | 56.20 |
| Total | 5.44 | 1,121 | 2.49 | 662.89 | 355.01 |

^a The data relate to private investment supported by NCER

Source: Economic Planning Unit, Annual Report (2016) of NCER, IM, ECER, SDC and SCORE

7. Slow Technological Upgrading

- While rapid economic growth through export diversification and industrialization helped reduce poverty and unemployment sharply, the lack of effective policies – especially appraisal mechanisms and ethno-political patronage restricted technological upgrading. Hence, Malaysia remains trapped among middle income countries.
- Both channels of upgrading – adapting from foreign sources of knowledge, and endogenous development have been found wanting owing to ineffective policies – weak technology transfer agreements and appraisal mechanisms, and ethno-political patronage.
- Figures 8, 9 and 10 shows the value added in gross output of the manufacturing sector, electric-electronics industry and the food and beverage industry. While the most affected industry is the food industry, Malaysia has remained stuck well below Republic of Korea and Japan.

Figure 8: Value Added in Gross Output, Manufacturing, Korea (Republic), Malaysia and Singapore 1960-2015

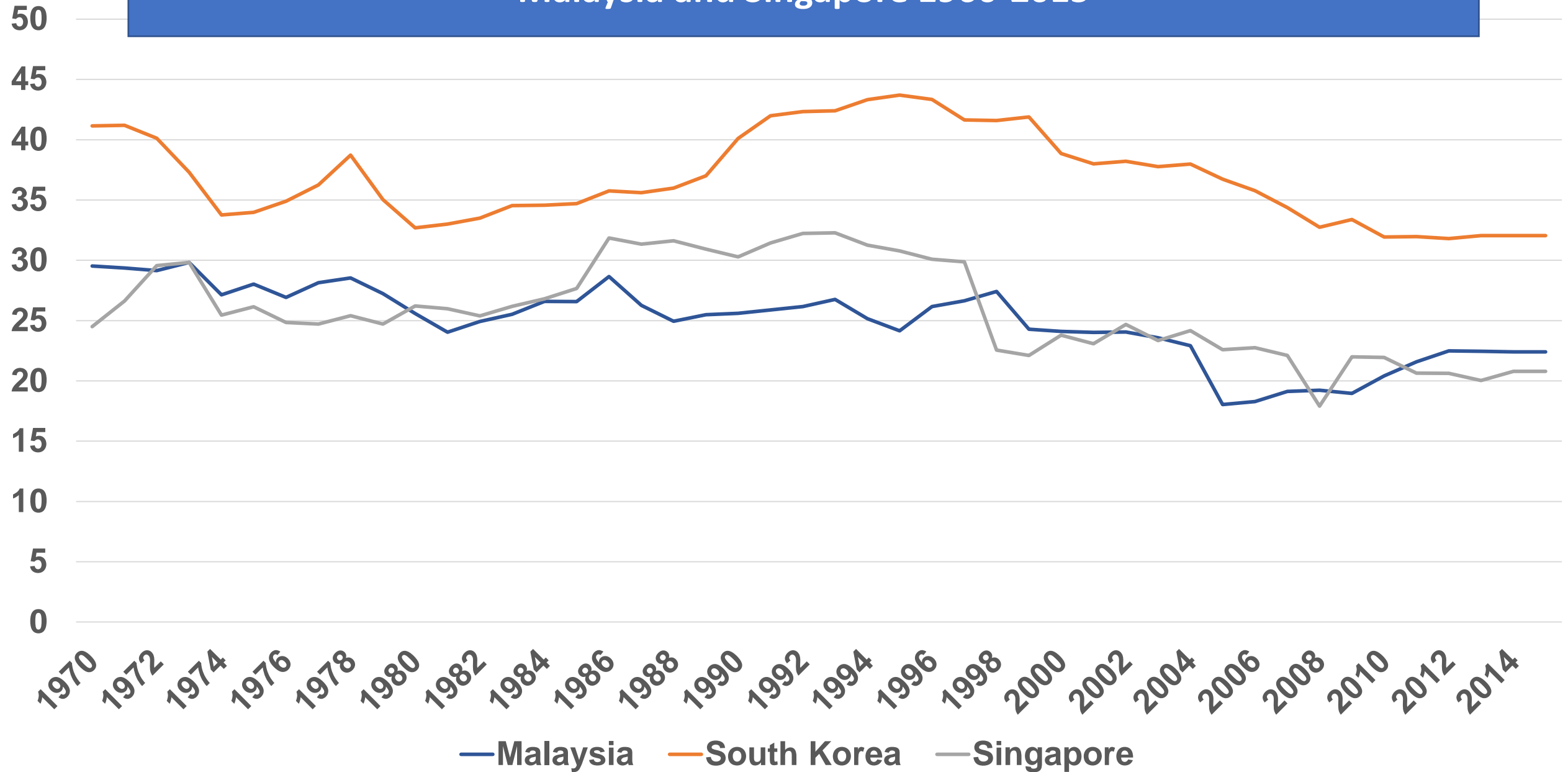


Figure 9: Electronics Value Added in Gross Output, Selected Countries, 1970-2015

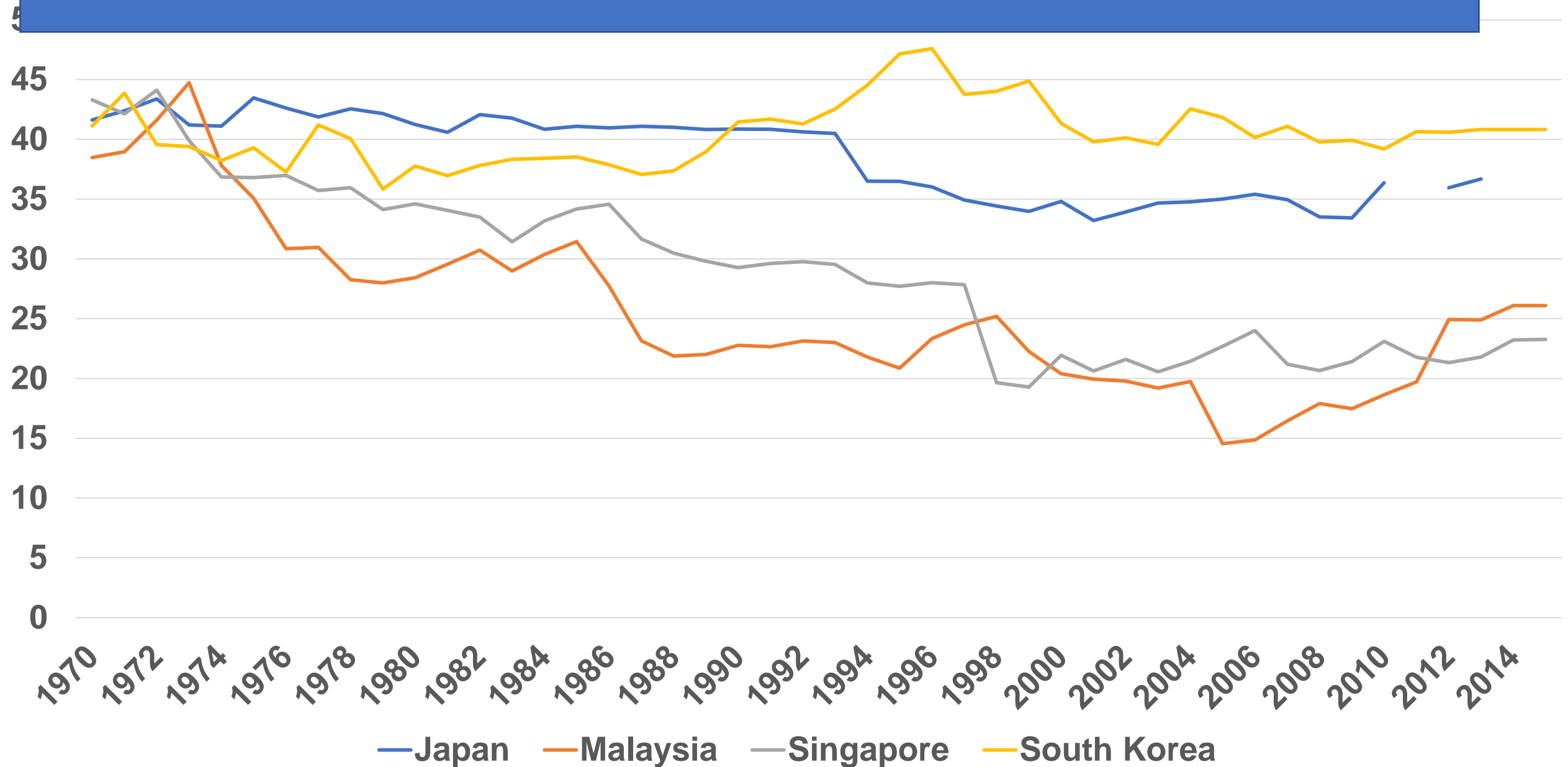
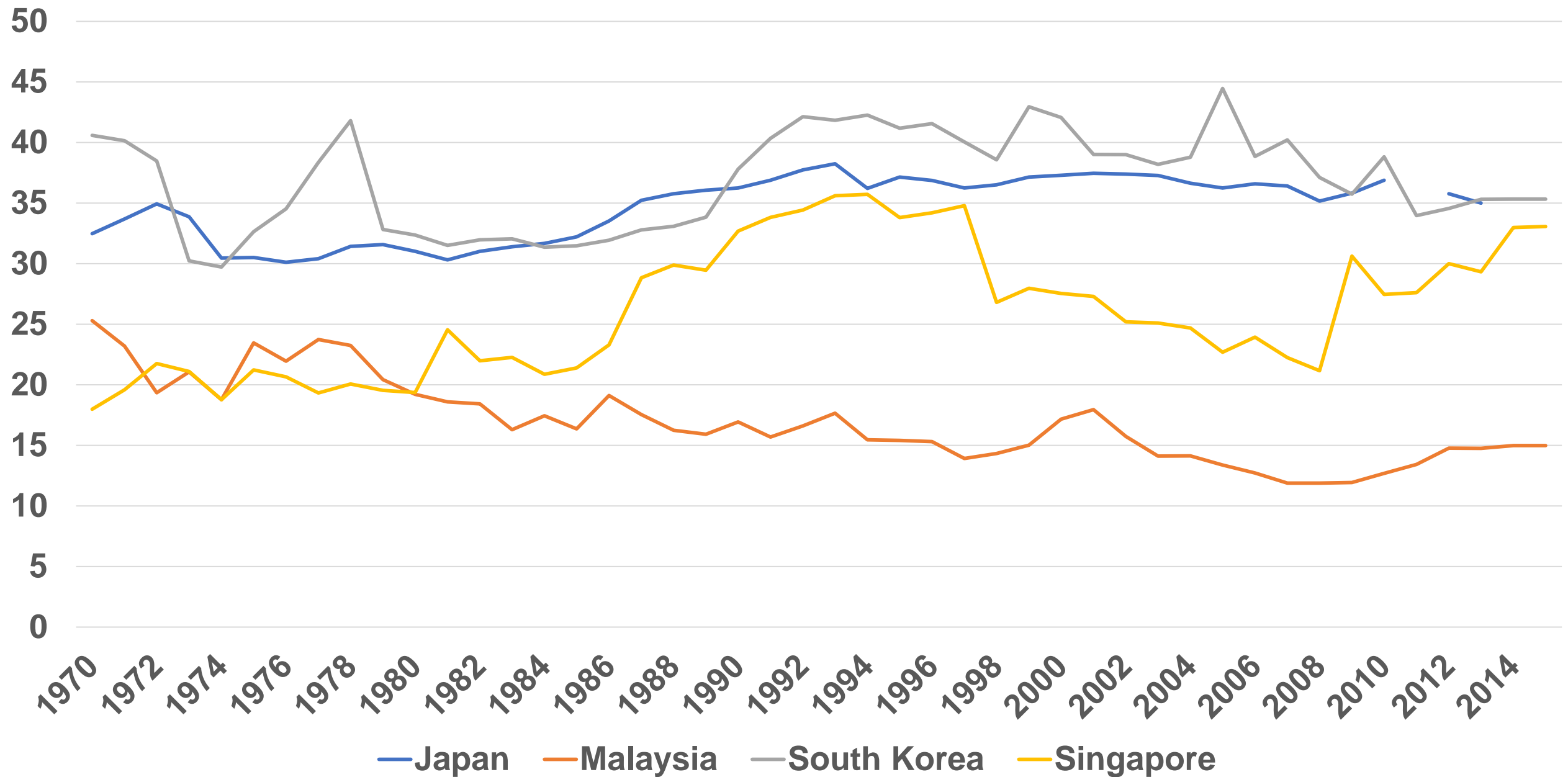


Figure 10: Food and Beverages Value Added in Gross Output, Selected Countries, 1970-2015



8. Conclusions

- Malaysia's experience with industrialization and industrial hubs is mixed. On the one hand efforts to attract FDI through export-orientation and the opening of FTZs and LMWs from 1972 successfully expanded manufacturing employment, value added and exports.
- Production concentration in labour-intensive operations at FTZs and LMWs helped stimulate exports and create jobs to reduce poverty and unemployment rates, as well as raise foreign exchange since 1972.
- Export diversification strongly helped to check the occurrence of fallacy of composition – shift from rubber to oil palm, and into export manufacturing.
- Expansion of STI infrastructure since the 1990s did not succeed in transforming manufacturing from low to high value added activities. The lack of institutional coordination to appraise the promotional instruments against performance, and connectivity and cohesion between the governance instruments, and firms and organizations restricted technological upgrading. Hence, manufacturing value added in GDP and gross manufacturing output rose until 2000 but has fallen in trend terms over the period 2000-16.

8. Conclusions

- As the labour market became saturated by the late 1980s, the government began stimulating the transformation of the manufacturing sector from low to high value added activities through the development of the STI infrastructure, including the opening of STPs. However, a lack of human capital development with a focus on STEM courses and the failure to attract Malaysians abroad and in the country carrying the requisite tacit knowledge affected the capacity of the STI to propel the transformation of manufacturing from low to high value added activities. Also, the lack of effective appraisal mechanisms in the selection, monitoring and *ex post* appraisal of the organizations and government controlled industries that were set up since Vision 2020 was launched sapped the country of industrial synergies.
- Malaysia's industrialization offers an excellent example of how basic infrastructure and security were developed to attract low-value added FDI to help lower unemployment and alleviate poverty. However, the shift from low to high value added activities requires a strong focus on technological upgrading. Unlike basic infrastructure, technology development involves the generation, spread and appropriation of knowledge associated with considerable uncertainties. While incentives and grants will be useful their successful impact requires stringent appraisal mechanisms to check the dissipation of these rents unproductively. Malaysia launched organizations to solve collective action problems involving knowledge generation, spread and appropriation. However, the country lacked a stringent appraisal mechanism and the requisite human capital to stimulate a shift from low to high value added activities in manufacturing.
- Countries seeking to avoid the Malaysian conundrum need to formulate effective technology policies through technology transfer governance, and strong selection, monitoring and appraisal policies.