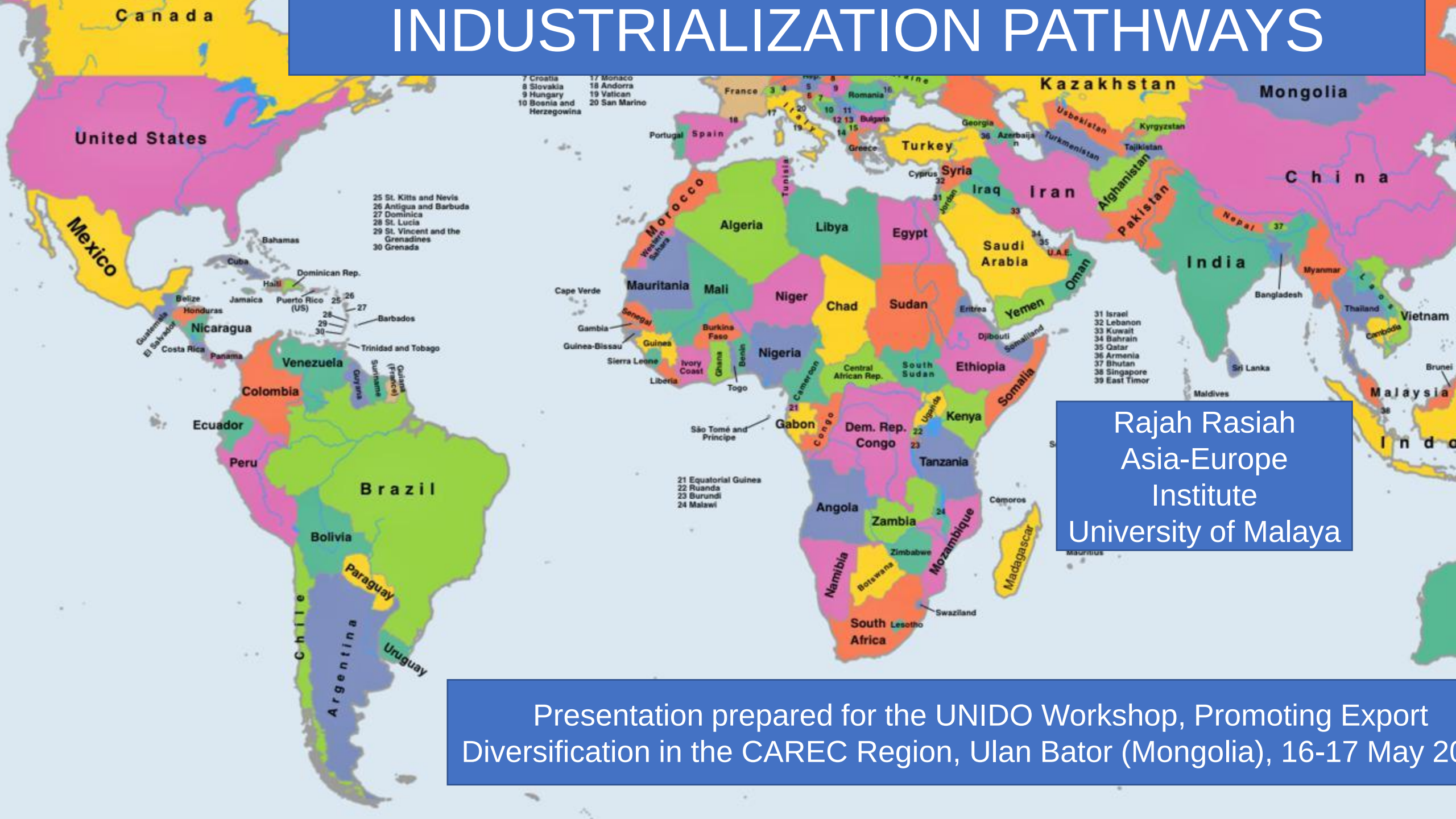
INDUSTRIALIZATION PATHWAYS



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1. Introduction

- While traditional industrialization existed in many countries, modern industrialization began with Britain as the first nation to industrialize since 1485 (Reinert, 2007).
- The United States was the first latecomer to have industrialized, which leapfrogged Britain in many industries. Germany followed since the 19th century, while Japan accompanied these countries after that.
- The Republic of Korea and Taiwan Province of China are among the developing countries that have experienced maturization of industry.
- Singapore, Malaysia, Brazil, Mexico, China, India, Argentina, Chile, Egypt and Turkey are other developing econome that have experienced considerable industrialization but have never reached the frontier in non-resource-based industries.
- Resource-rich countries, such as Argentina, Brazil, Chile, Mexico, Malaysia, China, India, Egypt, Angola, Nigeria, Mozambique, Tanzania, Zimbabwe, South Africa, Namibia, Ghana, Togo, Benin, Burkina Faso, Ethiopia, Kenya, Ivory Coast, Liberia, Morocco, Algeria, Libya and Pakistan have the potential to follow the Nordic countries to drive resource-based industrialization.
- Diversification into industrial exports have been a major path developing countries have taken to avert being trapped into the quagmire of fallacy of composition. However, sound macroeconomic management has been critical for countries to avoid being trapped by Dutch Disease. Importantly, successful industrial catch up requires stimulation of industrial synergies and technological upgrading
- Hence, this presentation seeks to address the critical instruments that explain successful industrial catch up and its translation into rapid income growth from the different pathways of industrialization using the experience of East and Southeast Asia.

2. Industrialization

Clustering

- The early differentiation and division of labour synergies can be traced to the Marshallian districts that attracted thousands of small firms engaged in leather goods and clothing, and their accessory firms.
- Knowledge flows in industrial districts were systemic without any profound internalized R&D or linkages with universities and public laboratories (Marshall, 1890). Such districts flourished in Italy to spread to *inter alia* pottery, food products and furniture industries (Brusco, 1983; Becatini, 1994). While the small firms managed to compete in export markets through specializing on the basis of scope and achieving scale at the industry level, they also focused on incremental technical change.
- The norm on radical innovations then was that only large firms had the capital to internalize and finance risky and uncertain activities. Schumpeter (1934, 1943) glorified the large firm for these reasons, which he argued were critical to initiate new cycles of innovation. The development of knowledge networks that connected small firms to knowledge nodes, such as universities, R&D laboratories and incubators facilitated the evolution of collective action innovation networks in many parts of the world (Rasiah, 2018).

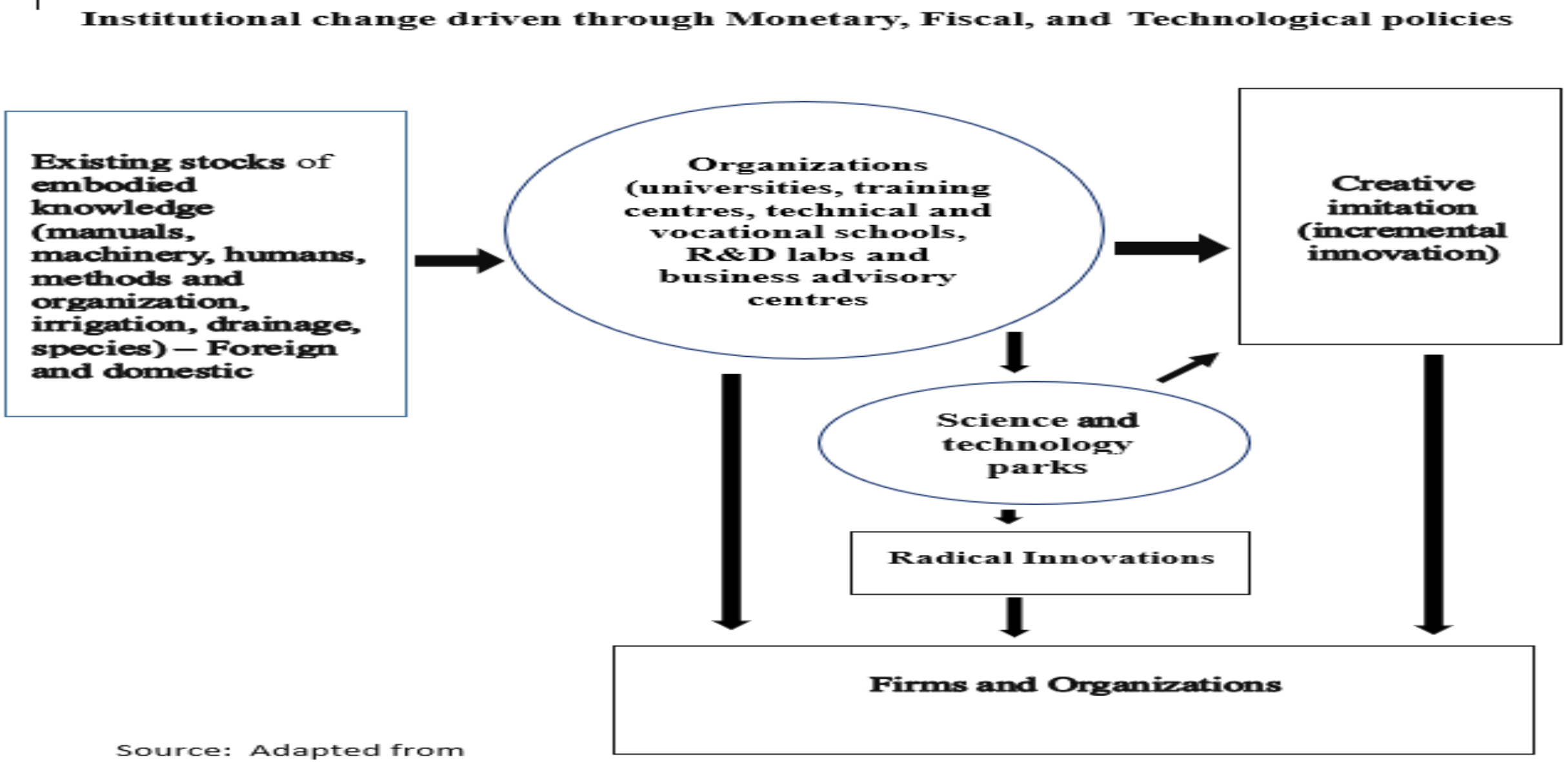
Special Economic Zones (EPZs)

- EPZs became central from 1960s to attract EO FDI processing and assembling imported inputs for export. Following Hirschman (1970) it became clear that export markets were critical to stimulate industrial synergies. TNCs relocated labour-intensive stages of production (Helleiner, 1973). Shannon International Airport was the first to embark on EPZs in East and Southeast Asia from 1965. While export markets created employment at host-sites, in the absence of incisive industrial policies it offered little stimulus to develop backward linkages and upgrading. Successful EPZs enjoyed excellent basic infrastructure, organizations to support integration in global markets and cohesion between firms, and organizations.

Industrial Policy

- Sensing that if left to markets alone, the differentiation and division of labour from industrial synergies may not occur, governments in the Republic of Korea and Taiwan began focusing on the development of national firms but through accessing foreign sources of knowledge. Hence, technology transfer was promoted from TNCs to national firms through licensing and acquisition of firms, and the hiring of nationals who had gained tacit knowledge from TNCs (Amsden, 1991; Saxenian, 2006). Indeed, the focus on technology development in national firms through the acquisition and subsequent development via R&D thrust forward the leapfrogging of several firms in Korea and Taiwan. Samsung and Taiwan Semiconductor Manufacturing Company (TSMC) are some examples. Whereas vertical integration has dominated the industry structure of Korea, de-verticallized structures of Taiwan (Rasiah, 2013).
- Figure 1 shows a framework of how incremental and radical innovations were promoted to support technological upgrading in successful industrial locations. Embodied knowledge – both from abroad and domestic – were continuously improved and harnessed through adaptation to raise industrial productivity in Japan, Korea and Taiwan. The organizational set up varied between the countries parastatals but with relatively higher internalized command in Korea over inter-firm connectivity and coordination, innovation stimulation centres (such as incubators in science parks) and markets in Taiwan.
- Macroeconomic and industrial policies were adapted to meet stringent appraisal standards to reduce rent dissipation (Rasiah, 2013). Amsden (1991) and Kim (1997) provided a lucid account of innovation appropriation and economic catch up from foreign sources. What distinguishes Korea and Taiwan from many other developing countries, such as Singapore and Malaysia is the focus on leapfrogging achieved in critical high technology industries through the development of a strong science, technology and innovation (STI) infrastructure.
- Hence, Samsung Semiconductor (in memories) and Taiwan Semiconductor Manufacturing Company (in logic chips) have become the world's lead firms by 1995 and 2004. The public good characteristics of knowledge creation and appropriation (innovation) was harnessed effectively in Taiwan and South Korea. Malaysia attempted to go the direction of Japan, Korea and Taiwan to develop a strong STI infrastructure. However, it will be shown in the chapter that the lack of an stringent appraisal mechanism and its inability to generate human capital has restricted its capacity to support rapid technological upgrading in manufacturing (see also Rasiah, 2011, 2018).

Figure 1: Institutional Framework for Promoting Industrial Upgrading



Source: Adapted from Rasiah (2007)

3. Macroeconomic Management

- Macroeconomic coordination to shield against recession, inflation and unemployment while keeping effective interest rates low to stimulate investment.
- ROK began with the second lowest Gross Fixed Capital Formation (GFCF) share in GDP after Indonesia among the countries shown in Figure 2.
- FDI was not a critical source of capital for ROK and Indonesia compared to the other economies shown in Figure 3.
- Republic of Korea faced the highest debt service problems at outset (see Figure 4).
- Effective policies to avoid major financial crises – Singapore and Taiwan Province of China.
- Crisis gripped countries – Philippines (1973-75, 1984-86, 1997-98), ROK (1997-98), Malaysia (1973-75, 1984-86, 1997-98), Indonesia (1997-98), Thailand (1997-98).

Figure 2: Gross Capital Formation in GDP, Selected Economies, 1960-2015

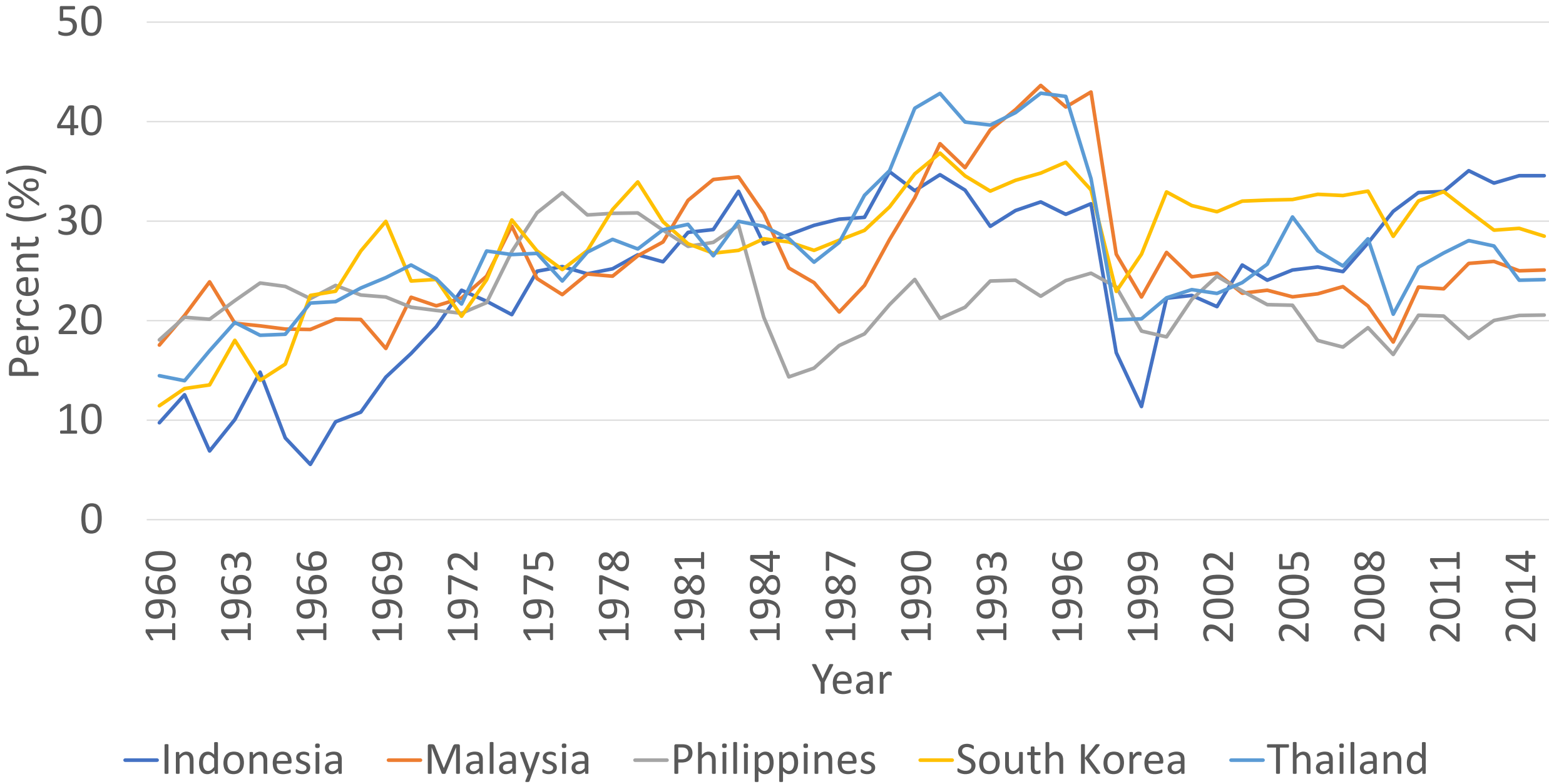


Figure 3: Net Foreign Direct Investment in GDP, Selected Economies, 1960-2015

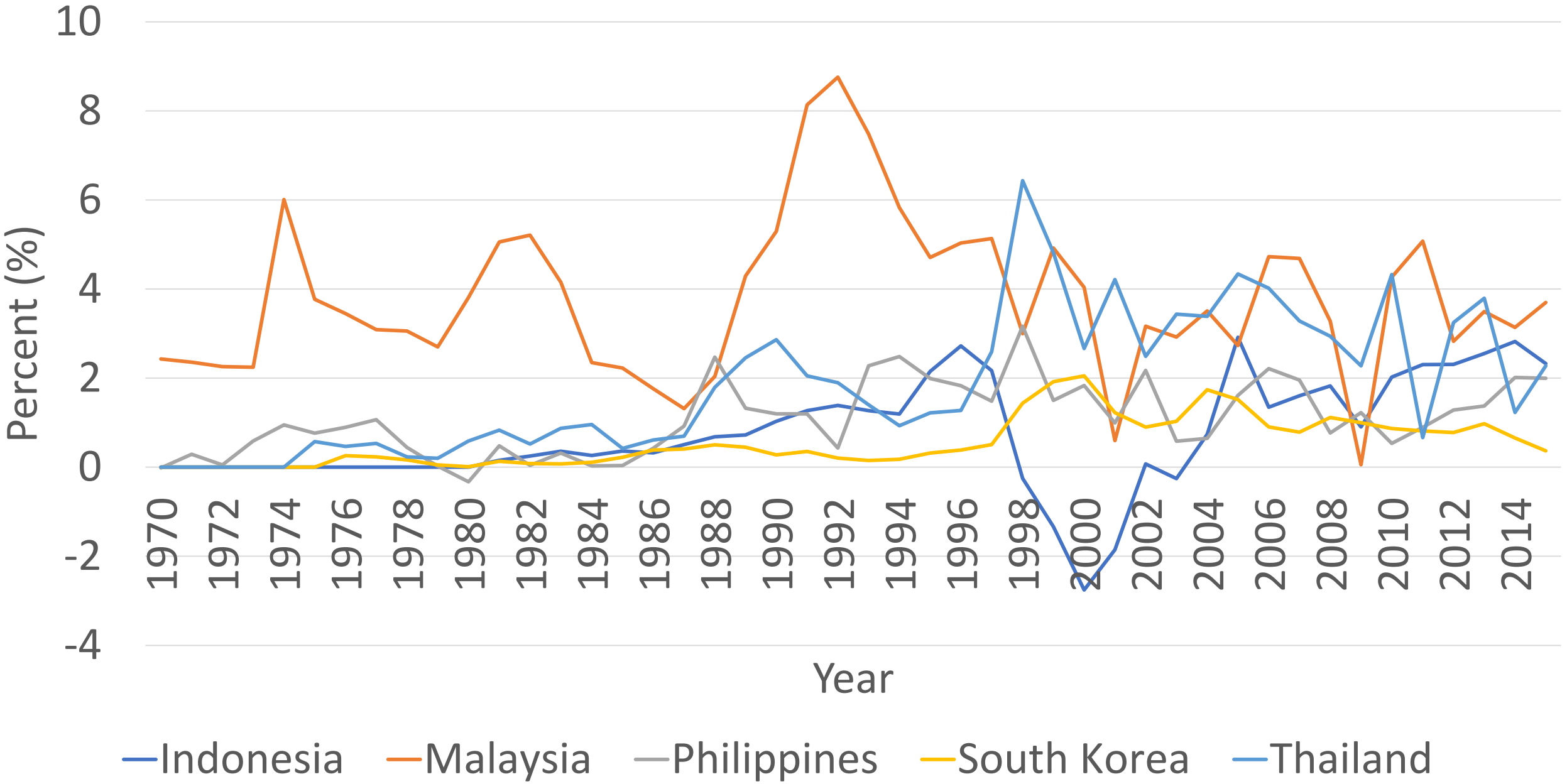
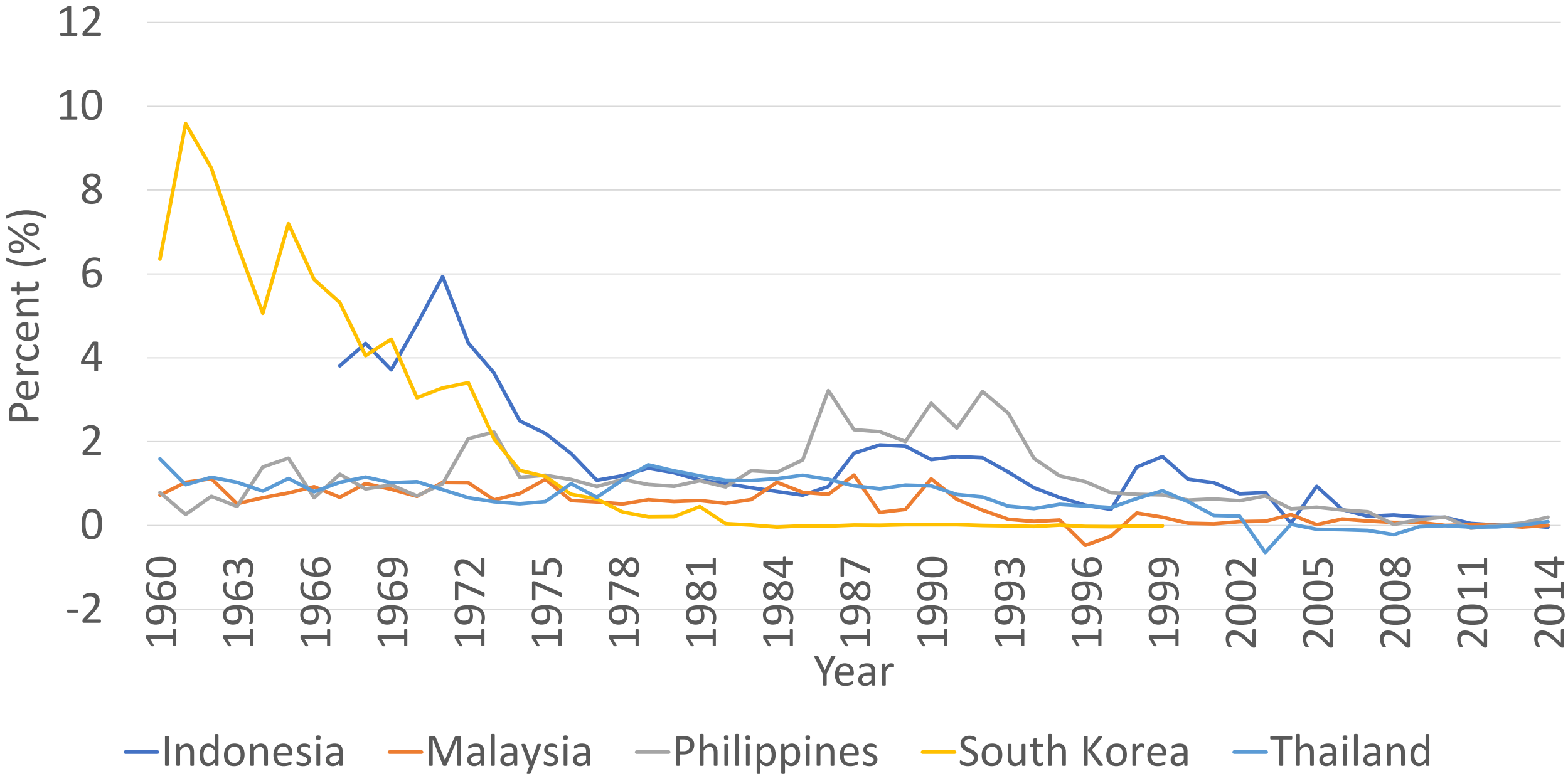


Figure 4: Overseas Development Assistance in GDP, Selected Economies, 1960-2014



4. Critical Industrial Instruments

- Import-substitution for Export-orientation

  - Incentives and subsidies in return for raising export share of gross output (ROK and Taiwan Province of China [TPC])

  - Incentives to stimulate exports (Indonesia, Malaysia, Philippines, Singapore, and Thailand. FDI a major plank of industrialization.

  - National firms the key spearhead of industrialization in Japan, ROK and TPC. Appraisal mechanisms to check rent dissipation ROK, Singapore and Taiwan

- Technological governance

  - Licensing and acquisition from foreign firms, using appraisal mechanisms – Japan, ROK and TPC. Leveraging to upgrade in foreign firms in Singapore.

- Technological Deepening

  - Roadmaps to catch up and leapfrog in strategic industries – ROK and TPC. Singapore managed that in petrochemicals and light shipbuilding industries (as completely built up [CBU] assemblers).

5. EPZs to stimulate FDI and employment

- EO Industries in ROK, TPC, Singapore, Malaysia, and Philippines were promoted from 1965 to attract FDI and create jobs. Thailand and Indonesia followed this strategy in the 1980s and 1990s respectively. Only strategy in Southeast Asia. EPZs provided excellent basic infrastructure, incentives and smooth integration in global markets. Little focus on STI infrastructure. Singapore and Malaysia began upgrading STI infrastructure since 1979 and 1991 respectively.
- Technological catch up and leapfrogging by national firms promoted by ROK and TPC from 1970 and 1974 respectively with heavy emphasis on STI infrastructure.
- Foreign **capital dominated export-oriented industries in Southeast Asia**. Thailand and Indonesia since 1980s and 1990s respectively. CLMV countries since the mid-1990s.

6. Industrialization and Deindustrialization

- All economies generally undergo deindustrialization at some point in their history. Some continue perpetually the deindustrialization process, while others reindustrialize, especially among economies that prematurely deindustrialize.
- Manufacturing is the key sector that undergoes expansion and contraction – especially relative to other sectors.
- Strong industrial policy shaped economic development in ROK, TPC [since 1970 and 1974 respectively] and Singapore [mildly since 1979). Indonesia [until 2000], Malaysia, Philippines [in the 1960s and 1970s], Thailand [until the 1980s] promoted industrialization. Among them Malaysia alone tried to connect it with STI infrastructure development since 1991.
- As shown in Figure 5, the Southeast Asian market economies experienced rapid expansion in manufacturing before falling relatively to other sectors in GDP.
- UNIDO data shows that none of these economies experienced value added of 30% of gross manufacturing output, suggesting that they have all deindustrialized prematurely (see Rasiah, 2018).
- Except for Lao PDR, the remaining CLMV countries have begun industrializing again with the manufacturing share in GDP rising (Figure 6).
- Among the Northeast Asian economies, the long term trend shows deindustrialization but the contribution of manufacturing has risen over the last few years (Figure 7). Importantly, Japan, ROK and China continue to experience a trend rise in value added in gross manufacturing output.

Figure 5: Share of Manufacturing in GDP, Southeast Asia Market Economies, 1960-2017

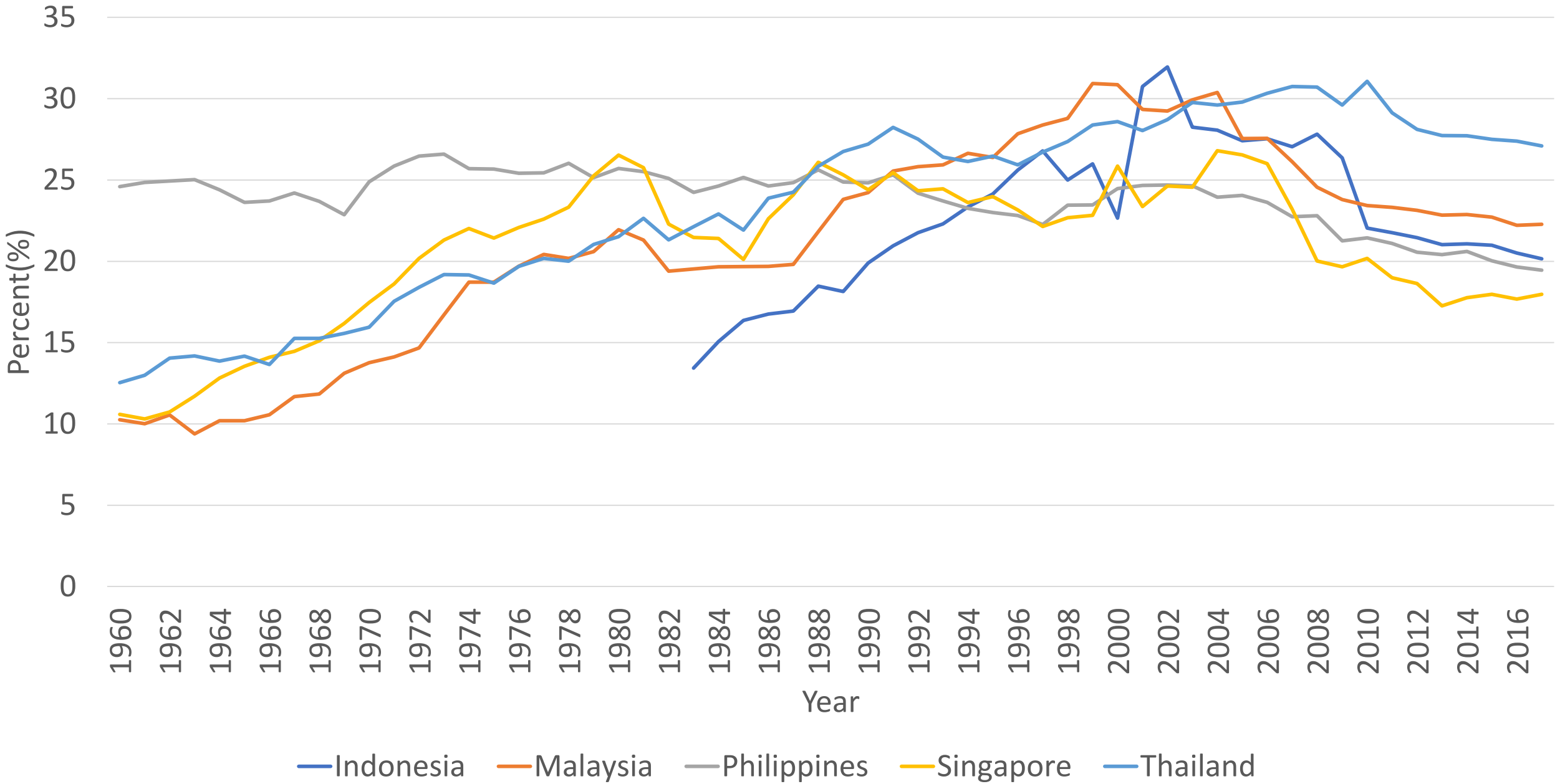


Figure 6: Share of Manufacturing in GDP, CLMV Economies, 1960-2017

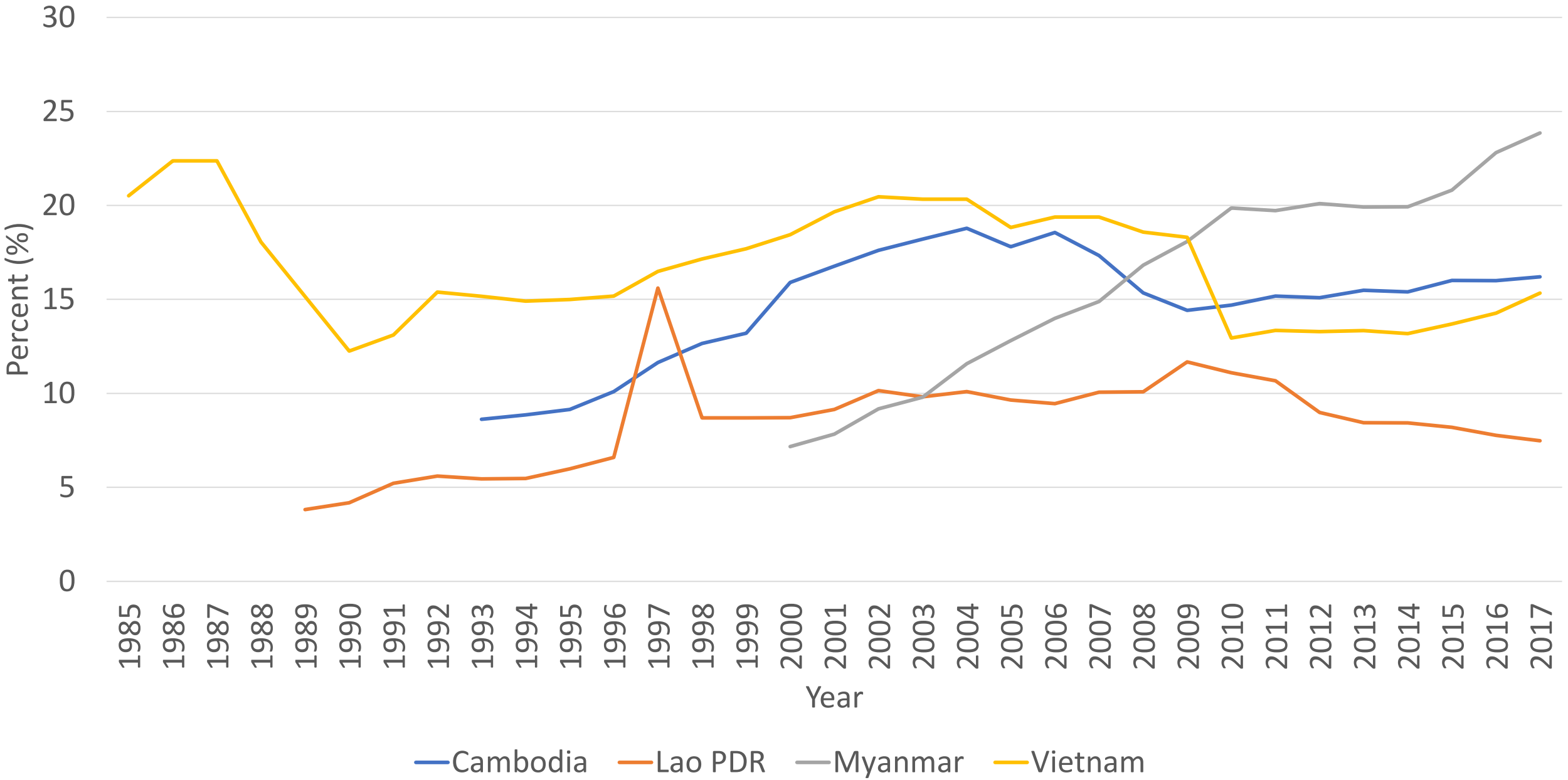
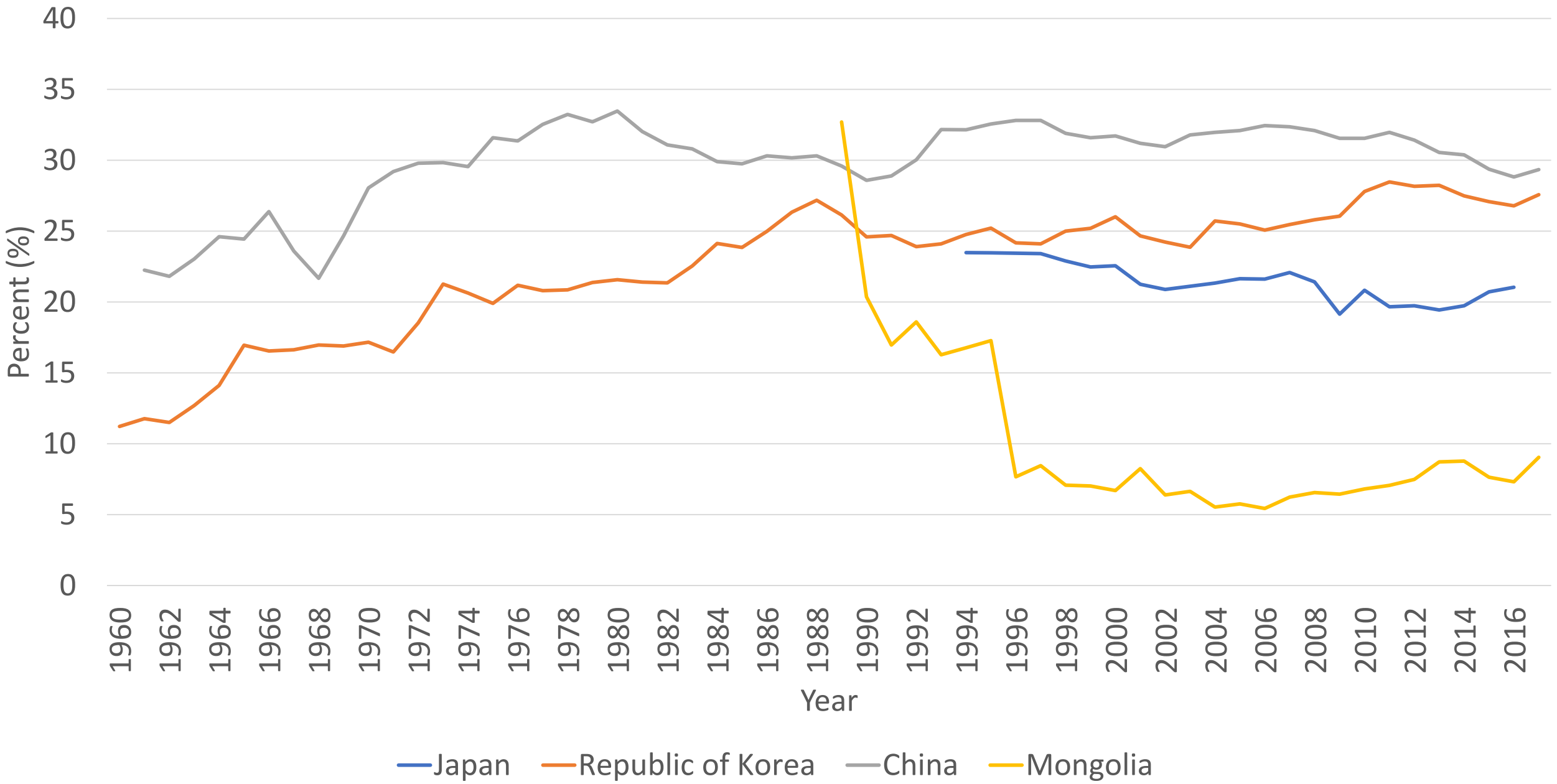


Figure 7: Share of Manufacturing in GDP, Northeast Asia, 1960-2017



6. Changes in Manufactured Export Shares

- Although there has been a relative fall since the late 1990s, manufacturing exports has remained dominant in overall exports among the Southeast Asian market economies (Figure 8). Light manufactured goods – such as electric/electronics and textile/garments- has dominated exports from these countries, though Thailand has experience strong growth in automotive exports. However, most of such exports are in low and medium value added products.
- Among the CLMV countries, manufactured exports dominate exports from Cambodia and Vietnam, while Myanmar and Lao PDR show a low intensity of manufacturing exports in total exports (Figure 9).
- Whereas exports of manufactured goods dominate exports in China, ROK and Japan, Mongolia shows a low share of manufactured exports in total exports (Figure 10).

Figure 8: Share of Manufactured Exports, Southeast Asia Market Economies, 1960-2017

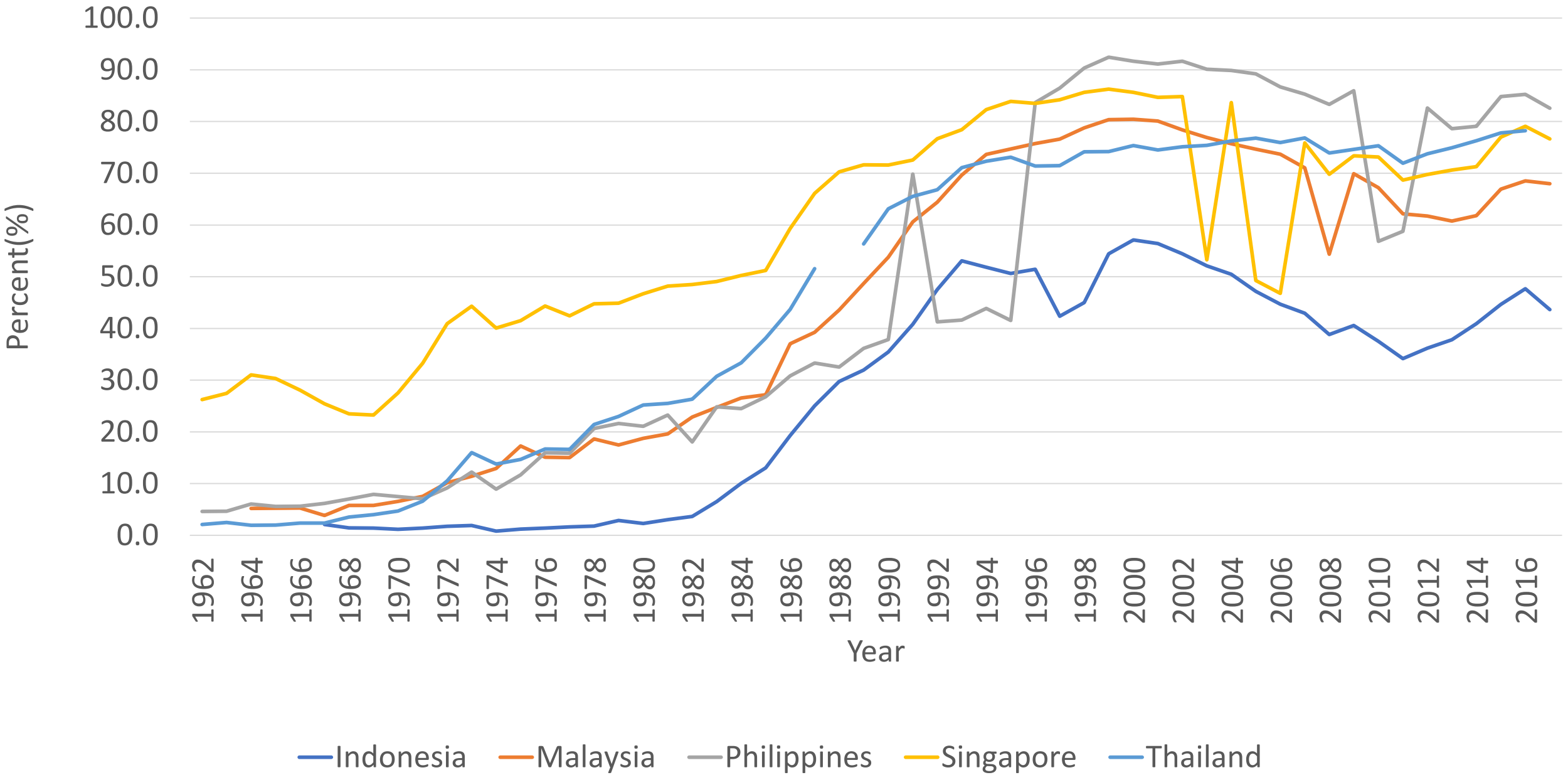


Figure 9: Share of Manufactured Exports, CLMV Economies, 1962-2017

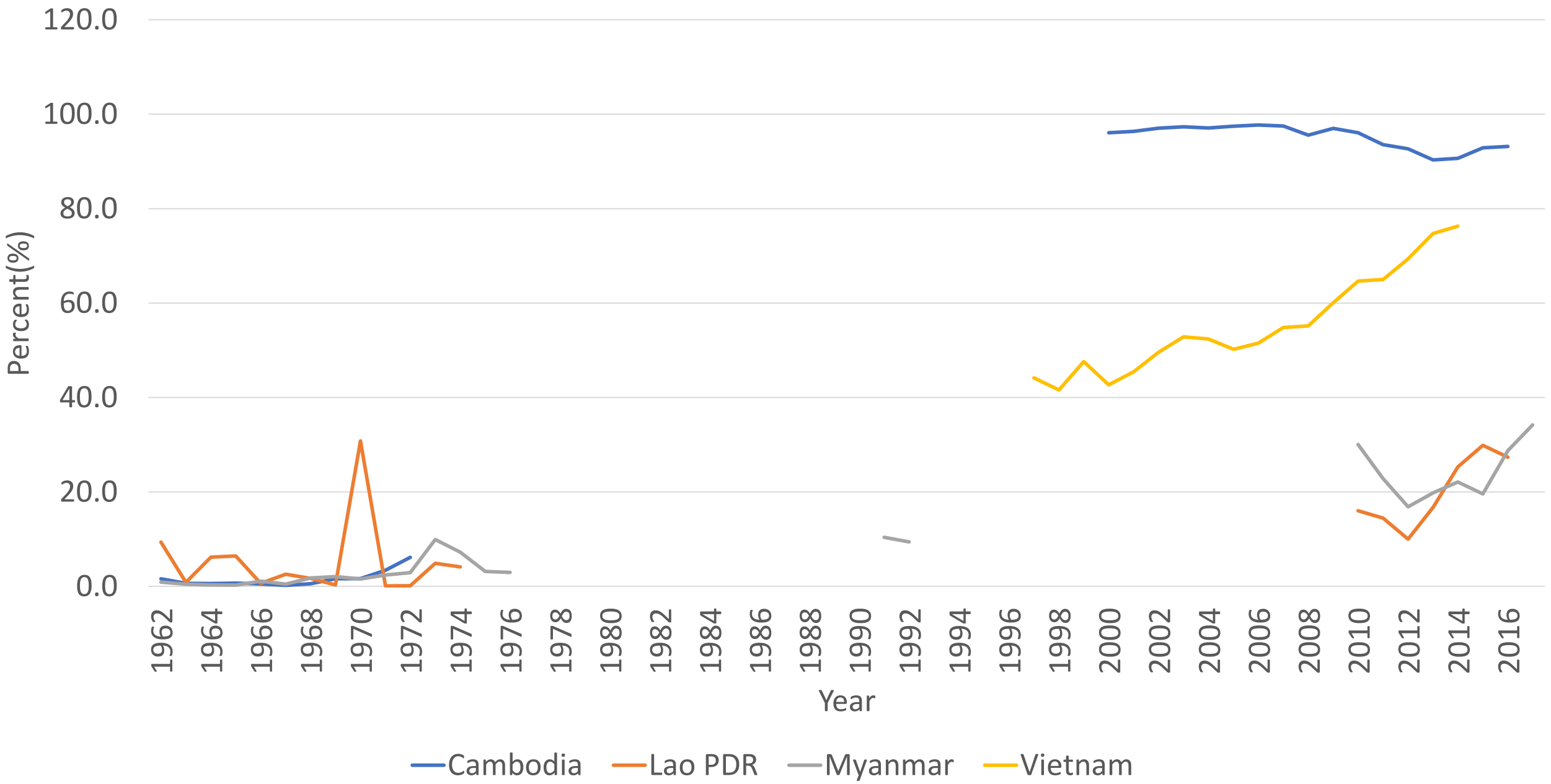
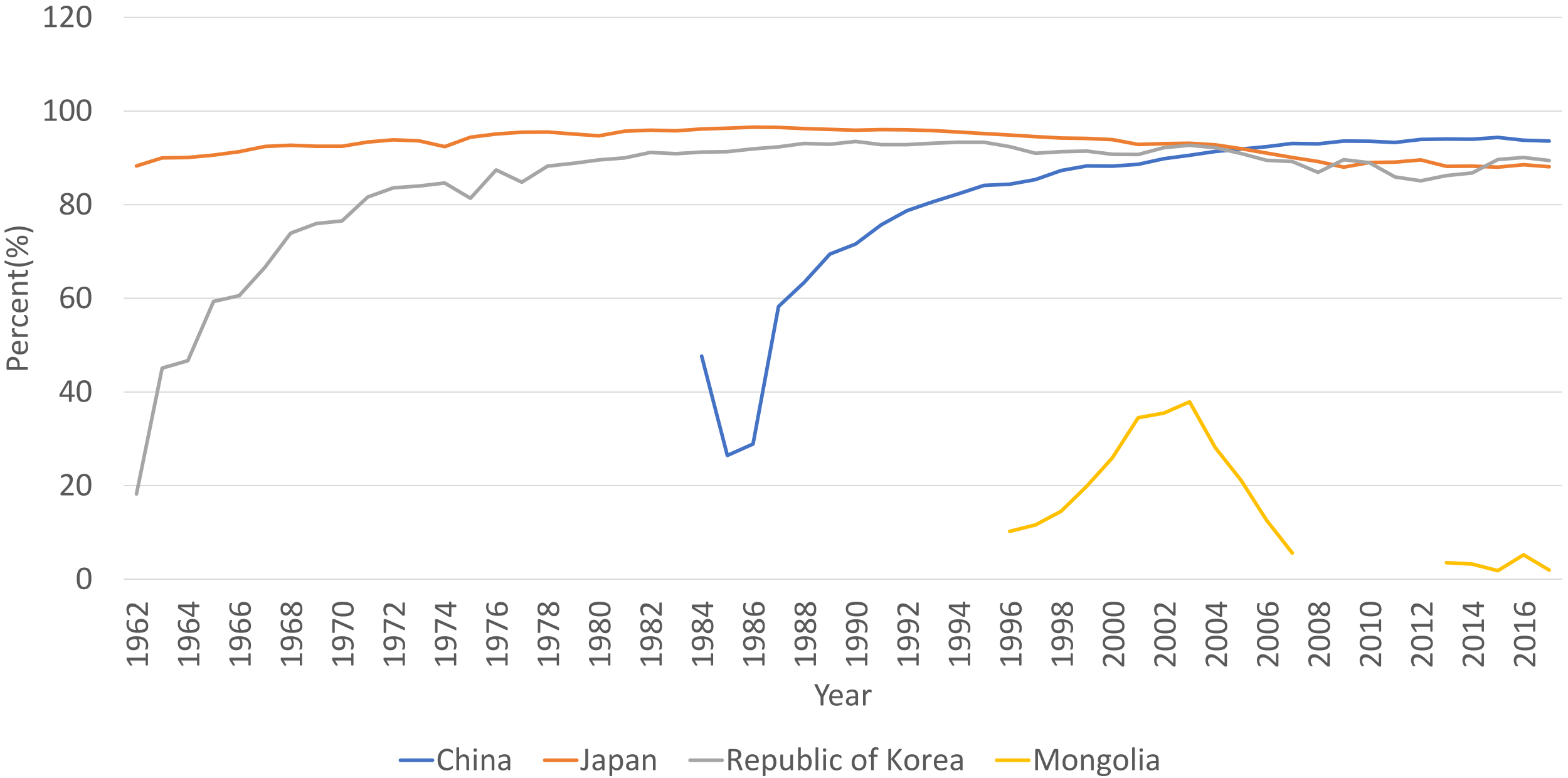


Figure 10: Share of Manufactured Exports, Northeast Asia, 1962-2017



7. Export Diversification and the Economy

- For brevity and problems of data, the Herfindhal-Hisrchman Index methodology was prefered over the Hidalgo-Hausman (product complexity) and the Theil indexes. The following formula was used
- $HHIX= [\Sigma\{Xi^2+....Xn^2\}/\{(\Sigma Xi..Xn)\}^2]^{1/2}$

  - Where Xi is trade value of a 5 digit product, Xn is tha trade value of the nth product.

- The impact of export diversification can be observed through its relationship with Current Account Balance or trade balance (TB) (Figures 11 and 12).
- Following the arguments on the fallacy of composition one should expect export concentration to correlate inversely with BOP, which should then be reflected on GDP per capita growth, i.e. the higher the concentration of export products the weaker will be its performance on TB.
- While the HHIX correlation is stronger in 2000 than 2015, the slope of the latter is steeper than that of the former.

Figure 11: Relationship between Export Concentration and Trade, East and Southeast Asia, 2000

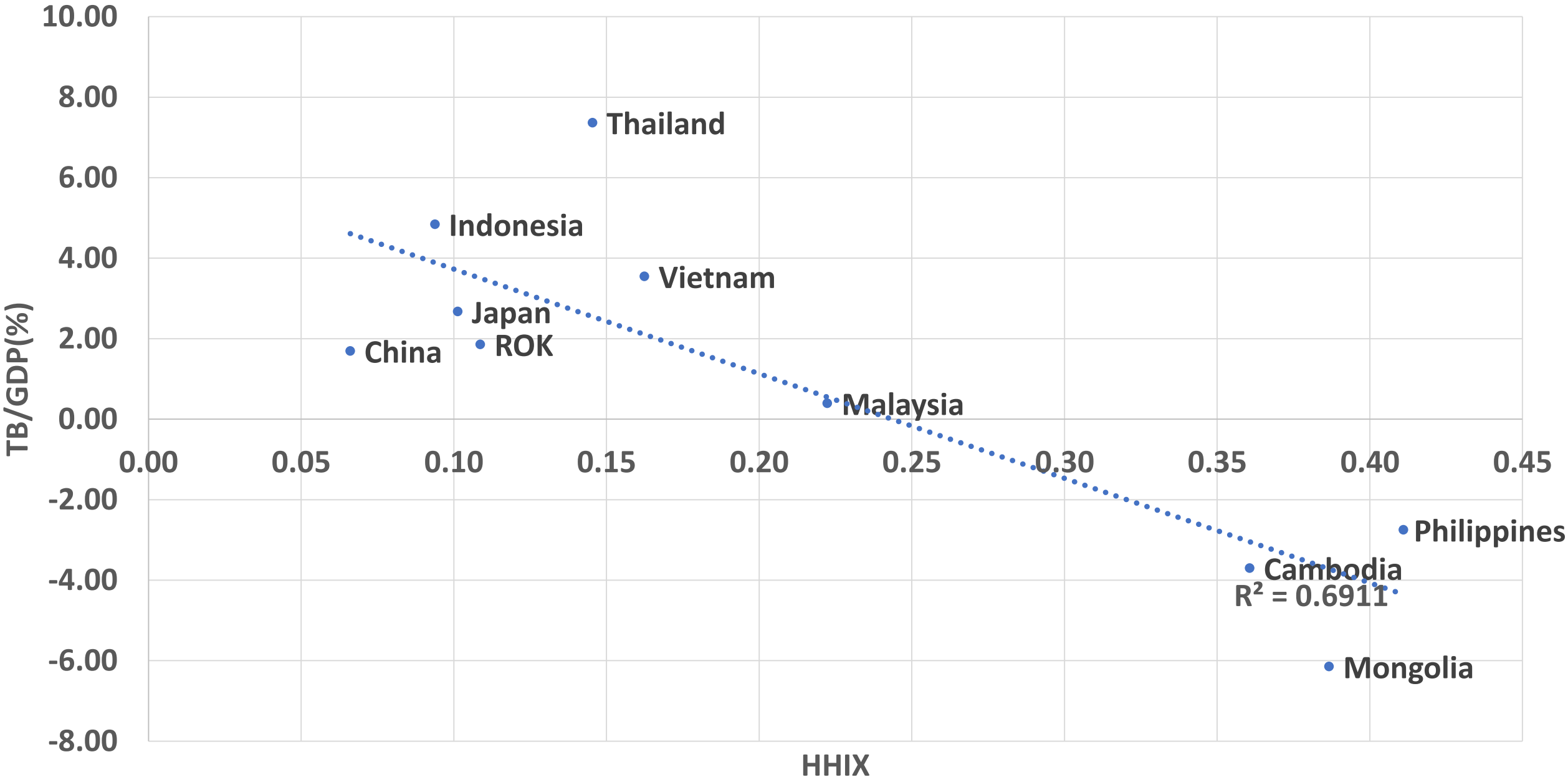
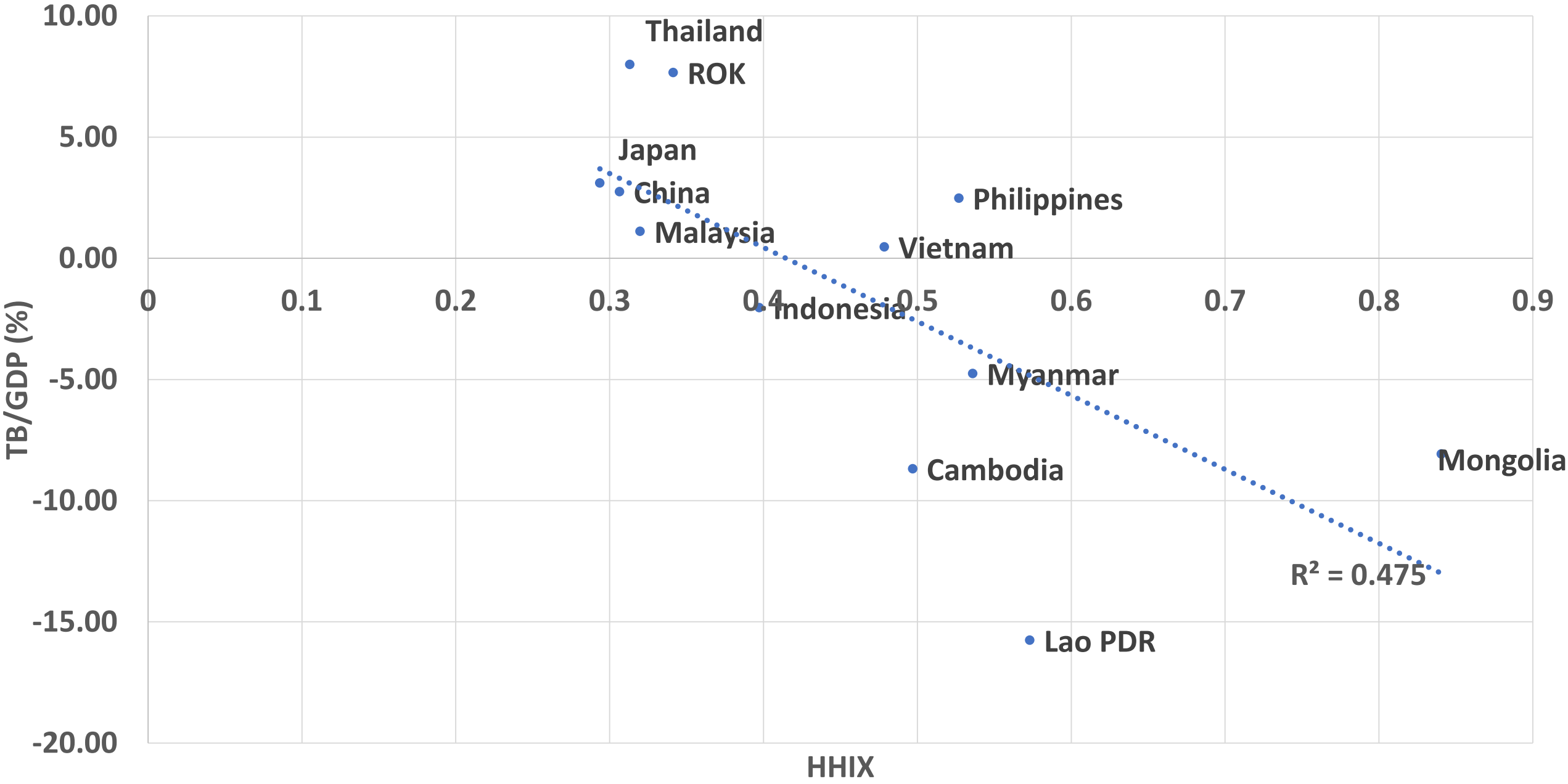


Figure 12: Relationship between Export Concentration and Trade, East and Southeast Asia, 2015



8. Explaining Divergence in Industrial Catch Up

- While export-orientation and diversification was critical in improving current account balances and speeding of GDP growth, the shift from low to high value added activities in Japan, ROK, TPC and China was driven by a strong focus on STI infrastructure. Singapore managed to achieve significant expansion is particular industries, such as petrochemicals and shipbuilding and repair, biopharma, and food fell short in electronics.
- Malaysia invested strongly on STI infrastructure but ethnic coloured patronage policies and the lack of effective appraisal resulted in heavy dissipation of rents.
- Figure 13 shows Gross Expenditure in R&D (GERD) of selected East Asian economies where a long series of data was available. ROK is only second to Israel on GERD (UNESCO, 2018).
- Figure 14 shows Intellectual trade balance – between receipts and payments – of East and Southeast Asian countries where data was available. It shows that Japan enjoys a huge surplus now, while ROK has almost become even.

Figure 13: R&D Expenditure in GDP,, East and Southeast Asia, 2015

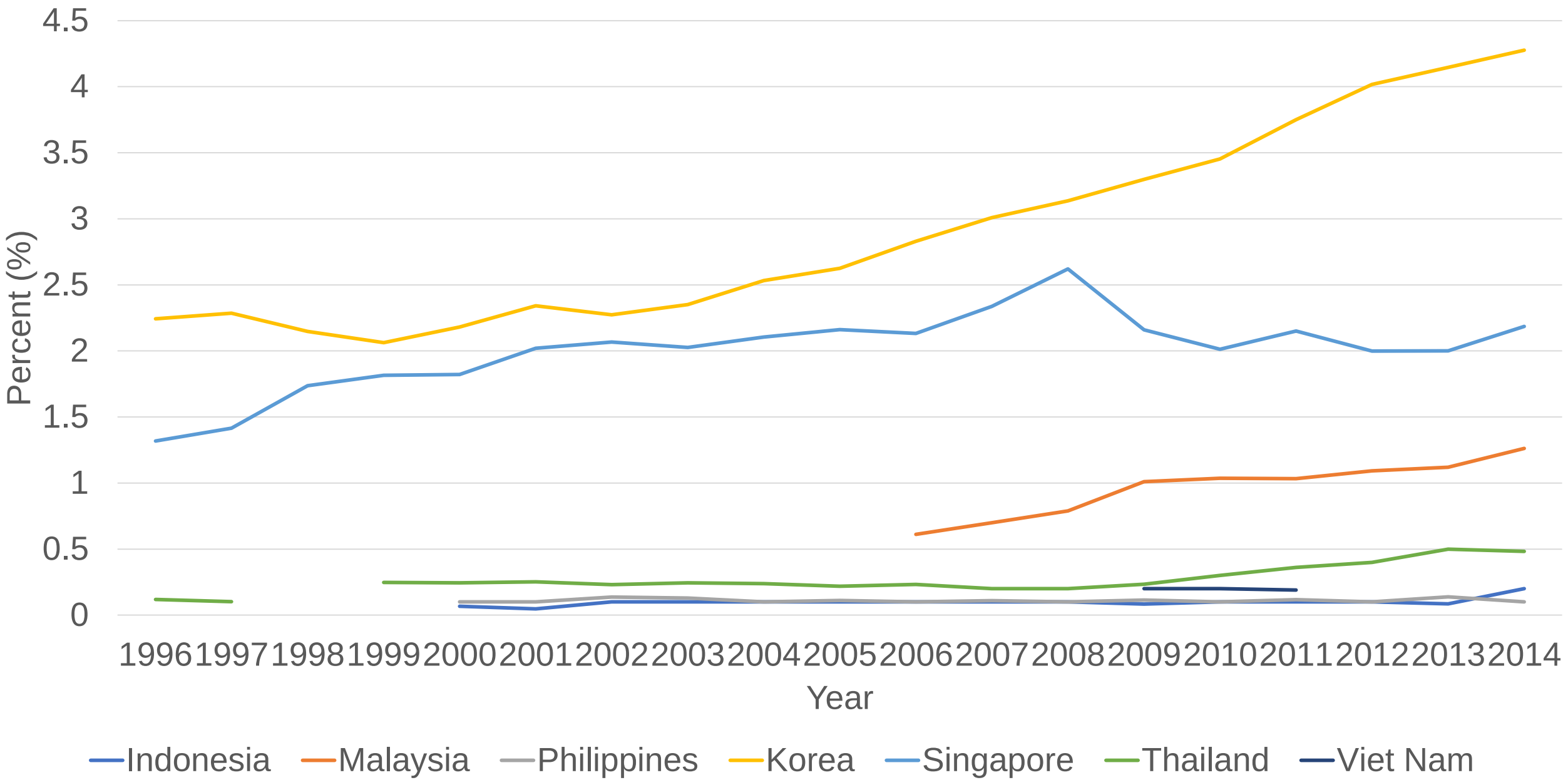
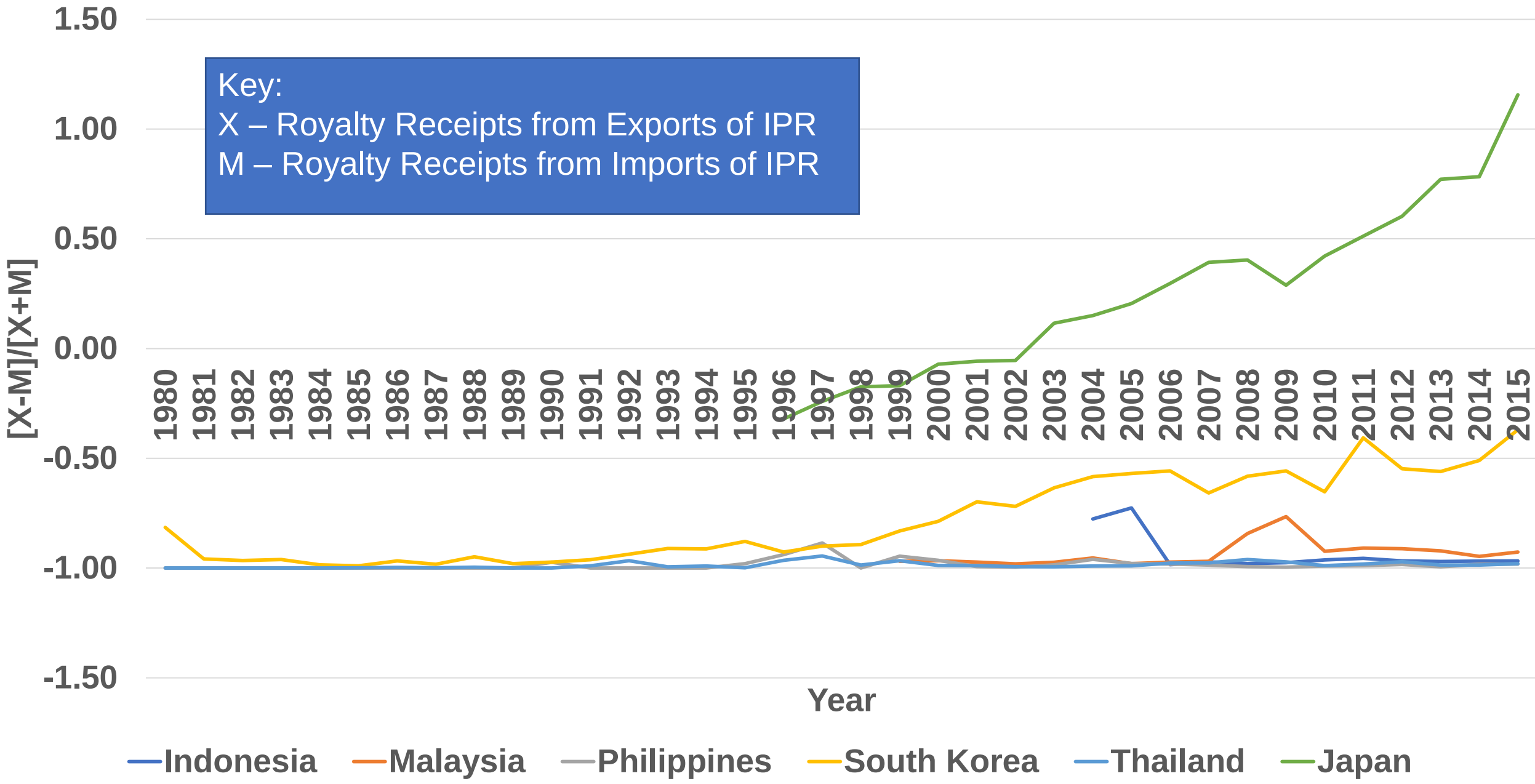


Figure 14: R&D Expenditure in GDP,, East and Southeast Asia, 2015



9. Conclusions and Implications for Industrial Policy

Performance of Manufacturing

- A number of conclusions can be drawn from this presentation. Firstly, Japan, ROK, TPC and China have begun to experience deindustrialization but one in which manufactured value added in gross manufacturing output has not shown signs to falling.
- The Southeast Asian market economies have begun experiencing premature deindustrialization as the share of manufacturing value added in GDP has begun to fall with either a stagnation or a fall in value added in gross output.
- Except for Lao PDR the CLMV countries are experiencing strong industrialization. However, Myanmar (and Lao PDR) show low manufactured export shares in total exports. Mongolia is saddled in this group on manufacturing performance.
- Japan, ROK and China continue to experience strong expansion in value added, and manufacturing export shares in total exports. Southeast Asian market economies performed dismally.

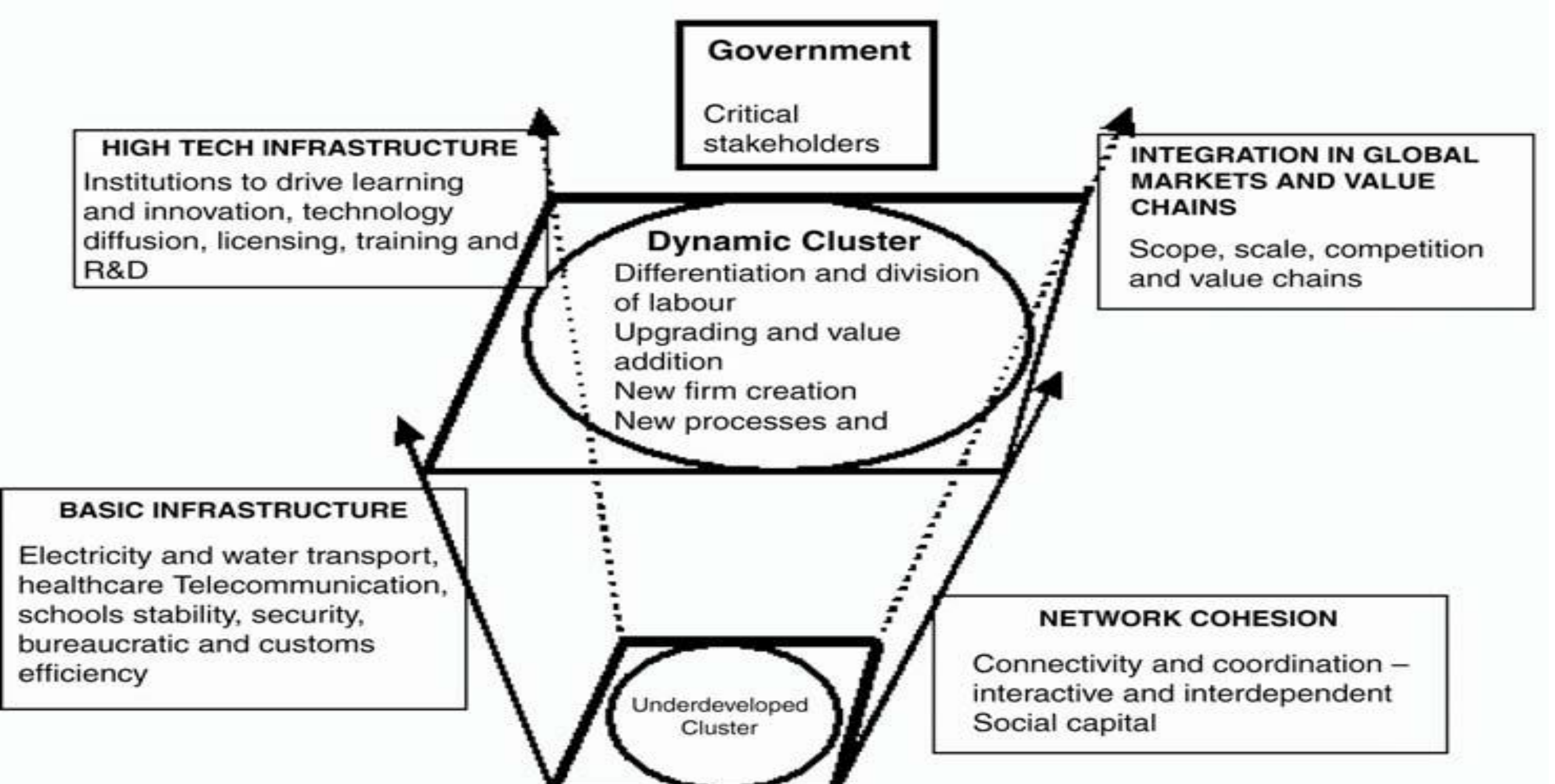
Trade Structure and Trade Balance

- Except for the crisis years, both the Southeast Asian and Northeast Asian (excluding Mongolia, Indonesia, Philippines, Cambodia, Lao PDR and Myanmar) have enjoyed positive current account balances in 2000 and 2015.
- Among these countries only Cambodia and Mongolia faced negative current account balances in both years, but we did not have the data on exports for Lao PDR and Myanmar for 2000. Cambodia has industrialized extensively, especially with massive exports of Cut, Make and Pack (CMP)-based garments. Its negative trade balance suggests that elements of fallacy of composition may also stretch to light manufactured goods (see Sarker and Singer, 1991). Obviously it will be necessary to avert concentration in the export of manufactured goods that face volatile fluctuations in external demand.
- East and Southeast Asia demonstrate a strong link between export diversification and positive current account balances. In fact, the more concentrated the exports the higher the likelihood that the country faces negative current account balances.
- We will explore the individual trade structure of Malaysia and ROK later in the workshop to examine the intricacies of this relationship using time series data.

Industrial Upgrading

- **Japan, ROK and TPC have made the shift from low to high value added activities. China has both high tech activities (e.g. computers, telecommunication products and automobiles), and low value added activities (e.g. semiconductors).**
- **Singapore has managed to upgrade to the frontier in petrochemicals, shipbuilding (light ships) and food and pharmaceutical industries. Singapore has remained stuck in medium technology activities in semiconductors owing to the lack of a critical mass of human capital.**
- **Also, CMP operations that characterise clothing manufacturing in Cambodia, Lao PDR, Myanmar and processing, and assembly of imported inputs that characterise most of the remaining Southeast Asian economies are characterized by low value added operations that expose economies to severe vulnerability. While they are critical to create jobs, industrial policy will be necessary to promote export diversification and upgrading.**
- **CLMV countries appear to be following the path of the main Southeast Asian market economies on FDI driven EPZs. The emphasis appears to be only on developing three of the four Systemic pillars necessary to promote agglomeration synergies and upgrading (see Figure 15).**
- **Industrial policy must emphasize clustering (differentiation capabilities), and technological catch up with a strong focus on STI infrastructure. Incentives and grants require stringent appraisal to prevent rent dissipation.**

Figure 15: Systemic Quad to Stimulate Effective Industrialization



Appendix 1: Critical Elements of Systemic Quad

Basic Infrastructure Provision of water, power, roads, telecommunications Provision of financial needs Customs coordination Security Health care Basic education	**STI Infrastructure** Technical and vocational training University education and research Skills development centres Standards organizations R&D incentives, grants and centres Intellectual property rights Science and technology parks Venture capital Regulatory functions – monitoring and appraisal
Network Cohesion Connectivity and coordination between firms, and suppliers and buyers Connectivity and coordination between firms, and basic infrastructure Connectivity and coordination between firms, and high tech infrastructure Connectively and coordination between firms, and intermediary organizations and customers	**Integration in Global Factor and Final Markets** Integration with input and product markets globally Integration with knowledge nodes globally Human capital suppliers Research universities Integration in GVCs