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Changes in Trade and Investment Policies in Thailand and the Implications for Medium-term Growth

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Abstract: *This paper addresses the noticeable changes in trade and investment policies in Thailand in the new millennium and assesses their impact. These changes began with trade policy changes from the World Trade Organization to free trade agreement (FTA)-induced liberalisation, followed by changes in investment policies, all of which are to boost firms' productivity and medium-term growth. Our results suggest that the policy changes are yet to produce the output the government expects. The signed FTAs' impact on trade has been limited so far and has occurred selectively on certain product lines, as did the FTA-induced direct investment. Similarly, changes in investment policies had the impact of enticing direct investment but this varied across investors' nationalities. The impact on firm productivity is also limited and found only for investment promotion policies. Our analysis highlights the role of traditional tools, i.e. trade openness, research and development, and skills upgrading, in fostering firm productivity. Whilst FTAs and investment promotion could be used as a catalyst for firms to enhance productivity, other supporting factors are also needed.*

Keywords: Thailand; FTAs; EEC; Investment Promotion

1. Issues

For the past 2 decades, there have been noticeable changes in both trade and investment policies in Thailand. These changes began with the trade liberalisation approach from World Trade Organization (WTO)-based multilateral trade liberalisation to preferential/free trade agreements (FTAs) at around the new millennium. From 2014, a new policy initiative was launched during the Gen Prayuth Administration (2014–2019) and continued in the current government to boost economic growth and productivity, but exhibited a clear slowdown from 2006 onwards. The policy initiative is a combination of selective industrial policies (i.e. picking the winner) and an economic corridor. In the former, 10 industries were selected and announced as the country's new growth engines. In the latter, the Eastern Economic Corridor (EEC), the newest special economic zone, was established in three eastern provinces of Thailand – Chonburi, Rayong, and Chachoengsao. This was done to entice multinational enterprises (MNEs) to set up their affiliates in Thailand, lift the technological capabilities of indigenous firms, and eventually enhance productivity and boost economic growth.

Such changes in Thailand seem to be in line with the growing sentiment worldwide about the disappointing performance of conventional economic policies, known as the Washington Consensus (Pack and Saggi, 2006; Cimoli, Dosi, and Stiglitz, 2009; Chang and Andreoni, 2016). As a consequence, the governments of many countries have tried to step in and alter the structure of production in favour of sectors that are expected to offer better prospects for economic growth in a way that would not have occurred if they operated under market forces. This is further motivated by the rapid technological changes, i.e. the Fourth Industrial Revolution.

In fact, the enticement of MNEs is not new to the world but is growing intensively in developing countries around the globe to compete for investment flows (Sbragia, 1996; Thomas, 2000, 2007). Arguably, amongst many potential benefits, the productivity gain from MNE affiliates to indigenous firms in host countries is the most desirable from the host country perspective. As capital is increasingly mobile, a number of developing countries have entered a series of bidding wars for particular investments.

Recent studies advocating the role of industrial policy argue to widen the scope of policy tools under the industrial policy and not be limited to trade policies solely. One approach is investment promotion policies as a potential policy instrument in the context of industrial policy to promote industrialisation (Greenwald and Stiglitz, 2006; Aghion et al., 2015; Chang and Andreoni, 2016).[1] Nonetheless, its effectiveness largely depends on the supporting environment (Melitz, 2005; Aghion et al., 2015). This is taking place amidst an ongoing debate about the effectiveness of such investment incentives,[2] and competition amongst many countries for the capital continues.

Even though there has long been the argument that the offered incentives could be cancelled out if all governments offered them for a particular investment, this is not the same as saying that if only one government offered an incentive, it would be no more likely to receive the investment than if all governments offered incentives (Guisinger, 1985). Hence, the research direction has shifted in focus in assessing the effectiveness directly from the provider and observing the contribution regularly as well as the types of investment incentives (Thomas, 2000, 2007).

Against this backdrop, this paper aims to conduct a systematic analysis of the policy changes, as well as assess their effectiveness so far with a view to identifying key policy challenges. This paper's outcome will provide policy lessons for policymakers in Thailand as well as other developing countries.

[1] Note that Aghion et al. (2015) argued that the benefit of investment promotion policy is conditional on the competitive pressure amongst promoted firms.

[2] On the one hand, a number of studies highlight that the role of other factors, such as host market size, governance, and institutions (often referred to as the collective term, 'fundamentals') is more important as opposed to investment incentives. Interestingly, Klemm and Van Parys (2009) found that the effect of tax holidays on foreign direct investment (FDI) is negligible, whereas according to Morisset and Pirnia (2001), tax incentives are up to eight times less effective in weaker investment climates than in stronger ones. On the other hand, there are studies suggesting that incentives do affect the location of investment (Moran, 1999; Blomström and Kokko, 2003; LeRoy, 2005; and Markusen and Nesse, 2007).

The structure of the paper is as follows. The following section presents the motivation and recent changes of trade and investment policies in the new millennium. This section begins with a brief history of the role of trade and investment policies. Then, recent changes in trade and investment policies are discussed in the next two subsections. Section 3 analyses the effect of such changes. Conclusion and policy inferences are discussed in the final section.

2. Recent Changes in Trade and Investment Policies in the New Millennium

2.1. A Brief History (1960–2000)

From about the early 1960s, Thailand has always pursued a 'market-friendly' approach towards foreign investors in manufacturing. There have not been major discriminatory policies, and foreign investors have been able to be involved in almost any business. There are legal restrictions on the foreign ownership of commercial banks, insurance companies, commercial fishing, aviation businesses, commercial transportation, commodity exports, mining, and other enterprises. However, these restrictions are not generally applied to foreign investors alone. Even local investors frequently require permission from government authorities to pursue these activities.

To influence resource allocation, trade and investment policies were used. This was done by maintaining high tariffs together with a cascading tariff structure to promote import-substitution industries. Non-tariff measures aiming to restrict international trade (e.g. import quotas and export restrictions) were hardly used, especially for manufacturing products (Kohpaiboon, 2006; WTO, 2015).[3] This was complemented by investment promotion policies in which consumer products industries received the highest investment incentives (see more discussion below). Until recently, the Thai government rarely adopted industrial policy in the narrow sense, wherein the government targets specific industries and collective actions are implemented over time to nurture them.[4]

[3] Note that cross-border protection in terms of capital restrictions, especially for FDI inflows, has been limited in Thailand. In contrast, the loosening of restrictions on outflows of FDI and portfolio investment was undertaken from 2003 to offer greater investment opportunities for residents (see Jongwanich (2019) and Jongwanich and Kohpaiboon (2012)).

[4] Whilst the government had ambiguous targets on occasion, such efforts were neither effective nor long-lasting, simply because of fragmented political parties and frequent changes in government (Siamwalla 2011: 74). The only exception involved the automotive industry, which has represented the main interest of technocrats from the Ministry of Industry and been the subject of concerted government efforts since the mid-1970s (i.e. imposing local content requirements on carmakers) up to the new millennium. However, as illustrated in Hill and Kohpaiboon (2017), the nurturing efforts in the automotive industries were in line with economic fundamentals, instead of comprising smart government fresh initiatives like many believe.

Significant reductions and rationalisation of the tariff structure and dismantling of most of the non-tariff barriers took place in the second half of the 1980s. As part of its commitments under the General Agreement on Tariff and Trade (GATT), which subsequently became the World Trade Organization (WTO) in 1995, a comprehensive plan for tariff reduction and rationalisation was proposed in 1990 and implemented in 1995 and 1997.

As a result, average tariffs dropped substantially to 9.3% in 2019 from 15.6% in 1995 and 35% in 1991 (Table 1). Tariff bands were cut from 39 to 6 (0%, 1%, 5%, 10%, 20%, and 30%). Nonetheless, substantial exemptions with tariffs greater than 20% remain, accounting for nearly 16% of total tariff lines (Table 2). Tariff liberalisation gained policy attention briefly in the new millennium, so there were minor tariff cuts, most of which were on raw materials and intermediates. As a result, the average tariff dropped from 13.4% in 2002–2005 to 11.1% in 2006–2015. Since then, attempts to continue unilateral tariff reform have been stalled as policy attention has shifted towards FTA-led liberalisation.

Table 1: Nominal Rates of Protection in Thailand, 1980–2019
(%)

	1991	1995	2002–2005	2006–2010	2011–2015	2016–2019
Processed foods	44.8	28.5	21.1	20.6	20.6	18.2
Textile products	42.2	21.2	16.8	12.8	12.8	8.8
Leather and footwear products	64.0	28.5	22.1	21.9	21.9	20.6
Wood products	21.8	n.a.	14.3	8.6	8.6	7.5
Paper and pulp	n.a.	n.a.	13.4	5.4	5.4	5.1
Chemical and petroleum products	31.6	12.2	8.2	6.5	6.4	5.2
Rubber products	49.5	26.8	24.7	18.6	18.6	13.5
Other non-metal products	n.a.	n.a.	15.2	11.5	11.3	8.9
Metal products	16.1	11.4	10.0	6.8	6.8	5.7
Machinery	35.0	9.5	8.8	6.7	6.7	5.1
Transportations	58.1	38.9	22.1	20.2	20.2	18.6
Total manufacturing average	**34.7**	**15.6**	**13.4**	**11.1**	**11.1**	**9.3**

n.a. = unavailable data
Notes: Data for 1991 and 1995 are from the World Integrated Trade Solution (WITS). From 2002, data are from the Ministry of Finance, Thailand. The weighted average, using the import share, is applied to calculate the nominal tariff rates in each category.
Source: Authors' calculations.

Table 2: Share of 4-Digit HS Categories of Applied Tariff Rates in Thailand, 1989–2019 (%)

Tariff band	1991	1995	2002–2005	2006–2010	2011–2015	2016–2019
0	2.5	2.6	5.7	20.3	20.5	31.6
0.1–5	14.4	17.3	37.0	31.1	31.1	26.8
5.1–10	14.2	17.6	13.6	11.1	11.0	14.2
10.1–15	12.7	3.2	5.8	10.6	10.6	4.8
15.1–20	15.4	16.4	17.5	8.3	8.3	6.9
20.1–30	15.8	16	13.7	12.9	12.9	11.3
30.1–100	25	26.8	6.8	5.6	5.6	4.5

n.a.= unavailable data.
Notes: Data for 1991 and 1995 are from WITS.
From 2002, data are from the Ministry of Finance, Thailand.
Source: Authors' calculations.

Despite lowering and streamlining tariffs, Thailand still keeps a cascading tariff structure wherein protection is granted to industries producing raw materials as well as intermediate goods (e.g. chemicals, metal products, and construction materials) that has been lower than for finished products (e.g. food, pharmaceuticals, garments and vehicles) (Table 1). Hence, using actual tariffs (nominal tariffs) to represent protection tends to understate the true level of protection from which an industry receives benefits.

When the cascading tariff structure is in effect, it is very difficult for firms to export because they are still facing input tariffs but selling their outputs at the world price. Instead, the structure encourages firms to produce for the highly protected domestic market. This is a typical instrument for import-substitution industrialisation strategy. To promote exports without altering the cascading tariff structure, many developing countries, including Thailand, introduce tariff exemption/redemption schemes where exporting firms can reimburse input tariffs. The implication of the cascading tariff structure together with tariff exemption schemes is that firms have to decide between exporting their entire output or selling it in the domestic market, not both simultaneously. In Thailand, tariff exemption/rebate schemes have played a crucial role for exports, accounting for nearly 40% of total imports (Kohpaiboon and Jongwanich, 2019).

The granting of investment incentives has been used to complement trade policy. When trade policy regime was intended to promote import-substituting

industries during the 1970s and 1980s, Board of Investment (BOI) incentives were granted on domestically oriented consumer products. Investment incentive measures included tax concessions on imported machinery, equipment, raw materials, and the intermediate inputs needed directly for production. From the mid-1980s, Thailand pursued an export-oriented industrialisation strategy, so a tariff-exemption scheme offered by the BOI to firms implementing export-oriented activities was introduced, and it still continues. The exemption scheme is on top of the other existing tariff exemption/redemption schemes.[5] As documented by Kohpaiboon and Jongwanich (2019), such a scheme accounted for 50% of total tariff exemption schemes from 2000 to 2015 and effectively and significantly reduced the burden of tariffs levied on raw materials and intermediates in export-oriented industries.

2.2. The New Millennium

2.2.1. Trade Policy

The slowdown of WTO liberalisation negotiation resulted in a switch in political attention and negotiating resources towards FTAs. The signed FTAs are expected to have preferential market access to exports from Thailand, which in turn makes Thailand remain attractive for direct investors worldwide. Nonetheless, FTA enthusiasm in Thailand has been on an on-off manner from 2001 until present. From 2001 to 2006 (i.e. during the Thaksin administration), FTA enthusiasm was the strongest. Driven by a significant change in the Thai political situation, the government initiated 15 FTAs, some of which were signed before the advantages and disadvantages could be studied, and consultation with the interested parties outside the government was inadequate. The first coup d'état in the new millennium paused FTA enthusiasm in Thailand. Not a single bilateral FTA was ratified

[5] Other schemes include tariff exemptions/drawbacks (Section 19 of the Custom Laws) given by the Department of Customs, tax rebate schemes given by the Fiscal Policy Offices (FPOs), duty relief for goods under the Custom Bonded Warehouse scheme, duty exemptions for goods taken into the Free zones established by the Customs, and duty exemptions for goods taken into Export Processing Zones (EPZs) (Kohpaiboon, 2006).

between 2006 and May 2011. The only new FTA negotiations were in the Association of Southeast Asian Nations (ASEAN) 'plus' format.[6]

From May 2011, Prime Minister Yingluck Shinawatra, the younger sister of former Prime Minister Thaksin Shinawatra, started to pay attention to FTA negotiations again. The negotiations for several FTAs, such as the Thailand–EFTA and the Thailand–Chile and Thailand–Peru FTAs, were resumed and progressed. They were stalled again in 2014 after the Royal Thai Armed Forces, led by General Prayut Chan-o-cha, launched another coup d'état. Nonetheless, the enthusiasm in signing FTAs has been resumed by Dr. Somkid Jatusripitak, the current deputy prime minister on economic affairs. Note that Dr. Somkid was also a key person in the Thaksin administration, including as minister of finance and commerce from 2001 to 2006.

By 2020, there were 18 FTAs signed with partners, including ASEAN members, Japan, the Republic of Korea (henceforth, Korea), China, Australia, New Zealand, India, Chile, and Peru, many of which have more than one FTA in effect (Table 3).[7] There are ongoing FTA negotiations in which the Thai government has expressed interest, including the Thailand–EU FTA, Thailand–Turkey FTA, and the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP).

Interestingly, the signed FTAs have been used primarily for market access into FTA counterpart markets. When it comes to further tariff cuts and continuing tariff reforms, policy reluctance is often observed. For example, the first tariff elimination offered by Thailand to Australia under the Thailand–Australia FTA comprised only 49.5% of product lines in 2005, rising to 93.3% in 2010. In contrast, the offer made by Australia was substantial when the FTA was signed, involving

[6] The possible exception would be the Thailand–European Union (EU) FTA, which replaced the ASEAN–EU FTA as a consequence of unresolved issues about Myanmar during the negotiations. Since May 2014, the Thailand–EU FTA has been stalled as the EU has expressed reluctance to have further negotiations with the junta.

[7] Note that only eight FTAs involve substantial tariff cuts, covering more than 80% of tariff lines and having been offered since 2010. These include the ASEAN Free Trade Area (now known as the ASEAN Economic Community), the ASEAN–China FTA, the Thailand–Australia FTA, the Thailand–New Zealand FTA, the Japan–Thailand Economic Partnership Agreement, the ASEAN–Japan FTA, the ASEAN–Korea FTA, and the ASEAN–Australia–New Zealand FTA. In the other three FTAs (i.e. the Thailand–Peru FTA, the Thailand–Chile FTA, and the ASEAN–India FTA), substantial tariff cuts took place in 2015 and 2016 (Kohpaiboon and Jongwanich, 2019).

tariff eliminations covering 83% of tariff lines in 2005. By 2010, the Australian offer encompassed 96.1% of total tariff lines. Hence, the tariff margin (i.e. the difference between the most-favoured-nation (Most Favoured Nation (MFN) and FTA preferential tariffs) offered by Thailand varies across FTAs, ranging between 6.3% and 10.2% (Table 4). These FTA tariff reduction schedules take time to complete. A similar sentiment was observed amongst the debate on Thailand joining the CPTPP, where CPTPP proponents pointed to the market access to the members (Bangkok Post, 2020). Under these circumstances, it would be unlikely for Thailand to redress the existing cascading tariff structure using the FTA tariff cut commitments.

Table 3: Thailand's Free Trade Agreements from 1990

Free Trade Agreement (FTA)	Signed	Effective	Remarks
1. ASEAN	1990	2006	Tariff reduction completed in 2010 for original ASEAN members; 2015 for new members
2. ASEAN–China	2003	2003	Early Harvest Program was launched to eliminate tariffs on fruit and vegetables (HS 07 and 08) in October 2003 China's tariff reduction – 60% (2009), 90% (2010) Thailand's tariff reduction – 33.3% (2009), more than 90% (2010)
3. India	Oct. 2003	n.a.	Early Harvest Program was launched to gradually liberalise 82 product items in September 2004. The rest is under negotiation.
4. Australia	Jul. 2004	Jan. 2005	Australia's tariff reduction – 83% (2005), 96.1% (2010), and 100% (2015) Thailand's tariff reduction – 49.5% (2005), 93.3% (2010), and 100% (2025)
5. New Zealand	Apr. 2005	Jul. 2005	New Zealand's tariff reduction – 79.1% (2005), 88.5% (2010), and 100% (2015) Thailand's tariff reduction – 54.1% (2005), 89.7% (2010), and 100% (2025)
6. Peru	Nov. 2005	Dec. 2011	Tariff reduction between Thailand and Peru – 50% (2011) and 70% (2015)
7. Chile	2006	Nov. 2015	Tariffs on 90% of product lines were cut to zero by November 2015.
8. Japan	Apr. 2007	Nov. 2007	Japan's tariff reduction – 86.1% (2007) and 91.2% (2017) Thailand's tariff reduction – 31.1% (2007) and 97.6% (2017) Currently, there are talks regarding further liberalisation, known as the Japan–Thailand Economic Partnership Agreement Phase 2.
9. ASEAN–Japan	Apr. 2008	Jun. 2008	Japan's tariff reduction – 85.51% (December 2008), 90.16% (April 2018) Thailand's tariff reduction – 30.94% (June 2009), 86.17% (April 2018)
10. ASEAN–Republic of Korea	Feb. 2009	Jan. 2010	Korea's tariff reduction – 90% (2010) Thailand's tariff reduction – 81% (2010), 83% (2012), 86% (2016), and 90% (2017)

Free Trade Agreement (FTA)	Signed	Effective	Remarks
11. ASEAN–Australia–New Zealand	Feb. 2009	Jan. 2010	Australia's tariff reduction – 96.34% (2010), 96.85% (2016), 100% (2020) New Zealand's tariff reduction – 82.47% (2010), 88.01% (2016), 100% (2020) Thailand's tariff reduction – 73.05% (2010), 91.11% (2016), 98.89% (2020)
12. ASEAN–India	Aug. 2009	2010	Tariff reductions began in 2010 with a target of 80% for Brunei Darussalam, Indonesia, India, Malaysia, Philippines, Singapore, and Thailand by 2016; and by 2021 for new ASEAN members.
13. Regional Comprehensive Economic Partnership	Under negotiation		Initiated in August 2006, known as ASEAN+6; changed to RCEP in 2011. Plan to cut tariffs to zero immediately on at least 65% of product lines. The negotiations were expected to be concluded by the end of 2019.
14. Thailand–European Union	Under negotiation/ Stalled		Initiated by November 2007 under ASEAN– European Union; shift to bilateral agreements with individual ASEAN members in 2009. Four meetings held from May 2013 to April 2014, but talks stalled because of the 2014 Thai coup. Negotiations are expected to be resumed after a newly elected government is in office.
15. Thailand–Canada	Under negotiation		Initiated in March 2012 but stalled because of the 2014 coup.
16. Thailand–European Free Trade Association	Under negotiation/ Stalled		Initiated in October 2005 but stalled because of the 2014 coup.
17. Trans-Pacific Partnership	Dismissed as a result of the US withdraw		Thai Prime Minister expressed interest in a Trans-Pacific Partnership (TPP) during the US President's visit to Thailand in November 2012. The TPP was abolished after the US withdrew on 23 January 2017.
18. Thailand–Turkey	Launching in July 2017		Negotiations launched in July 2016.
19. Comprehensive and Progressive Trans-Pacific Partnership (CPTPP)	Applying		

ASEAN = Association of Southeast Asian Nations, n.a. = not applicable.
Source: Author's compilation from official data source (http://www.dtn.go.th/index.php/forum.html accessed 02 February 2020).

Table 4: Margins between General and Preferential Tariff Rates Offered by Thailand and Their Distribution in 2010
(%)

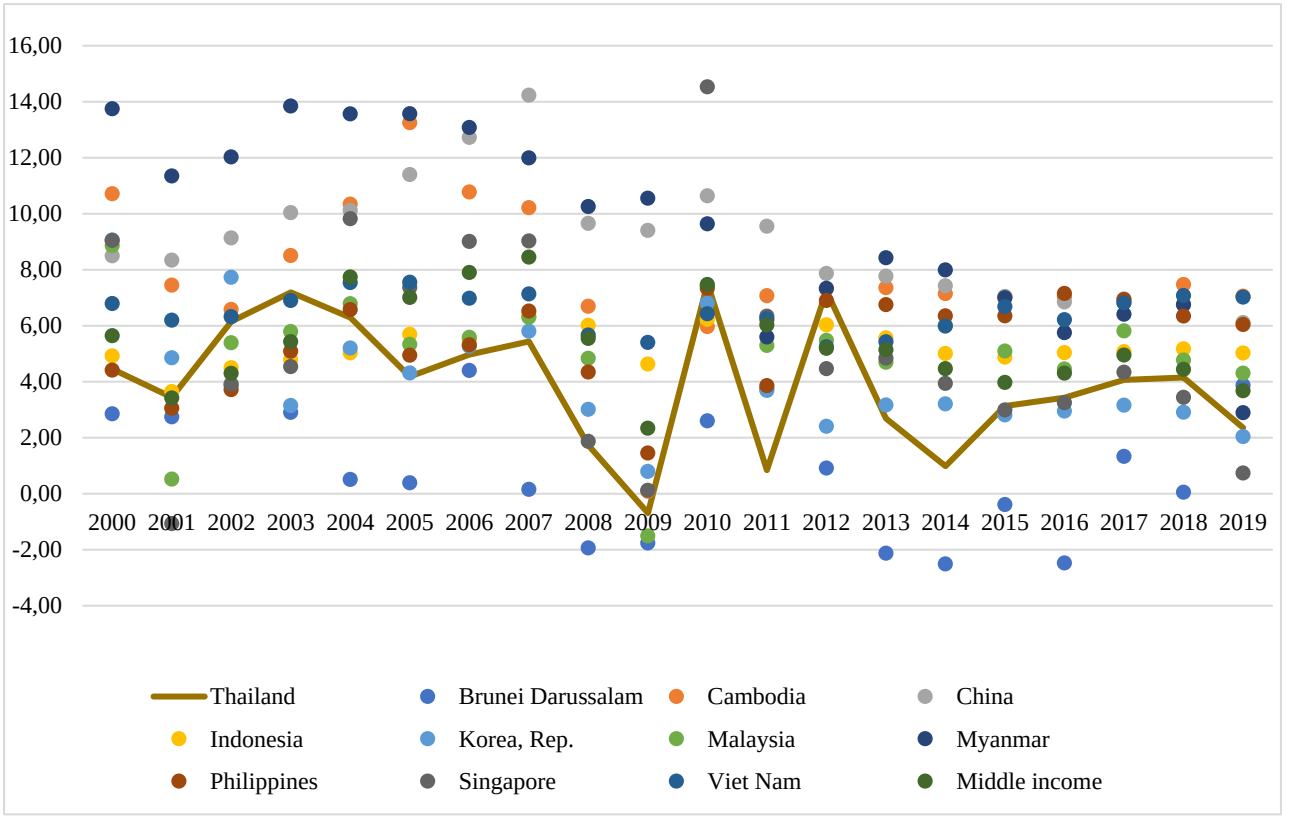
	AFTA	ASEAN–China	Thailand–Australia	Thailand–New Zealand	Japan–Thailand	ASEAN–Rep. of Korea
Tariff margin	10.2	9.3	9.7	9.5	6.3	8.6
Distribution of the margins between general and preferential tariffs (% of total tariff lines)						
$\Delta t = 0$	20.1	25.3	21.2	20.7	30.7	26.7
$0 < \Delta t \leq 5$	39.9	38.3	39.3	39.6	42.5	37.9
$5 < \Delta t \leq 10$	15.3	13.3	15.6	15.6	13.1	13.8
$10 < \Delta t \leq 20$	6.6	6.3	6.6	6.7	4.5	7.9
$20 < \Delta t \leq 30$	14.8	13.6	14.4	14.4	8.0	11.0
$30 < \Delta t$	3.4	3.1	3.0	3.1	1.3	2.7
Number of tariff lines	4,995	4,996	4,996	4,996	4,985	4,996

AFTA = ASEAN Free Trade Area, ASEAN = Association of Southeast Asian Nations.
Note: The average most-favoured-nation rate of Thailand in 2010 was 10.7%. Some 993 items have a most-favoured-nation tariff of zero.
Sources: Data are based on the authors' calculations using official documents from the Office of Fiscal Economics, Ministry of Finance, Thailand.

2.2.2. Investment Policies

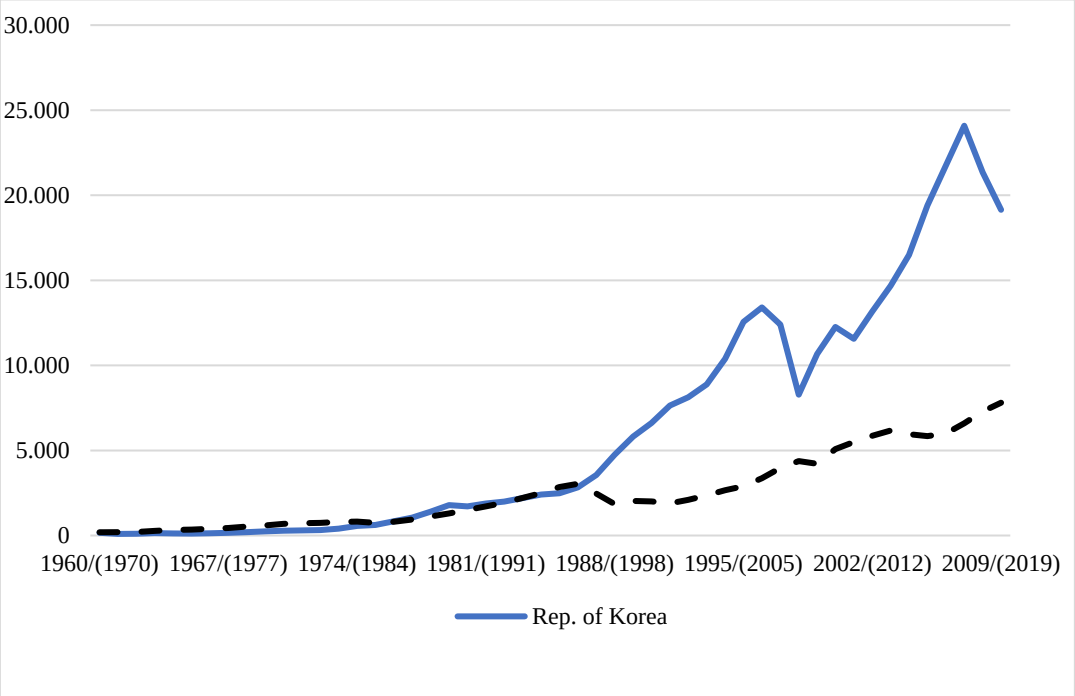
Despite a quick recovery from the 1997 crisis, economic growth has yet to recover to its pre-crisis levels. The annual growth rate of the Thai economy was around 4% from 2000 to 2019. The economic growth slowdown has been noticeable since 2006 onwards, and performance is poor compared to other East Asian economies (Figure 1). In addition, Thailand lags Korea by around 10 years, i.e. GDP per capita of Korea in 1960 was more or less the same as that of Thailand in 1970. When GDP per capita between Korea and Thailand were matched each other with 10 years time lag (i.e. the first observations for Korea and Thailand are 1960 and 1970 GDP per capita, respectively), suggesting that Thailand shared its GDP per capita trajectory with Korea until around 2000 (Figure 2). Since then, the growth pattern of Thailand has been at a lower growth trajectory than Korea's.

Figure 1: Annual GDP Growth of Selected Countries, 2000–2019
(%)



Source: World Development Indicators database.

Figure 2: GDP per Capita for the Republic of Korea and Thailand, 1960–2019
(current US$)



Note: The diagram was firstly developed by Reidel (2019), and new data were added by the authors.
Source: World Development Indicators database.

The decade-long sluggish growth sluggish caused concerns. Whilst Thailand experienced successive internal and external shocks from 2005 onwards, including political unrest starting in 2005, the sickness of King Rama IV from 2006 to 2016, the 2011 Great Floods, the deteriorating global situation (e.g. the global financial crisis beginning in 2008, Brexit, the European crisis, and the trade war between the US and China starting in 2018), many believe that the growth slowdown is a symptom of the middle-income trap in Thailand (e.g. Warr, 2011; Jitsuchon, 2012; Bisonyabut and Kamsaeng, 2015; Tangkitvanich and Bisonyabut, 2015; and World Bank, 2016) and attribute it to being an undesirable consequence of Thailand's export-led strategy. In particular, as documented in the country's diagnostic report in 2016 by the World Bank, the causes of the growth slowdown include failing to sustain strong productivity-driven growth, losing export competitiveness in labour-intensive manufacturing, unsuccessful upgrading of Thailand's medium and high-

tech exports, and limited FDI spillovers and a slump in private investment (World Bank, 2016).

Whether the causes of the growth slowdown listed are economically sound remains debatable, but these causes were considered in Thailand's policymaking as reflected in the report prepared by Dr. Kanit Sangsubhan for the Prime Minister on 17 November 2015 (Private Investment Promotion Working Group, 2015). Hence, economic transformation is needed, and this has resulted in the Thailand 4.0 policy, the latest economic policy flagship of Gen Prayuth's administration (2014–present).

There are two main components under the Thailand 4.0 flagship policy. One is to pursue picking up the winner strategy as a part of the new investment policy. Ten industries are selected and announced as the country's new growth engines and categorised into two groups. The first group, known as the five S-curved industries, includes new-generation automotive; smart electronics; affluent, medical, and wellness tourism; agriculture and biotechnology; and food for the future, all of which are related to existing industries. Nonetheless, they account for around one-third of the gross output and value-added of Thai manufacturing and largely involve large corporations. The share of small and medium-sized enterprises (SMEs) in this group is around one-fifth (Jongwanich et al., 2020: Table 5.4). The second group, known as the five new S-curved industries, consists of robotics manufacturing, a medical hub, aviation and logistics, biofuels and biochemicals, and digital industries, all of which are nascent high-tech industries. They are expected to boost medium-to-long-term productivity and facilitate any structural transformation that might take place as a consequence of the Fourth Industrial Revolution.

To achieve the industrial transformation above, the BOI investment promotion act was amended substantially in 2015 to promote activities enhancing national competitiveness through research and development (R&D) and innovation. Additional incentives were granted to support 10 newly targeted industries (five S-curve and five new S-curve industries). They comprise a combination of two sub-incentive schemes: one involves activity-based incentives and the other merit-based incentives. With respect to the former, a list of activities is divided into seven categories (A*, A1–A4, and B1–B2) according to their involvement in technology and innovation. A*, for example, refers to activities classified as support-targeted

technology, i.e. nanotech, biotech, advanced materials, and digital. The tax holiday for A* is 10 years. A1 includes knowledge-based activities focusing on R&D and design, and A2 represents incentives for infrastructure activities using advanced technology to create value-added benefits. The two bottom ones (i.e. B1 and B2) are for those regarded as the remaining export engines and are often blamed as a cause of growth sluggish. The privileges for them are tariff exemption on raw materials and non-tax incentives (Table 5).

Table 5: Investment Incentives Granted by Activities

	Activity-based Incentives				Merit-based Incentives (further corporate income tax exemption: years)		
	Corporate Income tax exemption (years)	Tax exemption of machinery and equipment	Tax exemption of raw material imports	Non-tax benefit[a]	Competi-tiveness enhancement[b]	Decentralisa-tion[c]	Industrial area develop-ments[d]
A1*	10	✓	✓	✓	1-3	3	1
A1	8 (no ceiling)	✓	✓	✓	1-3	-	-
A2	8	✓	✓	✓	1-3	-	-
A3	5	✓	✓	✓	1-3	3	1
A4	3	✓	✓	✓	1-3	3	1
B1	-	✓	✓	✓	1-3	3	-
B2	-	X	✓	✓	-	-	-

A1* = technological targeted activities including those in Section 8 (Technology and Innovation Development includes targeted core technology development, such as the development of biotechnology, nanotechnology, advanced materials technology and digital technology); A1 = knowledge-based activities, focusing on research and development (R&D) and design to enhance the country's competitiveness; A2 = activities in infrastructure for the country's development activities using advanced technology to create value added, with none or very few existing investments in Thailand; A3 = high technology activities that are important for the country's development, with a few investments already existing in Thailand; A4 = activities with lower technology than A1–A3 but that add value to domestic resources and strengthen the supply chain; B1/B2 = supporting industries that do not use high technology but are still important to the value chain.

Notes:

A* and A1 projects also receive tariff exemption on raw materials used for R&D activities.

[a] Non-tax incentives include land ownership, foreign exchange, work permit to foreign workers

[b] Firms also receive additional incentives in terms of eligible tax-deductible expenditures, including (200%) R&D expenses, (100%) donations to Technology and Human Resources Development Funds, educational institutes, specialised training centres, R&D institutes, or governmental agencies in the S&T field in Thailand, (100%) IP acquisition/licensing fees; (100%) advanced technology training; (100%) development of local suppliers with at least 51% Thai shareholding in advanced technology training and technical assistance; and (100%) product and packaging design: in-house or 100% outsourced in Thailand.

[c] Projects located in 20 provinces with the lowest per capita income: Kalasin, Chaiyaphum, Nakhon Phanom, Nan, Bueng Kan, Buri Ram, Phrae, Maha Sarkham, Mukdahan, Mai Hong Son, Yasothon, Mae Hong Son, Yasothon, Roi Et, Si Sa Ket, Sakhon Nakhon, Sa Kaew, Sukhothai, Surin, Nong Bua Lamphu, Ubon Ratchatani, and Amnatcharoen (excluding border provinces in Southern Thailand and Special Economic Development Zones which have special incentive packages).

Source: Compiled by authors from official information available at https://www.boi.go.th/index.php?page=boi_announcements

For the merit-based incentives, additional incentives are stipulated when activities add additional value to the economy in three areas, namely competitiveness enhancements, decentralisation, and industrial area developments. Incentives for investors come in the form of corporate income tax (CIT) exemptions (up to a maximum of 13 years),[8] exemptions from import duties on machinery and raw materials used in R&D and/or exports, and non-tax incentives, such as access to long-term land leases and work visas. Devising the investment incentives discussed above seems to be in line with a measure that should be regarded as industrial policy in the recent literature.

The other main component is the establishment of the EEC, the newest special economic zone. The EEC was started in 2014 and straddles three eastern provinces of Thailand – Chonburi, Rayong, and Chachoengsao – off the coast of the Gulf of Thailand and spans a total of 13,285 square kilometres. It is planned to be a hub for technological manufacturing and services with strong connectivity to its ASEAN neighbours by land, sea, and air. It aims to create a favourable eco-system by enhancing the service quality of basic infrastructure as well as providing adequate qualified human resources for the newly targeted industries.

There are four key components to creating a favourable eco-system. The first is to set up EEC Offices (EECO) as one-stop service centres for handling applications for the permissions and licenses necessary for business operation in special economic processing zones (SEPZ). The authorities responsible for approving license applications under several laws (i.e. building control law, factory law, etc.) have all been transferred to the EECO to simplify the regulatory processes for foreign investments. The EECO is also establishing an e-permission and privilege system to facilitate applications and approvals online.

The second component is about mega infrastructure investment to enhance the connectivity of the EEC area with the rest of the world and Chinese megaprojects associated with the Belt and Road Initiatives, in particular. Total infrastructure investment amounting to US$43 billion in investments will be channelled into the EEC by 2021. This includes enhancing air transport and cargo

[8] Note that under the Competitiveness Enhancement Act, section 24, the CIT exemption for a targeted industry could be extended to 15 years, based on the judgment of the BOI.

capacities substantially through expanding the U-Tapao airport; setting up a maintenance, repair, and overhaul (MRO) centre in Rayong province (US$5.6 billion); enlarging the Laem Chabang seaport (Laem Chabang Phase 3), the country's biggest seaport (US$2.5 billion); continuing the third phase of the Map Ta Phut seaport (US$ 1.5 billion); extending the road network; and investing in high-speed and double-track railways.[9]

The third component is to provide more investment incentives to make the EEC competitive in attracting foreign direct investors, over and above the BOI incentives discussed above. In particular, those who invest in the three provinces of the EEC are now eligible for corporate income tax holidays for up to 15 years, a 50% reduction in corporate income tax rates over 5 years, and a reduced personal income tax rate of 17%, as well as existing exemptions and benefits offered by the BOI, such as access to long-term land leases, import duty exemptions, and work visas.

New subsidies will also be rolled out in the form of a B10 billion (US$282 million) seed fund, called the Industrial Economic Development Fund (IEDF), which will offer a special interest rate and investment funds for activities prioritised by the government, including R&D and skill formation at Thai universities. The EEC also bypasses regulatory obstacles that businesses usually experience. For example, foreign skilled labour, executives, and specialists working for businesses in the SEPZ can now work in Thailand without a work permit upon receiving a permit from the Secretary General of EECO. As another example, the authority to approve license applications under several laws (i.e. the building control law, factory law, etc.) has been transferred to the EEC Policy Committee chaired by the prime minister. The newly amended Public-Private Partnership Act was enacted to streamline and make transparent the regulatory complexity in the earlier version of the act.

[9] Data are from the EEC office, published by the Bangkok Post (2018), and a Roadshow document by M. Sibunruang, Executive Director, U-Tapao Airport City Project Management, available at https://www.boi.go.th/upload/content/Aviation_BOI%20roadshow_Full%20version_5ab4f81a06c70.pdf

The final component is to set up special development areas, i.e. the Eastern Airport City (EEC-A), Eastern Economic Corridor of Innovation (EEC-i), and Digital park Thailand (EEC-d), all of which are to create new economic clusters fitting to the 10 newly targeted industries plan. For example, EEC-A is an area for the aviation industry. Global leading firms like Boeing, Rolls-Royce, and Triumph Group have been invited to invest in Thailand. Incentives can be tailored to fit firms' needs (The Nation, 2012). This will eventually entice other suppliers to set up factories nearby and result in an aviation cluster in Thailand.

Three remarks can be drawn from the policy initiatives discussed above. Firstly, the rationale for the choice of these industries is unclear. Interestingly, out of the 10 industries, 7 overlap with the 10 targeted industries under the Made-in-China 2025 initiatives. Many of these industries are not connected to each other to some extent. For example, new-generation automotive and smart electronics are planned to be starting points for manufacturing robotics. Medical and wellness tourism, which are quite different in nature, are further combined into the medical hub.

Secondly, whilst the effort to target specific industries would signal ambitious policy effort, the EEC is in practice just a typical policy measure package to entice FDI from aboard (e.g. by providing investment incentives and high-quality infrastructure) due to the lack of a clear and pragmatic implementation plan. Consider the next-generation automotive industry, which is loosely defined as non-internal combustion engine (ICE) vehicles but refers to electric vehicles (EVs) in public – the Thai government has set a very ambitious target for the industry. It aims to have 1.2 million EVs and 690 charging stations nationwide by 2036 – about 20 years from the time the plan was launched. By March 2021, a new and even more ambitious target was announced, i.e. by 2035 all vehicles must be zero emission, without a clear implementation plan (Kohpaiboon, 2021). To put this goal in perspective, ICE vehicles still accounted for about 99% of vehicles in 2020.[10] How the automotive industry can be transformed to achieve the ambitious target

[10] The total cumulative registered non-ICE vehicles in 2020 were 177,617 units, which accounted for 0.42% of total cumulative registered vehicles. Data are from the Association of Thai electric vehicles (https://www.autostation.com/car/ev-in-thiland-grow-twice-in-2020-evat) and the Department of Land Transport, Ministry of Transport.

will be a major challenge. Certain parts, such as batteries for EVs, safety parts, transmission systems, and engines exceeding 248 cc for motorcycles are targeted. The most important policy tool would be the much lower newly designed excise tax on electric vehicles introduced in 2017. Nonetheless, eligibility is conditioned by the local content requirements on batteries.

To a large extent, a similar pattern is observed for the new S-curved industries, such as the digital industry. Activities to be promoted include embedded software, e-commerce players, analytics and data centres, cloud computing, cyber security, creating smart cities (connected through the internet and referred to as Internet of Things (IoT), and creative media and animation. A number of incentives have been introduced, such as 200% R&D expenditure tax deductions, work permits for professionals, and grants to universities to promote digital activities. At this stage, the overall implementation strategy for this industry remains vague.

Thirdly, so far, slow progress in these development areas has been observed. For example, by 2019, EEC-A, EEC-i, and EEC-d accounted for only 2.9%, 13.9%, and 6.2% of total investment projects in the EEC (Jongwanich et al., 2020: Table 4.4). Another example is the case of Rolls-Royce, which expressed interest in investing in Thailand in 2012 (The Nation, 2012). Instead, by 2018, Rolls-Royce signed up as a technical knowledge provider to the engine maintenance centre invested in by Thai Airways International in the first international airport, Don Mueang (Bangkok Post, 2018).

3. Effects of Policy Changes

This section examines the effect of the policy changes discussed above. It begins with the impact of FTAs on trade and investment in Thailand (Section 3.1). Section 3.2 discusses the trends and patterns of BOI-promoted projects, whilst Section 3.3 examines the effects on productivity and medium-term economic growth.

3.1. The impact of FTAs on trade and investment in Thailand

As mentioned above, the main purpose why Thailand is active in signing FTAs is to promote exports and to stay attractive to foreign direct investors. To illustrate the impact of FTAs, this subsection probes into records on preferential trades for which firms have applied for FTA privileges. The records will be compared to actual trade to indicate the extent to which FTAs have been utilised. The higher the utilisation of a given FTA, the greater the impact on trade. In a given host investment-receiving country, a high FTA utilisation also implies the benefit that foreign direct investors can gain from setting up affiliates. All in all, FTA utilisation and FDI patterns will be analysed together to illustrate the impact of FTAs.

Figure 3 presents the ratio of preferential exports to the actual export value between Thailand and its FTA counterparts from 2015 to 2019. Note that the total actual exports are used in the denominator when calculating the utilisation rates.[11] When all partners are combined, the utilisation rate is rather low, and the average utilisation rate is 31.1 % over the period in consideration. In other words, only one-third of total exports from Thailand to the FTA partners applied for the available FTA preferential schemes.

[11] There is ongoing debate on what the appropriate denominator in calculating the ratio should be when the overall assessment of FTAs is concerned. See Appendix 1 in Kohpaiboon and Jongwanich (2015).

Figure 3: FTA Utilisation in Exports, 2015–2019

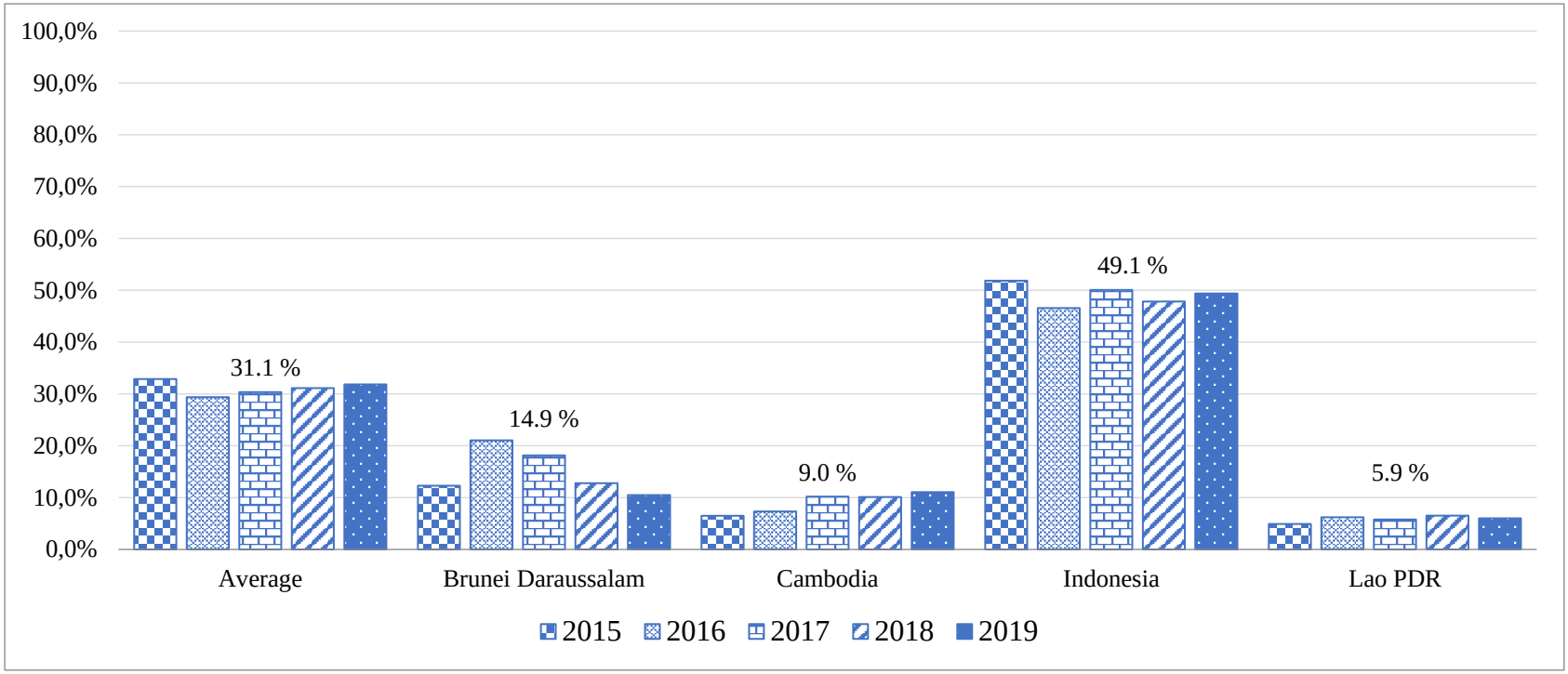


Figure 3 (Contd.)

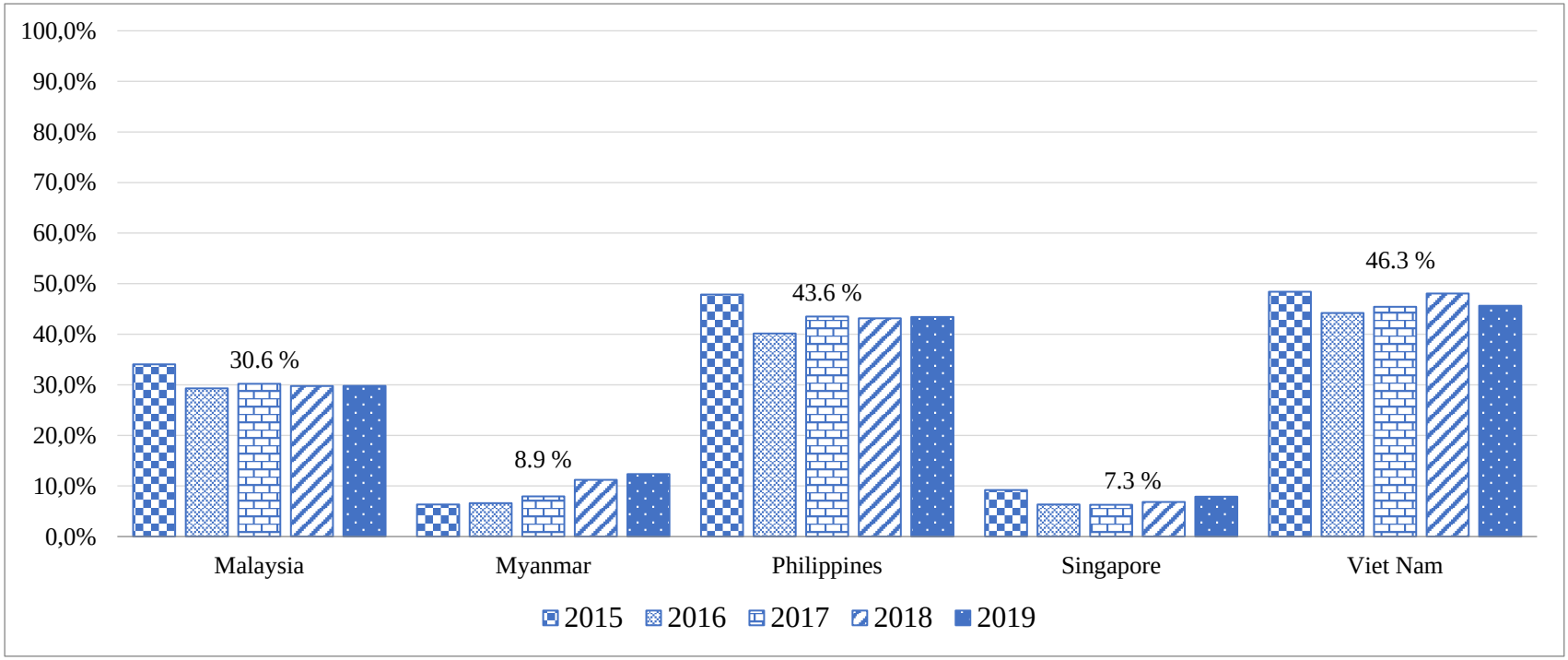
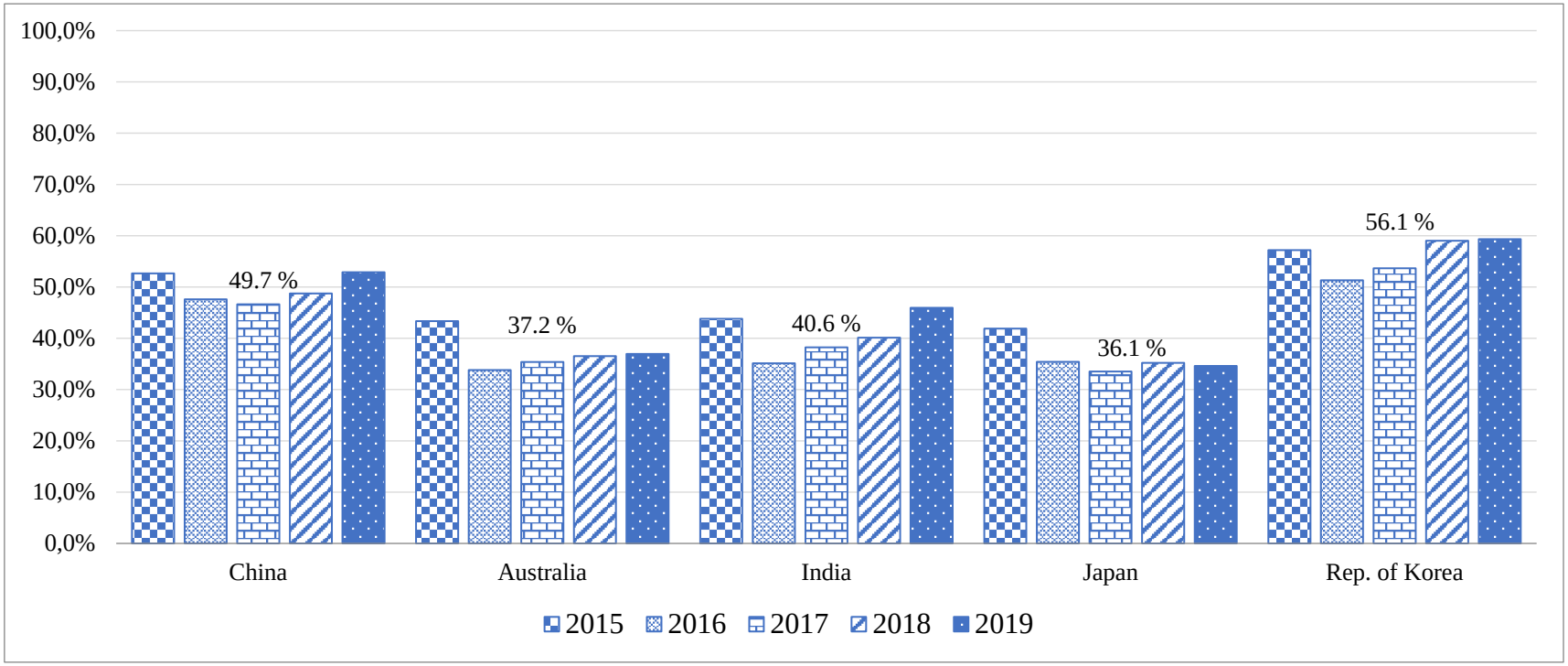


Figure 3 (Contd.)



FTA = free trade agreement.
Notes: The number above each bar graph is the average of the FTA utilisation rate between 2015 and 2019. The FTA utilisation rate of exports to New Zealand is Self-Certification system where preferential scheme transactions are not recorded.
Source: Authors' calculations from the Department of Internal Trade, Ministry of Commerce, and the Customs Department, Ministry of Finance.

The utilisation rates vary across FTA partners. Amongst the ASEAN members, Indonesia had the highest utilisation rate. The average utilisation rate was around 49%. Viet Nam and the Philippines were the other two ASEAN members whose utilisation rates records exceeded 40%. Malaysia, another major economy in ASEAN, recorded rather low utilisation rates at around 30.6 % over the period. The low utilisation rate for Singapore is not surprising given the fact that the country is tariff-free. Hence, most transactions reflect the increasingly important role of Singapore as the location of many multinational enterprises' regional headquarters. Turning to Cambodia, the Lao PDR, and Myanmar, utilisation rates were registered at less than 10%, on average, between 2015 and 2019. This was due to their gradual adjustment to tariff reductions.

Utilisation rates were the highest for Korea, whose utilisation rate was 56.1% from 2015 to 2019. This was due to the fact that Korea's MFN tariff is relatively high compared to its income per capita level.[12] It was followed by China (49.7%), India (40.6%), and Australia (37.2%).

FTA utilisation on the import side is shown in Figure 4. Overall, the utilisation rate averages at 25.9 % from 2015 to 2019. The rate was virtually unchanged during the period of consideration and lower than those on the export side. The difference in utilisation rates between imports and exports was observed in all FTA trading partners. All in all, the pattern of FTA utilisation rates revealed above suggests the limited impact of FTAs on trade. This seems to be consistent with the nature of the FTA commitments in which Thailand often expresses a reluctance to offer preferential tariffs to FTA partners.

[12] According to the World Development Indicators database, Korea's simple average most-favoured-nation (MFN) tariff rate was 14.1% in 2019. The corresponding figure for high-income countries was 6.8% in 2018.

Figure 4: FTA Utilisation in Imports, 2015–2019

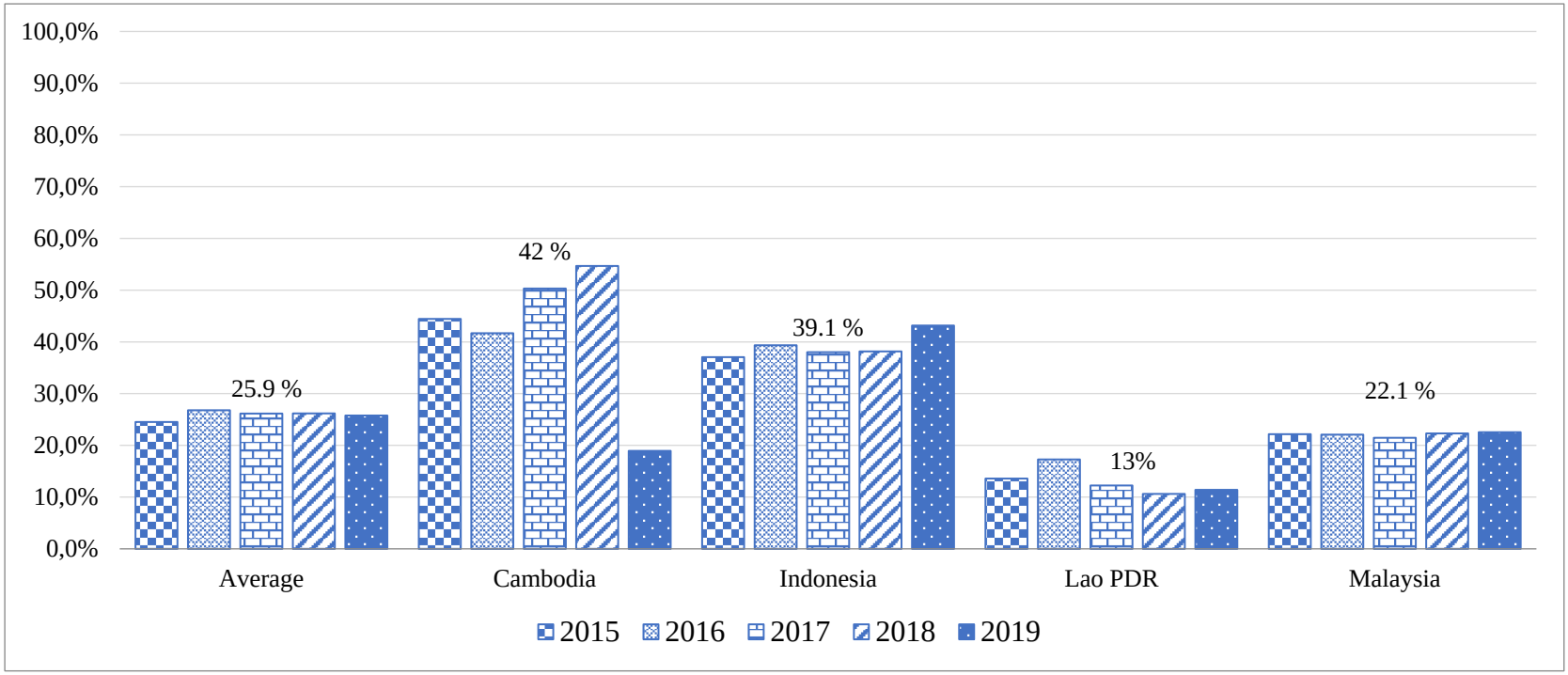
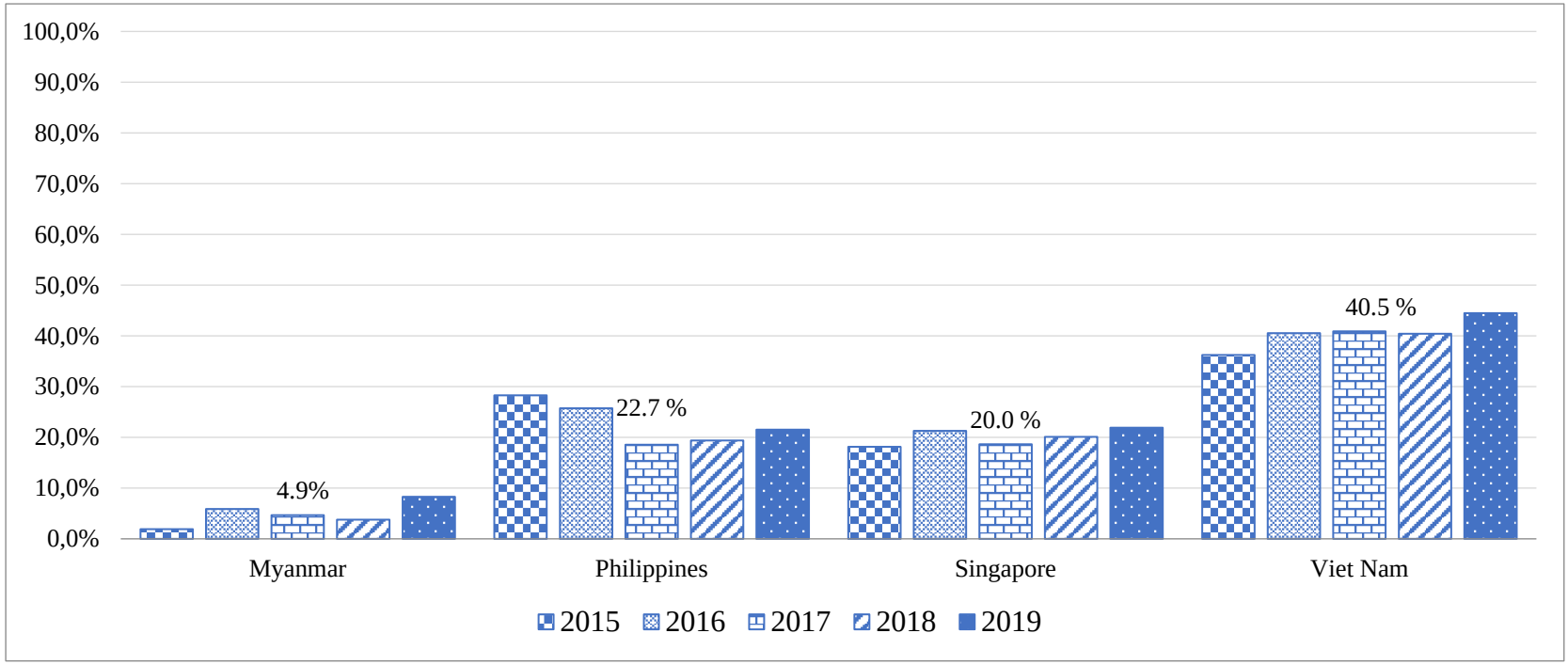


Figure 4 (Contd.)



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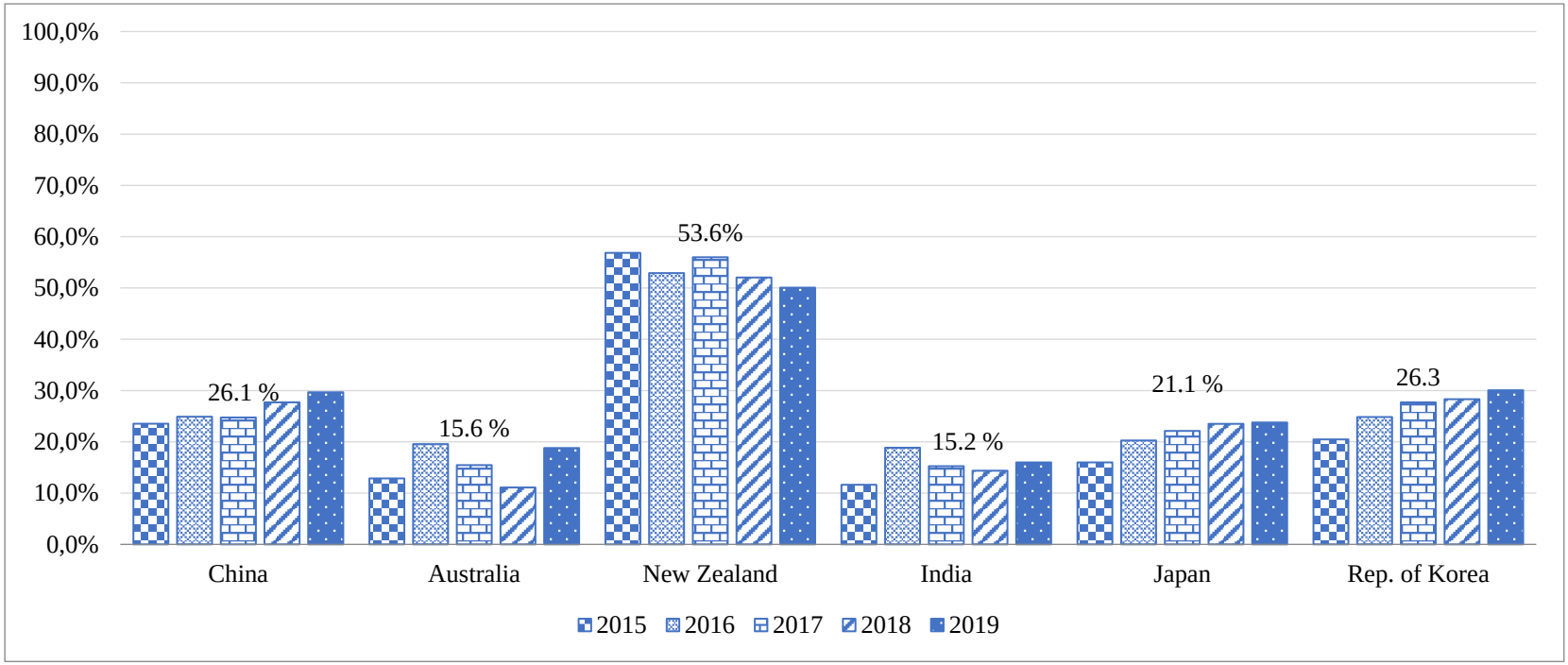
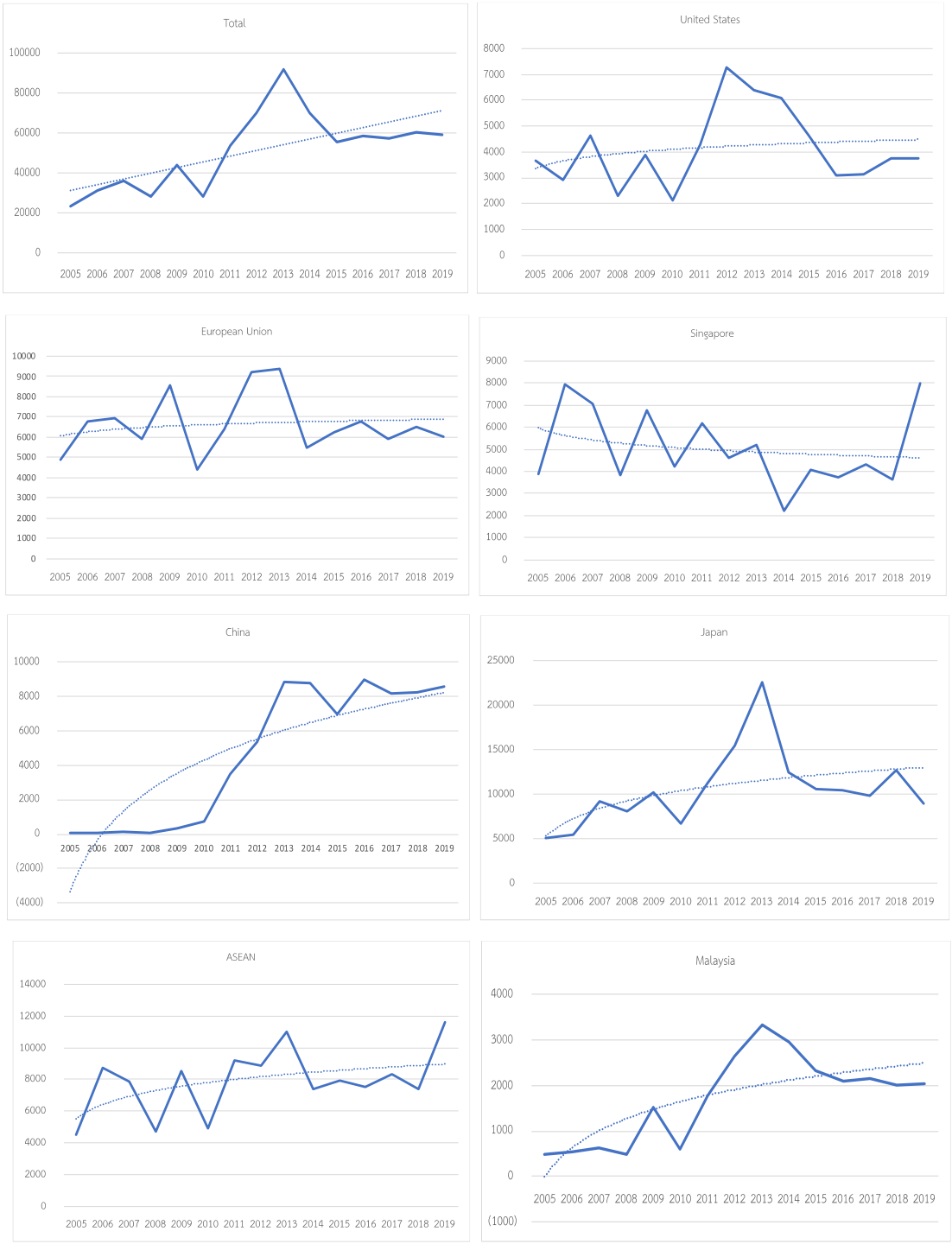


FTA = free trade agreement.
Notes: The number above each bar graph is the average of the FTA utilisation rate between 2015 and 2019. The FTA utilisation rate of imports to Brunei Darussalam is less than 0.5%.
Source: Authors' calculations from the Customs Department, Ministry of Finance.

Figure 5 reveals the trends and patterns of FDI inflows from major direct investors (US, EU, Japan, China, Singapore and Malaysia) to Thailand from 2005 to 2019. Generally, FDI inflows grew continuously over the considering period. The exception was a spike during 2012-13 largely due to the rehabilitation after the great flood in 2011 in which many industrial estates in central Thailand were severely affected. Amid the steady growth of FDI inflows, China and ASEAN members gained their relative importance as direct investors over the considering period. In contrast, the role of direct foreign investors from the US and EU became less important.

Meanwhile, Japanese investors remained the largest direct investor in Thailand. Changes in the relative importance of investor nationality are not clearly correlated with FTAs Thailand has signed so far. This seems to be consistent with the rather low FTA utilisation discussed above.

Figure 5: Foreign Direct Inflows to Thailand, 2005–2019 (mil US$)

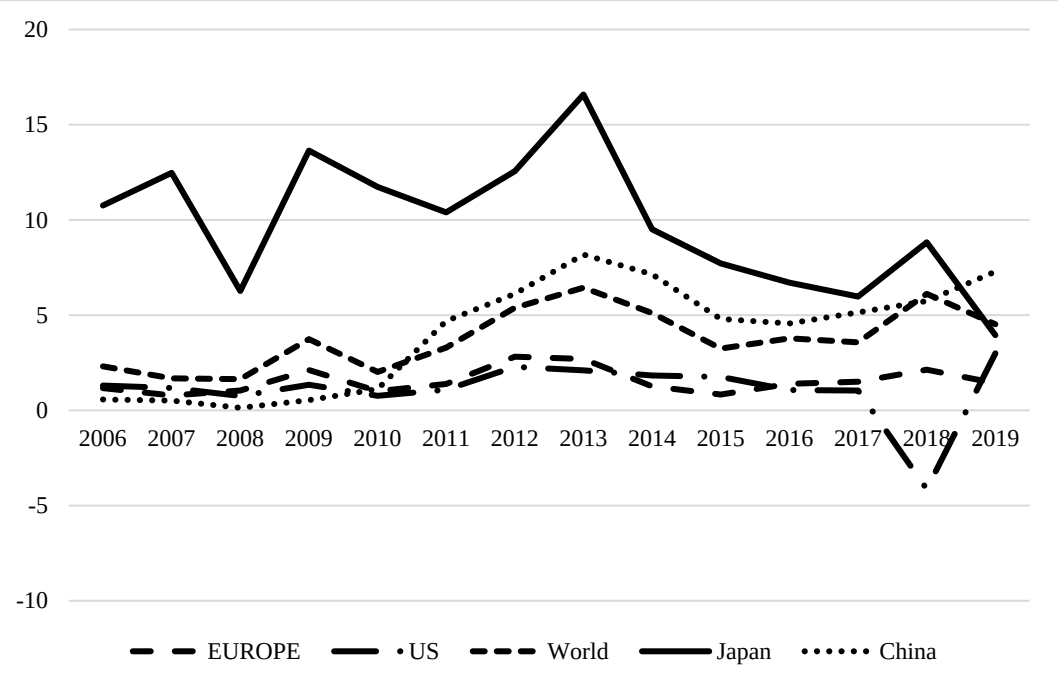


ASEAN = Association of Southeast Asian Nations.
Source: Bank of Thailand.

Interestingly, the relative importance of Thailand as an overseas production base of these major direct investors changed over the period. Figure 6 presents the FDI inflows to Thailand from four major direct investors (Japan, the US, the EU,

and China) as a percentage of their total FDI outflows to the world. Figure 6 reveals that Thailand has gained relative importance for outward FDI from China. However, in contrast, the relative importance of Thailand as an overseas production base for Japan and the US declined, whilst that for the EU remained unchanged. This points to other factors that have influential impacts on FDI inflows to Thailand as opposed to the effect of FTAs. The observed changing relative importance has been observed since 2014.

Figure 6: Share of FDI to Thailand as a Share of Outward FDI, 2006–2019
(%)



FDI = foreign direct investment, US = United States.
Source: UNCTAD's Foreign Direct Investment database.

3.2. The impact of promoted investment activities

This subsection analyses promoted investment activities to illustrate any changes from the amended Investment Promotion Act as presented in Table 6. The dollar value of the investment exhibits an upward trend, from B254.5 billion in 2016 to B346.6 billion in 2019. The dollar value in the first 9 months of 2020 reached B346.2 billion. Until 2020, there were only minor changes in the sectoral composition. The plastics, chemical, and paper industries gained relative

importance whereas the electronics and electrical appliance industries moved in the opposite direction.

Table 6: Total Investment of BOI-promoted Projects from 2016 to 2020

	2016	2017	2018	2019	Jan–Sep 2020
Total Investment Fund (B billion)	254.5	476. 0	584.1	346.6	346.2
% to total investment fund					
Agriculture and agricultural products	15.3	13.3	9.8	9.1	9.1
Mining and quarrying	2.3	2.2	1.6	4.3	6.2
Light manufacturing	3.0	3.6	1.6	4.5	4.9
Transport and machinery equipment	20.2	18.1	10.7	21.8	21.6
Electronics and electrical appliances	13.6	7.8	5.5	10.7	23.9
Plastics, chemical, and paper	7.4	4.4	31.2	17.9	15.7
Services and infrastructure	38.3	50.1	39.6	31.6	17.7
Technology and innovation	0.0	0.5	0.0	0.0	0.8

Source: Authors' calculations from official data available at www.boi.go.th

In the first 9 months of 2020, investment in electronics and electrical appliances noticeably increased, largely driven by the impact of COVID-19. As argued by Kohpaiboon and Jongwanich (2021), the trade war between China and the US triggered many MNEs to reallocate their production facilities from China to elsewhere, some of which moved to Thailand. The reallocation plan was accelerated by the COVID-19 pandemic and lockdown measures in China in February and March 2020. In addition, the severe COVID-19 situation in the Philippines induced the government to impose strict lockdown measures. Hence, many firms in Thailand experienced parts shortages and started sourcing more from existing local suppliers. As many of these local suppliers were foreign affiliates, they started expanding their production facilities and sought investment promotion from the BOI.

As mentioned above, the Thai government pursued the so-called Thailand 4.0 policy to ignite new growth engines, known as the five S-curve industries and five new S-curve industries, starting in 2015. The BOI-promoted investment flows shown in Table 7 illustrate that these targeted industries remained a small proportion. For example, under the light manufacturing category, there are four

items that are in line with the scope of the 10 newly targeted industries, i.e. technical fibre, recycled fibre, hygienic non-woven fabric, and sophisticated medical devices (e.g. CT scanners, X-rays, and microchips). These items accounted for 39% over the period. The corresponding figure for all activities combined was 13.9% with a declining trend. The highest figure was found in electronics and electrical appliance activities, at 62%, due to the fact that the definition of smart electronics in the newly targeted industries is wide and covers many existing electronics and electrical appliances that have long been available in Thailand. These include hard disk drives and the assembly of electronics (printed circuits board assembly and integrated circuits).

Table 7: Newly Targeted Activities
(% of total promoted investment by BOI)

	2016	2017	2018	2019	2020 (Jan–Sep)
Total	14.8	13.5	7.1	13.9	25.5
Agriculture and agricultural products	1	4	4	6	3
Mining and quarrying	0	1	7	18	2
Light manufacturing	64	81	47	15	5
Transport and machinery equipment	4	25	21	31	31
Electronics and electrical appliances	87	52	64	43	62
Plastics, chemical, and paper	0	21	0	3	16
Services and infrastructure	0	0	0	0	0
Technology and innovation	n.a.	100	n.a.	100	100

Source: Authors' calculations from official data available at www.boi.go.th

3.3. Impacts on Productivity

3.3.1. Empirical model

To address the impact of the policy changes mentioned above, we estimated an equation of firms' productivity determinants. Total factor productivity (TFP) is used as a measure of firms' productivity. A set of productivity determinants includes firm- and industry-specific factors. The former includes firms' market orientation (exp_{ijt}), imported raw materials (rim_{ijt}), ownership (own_{ijt}), and firms' efforts to increase productivity, e.g. R&D intensity (RD_{ijt}), and skill intensity ($skill_{ijt}$), all of which are theoretically expected to enhance firms' productivity.

Three industry-specific factors are included in the model. The first two variables are the export–output ratio (XOR_{jt}) and import penetration ratio (MPR_{jt}) to capture the effects of international competitive pressure on firm productivity, regardless of the extent to which firms engage in the global market. Domestic competitive pressure, proxied by the sales concentration ratio (CON_{jt}), is another industry-specific factor in the model. All of these variables are expected to reflect a positive relationship with productivity.

The impact of policy changes is examined in three aspects. The first aspect is trade policy measured by the effective rate of protection (ERP). The formula for ERP is in Equation 1.

$$ERP\_1_{kt} = \frac{t_{kt} - \sum_{i=1}^{n} a_{ikt}^{*} t_{it}}{1 - \sum_{i=1}^{n} a_{ikt}^{*}} \quad (1)$$

where t_{kt} = tariff on product (finished products) *j* at time *t*

t_{it} = tariff on product (raw materials) i at time *t*

a_{ikt}^{*} = share of product *i* used in producing product *j* at time *t.*

As mentioned above, there are many tariff exemption/rebate schemes in Thailand for exporters. To capture the effect of these schemes, the weighted average of ERP $\left(ERP_{j,t}^{W}\right)$ between import-competing $\left(ERP_{j,t}^{IM}\right)$ and export-oriented $\left(ERP_{j,t}^{XO}\right)$ is used where the export-output ratio is the weight. $ERP_{j,t}^{IM}$ is the standard ERP using the MFN tariff, whereas the output tariff is assumed to be zero as the export and input tariffs are equal to the costs of the tariff exemption/rebate schemes in $ERP_{j,t}^{XO}$. This is expressed in Equation 2.

$$ERP_{j,t}^{W} = \left(1 - \alpha_{j,t}\right) ERP_{j,t}^{IM} + \alpha_{j,t} ERP_{j,t}^{XO} \quad (2)$$

where $ERP_{j,t}^{IM} = \frac{t_{j,t} - \sum_{i=1}^{n} a_{ij,t} t_{i,t}}{1 - \sum_{i=1}^{n} a_{ij,t}}$

$ERP_{j,t}^{XO} = \frac{0 - \sum_{i=1}^{n} a_{ij,t} r_i}{1 - - \sum_{i=1}^{n} a_{ij,t}}$

$\alpha_{j,t}$ = export-output ratio of (product) industry *j* at time *t*

$t_{i,t}$ = MFN tariff of product *i* at time *t*

$a_{ij,t}$ = the share of product *i* used in producing product *j* at time *t*

Such a weighted ERP is used to illustrate the impact of trade protection on productivity as expressed in Equation 4 below. The changes in the ERP estimate indicate changes in the tariff structure, which were minor between 2006 and 2016, and those in market orientation (i.e. changes in the export sale ratio).

To examine the partial trade liberalisation induced by the signed FTAs, $ERP_{j,t}^{W\_FTA}$ is re-calculated using the weighted tariff between the MFN and FTA preferential rates (t_{jt}^{*}) for calculating $ERP_{j,t}^{IM}$. The weighted tariff is expressed in equation 3.

$$ERP_{j,t}^{W\_FTA} = \left(1 - \alpha_{j,t}\right) ERP_{j,t}^{IM\_FTA} + \alpha_{j,t} ERP_{j,t}^{XO} \qquad (3)$$

where $ERP_{j,t}^{IM} = \frac{t_{j,t}^{*} - \sum_{i=1}^{n} a_{ij,t} t_{i,t}^{*}}{1 - \sum_{i=1}^{n} a_{ij,t}}$

$$t_{j,t}^{*} = \left(1 - \sum_{k=1}^{n} \theta_{k,t} t_{j,t}^{FTA}\right) t_{j,t} - \sum_{k=1}^{n} \theta_{k,t} t_{j,k,t}^{FTA}$$

$t_{j,t}^{FTA}$ = FTA tariff on product *j* at time *t* Thailand offered to FTA partner *k*

$\theta_{k,t}$ = import share of FTA partner *k* to total imports at time *t*.

In our analysis, both ERPs are used as an alternative measure to examine the effect of trade protection on productivity, and a statistically significant coefficient of ERP would indicate an impact of trade liberalisation. The differences in the estimated coefficients of these two alternative ERPs would suggest that the effect of FTA-led trade liberalisation is different from that of the multilateral trade liberalisation that took place before the new millennium. To mitigate any possible simultaneity problem, the lagged value of ERP is used.

The BOI investment promotion status is introduced in the model to examine whether the granted investment incentives could enhance firms' productivity. In general, obtaining BOI investment incentives is *de facto* compulsory for foreign plants in order to overcome the many constraints involved in operating a business in Thailand, such as the prohibition on land ownership and constraints on work permits granted to foreign professionals, from which BOI-promoted foreign firms are exempt. These regulations implicitly encourage foreign investors to apply for BOI promotion privileges. This is in sharp contrast to indigenous firms, where only some apply for BOI promotion privileges, most of which are likely to be exporters

(Kohpaiboon, 2006). Hence, the estimated coefficient would indicate the effect on productivity enhancement.

All in all, the empirical model used in the analysis is presented in Equation 4 with the expected signs in parentheses:

$$TFP_{i,j.t} = \beta_0 + \beta_1 exp_{i,j,t} + \beta_2 rim_{i,j,t} + \beta_3 own_{i,j,t} + \beta_4 RD_{i,j,t} + \beta_5 skill_{i,j,t} \quad (4)$$
$$\beta_6 XOR_{j,t} + \beta_7 MPR_{j,t} + \beta_8 CON_{j,t} + \beta_9 ERP_{j,t-1} + \beta_{10} BOI_{i,j,t} + \varepsilon_{i,j,t}$$

where $TFP_{i,j.t}$ = total factor productivity of establishment *i* of industry *j* at time *t* (in ln)

$exp_{i,j,t}$(+) = export-sales ratio of establishment *i* of industry *j* at time *t*

$rim_{i,j,t}$ (+) = imported raw materials as a share of total raw materials of establishment *i* of industry *j* at time *t*

$own_{i,j,t}$ (+) = foreign share of establishment *i* of industry *j* at time *t*

$RD_{i,j,t}$ (+) = R&D effort by establishment *i* of industry *j* at time *t* measured by two definitions;

(1) $RDD_{i,j,t}$= the binary dummy variable, equal to 1 when there is R&D effort and zero otherwise,

(2) $RDD_{i,j,t}$= the R&D expense for the sale of establishment *i* of industry *j* at time *t*

$skill_{i,j,t}$ (-) = the ratio of blue-collar to total workers of establishment *i* of industry *j* at time *t*

$ERP_{j,t-1}$ (+/-) = effective rate of protection of industry *j* at time *t* measured by two alternatives;

(1) $ERP_{j,t-1}^{W}$= the weighted average of ERP using MFN tariff (See Equation 1 above)

(2) $ERP_{j,t-1}^{W\_FTA}$= the weighted average of ERP using FTA tariff (See Equation 2 above)

$XOR_{j,t}$ (+) = export-output ratio of industry *j* at time *t*

$MPR_{j,t}$(+) = import penetration ratio of industry *j* at time *t*

$CON_{j,t}$ (-) = Hirschman Herfindahl producer concentration of industry *j* at time *t* (in ln)

BOI_{ijt} (?) = a zero-one binary dummy that equals 1 when an establishment is BOI-promoted and is zero otherwise

3.3.2. Data and Variable Measurement

The dataset used in this research is derived from the Thai industrial census, conducted by the National Statistical Office. So far, four censuses are available (i.e. 1996, 2006, 2011, and 2016). As plant-level data in Thailand is still at an early development stage, a fraction of observations can be matched and a panel-data

analysis conducted amongst the three latest censuses (2006, 2011, and 2016), involving 14, 617 observations. In this paper, panel data from the three latest censuses are used.

Data cleaning in our study starts with examining the possibility of duplicated observations, i.e. samples with different plant identification numbers reporting the same values of key variables. Presumably, this is largely driven by multi-plant cases where all affiliates fill in a questionnaire using identical company-level information wherein all affiliates are included. Seven key variables are used to identify duplication: (i) years in operation, (ii) total employment, (iii) wage compensation, (iv) raw materials, (v) initial raw material stocks, (vi) initial finished product stocks, and (vii) initial fixed assets. When duplicated samples are found, only one is kept in the sample and the others are removed.

The next step is to examine whether the samples provide reliable information in the questionnaire. To do so, we drop observations that report annual sales of less than B12,000 (less than $400), an annual value added of less than B10,000, and/or less than B10,000 in initial fixed assets. To mitigate the discretionary criteria employed, we run a sensitivity analysis. In addition, small/micro enterprises, defined as plants employing less than 10 workers, are excluded as they would behave differently from, and might not participate directly with, larger plants. The final feature that must be addressed is industrial classification. Generally, ISIC revision 3 is employed to analyse the three censuses with observations matched as a panel dataset by plant identification. There are 3,395 cases where the ISIC assigned to a given plant identification changes amongst these three censuses because of changes in product coverage. They are dropped from the analysis. Note that all the nominal variables (e.g. sales, raw materials expenses, and inventory) are converted into 2001 prices using the price deflator at the 4-digit ISIC disaggregation.

Total factor productivity (TFP_{ijt}) is calculated according to the method developed by Levinsohn and Petrin (2003) to address the endogeneity problem that

might be present when estimating the standard production function.[13] According to the LP approach, intermediate inputs are used as a proxy for unobserved determinants and mitigate any endogeneity bias that might occur in ordinary least squares (OLS) estimations. The capital used in the TFP calculation is proxied by the initial fixed asset of plants. The intermediate inputs used are adjusted by changes in their inventories.

exp_{ijt}, rim_{ijt}, own_{ijt}, BOI_{ijt} are all available in the questionnaire. Note that $skill_{i,j,t}$ in this study is proxied by the ratio of blue-collar to total workers, so an increase in $skill_{i,j,t}$ indicates less skilful workers and the expected sign is negative. To measure RD_{ijt}, two proxies are used. The first is the binary dummy variable RDD_{ijt}, which is equal to 1 when establishments commit to R&D investment; the second is the ratio of R&D expenditure to total sales (RDS_{ijt}).

To calculate ERP_{jt}, the inter-industry linkage relationship is derived from Thailand's input–output (IO) table compiled by the National Economic and Social Development Board (NESDB). Since the input–output table for Thailand is updated every 5 years, three tables are available for 2005, 2010, and 2015, which are employed to match the industrial censuses of 2006, 2011, and 2016, respectively. The output and input tariffs for 2006, 2011, and 2016 are from HS2002 6-digits. The concordance between the HS-code, ISIC, and the IO table is applied in calculating four different ERPs at the industry level as mentioned earlier. The interest rates applied to reflect the opportunity costs of exporters are sourced from the weighted average of the minimum lending rates (MLR) offered by various commercial banks in Thailand. Note that the 2006 ERP_{jt} reflects the pre-FTA era. Substantial tariff commitments took place after 2006 (90% in 2010 for the ASEAN-China Free Trade Agreement, 93% of tariff lines in 2010 for the Thailand-Australia Free Trade Agreement, and 100% in 2010 for the ASEAN Economic Community). In the case of the Japan-Thailand Economic Partnership Agreement, there were two

[13] Note that the results when the LP approach is applied are similar to those referred to by Olley-Pakes (1996), but the former yields better diagnostic results. The key difference between the LP and OP approaches is that the former uses intermediate inputs in estimating productivity, whilst the latter uses investment. Levinsohn and Petrin (2003) pointed to the disadvantage of using investment in estimating TFP as in the OP approach, especially in terms of data exclusion due to no investment being reported in many plants.

tariff cuts, i.e. before and after 2011. Hence, the effect of FTAs is captured in the two series (the 2011 and 2016 ERP_{jt}).

Concentration (CON_{jt}) is measured by the Hirschman Herfindahl index (HHI_{jt}) expressed in Equation 5. It was constructed from information gathered from each census after cleaning procedures were undertaken as discussed above.

$$HHI_j = \sum_{i=1}^{n} \left(S_{ij}\right)^2 \quad (5)$$

where S_{ij} is the market share of firm *i* in industry *j* and *n* is the number of firms.

The export–output ratio (XOR_{jt}) and import penetration ratio (MPR_{jt}) at the industry level are used as control variables.[14] The data to calculate these variables were retrieved from the United Nations Comtrade database (UNCOMTRADE), whereas the gross output data were from the NESDB. The standard concordance between the HS and ISIC was applied to convert XORjt and MPRjt from HS codes to the ISIC 4-digit level. The data used in the empirical model are summarised in Tables 8 and 9.

Table 8: Summary Statistics of All Variables Used in the Analysis

Variable	Mean	SD	Min	Max
$TFP_{i,j.t}$	9.19	2.9	-1.55	27.84
$own_{i,j,t}$	0.05	0.16	0	0.69
$exp_{i,j,t}$	0.09	0.2	0	0.69
$rim_{i,j,t}$	0.08	0.17	0	0.69
$RDD_{i,j,t}$	0.12	0.32	0	1
$RDS_{i,j,t}$	0.02	0.29	0	27.54
$skill_{i,j,t}$	0.55	0.16	0	0.69
$CON_{j,t}$	-3.38	0.98	-5.52	-0.01
$BOI_{i,j,t}$	0.16	0.37	0	1
$ERP_{j,t-1}^{W}$	-0.21	19.61	-67.4	80.81
$ERP_{j,t-1}^{W\_FTA}$	0.54	10.96	-18.16	84.24
$XOR_{j,t}$	0.26	0.25	0	0.69
$MPR_{j,t}$	0.14	0.17	0	0.69

Source: Authors' calculations.

[14] Note that the export–output ratio (XOR_{jt}) and import penetration ratio (MPR_{jt}) are calculated using lag values of exports, imports, and output to redress any possible endogeneity problem.

Table 9: Correlation Coefficients of the Variables

	$TFP_{i,j.t}$	$own_{i,j,t}$	$exp_{i,j,t}$	$rim_{i,j,t}$	$RDD_{i,j,t}$	$RDS_{i,j,t}$	$skill_{i,j,t}$	$CON_{j,t}$	$BOI_{i,j,t}$	$ERP_{j,t-1}^{W}$	$ERP_{j,t-1}^{W\_FTA}$	$XOR_{j,t}$
$own_{i,j,t}$	-0.0066	1										
$exp_{i,j,t}$	0.022	0.3981	1									
$rim_{i,j,t}$	0.0297	0.3562	0.4035	1								
$RDD_{i,j,t}$	0.0258	0.0759	0.1236	0.107	1							
$RDS_{i,j,t}$	0.0032	0.0148	0.0349	0.0272	0.2966	1						
$skill_{i,j,t}$	-0.0413	-0.0563	-0.121	-0.114	-0.0654	-0.1262	1					
$CON_{j,t}$	-0.2558	0.0615	0.0384	0.0908	0.0458	0.0234	0.0031	1				
$BOI_{i,j,t}$	0.0241	0.4159	0.5422	0.3333	0.1505	0.088	-0.2266	0.0511	1			
$ERP_{j,t-1}^{W}$	0.0715	0.0116	0.0814	0.0338	0.0096	0.0949	-0.5557	0.0037	0.1669	1		
$ERP_{j,t-1}^{W\_FTA}$	0.0168	-0.01	0.0065	-0.0105	-0.0026	0.0383	-0.1694	0.1549	0.0556	0.4229	1	
$XOR_{j,t}$	-0.2267	0.0393	0.0351	0.0255	0.0308	0.0118	0.0383	0.2411	0.0289	-0.1377	-0.0497	1
$MPR_{j,t}$	-0.1289	0.0523	-0.0006	0.0786	0.0422	0.0265	0.049	0.4577	0.0207	-0.1051	-0.0467	0.7579

Source: Authors' calculations.

3.3.2. Results

Panel data analyses were performed to estimate Equation 4. The Blundell and Bond (1998) panel system Generalized Method of Moments (GMM) regression was also applied as an alternative methodology, but the lag value of endogenous variables (i.e. TFP) was statistically insignificant. Therefore, the panel data analyses were chosen. Both fixed effect (FE) and random effect (RE) panel data estimations were undertaken as reported in Table 10. Year dummies are introduced in all regression analyses. In the table, the results are grouped into two main categories: one is based on $ERP_{j,t-1}^{W}$ (i.e. columns 1–4) and the other is on $ERP_{j,t-1}^{W\_FTA}$ (columns 5–8). In each category, estimations based on two alternative measures of R&D variables are reported separately. All estimation results pass the overall fit at the 1% level of statistical significance. Whilst the results are slightly different in the level of statistical significance and a few variables such as $RDD_{i,j,t}$, the following discussion is based on the FE estimation as suggested by the Hausman tests.

The estimated coefficients corresponding to all firm-specific variables in the analysis are statistically significant with the theoretically expected signs. Firms that are more engaged in the world market (either exporting their products, $exp_{i,j,t}$, or sourcing their inputs, $rim_{i,j,t}$) exhibit higher productivity. The coefficients associated with exp_{ijt} and rim_{ijt} are statistically significant at the 1% level.

Foreign firms exhibited higher productivity than indigenous firms, reflected by the positive and statistical significance of the coefficient associated with the share of foreign ownership (own_{ijt}). This suggests that advanced technology associated with the former could benefit the latter. The coefficient for the variable $skill_{ijt}$ is negative and statistically significant. All things being equal, firms hiring more white-collar workers benefit from a productivity gain. The estimated coefficient of $RDD_{i,j,t}$ is statistically significant in the RE estimation but not in the FE one. When RDS_{ijt} is used, it is not statistically significant in both FE and RE estimations. This could be due to the rather narrow definition of R&D adoption used in the questionnaire, which emphasises product innovation.

Regarding industry-specific factors, the coefficient associated with the export–output ratio (XOR_{jt}) is positive at the 5% significance level. *Ceteris paribus*, firms in industries that are more exposed to the global market tend to have higher productivity. In contrast, the import threat measured in MPR_{jt} is statistically insignificant in all cases. Such a finding could be due to the dualistic trade policy adopted in Thailand (i.e. maintaining the cascading tariff structure together with the presence of tariff exemption/rebate schemes). Under such circumstances, firms can be either export-oriented to access a larger market or serve local niches, but not both markets simultaneously. The latter could operate to serve local niches that are not in direct competition with imported products.

The coefficient associated with $ERP_{j,t-1}^{W}$ is negative and statistically significant at the conventional 5% level. This suggests that trade liberalisation could be used to boost firms' productivity. More competition from abroad forces firms to keep improving their productivity and stay alert to innovation elsewhere. Interestingly, that with $ERP_{j,t-1}^{W\_FTA}$ turns out to be statistically insignificant in all specifications. This suggests that trade liberalisation induced by the signed FTAs fails to add substantial competitive pressure or induce firms to improve productivity. This outcome seems to be consistent with the trade liberalisation adopted in FTA negotiations. As mentioned in Section 3, policymakers use FTAs as a tool to open up the markets of FTA partners but are reluctant to offer preferential tariffs to FTA partners. Sectors like the vehicles and apparel sectors, which are subject to high tariffs, are also often on the sensitive list in FTA negotiations. This will remain a challenge for the Thai government in fully materialising the potential of the FTAs signed so far.

The coefficient corresponding to $BOI_{i,j,t}$ is positive and statistically significant at the 1% level. The results point to a potential role in the enhancement of firm productivity, suggesting a benefit in terms of productivity for firms. Nonetheless, its net benefit to the economy remains ambiguous to a large extent because any positive impact of the BOI initiatives is associated with costs in terms of foregone government revenue (e.g. tax holidays and tariff exemptions).

Interestingly, the coefficients corresponding to $BOI_{i,j,t}$, $exp_{i,j,t}$, and $rim_{i,j,t}$ are all positive and statistically significant. Nonetheless, $BOI_{i,j,t}$ is a binary dummy

variable whereas the others are shares. To make it more comparable, all equations in Table 10 are re-estimated, replacing $exp_{i,j,t}$ and $rim_{i,j,t}$ with binary dummies indicating whether firms export or not $(expdum_{i,j,t})$ and whether firms import raw materials or not $(impdum_{i,j,t})$, respectively. The re-estimated results are shown in Table 11. With a few exceptions, the estimation results of the other variables are consistent with those in Table 10. The coefficient associated with $BOI_{i,j,t}$ turns out to be statistically insignificant in the FE model. In contrast, those associated with $expdum_{i,j,t}$and $impdum_{i,j,t}$ remain positive and statistically significant. In other words, the productivity enhancement of the BOI is not statistically robust.

Table 10: Productivity Determinant Equation Estimation

	$ERP^{W}_{j,t-1}$				$ERP^{W\_FTA}_{j,t-1}$			
	FE	RE	FE	RE	FE	RE	FE	RE
Intercept	9.13(0.12)***	9.21 (0.16)***	9.13(9.13)***	9.25(9.25)***	9.09(0.12)***	9.19(0.16)***	9.1(0.12)***	9.23(0.2)***
$own_{i,j,t}$	0.14(0.1)*	0.37(0.08)***	0.14(0.1)*	0.35(0.08)***	0.15(0.1)*	0.36(0.08)***	0.14(0.1)*	0.35(0.08)***
$exp_{i,j,t}$	0.13(0.09)*	0.46(0.07)***	0.13(0.09)*	0.48(0.07)***	0.12(0.09)*	0.45(0.07)***	0.12(0.09)*	0.47(0.07)***
$rim_{i,j,t}$	0.2(0.09)**	0.42(0.07)***	0.2(0.09)**	0.44(0.07)***	0.21(0.09)**	0.43(0.07)***	0.21(0.09)**	0.45(0.07)
$RDD_{i,j,t}$	-0.03(0.05)	0.32(0.03)***			0.15(0.04)***	0.32(0.03)***		
$RDS_{i,j,t}$			-0.03(0.05)	0.03(0.05)			-0.03(0.05)	0.03(0.05)
$skill_{i,j,t}$	-0.39(0.1)***	-0.26(0.09)***	-0.39(0.1)***	-0.29(0.09)***	-0.35(0.09)***	-0.24(0.09)***	-0.36(0.09)***	-0.26(0.09)***
$CON_{j,t}$	-0.07(0.03)**	-0.05(0.03)**	-0.07(0.03)**	-0.06(0.03)**	-0.07(0.03)***	-0.05(0.03)**	-0.07(0.03)**	-0.06(0.03)**
$BOI_{i,j,t}$	0.09(0.04)**	0.26(0.03)***	0.09(0.04)**	0.28(0.03)***	0.08(0.04)**	0.26(0.03)***	0.09(0.04)**	0.28(0.03)***
$ERP_{j,t-1}$	-0.14(0.08)**	-0.17(0.00)**	-0.14(0.08)**	-0.17(0.08)**	-0.04(0.09)	-0.09(0.09)	-0.05(0.09)	-0.1(0.09)
$XOR_{j,t}$	0.45(0.26)**	0.32(0.26)*	0.45(0.26)**	0.34(0.26)*	0.43(0.27)*	0.27(0.27)	0.43(0.27)*	0.29(0.27)
$MPR_{j,t}$	-0.34(0.37)	-0.34(0.37)	-0.34(0.37)	-0.29(0.37)	-0.32(0.37)	-0.29(0.37)	-0.3(0.37)	-0.24(0.37)
Hausman	295.8(p =0.00)		255.81 (p =0.00)		301.46 (p =0.00)		258.7 (p=0.00)	
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy		Yes				Yes		
No. of observations	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332
No. of groups	4,475	4,475	4,475	4,475	4,475	4,475	4,475	4,475
Overall fit	12.32^{1***}	52485^{2***}	9.94^{1***}	51803.8^{2***}	12.14^{1***}	$52,507^{2***}$	9.85^{1***}	51803.8^{2***}
R^2 *within*	0.0189	0.0158	0.0179	0.0136	0.0185	0.0155	0.0175	0.0133
R^2 *between*	0.0001	0.8959	0.0002	0.8938	0.0004	0.8959	0.0007	0.8938
R^2 *overall*	0.0001	0.8477	0.0004	0.8456	0.0006	0.8477	0.0009	0.8456

Note: The numbers in parentheses are the robust standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.
[1] F-statistic
[2] Wald test
Source: Authors' estimation.

Table 11: Productivity Determinant Equation Estimation

	$ERP^{W}_{j,t-1}$				$ERP^{W\_FTA}_{j,t-1}$			
	FE	RE	FE	RE	FE	RE	FE	RE
Intercept	9.11(0.12) ***	9.19(0.2) ***	9.11(0.12) ***	9.22(0.2) ***	9.06(0.12) ***	9.17(0.2) ***	9.07(0.12) ***	9.2(0.2) ***
$own_{i,j,t}$	0.11(0.1)*	0.32(0.08) ***	0.11(0.1)*	0.31(0.08) ***	0.12(0.1)*	0.32(0.08) ***	0.11(0.1)*	0.31(0.08) ***
$expdum_{i,j,t}$	0.12(0.04)***	0.3(0.03)***	0.12(0.04)***	0.31(0.04) ***	0.11(0.04)***	0.3(0.03)***	0.12(0.04)***	0.31(0.04) ***
$impdum_{i,j,t}$	0.11(0.04)***	0.25(0.03)***	0.11(0.04)***	0.26(0.03) ***	0.11(0.04)***	0.25(0.03)***	0.11(0.04) ***	0.26(0.03) ***
$RDD_{i,j,t}$	-0.03(0.06)	0.3(0.03)***			0.15(0.04)***	0.3(0.03)***		
$RDS_{i,j,t}$			-0.03(0.06)	0.01(0.05)			-0.03(0.06)	0.01(0.05)
$skill_{i,j,t}$	-0.38(0.1)***	-0.24(0.09)***	-0.38(0.1)***	-0.26(0.09) ***	-0.35(0.09)***	-0.22(0.09)***	-0.36(0.09) ***	-0.24(0.09) ***
$CON_{j,t}$	-0.08(0.03)***	-0.06(0.03)***	-0.08(0.03)***	-0.06(0.03) ***	-0.07(0.03)***	-0.06(0.03)***	-0.08(0.03) ***	-0.06(0.03) ***
$BOI_{i,j,t}$	0.04(0.04)	0.15(0.04)***	0.04(0.04)	0.17(0.04) ***	0.03(0.04)	0.15(0.04)***	0.04(0.04)	0.17(0.04) ***
$ERP_{j,t-1}$	-0.14(0.08)*	-0.15(0.08)*	-0.14(0.07)**	-0.15(0)**	-0.03(0)	-0.07(0.09)	-0.04(0.09)	-0.08(0.09)
$XOR_{j,t}$	0.46(0.26)*	0.34(0.26)*	0.46(0.26)**	0.36(0.26)*	0.44(0.27)**	0.3(0.27)*	0.44(0.27) **	0.31(0.27)*
$MPR_{j,t}$	-0.34(0.37)	-0.35(0.37)	-0.34(0.37)	-0.3(0.37)	-0.32(0.37)	-0.3(0.37)	-0.3(0.37)	-0.26(0.37)
Hausman	676.5 (p =0.00)		337.65 (p =0.00)		359.94 (p =0.00)		324.86 (p=0.00)	
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy		Yes		Yes		Yes		ท
No. of observations	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332
No. of groups	4,475	4,475	4,475	4,475	4,475	4,475	4,475	4,475
Overall fit	10.9[1]***	53699.21[2]***	10.9[1]***	53055.13[2]***	12.14[1]*	52,507[2]***	10.82[1]***	53079.62[2]***
R^2 *within*	0.0199	0.0177	0.0199	0.0156	0.0216	0.0155	0.0195	0.0153
R^2 *between*	0.0006	0.8984	0.0006	0.8967	0.0011	0.8959	0.0011	0.8967
R^2 *overall*	0.0009	0.8501	0.0009	0.8483	0.0015	0.8477	0.0014	0.8483

Note: The numbers in parentheses are the robust standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.
[1] F-statistic
[2] Wald test
Source: Authors' estimation.

This finding raises a concern about overemphasising BOI measures for promoting firms' productivity. Our result is in favour of traditional channels like global integration to promote firms' productivity enhancement.

4. Conclusions and Inferences

This paper addresses noticeable changes in trade and investment policies in Thailand in the new millennium and assesses their impact. Both policies have played a pivotal role in driving the economy since 1960. This began with trade policy changes to rely on FTA-led trade liberalisation largely driven by FTA enthusiasm in Thailand, like in other developing countries that entered the race for maximising FTAs since the new millennium. Changes in investment policies then took place due to growing concerns about the sluggish growth in Thailand that was clearly observed since 2006. Investment incentives are ascending based on the level of technological advancement and in certain geographical areas (three provinces in the Eastern part of Thailand) in which a favourable eco-system is being created but is not yet completed, i.e. one-stop service agency, generous investment incentives over and above those generally available elsewhere, huge infrastructure investment, and special development zones.

Our results suggest that the policy changes have not produced the output that the government expects. The signed FTAs have had limited utilisation on both the export and import sides, and their impact on trade has been limited so far and has occurred selectively on certain product lines, as did the FTA-induced direct investment. Similarly, the net impact of enticing foreign direct investors due to the changes in investment policies remains limited and varies across foreign investors. In particular, its impact was observed in the case of Chinese direct investors, and not others.

Where the impact on firms' productivity is concerned, it seems the signed FTAs have a limited effect on promoting firms' productivity improvement, as opposed to unilateral/multilateral trade liberalisation. This seems to be consistent with the FTA trade liberalisation strategy. In contrast, investment promotion policies did have a positive impact on firms' productivity in spite of concerns of statistical robustness. Additionally, the positive impact must be weighted by

foregone tax revenues, so whether its net benefit is positive remains an empirical question.

Three policy inferences can be drawn from this study. Firstly, our analysis highlights the role of traditional tools, i.e. trade openness and skills upgrading, in fostering firm productivity.

Secondly, in theory, FTAs could be used for partial trade liberalisation, but they must be undertaken with a limited level of policy discretion, especially regarding the scope of liberalisation. In particular, tariff cuts under an FTA must be implemented in a comprehensive manner to ensure the negotiation efforts undertaken so far are ultimately worthwhile. Otherwise, it is less likely for a country to materialise such potentials. This seems to be a challenge as the new FTA extends its scope beyond trade in goods and complicates the net benefit a country can gain from a signed FTA.

Thirdly, the weak statistical relationship between the investment incentives provided via the BOI and firms to improve their productivity found in this study raises caution on relying heavily on investment promotion. In fact, its performance in promoting productivity seems to be outperformed by traditional tools, e.g. exporting products abroad and importing raw materials.

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