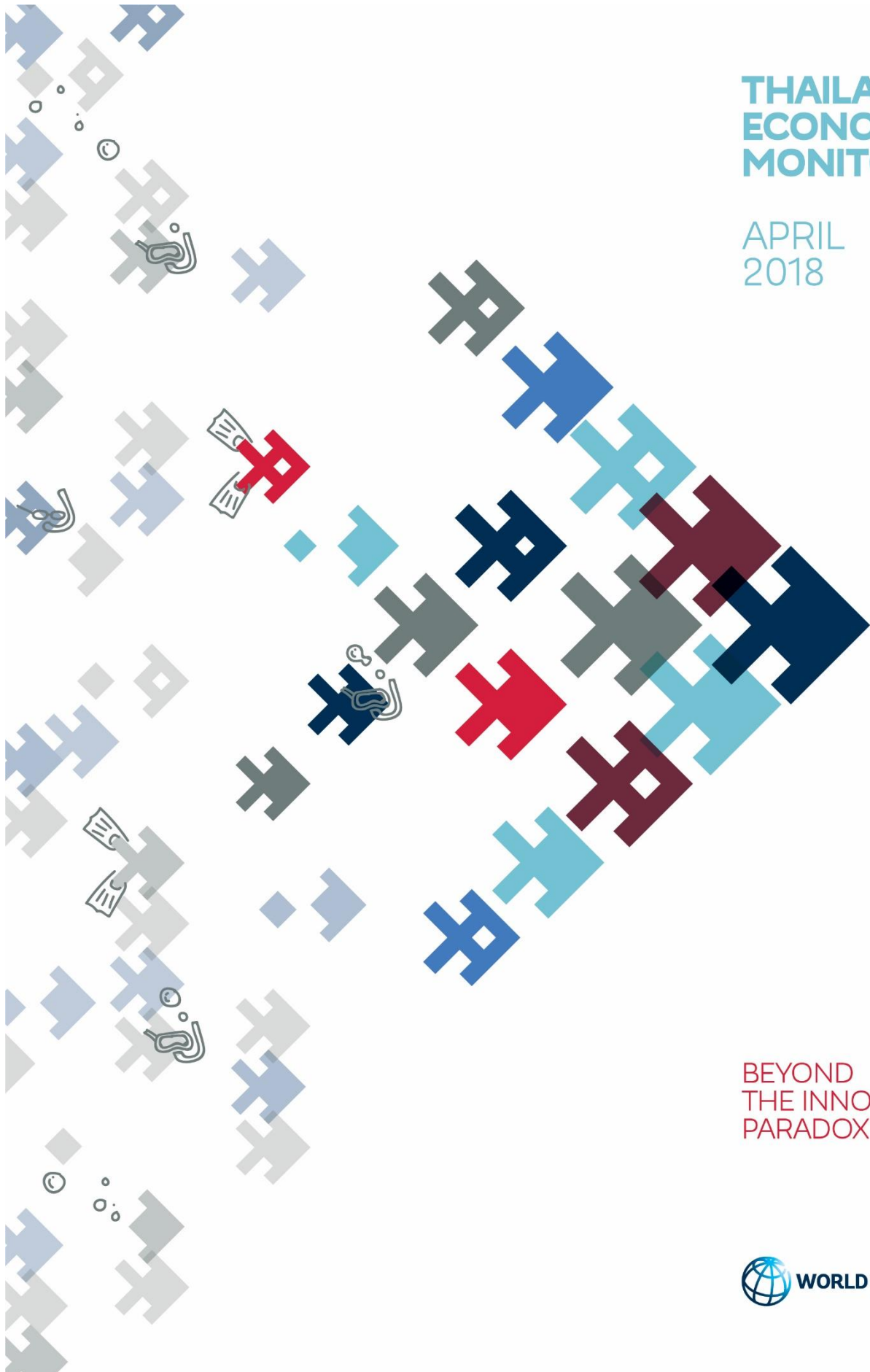


# THAILAND ECONOMIC MONITOR

APRIL  
2018

BEYOND  
THE INNOVATION  
PARADOX



# THAILAND ECONOMIC MONITOR: BEYOND THE INNOVATION PARADOX

APRIL 2018

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## Executive Summary

### Part 1. Macroeconomic Developments and Outlook

**The global economy grew by an estimated 3.0 percent in 2017, up from 2.4 percent in 2016.** Growth in both advanced economies (2.3 percent) and emerging markets and developing economies (4.3 percent) exceeded expectations.

**Rapid export growth, buoyed by healthy global growth, drove Thailand's economic growth to 3.9 percent in 2017, the fastest GDP growth since 2012.** Growth accelerated in the second half of the year – with robust growth of 4.3 percent in 2017Q3 and 4.0 percent in 2017Q4. A sharp acceleration in net exports accounted for 40 percent of the growth from 2016 to 2017. Export rose by 7.5 percent in 2017, the highest growth since 2011, driven by sharp increase in merchandise exports and a rebound in tourism with a 9 percent increase in tourist arrivals from 2016.

**While external demand drove growth, domestic demand remained sluggish: consumption grew marginally faster in 2017, while investment growth decelerated.** Private consumption grew at 3.2 percent in 2017, slightly faster than in 2016 (3.1 percent), reflecting modestly rising consumer confidence and strong consumption of durables, while weakness in farm incomes and still elevated household debt weighed down consumption. Investment growth decelerated from 2.8 percent growth in 2016 to 2.1 percent in 2017. Government investment grew at 2.2 percent in 2017, significantly below the 7.4 percent growth in 2016, as the implementation of large projects suffered from approval and procurement delays. Private investment grew faster than in 2016 at 2.2 percent, with an increase in capacity utilization and acceleration in capital goods imports pointing to a potential recovery.

**Thailand maintained low and stable inflation, external stability and the domestic financial system remains well capitalized.** Headline inflation edged higher to 0.7 percent driven by higher oil prices and slightly firmer domestic activity but remains below the target range of 1-4percent. Policy rates remained unchanged during the period at 1.5 percent. With regards to external stability, Thailand remained well placed to manage any potential volatility arising from cross-border capital flows: external debt levels to GDP remain lower than the rest of the region and most external debt is either baht denominated or hedged against currency fluctuations. The domestic financial system remained well capitalized with capital to risk-weighted assets ratio above the Bank of Thailand's minimum requirements. However, rising Non-Performing Loans (NPLs) ratios remain a concern.

**Thailand has made progress in reducing poverty but continued progress will depend on productivity gains.** Poverty is expected to decline at a slower rate in rural areas in the medium term as agricultural prices are not expected to reach highs observed in recent years due to the global commodity cycle.

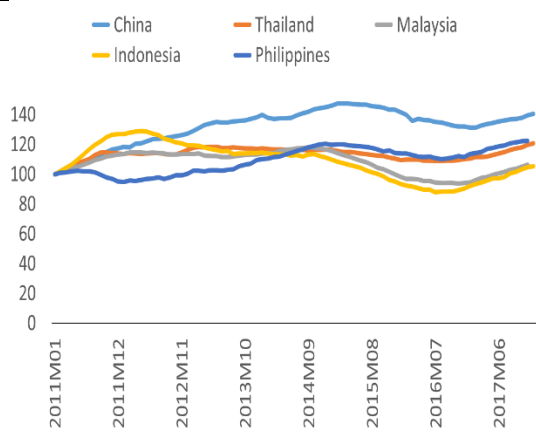
**Thailand's economic recovery is expected to accelerate in 2018, with growth projected at 4.1 percent, driven by external demand and private consumption.** Growth is projected to be underpinned by continued strength in merchandise exports and further recovery in private consumption, signaled by improving consumer confidence and continued deleveraging. However, the growth rate of exports may

slow over the medium term because of the base effect from elevated exports in 2017 and the potential impact from real exchange rate appreciation. Consumption growth will still face headwinds from slowing farm income, because of falling agricultural prices, and continued high debt burden for low income households. Government measures for low income earners and farmers, if well targeted, could potentially add mitigate the fall in disposable incomes. Key economic indices, such as the Bank of Thailand's Coincident Economic Index (CEI) and Leading Economic Index (LEI) point to an uptick in the business cycle (Figure 21) and a further pick-up in economic activity going into 2018.

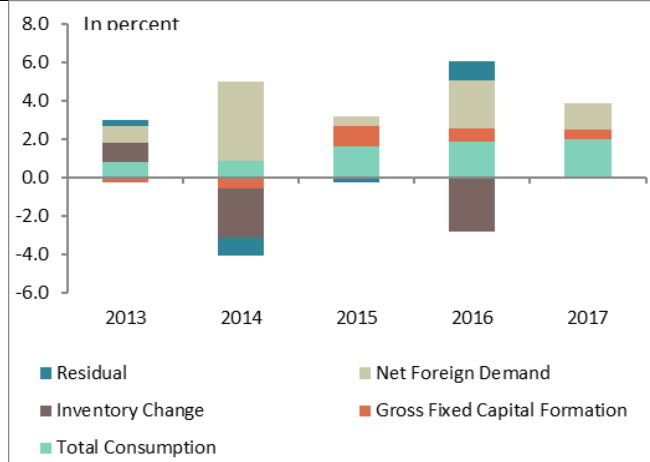
**A potential broadening of the economic recovery in 2018 will depend on progress in the implementation of critical public investment projects.** A pick up in private investment is also expected in 2018, as signaled by improved business sentiment and acceleration of capital goods imports in late 2017. The extent of the private investment rebound will depend on the progress on implementing large public infrastructure projects. Government has budgeted for a 15 percent increase in capital expenditure, with a focus on efficiency measures to accelerate disbursement. The pace of disbursements will pick up, with a planned 49 percent increase in investments under the Transportation Action Plan. Projects anticipated to begin construction in 2018 include the yellow and pink lines of the sky train private-public partnership (PPP) projects, three dual track railways, and the China-Thailand high speed rail from Bangkok to Nong Khai. Even though the budget shows an ambitious scale up in disbursement, challenges remain on project execution especially around land acquisition and labor shortages.

**The government has focused on economic reforms aimed at raising Thailand's potential growth to achieve high income and inclusive growth as envisioned in the new 20-year national strategy.** Initial steps taken are promising and bode well for reinvigorating investor confidence. Some recent highlights from the ongoing reform efforts include the passing of the Eastern Economic Corridor (EEC) Act, the new Competition Act, the Procurement Law and regulatory reforms to raise Thailand's 2017 Ease of Doing Business Ranking to 26. Continued reform efforts as well as institutional capacity to maintain implementation will be crucial for raising Thailand's potential growth above 4 percent.

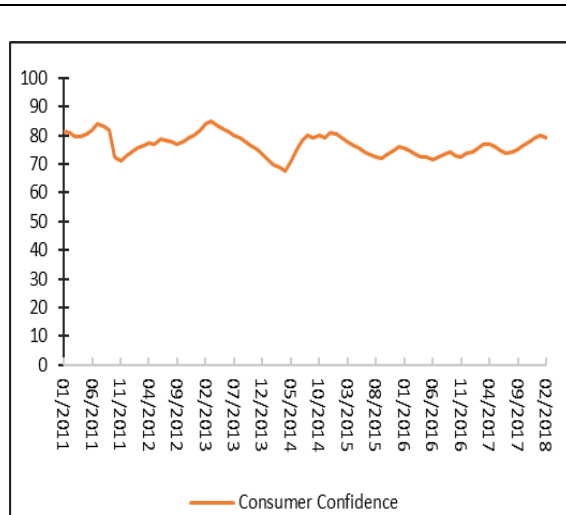
Exports picked up across the region...  
/ Percent, percentage points



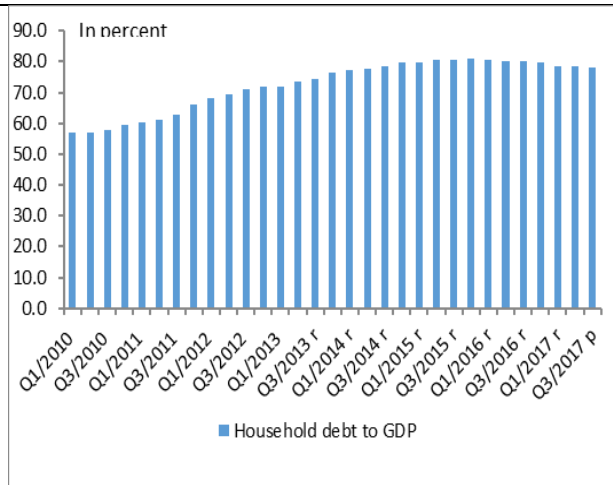
...pushing up growth in Thailand in 2017..  
/ Percent, percentage points



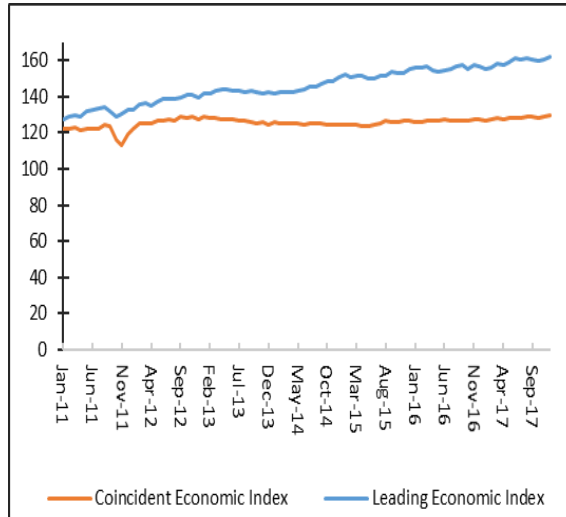
...as private consumption continued a steady recovery, with rising confidence...  
/ Consumer Confidence Index



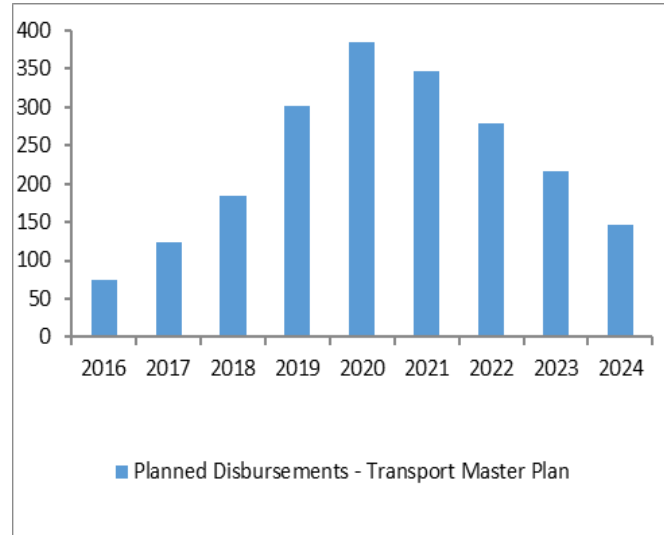
... amid lingering concerns about still high household debt.



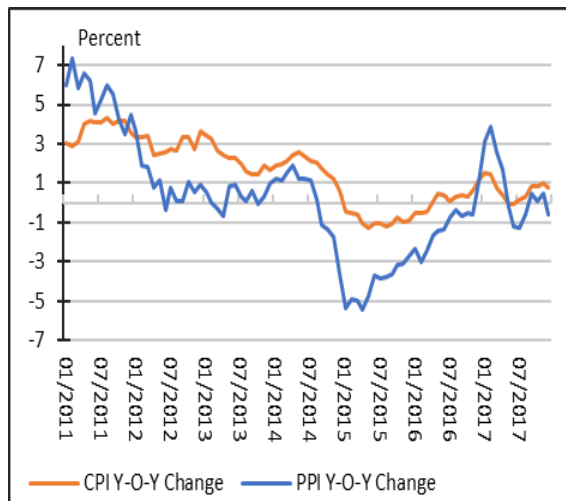
Private investment is showing signs of recovery, with improving leading indicators.



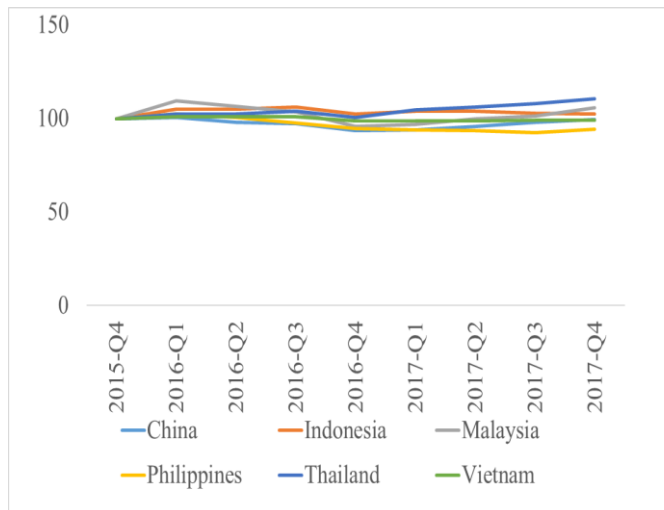
A sustained, broadening recovery will depend on the execution of ambitious public infrastructure plans.  
/ Billion Baht



Inflation remains below target..  
/ Y-O-Y Change, Percentage



..while healthy external accounts have driven a nominal appreciation of the Baht, in line with regional currencies.  
/ Index, 2015 =100



## Part 2. Beyond the Innovation Paradox

**Thailand's journey to upper middle-income was accompanied by a spectacular structural transformation.** The Thai economy grew rapidly in the 1980s, with economic liberalization and a shift of labor from agriculture to manufacturing and services. Thailand attracted foreign direct investment and became an exporting powerhouse. Growth averaged 6 percent annually during 1980-2015. In the two decades since the East Asia crisis, Thailand's competitive edge from the structural transformation in the 20<sup>th</sup> century has largely eroded, and potential growth has fallen to an estimated 3.5 percent on average over 2013-17.<sup>1</sup>

**Long-term growth prospects will rest on innovation and productivity in manufacturing and service sectors.** Services now account for approximately half of output and around 40 percent of employment. While service industries such as tourism and health services are highly successful, many others stagnate at low levels of productivity, with low levels of healthy "creative destruction" and turnover where new productive and innovative firms enter and thrive. Productivity is highest in manufacturing, which accounts for roughly 35 percent of output but only 15 percent of 39-million-member labor force. However, mega-trends such as the technological revolution, global connectivity, demographics and a scarcity of high-tech skills are changing what firms are looking for in a desirable manufacturing location. Companies once influenced by the prospect of inexpensive labor costs are beginning to favor locations that can better take advantage of new technologies, skilled labor and specialized service inputs.

**Thailand aspires to regain robust economic growth for lasting, shared prosperity among its people.** This aspiration is embedded in Thailand's 20-year national strategy, with a focus on harnessing new engines of growth such as technology, innovation, and services. The reform program encompasses areas such as competitiveness (5 S-curve innovative sectors: automation and robotics, aerospace, bio-energy and bio-chemicals, digital and medical and healthcare, SME promotion, ease of doing business, skills and education), tax (personal, property and inheritance taxes, FDI and SME tax incentives), state-owned enterprises (state-owned enterprises and specialized financial institutions), infrastructure (rail, road, and air links; integrated water management) and digital economy (broadband access and e-payments for SMEs and online commerce).

**Thailand is an example of an emerging market facing the innovation paradox: returns to R&D are high but actual investments are low compared to peers.** Firms that invest in technology exhibit higher productivity (World Bank Enterprise Survey 2016). Siam Cement Group, Indorama, and Charoen Pokphand Foods are prominent examples of innovative Thai firms that have become globally competitive. Nevertheless, such firms remain few. Past policies to boost overall R&D have had limited results. R&D spending, patents, and the numbers of science and technology professionals in Thailand is behind those of Malaysia and China. Thailand ranks 52 out of 128 in the Global Innovation Index (Cornell University / INSEAD / WIPO), behind Malaysia and Singapore. Firms cite difficulties in finding skilled labor, such as IT professionals and English speakers, as obstacles to productivity upgrading (see Productivity Investment Climate Survey 2016).

**How can Thailand overcome the innovation paradox?** Can Thailand create an environment that rewards and incentivizes the pursuit of innovation while strengthening the ability of institutions to implement such an environment? Our analysis of the Thai economy and international experience points to five critical

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<sup>1</sup> IMF (International Monetary Fund) Article IV consultation 2016 and ADB (Asian Development Bank) *Asian Development Outlook 2016: Asia's Potential Growth*



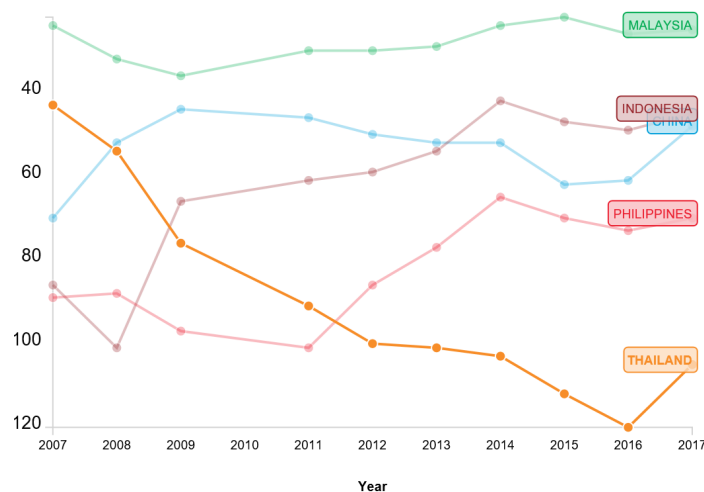
building blocks of an innovation economy that Thailand may pursue: competition policy, service liberalization, intellectual property rights, a national data strategy, and skilled labor.

**Competition policy.** Competition, both domestic and international, lowers firm profit margins and incentivizes firm to innovate in order to survive and excel. It also fosters industry dynamism through the entry of new firms and the selection of efficient and innovative firms. Historically, implementation of competition policy has been lacking. Although several complaints were made to the Trade Competition Commission between 1999-2015 involving unfair trade practices, restrictive agreements and abuses of dominant positions (and decisions were made in 84 cases), only one was prosecuted. The 2017 Competition act is an improvement but implementation can be further strengthened by legal clarification of treatment of state-owned enterprises and quasi-fiscal measures such as price control as well as incentivizing reporting of cartel behavior.

**Sector liberalization and trade in services.** The service sector can serve as a new driver of growth by harnessing domestic and global competitive forces. Services is becoming increasingly important to growth due to its complementarity with manufacturing, criticality in the global value chain and rising tradability given technological advances. A global World Bank study finds that Thailand has a more restricted service market on average compared to ASEAN peers such as Malaysia and other regions in the world, particularly in professional services such as accounting, legal, architecture, engineering and management consulting. Labor productivity in the service sector lags behind that of the manufacturing sector by 28 percent (see World Bank Thailand Economic Monitor Fall 2017). Integration in services can be deepened considerably by implementing Thailand’s commitments laid out within the AEC framework agreement on services such as Mutual Recognition Agreements on free flow of skilled professionals.

**Intellectual property.** The pursuit of innovation is a risky, costly and long-term endeavor. Intellectual property protection is critical to enable firms and researchers to make such risky investments. Thailand’s ability to implement intellectual property has been in decline as reflected in Thailand’s ranking of 110 in the World Economic Forum Global Competitiveness Sub-index for intellectual property protection, significantly below peers such as Malaysia, Indonesia and the Philippines.

Figure i. Intellectual Property Protection (Rank)



Source: World Economic Forum Global Competitiveness Index

Enhancing IP would include amendment of the existing IP regulatory framework to ensure compliance with a TPP-like regime; providing the Department of Intellectual Property with enhanced financial autonomy and enabling it to retain stronger competencies to implement its mandate; and enhancing the institutional capacity of all IP-related agencies, including all relevant enforcement agents, ranging from judges and personnel of the Intellectual Property and International Trade Court (IPIT) Court, to police and custom officials, private and public-sector lawyers.

**A national data strategy.** Data is the new “natural resource” and can help firms raise productivity and innovation. In the Thailand enterprise survey, firms that use IT technology, show higher productivity. Globally, the importance of data can be seen from the fact that six of the top ten companies in the world by market capitalization are companies that are in the business of data. These include Apple, Amazon, Alphabet, Facebook, Microsoft and Tencent Holdings<sup>2</sup>.

Developing a national strategy on data would be beneficial for Thailand. Currently, Thailand’s approach to data is limited to the promotion of open data in government, and integrating data for providing better services to citizens and businesses. Thailand can look at data in a broader perspective (including private sector data). For example, an increasing amount of data will be generated by machines or processes related to the Internet of Things, including factories of the future and autonomous connected devices and systems. However, no comprehensive policy frameworks exist with regard to non-personal machine generated data or to the conditions in which such data can be exploited or traded.

A national strategy on data could touch upon these as well as issues of i) data standardization; ii) free flow of data; iii) access to machine-generated data; iv) liability and safety issues related to data; v) establishing 311 type of data services to facilitate the location, processing and brokering of data; vi) creation of data maps; vii) providing support to data matching services; and viii) helping grow data exchanges and markets. Most of these interventions, for example, underpin Korea’s recent Master Plan for the Intelligent Information Society<sup>3</sup>.

**Skilled Labor.** Workforce development policies help shape a country’s human capital pool to support an innovative knowledge-based economy. Workforce development policies include the following areas, each one with a specific set of objectives: i) education - creates the next generation of workers; ii) training - targets skills development for current labor market needs; iii) upskilling - helps current workers adapt to the changing labor market; iv) migration and talent attraction - can fill skills gaps in the short-term. Coordination between these policies is going to be crucial to build the skills and human capital for the shift to the knowledge-based economic model envisioned as part of the Thailand 4.0 aspiration.

Thailand can focus on building a skill monitoring system to address skill shortages which can be applied to training, education and migration policy. In the United Kingdom and Australia, occupations and skills imbalances monitoring procedures and the structures for formulating regularly published “skilled occupation shortages lists” have been established and are continuously maintained. These procedures combine “top down” analysis of key labor market data with “bottoms up” input from and validation by industry. In both countries skills imbalance monitoring is used to inform and prioritize a broad range of

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<sup>2</sup> Forbes rankings for 2017 of the World’s Biggest Public Companies (<https://goo.gl/pK7vXV>).

<sup>3</sup> Mid to Long Term Masterplan in Preparation for the Intelligent Information Society, (<https://goo.gl/3x7TTt>).

human capital policies, from the curricula standards that have to be met by academic and technical-vocational education providers to scholarships, apprenticeships, public employment programs, and fiscal and immigration incentives used to tap the international supply of skills. Recently, Malaysia has also introduced a similar tool – the Critical Occupation List - to inform both immigration and human resource development policies.

## Part 1. Macroeconomic Developments and Outlook

### Part A. The Economy in 2017

**The global economy grew at an estimated 3.0 percent in 2017, slightly above expectations in mid-year, with synchronous recovery in advanced economies and emerging markets and developing economies (EMDEs).** (Table 1). The upturn was geographically broad-based, with growth increasing in over half of the world's economies. Advanced economies growth rebounded to 2.3 percent from 1.6 percent in 2016, supported by broad-based strength in domestic demand, especially investment, and stronger exports (e.g., Japan and Euro Area). Emerging markets and developing economies growth accelerated to 4.4 percent in 2017, reflecting a cyclical rebound in commodity-exporting economies, amid robust growth in commodity-importing economies (E.g., China and India) (Table 1).

**Buoyed by healthy global growth, Thailand's exports grew at the fastest rate since 2011. Net exports helped drive Thailand's economic growth to 3.9 percent in 2017, the best growth performance since 2012 (Figure 1 and Table 2).** Economic growth exceeded market expectations and accelerated in the second half of the year – with robust growth of 4.3 percent in 2017Q3 and 4.0 percent in 2017Q4. Growth was supported by a steady rise in domestic consumption and a sharp acceleration in net exports, accounting for close to 40 percent of the growth from 2016 to 2017. Gross exports accelerated close to 7.5 percent in 2017, the highest growth since 2011, driven by a sharp increase in merchandise exports and a rebound in tourism with a 9 percent increase in tourist arrivals from 2016.

**While external demand helped drive growth, domestic demand remained sluggish: consumption only grew marginally faster in 2017 while investment growth decelerated.** Private consumption grew at 3.2 percent in 2017, slightly faster than the 3.1 percent growth in 2016, which reflects modestly rising consumer confidence and strong consumption of durables. However, this was counterbalanced by weakness in farm income and elevated household debt. Investment growth decelerated from 2.8 percent growth in 2016 to 2.1 percent in 2017. This was driven by government investment, which grew at 2.2 percent in 2017 compared to 7.4 percent in 2016, driven by inclement weather and delays in approval and procurement for large projects. Private investment grew faster than in 2016 at 2.2 percent with signs of potential recovery, such as an increase in capacity utilization and acceleration in capital goods imports.

**On the production side, the agriculture sector recovered from the severe drought in 2015, with output expanding by 6.2 percent, while manufacturing and retail grew faster than in 2016.** Agricultural prices declined by 6.1 percent, driven by rubber and oil palm price decline, but this was offset by a significant increase in agricultural production, especially in rice paddy production. The manufacturing sector expanded by 2.5 percent in 2017, slightly faster than in 2016, driven by an acceleration of production in export-oriented industries. Wholesale and retail grew by 6.3 percent in 2017 from 5.3 percent in 2016, with retail sales growing at the fastest rate since 2012, supported by higher private consumption and increase in tourism.

**Thailand has continued to make progress in reducing poverty (Figure 2) but continued progress will depend on productivity gains.** Poverty is expected to decline at a slower rate in rural areas in the medium term as agricultural prices are not expected to reach highs observed in recent years due to the global commodity cycle. Growth could become less inclusive, with the rural poor negatively affected unless agricultural productivity increases.

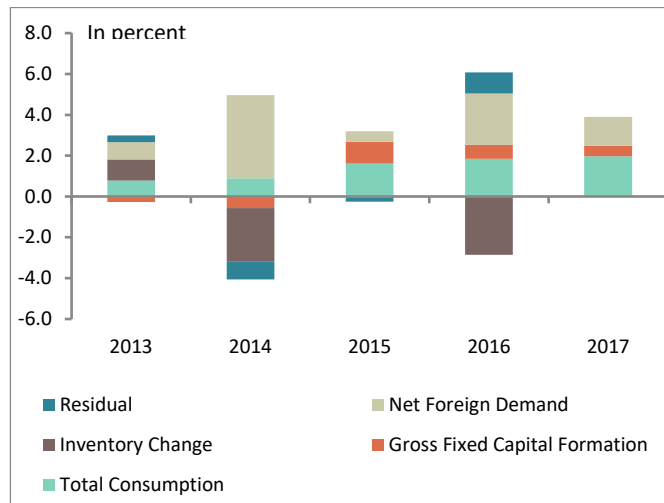
**Thailand maintained low and stable inflation and external stability, and the domestic financial system remains well capitalized.** Headline inflation edged higher to 0.7 percent driven by higher oil prices and slightly firmer domestic activity, but remains below the target range of 1-4 percent. Policy rates remained unchanged during the period at 1.5 percent. With regards to external stability, Thailand remained well placed to manage any potential volatility arising from cross-border capital flows: external debt levels to GDP remain lower than the rest of the region and most external debt is either Baht denominated or hedged against currency fluctuations. Within the domestic financial system, Non-Performing Loans (NPLs) ratios edged higher but the rate of growth of NPLs slowed down and capital to risk-weighted assets ratio were above the Bank of Thailand's minimum requirements.

Table 1: Real GDP growth / percent change from previous year

	2016	2017 estimate (as of Jun 2017)	2017 estimate (as of Dec 2017)	Difference from June 2017 forecast
<b>World</b>	<b>2.4</b>	<b>2.7</b>	<b>3.0</b>	<b>0.3</b>
<i>Advanced Economies</i>	1.6	1.9	2.3	0.4
United States	1.5	2.1	2.3	0.2
Japan	0.9	1.5	1.7	0.2
Euro Area	1.8	1.7	2.4	0.7
<i>Emerging Markets and Developing Economies</i>	3.7	4.1	4.3	0.2
East Asia and Pacific	6.3	6.2	6.4	0.2
China	6.7	6.5	6.8	0.3
Thailand	3.2	3.2	3.9	0.7

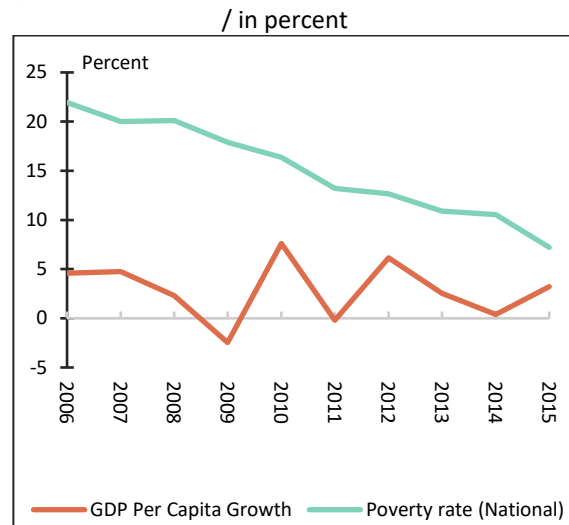
Source: World Bank Global Economic Prospects, January 2018

Figure 1: Contribution to real GDP growth  
/ Percent, percentage points



Source: NESDB, World Bank Staff Estimates

Figure 2: Poverty rate and GDP per capita growth  
/ in percent



Source: NESDB; World Bank Staff estimates

Table 2: Selected Economic and Social Indicators

	2015	2016	2017e	2018f	2019f
<b>Real gross domestic product</b>	<b>2.9</b>	<b>3.2</b>	<b>3.9</b>	<b>4.1</b>	<b>3.8</b>
Private consumption	2.2	3.1	3.2	3.1	3.1
Government consumption	3.0	1.7	2.0	2.7	2.7
Gross fixed capital investment	4.4	2.8	2.1	5.4	4.6
Exports, goods and services	0.7	2.1	7.5	6.9	6.0
Imports, goods and services	0.0	-1.4	6.5	6.8	5.9
Change in inventories, cont to growth	0.0	-2.8	0.0	0.0	0.0
Residual, cont to growth	-0.2	1.0	0.0	0.0	0.0
<b>GDP, at market prices</b>	<b>2.9</b>	<b>3.2</b>	<b>3.9</b>	<b>4.1</b>	<b>3.8</b>
Agriculture	-5.7	0.6	6.2	4.0	3.5
Industry	2.8	2.1	2.9	3.5	3.5
Services	4.1	4.3	4.3	4.6	4.1
Consumer price index, average	-0.9	0.2	0.7	1.2	1.7
Current account balance, % of GDP	8.0	11.8	10.9	11.2	11.5
Fiscal Balance, % of GDP	0.1	-2.6	-2.8	-2.9	-2.7

Sources: Central Bank of Thailand, NESDB and World Bank Staff Estimates. Historical fiscal balance based on IMF Article IV

Note: Figures for 2017 are tentative, and may present variations with respect to official estimates

Data in annual percentage change, unless otherwise specified. e = estimate. f = forecast

## Real Sector Developments

### *Exports: riding the wave of global recovery*

**Exports grew at the fastest rate since 2012, at 7.5 percent, driven by acceleration in merchandise goods exports and in tourism.** Goods exports grew by 9.7 percent (f.o.b basis) in 2017 as compared to only 0.1 percent in 2016, thanks to increases in export volume and value for automotive, electronics, agro-manufacturing products and agricultural products (Table 3). This reflected a regional trend as export growth increased in all economies in the region -- nevertheless, Thailand's export growth was slower than its neighbors (Figure 3). Tourism is a major export revenue earner for Thailand, accounting for close to 20 percent of goods and services exports in 2017. Thailand remains a popular destination for tourists and is the second most visited country in Asia after China. The number of foreign tourists increased by 9.9 percent to 35 million and receipts from foreign tourists, in Baht terms, increased by 12 percent in 2017.

**A pick up in the global technology cycle has driven faster electronics exports in East Asia, but Thailand has benefited less than its neighbors.** A rise in industrial production and the re-stocking of technology inventory (including mobile phones) have been among the most significant determinants of global export growth in 2017<sup>4</sup>. Global electronics exports are likely to expand further, driven by advancement of technology inducing demand for parts, rise in smartphone penetration in new markets and accelerated growth in the Internet of Things (IoT)<sup>5</sup>. Countries in East Asia and Pacific have benefited disproportionately, given the global dominance of some countries (China, Malaysia and Philippines) in exports of integrated circuits and semiconductor devices. As its share in global markets is relatively low, Thailand has benefited less than its neighbors, with electronics exports, in real terms, only recovering to 2010 levels by the end of 2017 (Figure 4).

**Imports grew by 6.5 percent in 2017, following a contraction in 2016.** Import value of all major products grew in 2017 (Table 4) but the largest increases were in import of raw materials and intermediate goods, driven by higher cost of crude oil and petroleum product imports. Capital goods imports grew by 8.6 percent in 2017, following a decline of 2.6 percent in 2016 (Table 4), reflecting a rise in machinery and equipment imports, which is a leading indicator for increased private investment activity in 2018.

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<sup>4</sup> IMF, 2017. Seeking Sustainable Growth: Short-Term Recovery, Long-Term Challenges. International Monetary Fund. Washington DC, October.

<sup>5</sup> Bank of Thailand, March 2017. Monetary Policy Committee Report,

Table 3: Value of Goods Exports (f.o.b basis)  
 / percent change from previous year unless otherwise state

	2016	2017	Percentage share of 2017 goods exports
<b>Total Exports</b>	<b>0.1</b>	<b>9.7</b>	<b>100.0</b>
<i>Agriculture Products</i>	-6.2	20.0	7.7
Rice	-4.4	17.2	2.2
Rubber	-12.1	35.7	2.6
<i>Fishery, Forestry and Mining</i>	26.4	13.9	2.1
<i>Manufacturing</i>	-1.2	10.3	88.1
Electronics	-2.8	14.2	15.1
Automotive	3.2	6.3	15.1
Apparels and Textiles	-5.5	3.9	2.9
Agro-Manufacturing	1.0	12.3	12.4
Machinery and Equipment	-0.3	7.3	8.8
<i>Other Exports</i>	75.5	-19.6	2.7
<i>Adjustment for BOP</i>			-0.7

Sources: Central Bank of Thailand, World Bank Staff Estimates.

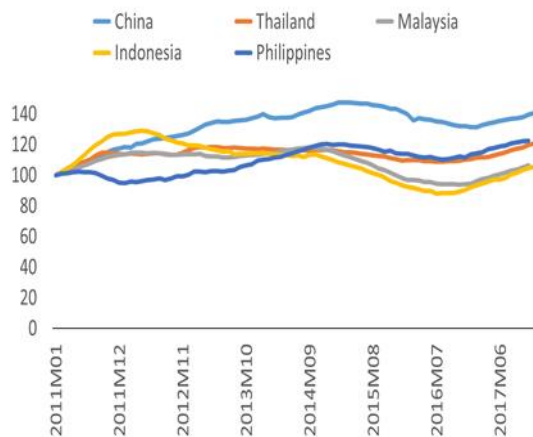
Table 4: Value of Goods Imports (f.o.b basis)  
 / percent change from previous year unless otherwise state

	2016	2017	Percentage share of 2017 goods exports
<b>Total Imports</b>	<b>-5.1</b>	<b>14.4</b>	<b>100.0</b>
<i>Consumer Goods</i>	6.0	7.3	11.2
<i>Capital Goods</i>	-2.6	8.6	27.7
<i>Raw Materials and Intermediate Goods</i>	-8.0	16.9	58.7
Fuel	-22.6	31.1	14.8
Electronics Parts	-2.7	11.1	13.9
<i>Other Imports</i>	3.0	28.0	12.1
Automotive imports	8.1	2.7	5.1
<i>Adjustment for BOP</i>			-10.0

Sources: Central Bank of Thailand, World Bank Staff Estimates.

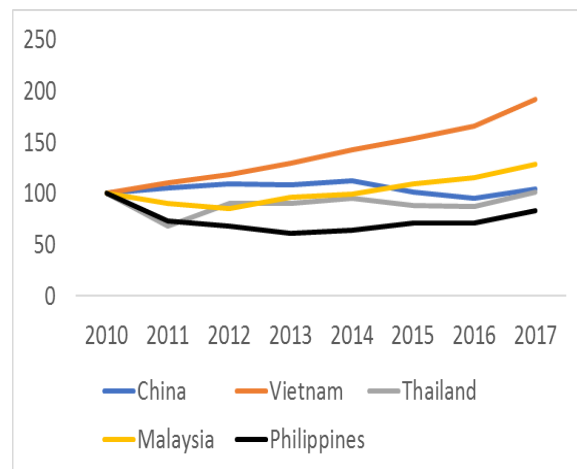


Figure 3: Value of Exports  
/ Index of 12 month moving sum, 2011 = 100



Source: CEIC, WB Staff Estimates

Figure 4: Electronics Exports  
/Deflated Index, 2010 = 100



Source: World Bank; IMF World Economic Outlook, Philippines Statistics Authority, China General Administration of Customs, Department of Statistics, Malaysia, ASEAN-CEIC Generate; and World Bank staff estimates. Note: Definitions of exports for electronics differ across countries

*Private Consumption: a gradual recovery, held back by structural inequality*

**Private consumption growth picked up from 3.1 percent in 2016 to 3.2 percent in 2017 and consumer confidence increased marginally but remained below 2011 peak levels.** Consumption accounted for close to 50 percent of GDP in 2017, and thus, the modest uptick in consumption growth contributed to close to half of aggregate economic growth in 2017 (Figure 1). Consumer confidence increased to its highest level since January 2015 but remained below 2011 peak levels (Figure 5). Private consumption index that measures consumption activity<sup>6</sup> (Table 5) increased for all categories of goods except for non-durables (Table 5). Consumption of durables and services accelerated in 2017 (Table 5). Sales of passenger cars showed a marked 18 percent increase in 2017, after disappointing growth of 1.5 percent in 2016 and

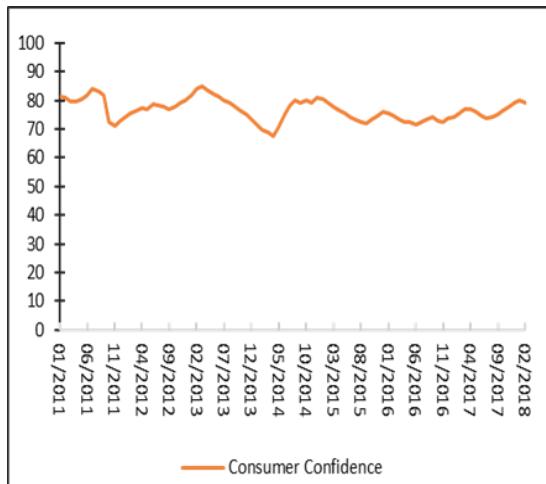
<sup>6</sup> The BoT private consumption index provides a snapshot of consumption activity in the economy and consists of the following indices: Non-Durables Index consisting of the Nielsen's fast moving consumer goods index, household electricity consumption and sales of fuel; Semi-Durables Index consisting of retail sales of textile and apparel at constant price, and import of textile and clothing; Durables Index consisting of sales of passenger cars, motorcycles and commercial cars; Services Index consisting of VAT of hotel and restaurants, sales of passenger transportation; and Non-residents expenditure index for measuring tourism, which is subtracted to obtain private consumption.

a decline of 8 percent in 2015, with the end of the 5-year restriction on sales of passenger cars bought under government subsidy schemes.

**Consumption growth was weighed down by decelerating farm incomes which remain 20 percent lower than their November 2011 peak.** Agriculture still accounted for 31 percent of the labor force in 2017. Thus, farm income is an important driver of consumption. Farm incomes increased by 2.8 percent in 2017, recovering from the decline from the 2015-16 drought, but remain 20 percent lower than their November 2011 peak (see discussion on production for more on agriculture sector performance).

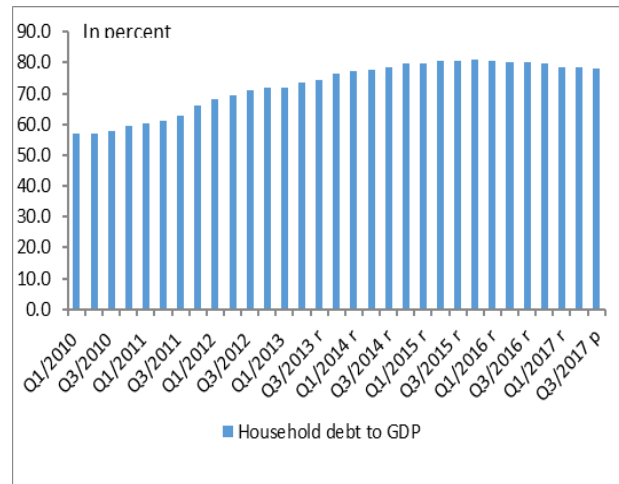
**Aggregate household debt fell as a share of GDP in 2017 but household debt burden increased for households in the poorest income quintile.** Household debt to GDP ratio has fallen for seven consecutive quarters from a peak of 81.2 percent of GDP in 2015Q4 to 78.3 percent of GDP in 2017Q3 (Figure 6). However, deleveraging has been uneven and concentrated in wealthier households in certain regions. Debt burden for households at the higher income quintile and in Bangkok has decreased in 2017, while the burden for households in the lowest income quintile has increased in the same period (Figure 7 and 8). This reflects continued challenges with reducing income inequality and generating inclusive growth. The uneven leveraging also affects aggregate consumption as poorer households tend to have a higher marginal propensity to spend disposable income<sup>7</sup>.

Figure 5: Consumer Confidence Index



Source: Thailand Chamber of Commerce

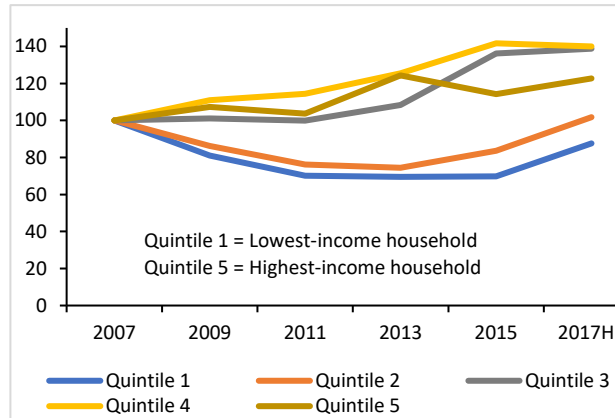
Figure 6: Household debt to GDP



Source: Bank of Thailand

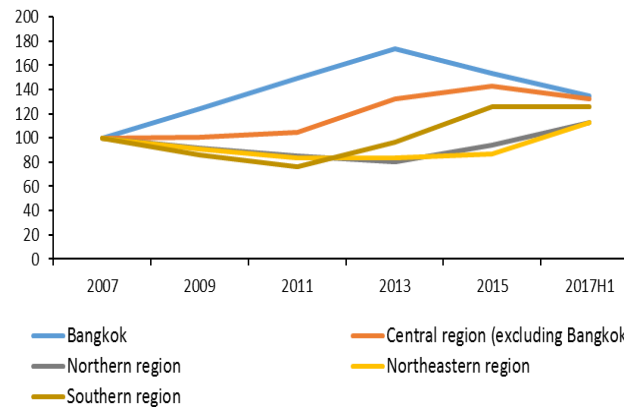
<sup>7</sup> "Thailand: Selected Issues: Current Account from a Savings-Investment Perspective", IMF (May 2017).

Figure 7: Household debt classified by income  
/ Index 2007 = 100



Source: Bank of Thailand

Figure 8: Household debt classified by region  
/ Index 2007 = 100



Source: Bank of Thailand

Table 5: Private Consumption Index and Components, Seasonally Adjusted  
/ end of year percent change from previous year

	2016	2017
<b>Private Consumption Index</b>	<b>3.7</b>	<b>6.6</b>
Durables Index	-2.3	13.6
Semi-Durables Index	1.4	1.9
Non-Durables Index	2.1	-0.1
Services Index	5.8	14.2
Nonresidents Expenditure Index	2.4	15.8

Sources: Bank of Thailand, World Bank Staff Estimates.

*Private Investment: signs of recovery*

**Private investment grew at 1.7 percent in 2017, as compared to 0.5 percent in 2016, but fell as a share of GDP.** This reflects two divergent trends: export-oriented industries' investment picked up (highlighted further in discussion on manufacturing) with a significant increase in capacity utilization while domestically-oriented industries' capacity utilization declined marginally. Output for SMEs, which employ 80 percent of all employees and are largely domestically oriented, grew slower than GDP in 2017. The composite private investment index<sup>8</sup> grew marginally by 1 percent in 2017. The index is still 5 percent

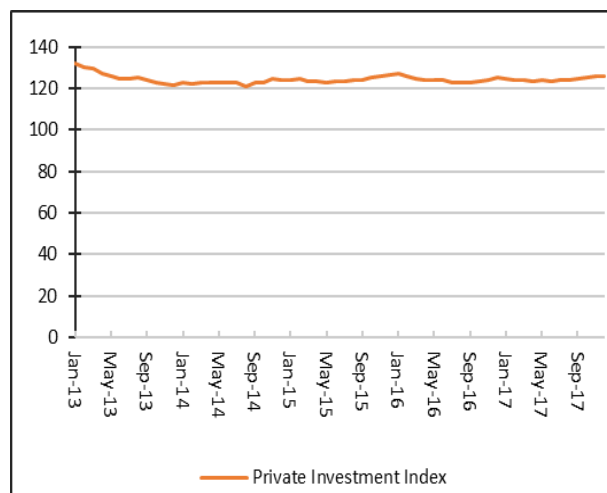
<sup>8</sup> The composite index, created by the Bank of Thailand (BOT) incorporates the following measures of private investment: construction area permitted, construction materials sales index, imports of capital goods, domestic machinery sales and domestic car sales for investment purposes.

lower than the Jan 2013 levels (Figure 9) but has improved from the mid-2015 low. This highlights that private investment is showing signs of recovery but is yet to fully recover.

**Private construction investment declined by 2.5 percent in 2017 while machinery and equipment investments grew faster than in 2016.** Private construction investment declined in 2017, which is also reflected in a 6 percent decline in the permitted construction area and 3 percent decline in sales of construction material in 2017. The construction sector performance is discussed in further detail in the GDP by production section. Investment in machinery and equipment, which accounted for 80 percent of fixed capital formation, picked up by 2.4 percent in 2017. Capital goods imports and car sales for investment accelerated in 2017, growing at 3.6 percent and 8 percent respectively in 2017. Higher imports of capital goods signal a potential pick up in private investment activity in 2018.

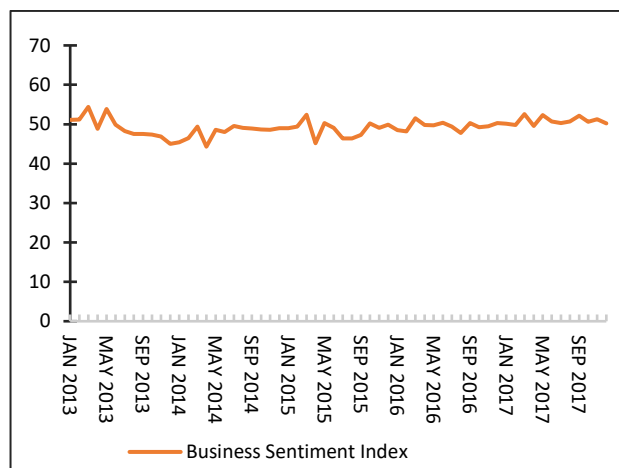
**Business sentiment continued improving in 2017 with boosts from political continuity and policy stability.** The ascension of King Maha Vajiralongkorn and promulgation of the of the new constitution contributed to political stability. In addition, the passing of the Eastern Economic Corridor law by the national assembly signaled policy continuity and boosted investor sentiment. Business sentiment shows a marginal improvement in 2017 and has recovered from the negative sentiments until the start of 2017 (Figure 10).

Figure 9: Private Investment Index  
/ Index, Jan 2010 = 100, SA, 3 month moving average



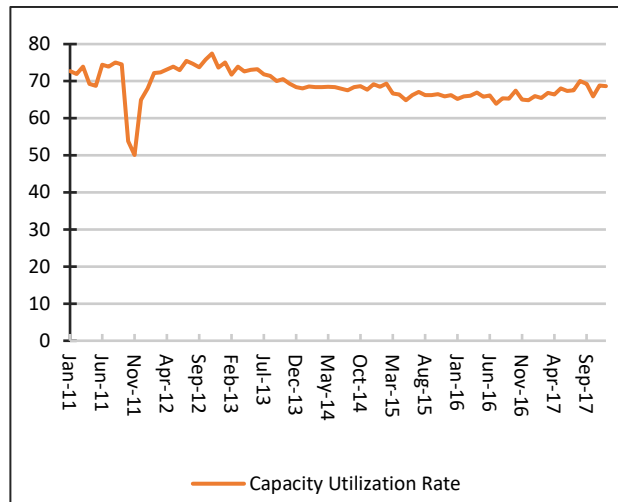
Source: Bank of Thailand

Figure 10: Business Sentiment Index  
/ 50 = stable, > 50 = improvement, < 50 worsening



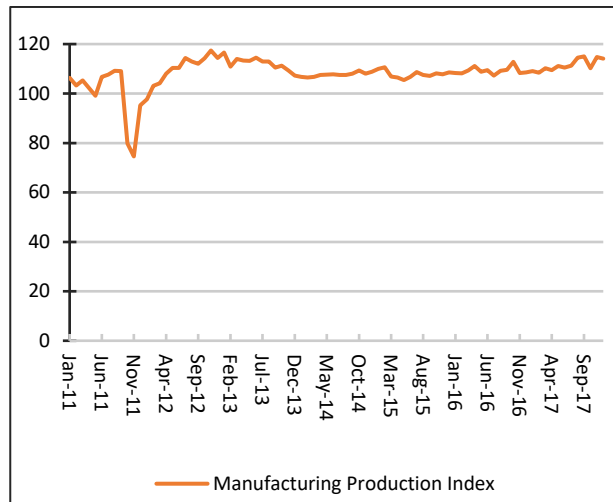
Source: Bank of Thailand

Figure 11: Capacity Utilization Rate  
/ Seasonally Adjusted, Monthly



Source: Bank of Thailand

Figure 12: Manufacturing Production Index  
/ Seasonally Adjusted, weighted by value added, 2011 = 100



Source: Bank of Thailand

*GDP by production: strong recovery in agriculture and retail, but modest gains in manufacturing*

**The agricultural sector, which accounts for 6 percent of GDP, recovered from the 2016 drought to grow at 6.2 percent in 2017.** The agricultural production index increased by 5.9 percent in 2017, driven by increased production of major crops like paddy (6.5 percent growth) and sugarcane (16 percent growth) but counterbalanced by a decline in fishery production by 4.5 percent. Production increased despite the negative impact of flooding in July-August and lower than average temperatures in the last quarter of the year, which led to a 0.9 percent decline year-on-year in the production index in 2017Q4. Agricultural prices declined by 2.7 percent in 2017, as a response to a marginal decline in the global agricultural prices<sup>9</sup> and increased supply from higher production. Nevertheless, increased agricultural output outweighed the price decline and agricultural farm income grew by 3.4 percent during 2017 (Table 7).

**The services sector accelerated in 2017, on the back of buoyant tourism.** The wholesale and retail trade sector, which accounted for 15 percent of GDP (Table 6), expanded by 6.3 percent in 2017 as compared to 5.3 percent growth in 2016. The sub-sector accelerated in 2017Q4 to 6.9 percent as sales of durable goods and motor vehicle rose and tourism expanded. Hotels and restaurants, which together accounted for 5.8 percent of GDP, expanded by 8.5 percent in 2017, slightly lower than the 10 percent growth in 2016. Sub-sector growth picked up pace in 2017Q4, expanding at 15.3 percent year on year, on the back

<sup>9</sup> The global agricultural price index declined marginally by 1 percent in 2017 driven by sharp decline in timber, coffee and cocoa, balanced by increases in rubber, cotton, and some fisheries prices like shrimp. Source: World Bank Commodity Price Data (Pink Sheet), March 2018

of a near 10 percent increase (in year on year terms) in tourist arrivals especially from China. This increase follows the relative slowdown in 2016 brought about by tighter regulation of illegal tour operators.

**The manufacturing sector, which accounts for 27 percent of GDP, expanded by 2.5 percent in 2017, masking diverging fortunes among export- oriented and domestically- oriented industries.** The Manufacturing Production Index (MPI) rose 3.1 percent in 2017Q4 for export- oriented industries, those with an export share of more than 60 percent of total production. On the other hand, MPI declined by 0.3 percent in 2017Q4 for domestically- oriented industries, those with export share of less than 30 percent of total production, with a sharp 15 percent decline in production for metal products and textiles (Figure 12).<sup>10</sup> The average capacity utilization rate across all industries improved marginally from an average of 65.7 in 2016 to 67.8 in 2017 but remains well below the early 2013 peak of 75, signaling spare capacity (Figure 11). Recent activity suggests further pick up in manufacturing activity, with capacity utilization in January 2018 rising to 70.2. Capacity utilization gains were especially concentrated in export oriented sectors such as manufacture of computers and electronic products and manufacture of private cars.

**Construction sector, which accounts for 2.8 percent of GDP, declined by 2.5 percent in 2017 with notable slowdown in the last quarter.** The sector declined by 2.5 percent in 2017, with notable slowdown in 2017Q4 of 5.3 percent. This was driven by slower public construction activity, which declined by 3 percent in 2017, because of lower disbursements, delays in approvals and inclement weather hampering project progress. Private construction activity also declined marginally by 1 percent in 2017, which is reflected in the decline in the permitted construction area by 6 percent and decline in sales of construction material by 2.8 percent in 2017.

Table 6: Supply side of GDP  
 / Real Y-O-Y growth rates, unless otherwise specified

	2015	2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Share of 2017 GDP (in percent)
<b>Total Agriculture</b>	<b>-6.3</b>	<b>-2.5</b>	<b>6.0</b>	<b>15.9</b>	<b>9.7</b>	<b>-1.3</b>	<b>6.3</b>
Agriculture	-5.9	-3.2	6.5	17.2	9.8	-1.2	4.9
Fishing	-10.5	5.8	0.9	2.3	8.6	-2.4	1.1
<b>Non Agriculture</b>	<b>4.1</b>	<b>3.8</b>	<b>3.2</b>	<b>3.0</b>	<b>4.0</b>	<b>4.6</b>	<b>94.5</b>
Mining	2.4	1	-5.5	-6.3	-6.7	0.6	2.3
Manufacturing	1.7	2.3	1.9	1.0	4.2	3.0	27.7
Electricity, Gas and Water Supply	5.1	4.3	2.1	-1.4	3.1	3.4	3.2
Construction	17.1	8.6	3.2	-5.7	-1.6	-5.3	2.8
Retail and Wholesale	4.8	5.3	5.9	6.0	6.4	6.9	15.2

<sup>10</sup> Source: Bangkok Bank, Thai Economic Outlook 2018

Hotels and Restaurants	15	9.9	5.1	7.0	6.9	15.3	5.8
Transport and Communications	5.3	4.1	5.3	7.8	7.4	8.9	10.3
Financial Intermediation	8.4	6.5	4.8	6.3	4.6	4.2	7.1
Real Estate	1.8	3.2	3.8	4.2	4.7	5.6	8.2
Public Administration	0.6	0.4	-0.2	1.4	-0.4	0.1	5.0
Education	-0.2	1.2	0.1	2.2	1.2	1.3	3.2
Health	3.6	2.2	1.5	3.1	4.1	3.8	2.0
Other Social Services	4.3	8.3	6.5	5.8	5.3	6.0	2.1
Domestic Services	3.7	-0.1	-0.4	-0.8	-4.9	-1.7	0.2
<b>Gross Domestic Production</b>	<b>3</b>	<b>3.3</b>	<b>3.4</b>	<b>3.9</b>	<b>4.3</b>	<b>4.0</b>	

Source: NESDB

Table 7: Evolution of Agriculture Sector Indicators in Thailand  
 / Y-O-Y growth rates

	2016				2017			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Agricultural Production Index</b>	-5.9%	-3.2%	0.3%	5.6%	4.2%	17.6%	11.7%	-1.3%
<b>Agricultural Price Index</b>	-5.8%	4.8%	11.1%	3.1%	11.6%	-2.2%	-12.9%	-6.0%
<b>Farm Income Index</b>	-11.6%	1.5%	11.0%	9.1%	16.5%	15.0%	-2.3%	-7.1%

Source: Office of Agricultural Economics, World Bank Staff Calculations

## Fiscal Policy Developments

**The government's fiscal stance remained expansionary, with the deficit increasing to 2.8 percent, the highest since 2009.** Government revenues declined as a share of GDP from 19.4 percent of GDP in FY 2016 to 18.1 percent in FY2017, on the back of tax cuts on corporate taxes and tax incentives to promote retail sales. Expenditures fell marginally as a share of GDP, from 22.1 percent of GDP in FY 2016 to 21.0 percent of GDP in 2017. Despite plans to substantially increase capital expenditure, it only grew at 2.9 percent in 2017, reaching 6.5% of GDP in 2017. Lower disbursement, especially on large projects, due to inclement weather and delays in procurement and approvals, as well as challenges posed by fragmented fiscal institutions are behind the slow growth in capital expenditure (Box 1 provides a detailed discussion on fiscal institution fragmentation and its impact on public investment delivery).

**Thailand has room for further fiscal stimulus with public sector debt to GDP levels and low cost of financing.** Thailand's debt to GDP ratio increased marginally to 46 percent in FY 2017, well below the 60 percent of GDP threshold set by the Cabinet. The cost of debt financing remained low, with interest payments stable at 1.2 percent of GDP or less than 5 percent of the total spending in FY 2017. The World Bank/IMF Debt Sustainability Analysis (DSA) highlights that, even with a significant additional stimulus of 1-1.5 percent of GDP additional deficit over 2017-19, the debt-to-GDP ratio is expected to remain stable. This underscores the opportunity for Thailand to increase public investments for large macro-critical projects to support economic growth.

**Government plans for FY 2018 (Sep 2017- Sep 2018) are expansionary, with a 15 percent planned increase in capital spending, but implementation remains a challenge.** Government revenue projections are budgeted to be 3 percent higher than in FY 2017, because of expectations of strengthening domestic economic activity and a rise in indirect taxes. The FY 2018 first quarter net revenue collections are 4.5 percent higher than target, suggesting further fiscal space for government spending plans. Capital expenditures are budgeted for a significant 15 percent scale up in FY 2018 (disbursement profile is in Table 8), with several large projects under the Transport 2016-18 Action Plan expected to begin construction. These include the yellow and pink lines of the sky train PPP projects and three dual track railways (see the outlook section for further discussion on transportation action plan progress). The government is looking to resolve disbursement challenges through Efficiency Enhancement Measures including: ensuring that all projects to be executed in under 1 year commencing in quarter 1, all special projects requiring additional procurement processes and multi-year projects to commence at least by quarter 2, and stricter rules regarding reallocation of unused funds from line ministries. Despite these enhanced efforts, disbursement in FY 2018 quarter 1 was 13.2 percent of total budgeted expenditure, well below the 21.1 percent targeted, reflecting longstanding public investment management challenges.

Table 8: Approved FY 2018 disbursement targets  
 / Billion Baht unless otherwise stated

Disbursement Target	FY2018				
	Q1	Q2	Q3	Q4	Total
<b>Total</b>	878.55	638.00	638.00	629.45	2,784.00
% of Total budget	30.29%	22.00%	22.00%	21.71%	96.00%
<b>Current</b>	739.27	492.85	492.85	478.42	2,203.39
% of Current Budget	33.00%	22.00%	22.00%	21.36%	98.36%
<b>Capital</b>	139.28	145.15	145.15	151.02	580.61
% of Capital Budget	21.11%	22.00%	22.00%	22.89%	88.00%

Source: Bureau of the Budget



## Monetary and Financial Sector Developments

**Headline inflation edged higher to 0.7 percent in 2017, but remained below the inflation target of 1-4 percent (Figure 13).** Energy prices increased marginally, reflecting strengthening global crude oil prices, but was counterbalanced by declining agricultural prices and stable core inflation. The producer price index (PPI) was flat during the year as price of agricultural products declined towards the end of the year. In response to low and stable inflation, and anchored inflationary expectations (Figure 14), the Bank of Thailand maintained an accommodative policy stance and kept the policy rate unchanged at 1.5 percent.

**Global financing conditions remained benign in 2017, with search for yield resulting in capital inflows to EMDEs including Thailand.** Despite gradual monetary policy normalization in the US, with a 125 basis point hike in the policy rate since December 2015 and a reduction in the size of the Federal Reserve's balance sheet, US and major Euro Area bond yields remained stable and low (Figure 15). Low bond yields in advanced countries contributed to declining bond spreads for emerging markets (Figure 16), including for Thailand, and an increase in capital inflows as a share of GDP (Figure 17).

**Unlike other markets in the region, however, Thailand had a net outflow of FDI (Figure 18).** Outward FDI exceeded inward FDI for the first time in 2010, reflecting some major acquisitions abroad by Thai corporations, and recorded its highest growth in 2012. Outbound FDI is dominated by investments made large Thai MNCs in regional markets<sup>11</sup>. The outflows could be driven by a combination of push factors, reflecting perceptions of lower risk weighted returns within Thailand and pull factors, such as the search by large firms to find new consumer markets, build brands, acquire technology, enlarge production networks and locate new energy sources.

**Thailand's prudent economic management makes it well placed to manage any potential volatility in cross border financial flows.** Thailand's external debt levels to GDP remains contained at 35.9 percent of GDP, which place Thailand at low level of external debt burden<sup>12</sup>. Most external debt is either denominated in Baht or hedged<sup>13</sup>. Foreign currency liquidity is adequate, with current account surplus increasing to 11 percent of GDP (Figure 19) and international reserves at 330 percent of short term external debt (above the 100 percent recommended ratio). In line with the stable and favorable external conditions the Thai Baht appreciated in nominal terms by 9 percent but in real effective terms, the appreciation was a more modest 3 percent (Figure 20).

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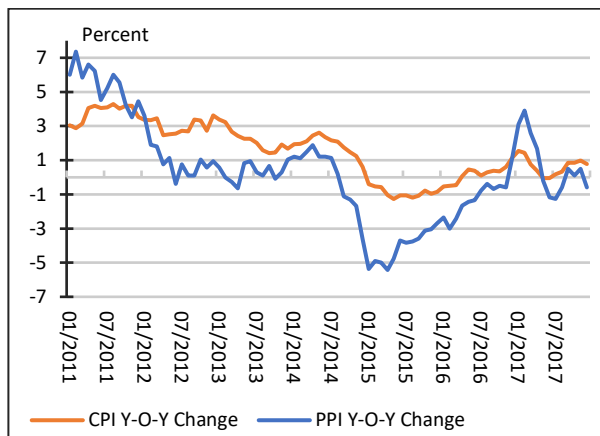
<sup>11</sup> Boston Consulting Group's (BCG) Global Challengers list of up-and-coming MNCs from emerging markets all over the world now includes five Thai MNCs: Charoen Pokphand Group, Indorama Ventures, PTT, and Thai Union Frozen. In comparison, Malaysia, Indonesia, and the Philippines combined boast only five firms on BCG's list (i.e. Malaysia: AirAsia, Petronas; Indonesia: IndoFood, Golden Agri-Resources; Philippines: Jollibeefoods). BCG Global Challengers List 2016 is available at: <https://www.bcg.com/publications/2016/globalization-growth-meet-new-challengers.aspx>.

<sup>12</sup> As per World Bank/IMF guidelines, country external debt burden can be categorized as (I) low – countries with external debt to GDP ratio of less than 48 percent; (II) medium – countries with external debt to GDP ratio of between 48 and 80 percent and (III) high – countries with external debt to GDP ratio of greater than 80 percent.

<sup>13</sup> "Financial Stability Report 2017: Bank of Thailand"

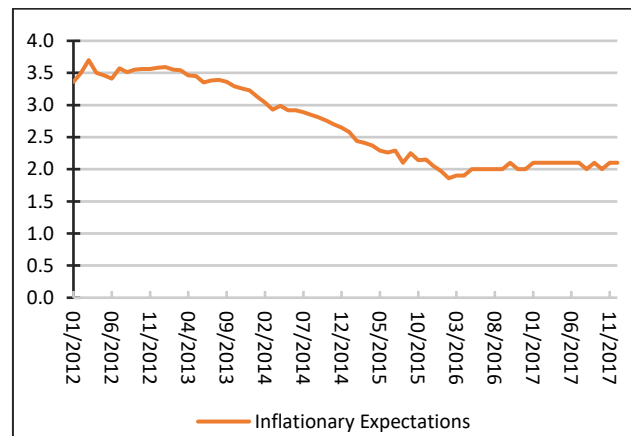
**Thailand’s financial system remains well capitalized but non-performing loans remain a concern.** Financial institutions maintained high levels of capitals and reserves: the ratio of capital to risk-weighted assets of the commercial bank system (BIS ratio) and the ratio of actual to regulatory loan loss provision, for both banks (18.5 percent and 15.8 percent) and specialized financial institutions (12.5 and 11.5 percent) were above the Bank of Thailand’s minimum requirements. However, the financial system faced challenges from deteriorating loan quality, especially to SMEs in non-export oriented industries such as construction. The Non-Performing Loans (NPL) ratio for banks increased marginally from 2.8 percent in 2016 to 3.0 percent in 2017. The rate of growth for NPLs has slowed since the end of 2016 with tightening prudential regulation.

Figure 13: Monthly Consumer and Producer Price Index / Y-O-Y Change, Percentage



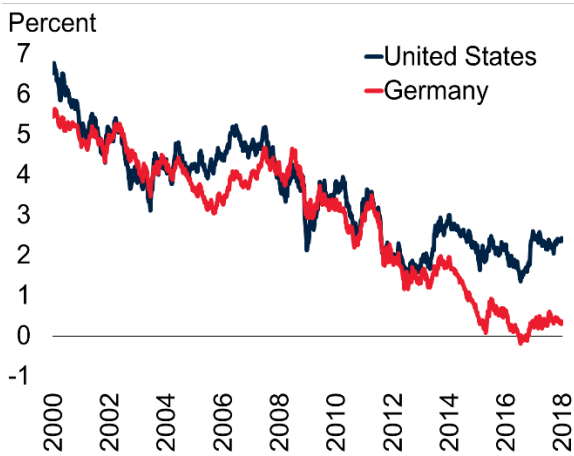
Source: Bank of Thailand

Figure 14: Median Inflationary Expectations for next 12 months / Percent



Source: Bank of Thailand

Figure 15: US and German Long-Term Bond Yields



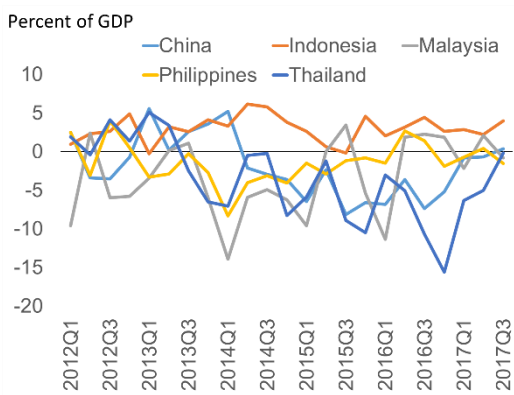
Source: World Bank Global Economic Prospects, January 2018

Figure 16: Emerging Markets and Developing Economists Sovereign Bond Spreads



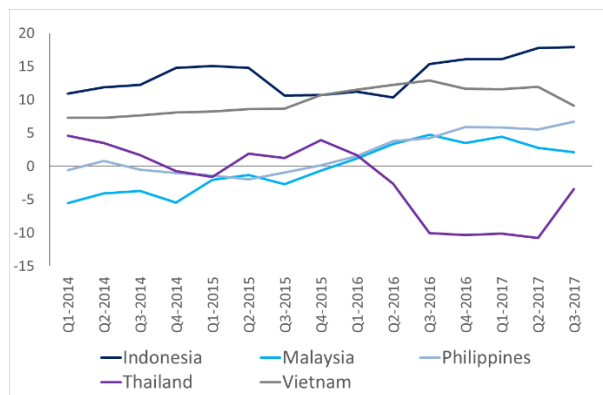
Source: World Bank Global Economic Prospects, January 2018

Figure 17: Capital inflows as a share of GDP – selected EAP countries



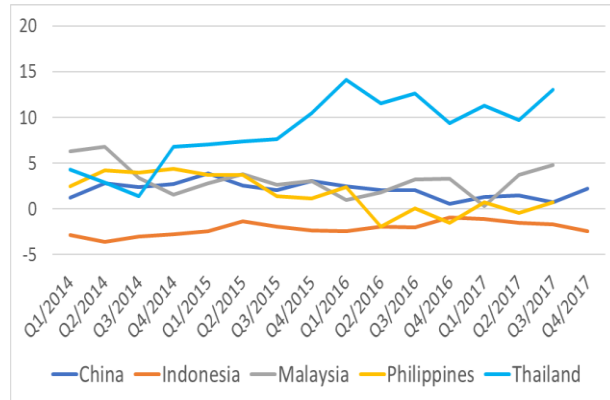
Source: World Bank, CEIC data

Figure 18: Net FDI – selected EAP countries / US \$ billion, four-quarter sum



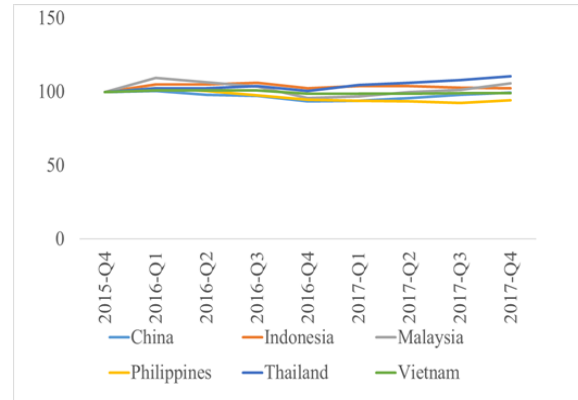
Source: World Bank, Haver analytics data

Figure 19: Current account balance as a share of GDP – selected EAP countries / seasonally adjusted



Source: World Bank, CEIC data

Figure 20: Index of US Dollar to Local Currency / December 2015 = 100



Source: World Bank, Haver analytics data

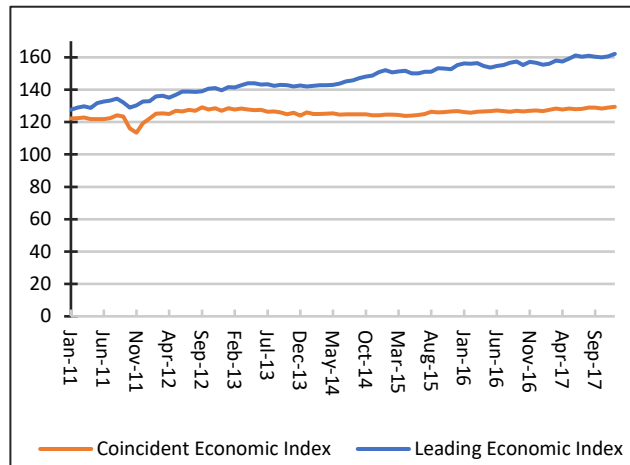
## Part B. Outlook for 2018: Strengthening recovery amid risks

**Thailand’s economic recovery is expected to accelerate in 2018, with growth projected at 4.1 percent, driven by external demand and private consumption.** Growth is projected to be underpinned by continued strength in merchandise exports and further recovery in private consumption, signaled by improving consumer confidence and continued deleveraging. However, the growth rate of exports may slow over the medium term because of the base effect from elevated exports in 2017 and the potential impact from real exchange rate appreciation. Consumption growth will still face headwinds from slowing farm income, because of falling agricultural prices, and continued high debt burden for low income households. Government measures for low income earners and farmers, if well targeted, could potentially add mitigate the fall in disposable incomes. Key economic indices, such as the Bank of Thailand’s Coincident Economic Index (CEI)<sup>14</sup> and Leading Economic Index (LEI)<sup>15</sup> point to an uptick in the business cycle (Figure 21) and a further pick-up in economic activity going into 2018.

<sup>14</sup> The Coincident Economic Index (CEI) and Leading Economic Index (LEI) are indicators of the business cycle and are intended as a complimentary tool in the assessment of the economic trend and short-term economic forecasting. They are especially useful in the determination of the turning points or the peaks and troughs of business cycles as well as the short-term (3 – 4 months) forecast of the economy. The index is used to evaluate economic conditions in conjunction with other tools such as macroeconomic models or financial programming models. Coincident Economic Index (CEI) is constructed from 5 components including real imports, manufacturing production index, real gross value added tax, volume sales of automobiles and real debit to demand deposit. *Source: Bank of Thailand*

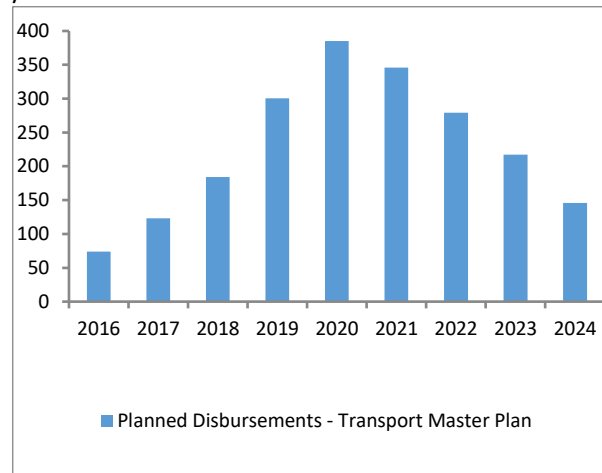
<sup>15</sup> Leading Economic Index (LEI) is constructed from 7 components including authorized capital of newly registered companies, new construction area permitted, export volume index (exclude gold), business sentiment index (3 months), SET index, real broad Money, and oil price inverse index (Dubai)

Figure 21: Coincident and Leading Economic Index / seasonally adjusted, monthly, Jan 2000 =100



Source: Bank of Thailand

Figure 22: Transportation Master Plan planned disbursements / billion Baht



Source: Thailand Development Research Institute

**The recovery may become more broad-based in 2018, but this will depend on progress on critical public investment projects.** A pick up in private investment is also expected in 2018, as signaled by improved business sentiment in late 2017 and acceleration of capital goods imports in 2017. The extent of private investment rebound will depend on the progress on critical public infrastructure. Government has budgeted for a 15 percent increase in capital expenditure, with a focus on efficiency measures to accelerate disbursement. The pace of disbursements will pick up especially for transportation projects, with a projected 49 percent increase in investments under the Transportation Action Plan, and a further pick up in 2019 and 2020, especially for State Railway of Thailand (SRT) dual track projects (Figure 22). Projects anticipated to begin construction in 2018 include the yellow and pink lines of the sky train PPP projects, three dual track railways, and the China-Thailand high speed rail from Bangkok to Nong Khai. Even though the plan shows an ambitious scale up in disbursement, challenges remain on project execution especially around land acquisition and labor shortages.

**Agricultural income growth and declines in poverty will slow down with lower global commodity prices.**

The global agricultural price index has fallen 14 percent from 2014 and is expected to stabilize at a lower level over the next five-year cycle, across food, beverages and raw materials. High agricultural prices supported farm income in recent years, which despite a major drought in 2015-16, did not fall significantly.

Going forward, moderating prices and the tapering of growth in 2017, driven by production gains measured against a low production year in 2016, imply that farm income growth may be subdued in the medium term. As a result, poverty is expected to decline at a slower rate in rural areas, unless announced welfare policies for low income earners and farmers are effective and well targeted (see Policy Watch for further discussion).

**Macroeconomic stability will be maintained in 2018, with inflation remaining within target and the current account expected to moderate.** Headline inflation will likely increase marginally to be in the range of 1.7 percent in 2018, driven by an increase in energy prices. Inflation is likely to breach the 1-4 percent monetary target, amid anchored inflationary expectations (Figure 14). The current account surplus will likely slightly moderate in 2018, driven by higher oil prices and higher capital goods imports for investments. Financial sector is expected to remain stable, with financial institutions expected to maintain an adequate level of capitals and reserves, but high NPLs are likely to remain a challenge especially for low-income borrowers. Monetary policy is likely to remain accommodative in 2018 as the output gap closes and inflation approaches the bottom end of the target range. Communication on monetary policy going forward would serve to manage expectations after a prolonged period of low interest rates.

## Emerging Challenges

**The first risk is lower spillover from external to domestic demand, due to concerns about political uncertainty and delays in progress of public investment projects.** Private investment has recovered slowly; despite improving business sentiment and positive signals such as the increase in capital goods imports, risks remain that private investment may not pick up significantly in the medium term due to investors' concerns about political uncertainty and delays in planned public infrastructure projects. Progress on the Eastern Economic Corridor projects will be critical. It could face some challenges in execution, driven by institutional challenges in public investment management (see Box 1), land acquisition and procurement, which need to be addressed in the new procurement law (see Policy Watch section on potential impact of procurement law).

**The second risk comes from external trade and global monetary policy.** Deceleration in growth in key trading partners such as the US and China may diminish demand for Thailand's exports, but, as highlighted in the recent developments section, Thailand's export markets are getting increasingly diversified. Growing protectionism also poses a risk to Thailand's merchandise export growth, including the risk that recent announcement of tariffs on steel and aluminum by the could spark global retaliatory action on other products. However, the direct impact of steel and aluminum tariffs is likely to be minimal for Thailand, as the country is not a major steel and aluminum exporter. Finally, Thailand also faces risks to external financing flows, as the recent US Tax Cuts and Act of 2017 and continued normalization of US monetary policy are likely to raise US bond yields.

**Significant policy and institutional reforms are key to sustaining the recovery and raising Thailand's potential growth rate above 4 percent.** Some recent economic data suggest that the ongoing recovery may be of a cyclical nature, with limited impact on raising potential growth in the medium term. The

export recovery is yet to fully translate into recovery in domestic demand, net capital inflows and FDI continue to be negative and public investment projects, while picking up, continue to face disbursement challenges. Implementing policy and institutional reforms under the 20-year national strategy in areas such as education, public investment management, ease of doing business and services liberalization will be important to raise Thailand's potential growth rate over 4 percent in the medium term. Thailand made some progress in 2017 on such reforms, which is highlighted in the next policy watch section.

## Part C. Policy Watch

**Water management.** Thailand ranks 60 out of 62 countries surveyed in the World Bank Enabling the Business of Agriculture indicators on water management. This indicates weaknesses on the legal and regulatory framework for Integrated Water Resources Management (IWRM). Unlike many countries, Thailand does not have a single law governing IWRM and the regulatory authority for water management is fragmented. In 2017, authorities have made some progress in addressing institutional fragmentation. The Water Resource Department has been relocated from the Natural Resources and Environment Ministry to the Office of the Prime Minister to integrate nation-wide water management policy by overseeing all water-related agencies.

**Procurement law.** Prior to 2017, public procurement in Thailand was governed by Regulations. The Comptrollers General Department in the Ministry of Finance was responsible for regulating and monitoring the procurement system. Overall the institutional structure was characterized by unclear policy making and coordination of functions. The Regulations were applicable to government ministries but did not cover state owned enterprises and local administrations. Key features of the procurement system were the mandatory use of e-auctions for goods and works contracts above THB2 million in combination with the application of a reference price system which in practice acted as ceiling price system. Bidder complaints system was weak.

The Government promulgated a new Public Procurement Law which was effective August 2017 based on the UNICITRAL model law. The new Law applies to government ministries, state owned enterprises and local administrations but exclude its application on government enterprises directly involved in commerce, procurement of armaments and security related services, procurement for research and development in higher education institutions and procurement involving foreign loans. The Comptroller General Department remain responsible for regulating and monitoring the system but has gained more control with centralization of certain functions such as registration of bidders and extended linkage to centralized government payment system to local administrations and state-owned enterprises. In the new Law e-auctions was replaced by e-Bidding, and e-Marketing, but reference prices are still used. Overall there is still a strong lowest price focus and further control to mitigate against corrupt practices.

The new law has introduced standstill period before the award of a contract and enhanced bidder complaints system both from institutional setup and procedural requirements. However, the roles of the Comptrollers General Department, the National Anticorruption Commission and Office of the Auditor General and others remain unclear and fragmented. Capacity building and professionalization of public procurement are still a work in progress. Research and monitoring is a key function yet to be established.



This is an important function which would help to assess the degree to which the new law fulfills its intended objectives.

1. The focus on corruption will likely have a number of impacts on public procurement:

- Decisions will be delayed as all participants would like to ensure that they are covered. This will lead to a tendency to escalate decisions towards the top overlooking established structures
- Too many committees and involvement of public sector in procurement process means that decisions will be delayed
- The use of reference prices is a way to make prices predictable and thus assumed to be free of corruption. However, this approach may prove costly to the procurer as tenders received will float around this price rather than below.
- Use of e-procurement for large value procurement such as infrastructure projects would not result in a value for money approach.

**Capital account liberalization.** The central bank has gradually released restrictions on capital flows, with a series of measures under the Capital Account Liberalization Master Plan. As the baht continues to appreciate against the dollar, there is growing encouragement from the authorities for Thais to invest abroad to ease pressure on the currency. In June 2017, the central bank relaxed foreign exchange rules, letting more Thais buy securities overseas and commercial banks lend baht to non-residents for investment in Thailand and the Greater Mekong sub-Region.

**Eastern Economic Corridor (EEC).** Parliament has passed the draft EEC Act on February 8, 2018 which is expected to boost investor confidence. The Act would build upon the success of the Eastern Seaboard by unlocking several restrictions in investment. While the Eastern Seaboard focused on hard infrastructure in the 1980s, the EEC will also focus on soft infrastructure to attract skills and targeted industries. Key measures in the Act which will encourage investment include (1) EEC areas which primarily include Chachoengsao, Chonburi and Rayong provinces, and others; (2) creation of regulatory bodies -- Eastern Economic Corridor Policy Committee and the Eastern Economic Corridor Office --- to drive the EEC projects and shorten the review and approval process; (3) tax incentives for business operators and foreign workers in EEC; and (4) allowing foreign investors to hold more than 50 percent stake in aviation and related businesses. According to the Board of Investment (BOI) report, applications for BOI privileges under EEC reached 388 projects in 2017 with a total investment value of THB 296.9 billion (compared to THB 199.3 billion in 2016). About 84 percent of 2017 application value was for 10 targeted industries. In 2018, the government expects that after the Act is enforced, the investment value of applications for BOI privileges under EEC would exceed its target of THB 300 billion.

**Ease of Doing Business.** The World Bank Group's 2017 Doing Business report ranked Thailand in 26th place among 190 economies in the ease of doing business for small and medium enterprises around the world, up from 48th place when applying the same methodology to the previous year's data. Thailand was one of top 10 economies improved most in the ease of doing business in the last year worldwide. Several recent major improvements in the ease of doing business stand out.

- For example, Thailand abolished a requirement to obtain a company's seal and eliminated the need for approval of company work regulations from the Labor Department. As a result, the time taken to start a business has been reduced to just 4.5 days, compared to 27.5 days previously.



- Thailand also introduced an automatic risk-based system for selecting companies for a tax audit; reduced the property transfer tax rate; adopted legislation to broaden the scope of assets that can be used as collateral; and is now using geographic information systems for access to electricity.
- Thailand is continuing systematic reforms to strengthen the business environment further, focusing on lagging areas, such as enforcing contracts, registering property, and paying taxes. For example, the time required to enforce contracts is 420 days, compared with the best recorded practice of 164 days in Singapore. On registering property, the cost of transferring property is 7.3 percent of the property value, above the regional average of 4.3 percent. Additional simplification in paying taxes—where Thailand ranks 67th globally and it takes 262 hours on average to prepare, file and pay taxes—will also be important.

Figure 23. Thailand ranked 26<sup>th</sup> in Ease of Doing Business 2017

DOING BUSINESS 2017

Indicator	Distance to Frontier			Rank		
	2016	2017	Δ	2016	2017	Δ
Ease of Doing Business	71.76	77.44	5.68	..	26	..
Dealing with Construction	74.58	74.58	0	..	43	..
Enforcing Contracts	65.51	67.91	2.4	..	34	..
Getting Credit	50	70	20	..	42	..
Getting Electricity	83.76	90.99	7.23	..	13	..
Paying Taxes	68.69	76.73	8.04	..	67	..
Protecting Minority Investors	65	73.33	8.33	..	16	..
Registering Property	66.97	68.75	1.78	..	68	..
Resolving insolvency	73.95	75.64	1.69	..	26	..
Starting a Business	85.04	92.34	7.3	..	36	..
Trading Across Borders	84.1	84.1	0	..	57	..

SOURCE: DOING BUSINESS REPORT 2017

Note: As per Doing Business, [rankings are calculated for Doing Business 2018 only](#). Year-to-year changes in the number of economies, number of indicators and methodology affect the comparability of prior years.

**Going forward, the sustained pace and quality of reforms as well as sound implementation will be crucial for translating the reform effort into the desired economic outcomes.** The government's 20-year strategic plan is envisaged to help ensure administrative consistency and coordination across agencies as well as continuity across governments. Continued reforms in additional areas such as public investment management, education and competition will be particularly important to take Thailand from middle- to high-income status.

## Box 1. 20 Years After the Asian Crisis: Are Thailand's Economic & Fiscal Institutions Fit for Purpose to Implement Thailand 4.0?<sup>1</sup>

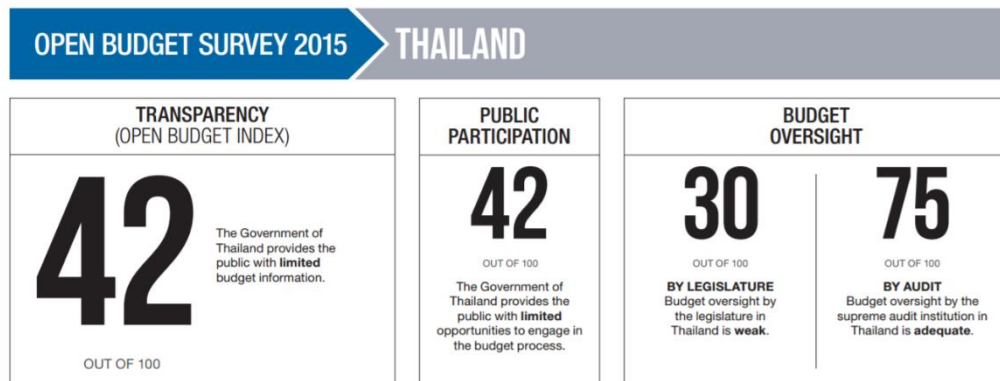
**Core economic institutions<sup>1</sup> in Thailand have historically played an instrumental role in development of the economy.** Key roles have been: responsive economic planning, promoting and sustaining macro-fiscal stability with resilience, providing financing for large transformative infrastructure development, and delivering on economic priorities. From 1970s to late 1990s these institutions planned, provided for, and monitored implementation of policies that helped propel Thailand from a low to a higher middle-income country in a single generation.

**Following the Asian financial crisis of 1997, Thailand reoriented institutions towards economic stability by introducing for example a strict fiscal sustainability framework and inflation targeting.** The fiscal sustainability framework entails accrued public debt to GDP below 50 percent, debt obligation below 15 percent of budget, a balanced budget and capital spending at 25 percent of the budget. Inflation targeting entails greater transparency in the appointment of the central bank governor, with greater independence and accountability through a monetary policy committee, composed of both internal and external members, that communicates its policy deliberations, actions, and outlook.

**Although governance at the institutional level improved, institutions became fragmented and risk averse and were not able to fully implement planned large public infrastructure and reforms over the past decade.** For example, construction on the Bang Pa-in Nakorn Ratchasima expressway only began last year despite the project having been planned for more than two decades. Overall economic growth slowed to below 4 percent while disbursement remained below 60 percent over 2010-2017 while macroeconomic fundamentals remained strong.

**Transforming economic and fiscal institutions will be a critical part of Thailand's 20-year national strategy to achieve high-income.** These institutions ought to be able to effectively plan and specify priority programs and investments, allocate resources to these priorities, and ensure their implementation. In particular, it is important that:

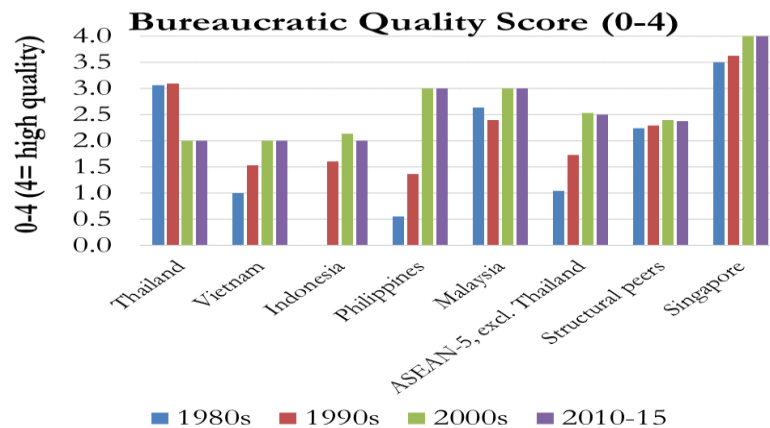
- Economic and fiscal institutions have the structures and processes that formulate an integrated medium-to-long term economic plan and the capacity for transparent appraisal of a transformative investment program; fiscal policy is linked to a credible medium-term investment program; budget execution and financial reporting systems are linked to the budget plan.
- All resources go through the budgeting system and process, irrespective of source of financing. This includes all revenues, state-owned enterprises and specialized financial institutions to support to programs, and debt flows. This means there are minimal off-budget financing flows.
- All government policies are transparently costed and disclosed, together with the associated budget documentation, to promote internal accountability and external credibility, as the public gains a view on how public resources are generated and spent. According to the Global Open Budget Index, Thailand scores low (42/100) on budgetary transparency over time.



Source: Open Budget Index (<http://www.internationalbudget.org/wp-content/uploads/OBS2015-CS-Thailand-English.pdf>)

At present the core economic institutions are fragmented do not have adequate capacity to formulate and execute complex integrated programs that underpin Thailand 4.0. Institutional fragmentation has meant that each department has instituted processes/rules/operating procedures that in totality overwhelm implementing agencies. The strengths of the 70s – 90s appear to have atrophied (Figure B1.1), and Thailand can reap significant gains from transforming its institutions of economic and fiscal management.

**Figure B1.1: Evolution of Bureaucratic Quality**



Source: Political Risk Services, International Country Risk Guide

Because of fragmentation, no single entity has overarching responsibility/oversight for achievement of government's economic and fiscal targets. NESDB devotes all resources to planning, BOB focus purely on budget allocations based on its performance based budgeting system, and the MOF focuses attention on fiscal policies and off-budget spending. **Thailand** is one of only a few middle-income countries without a

fully operational medium term economic and fiscal framework (MTFF) linked to the budget system. In Asia, high income countries like Korea, Singapore, and Japan have MTFF, and middle-income countries such as Vietnam, India, Indonesia, and the Philippines also utilize MTFFs.<sup>1</sup>

**Thailand can transform its economic and fiscal institutions so that they are fit-for-purpose to implement the 20-year National Strategy, while remaining flexible for adaptation over time.** In the absence of core economic agencies with appropriate institutional structures and capacity endowments at the central government level, it will be difficult for Thailand to drive the 20-year National Strategy, formulate and coordinate transformative programs as global and regional developments and mega trends unfold in the future. Most countries in the OECD, including in East Asia – notably Japan, Korea, and Singapore – have in the last 20 years undertaken significant transformation of core economic management institutions in order to achieve a combination of following outcomes: (i) linking economic policies to the budget; (ii) sustain macro-fiscal discipline; (iii) promote efficiency; and (iv) improving public investment management.

Some options Thailand could consider are:

- Integrating the Ministry of Finance, the NESBD, and the Bureau of the Budget into a single agency with a strong public investment management function.
- Integrate the budgeting and financial management functions and policy functions under a single entity, and develop a strong public investment management function with a functional medium term public investment program.
- Establish an Economic and Fiscal Council to coordinate economic and fiscal policies to implement large transformative policies.

## Part 2: Thailand: Beyond the Innovation Paradox

### Introduction

**Thailand, like all nations, aspires to reach lasting economic prosperity.** Yet only a few emerging markets have succeeded in becoming advanced economies.<sup>16</sup> Many try, fail, and fall behind. For the first time, Thailand is now translating the aspiration to advance to high-income status into a 20-year national strategy, with innovation playing a central role.

**From a starting point of gradually declining skills advantages, competitiveness, and growth since the East Asia crisis, Thailand faces an uphill battle.** Fundamental economic reforms and trade openness put the Thai economy on a high-growth trajectory in the 1980s. The economy grew around 9 percent annually during 1986–95, turning Thailand into a leading emerging market for many years. However, the growth trajectory has been slowing. In the two decades since the East Asia crisis, Thailand’s competitive edge from the structural transformation in the 20<sup>th</sup> century has largely eroded, and potential growth has fallen to an estimated 3.5 percent on average over 2013–17.<sup>17</sup> Total factor productivity growth fell to 1.3 percent over 2010–2016 from 3.6 percent over 1999–2007 (see Table 1). Private investment as a share of GDP remains around 22 percent, below pre-1997 levels.

**Thailand’s long-term growth prospects rest on productivity.** Global evidence suggests that economic growth is mainly driven by productivity growth.<sup>18</sup> In Thailand, past economic growth was driven by an expansion in the labor force and in physical capital. However, returns from capital expansion and labor accumulation have begun and will inevitably continue diminishing, particularly as Thailand’s society is rapidly aging. In the future, rising productivity will be essential for renewed, robust economic growth and income gains.

**Thailand’s productivity gains in the 1980s and 1990s were mainly driven by a fundamental structural transformation**—with a large-scale shift of labor from low-productivity agriculture to high-productivity manufacturing. The productivity gains from this large-scale resource reallocation have continuously narrowed, as returns to investment are diminishing, neighboring countries emulate the same transformation and become more competitive, and the labor force is beginning to contract.

**Going forward, growth will become increasingly dependent on productivity growth and innovation, given headwinds from aging.** Since private investment is unlikely to return to pre-1997 levels, productivity growth will become increasingly important for sustaining a higher growth path and attaining high income. The labor force is projected to shrink beginning in 2018, and by 2040, elderly people will account for more than one-quarter of Thailand’s total population, the highest share of elderly of any developing country in East Asia and the Pacific. In addition, new sources of productivity growth from innovation (See Box 1) and

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<sup>16</sup> Only 12 middle-income countries—Antigua and Barbuda, Chile, Hungary, the Republic of Korea, Malta, Oman, Poland, Portugal, the Seychelles, St. Kitts and Nevis, Trinidad and Tobago, and Uruguay—transitioned to upper-income countries during 1987–2015.

<sup>17</sup> IMF (International Monetary Fund) Article IV consultation 2016 and ADB (Asian Development Bank) *Asian Development Outlook 2016: Asia’s Potential Growth*

<sup>18</sup> Easterly and Levine 2001.

within-industry productivity gains from structural transformation are diminishing. Firms, particularly SMEs, will need to shift from a cost-based to a value- or knowledge-based competitive advantage.

**Table 1. Average annual total productivity growth for selected countries  
(and average contribution to GDP growth using growth accounting)**

	1985–2014*	1985–97*	1999–2007	2010–16
Cambodia	2.6 (34)	2.8 (42)	3.9 (41)	2.4 (34)
China	4.1 (43)	4.5 (45)	4.8 (45)	2.9 (37)
Lao PDR	1.5 (20)	2.3 (40)	0.6 (10)	1.9 (30)
Malaysia	1.6 (27)	2.3 (28)	2.3 (42)	1.8 (32)
Thailand	2.1 (40)	2.4 (31)	3.6 (69)	1.3 (43)
Vietnam	2.1 (31)	4.8 (53)	1.9 (10)	2.1 (38)

*Note:* \*Observations for Cambodia, Lao PDR, and Vietnam begin in 1993, 1991, and 1994, respectively. Asian and global financial crises years are omitted.

## Box 2. What is Innovation?

**Innovation is the development and application of ideas and technologies that improve firm products—goods and services—or make their production processes more efficient.** Schumpeter (1934) defined several of these applications that qualify as innovation:

- Introduction of a new product or modifications to an existing product
- A new process or technology in an industry
- The discovery of a new market
- Development of new sources of supply of inputs and raw materials
- Changes in industrial organization.

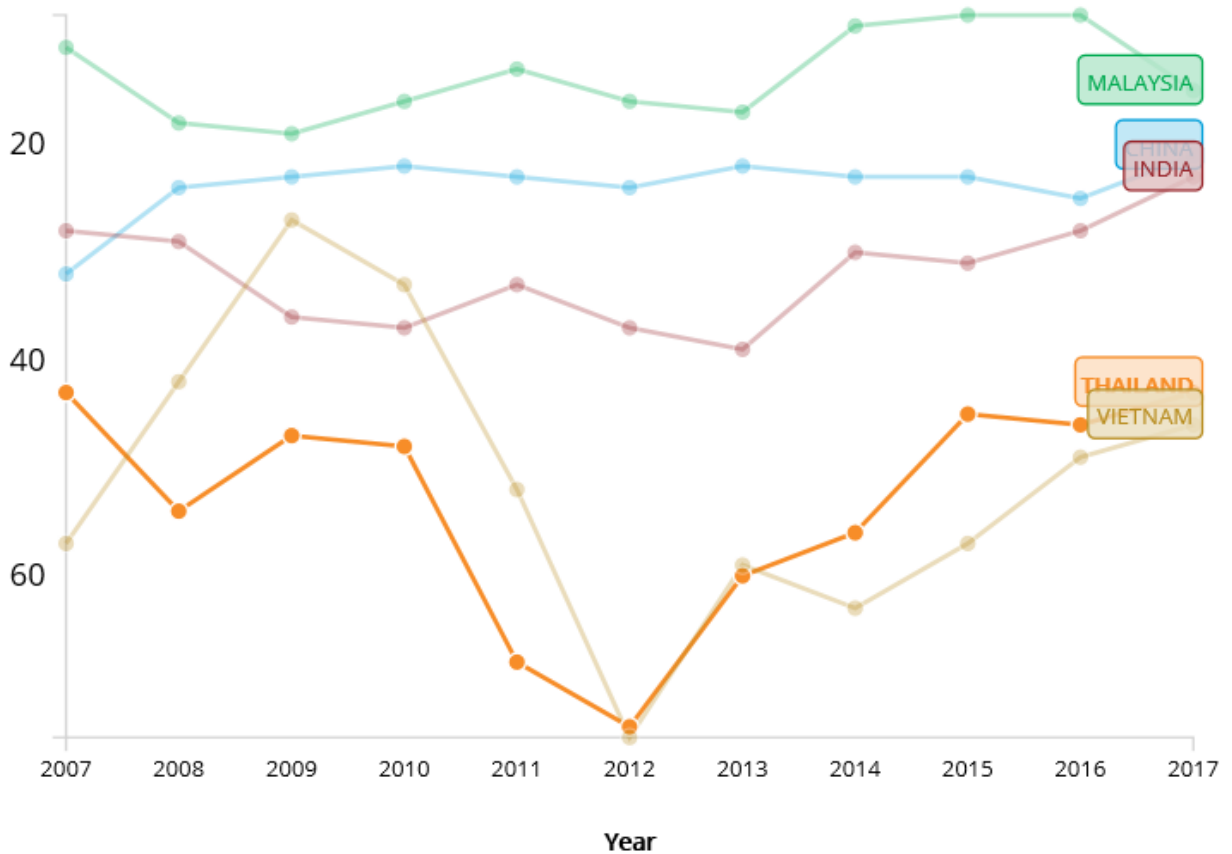
Innovation is, therefore, broader than invention. It includes commercial applications of new technology, new material, or new methods and processes. It primarily involves the process of adoption of existing technologies, the process of copying or imitating attributes from other products, or the adoption of new managerial and organizational practices or business models from other companies.

**Innovation also includes the invention of new technologies as well as disruptive business models.** Although important, these are a small part of the innovation process, especially in those countries farther away from the technological frontier. The popular view of innovation that understands innovation primarily as invention, patenting, or the generation of disruptive technologies misses the larger part of the innovation process—the more incremental and possibly disruptive implementation of ideas and knowledge to improve the firm that lies at the heart of the “growth miracle” in East Asia.

**Breakthrough innovation can lead to the rise of new industries, jobs, and economic growth, which Schumpeter (1942) coined as creative destruction.** An example of a breakthrough innovation is the development of steam engine technology in the 18th century. Steam engines were put to use in factories, enabling mass production and revolutionizing transport with railways and shipping. Today, computers and data are transforming the way companies produce and sell their goods and services, while opening new markets and creating new business models such as online commerce, e-sports, automation of production with pattern recognition, and ride sharing. Schumpeter explained how this process of innovation can drive the rise of new industries and the fall of obsolete industries through creative destruction (1942). Creative destruction now forms the foundation for modern growth theory.

**Thai firms invest in innovation less than firms in Malaysia, India, and China.** Thailand ranked 43rd in the 2017 World Economic Forum Competitiveness Index on company spending on R&D, while Malaysia ranked 15th and China 21st. Global evidence indicates that advancement to high-income status typically involves increased investment in innovation and R&D. Firms in developing countries are less likely to purchase technology licenses or intellectual property that would allow them to use more efficient processes that have already been developed, invest less in training and equipment for innovation, are less likely to introduce new products and processes that require significant upgrading, and invest less on R&D or patenting. This raises two questions: Why don't developing country firms invest more in innovation and technology adoption to realize large potential gains, and how can developing and middle-income country governments prioritize and stimulate innovation further?

**Figure 1. Company Investment in Research and Development, Rank**



Source: World Economic Forum Competitiveness Index.

Note: To what extent do companies spend on research and development (R&D)? (1 = do not spend on R&D; 7 = spend heavily on R&D).

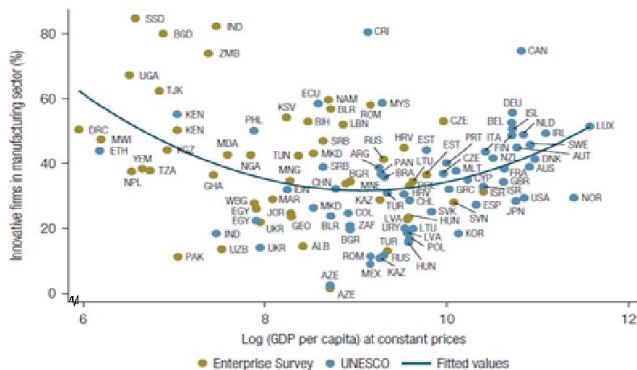


## The Innovation Paradox

Using panel country-level data, Goni and Maloney (2017) estimate the relationship between returns to R&D and country income and find that poorer countries face lower returns to R&D. Consistent with Griffith, Redding, and Van Reenen (2004), they find that the rate of return to R&D increases with distance from the frontier up to the income level of modern Argentina or Chile. However, moving still farther from the frontier, the rate of return begins to fall and may even be negative for quite poor countries.

Very poor countries report higher levels of innovation than, for instance, China, Colombia, or South Africa, as surprisingly shown in the Figure 2 U-shaped curve. The slope increases again as countries approach the technological frontier. The high level of variance among the low-income countries and often disparate values from different surveys for the same country point to significant measurement issues (see Goni and Maloney 2017). Nevertheless, the U shape would emerge with either data set alone.

**Figure 2. Manufacturing Firms in Low- and High-Income Countries Report More Innovation**



Source: Elaboration using Enterprise Survey data ([www.enterprisesurveys.org](http://www.enterprisesurveys.org)) and United Nations Educational, Scientific, and Cultural Organization (UNESCO) data.  
Note: GDP = gross domestic product.

Data show that not only do developing countries not make large investments in innovation, but they also invest far less in every type of innovation than advanced countries do. Poor countries invest far less as a share of their gross domestic product (GDP) than do rich countries in R&D: the Scandinavian countries, Japan, and the United States rank highest in investment, and Africa and parts of Asia rank lowest. What can explain this seeming irrationality on the part of developing country firms and governments? While distance from the frontier could indeed increase the gains from Schumpeterian catch-up, the increased scarcity of complementary factors necessary for R&D to have an impact prevents these potential returns from being realized. This hints at a deeper paradox: if complementary factors are lacking but can produce high returns together with innovation inputs, why don't countries invest in these complementary factors?

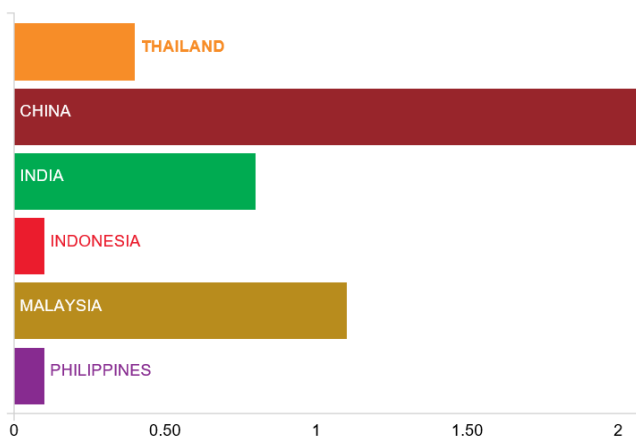
## Thailand's Innovation Capability

Thailand lags behind its peers in terms of both innovation inputs and outputs, and is ranked 52nd on the 2017 World Economic Forum's Global Competitiveness Index (GCI) innovation sub-index. Overall,

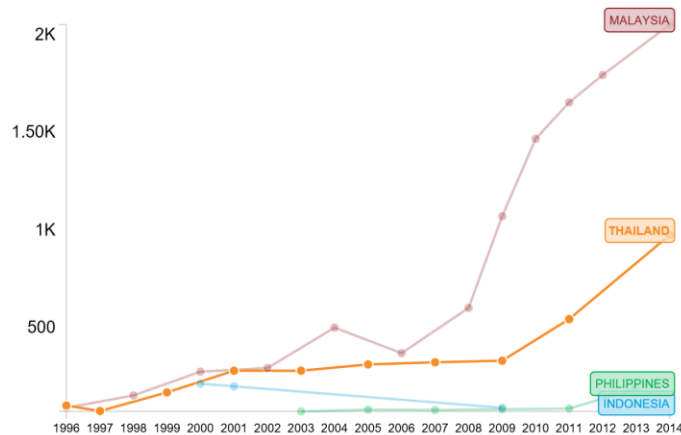
Thailand ranked 37th in the GCI, which consists of three sub-indexes including Basic Requirements, Efficiency Enhancer, and Innovation and Sophistication factors. The key factors include Technological Readiness and Innovation, with Thailand ranking 78th and 66th, respectively. Thailand fared relatively well in terms of Basic Requirements and Efficiency Enhancer.

**Thailand ranks 52nd out of 128 in the Global Innovation Index (Cornell University / INSEAD / World Intellectual Property Organization [WIPO]) and lags behind Malaysia and Singapore.** Thailand is currently lagging behind key competitor countries in terms of Global Innovation Index rankings, covering Research and Development (R&D) and Intellectual Property (IP) protection. Thailand’s tech start-up scene has developed well over the last five years but remains very small on the global level. It will need to do more to attract more investors and high-quality entrepreneurs.

**Figure 3. Gross Expenditure on R&D 2015, % of GDP**



**Figure 4. R&D Researchers per Million Population**



**Thailand's innovation efficiency is comparable to peers in developing East Asia and notably exceeds that of Malaysia.** Thailand invests less in innovation inputs (that is, expenditure on R&D in Figure 3, number of researchers involved in R&D in Figure 4, payment for intellectual property, internet use as a proxy for digital infrastructure, and quality of management as reported by the World Management Survey), and produces less innovation outputs (that is, patent and trademark applications and share of high-technology exports in total exports) compared to Malaysia and China, but outperforms the Philippines, Indonesia, and Vietnam in innovation outputs. Most importantly, when the results are combined across various inputs and outputs in all sample countries, Thailand boasts higher innovation efficiency than Malaysia and Indonesia but trails behind China (see Box 3). Thailand, as well as developing Asia as whole, is found to have above-average innovation efficiency compared to global peers in other regions.

## Box 3. Are East Asian Countries More Innovative?<sup>19</sup>

**Developing East Asia and Pacific (EAP) countries have more efficient innovation functions than their global peers.** EAP countries tend to invest as much or less in innovation inputs than other developing countries, yet they outperform their global peers in innovation outputs. Nevertheless, EAP countries are far from achieving the level of performance seen in OECD countries, in terms of both investment in innovation inputs and in translating them into effective outputs. While innovation policies need to be country specific, in general, EAP countries would benefit from investing more in innovation-generating activities and strengthening the complementary factors such as reducing the cost of doing business, and improving their trade regimes, competitiveness frameworks, intellectual property rights protection, and human capital.

### Benchmarking innovation inputs and outputs

**The framework developed in Cirera and Maloney (2017) forms the basis of our analysis.** Lack of credible data forces us to focus on a narrow set of five indicators of inputs: research and development (R&D) expenditure as a percentage of GDP, the number of researchers involved in R&D per thousand people, payments for intellectual property (IP) per capita, the percentage of the population that uses the internet (as a proxy for digital infrastructure), and management quality as reported by the World Management Survey. On the output side, we consider patent and trademark applications per million people and high-technology exports per capita. (All data are available from the World Bank's World Development Indicators except management quality, which comes from the World Management Survey. Values for IP payments, high-technology exports, trademark applications, and patent applications were highly skewed and therefore logged for regression analysis.)

**The spending by EAP countries on innovation inputs does not differ significantly from the rest of the developing world.** As shown in Table B2.1, all innovation inputs and outputs are strongly and positively correlated with a country's per capita income. On inputs, EAP countries are not different from the rest of developing countries with respect to R&D expenditure, researchers involved in R&D, internet use, or management quality. The only variable where East Asian countries invest more is IP payments, which is likely because of the large presence of foreign companies in these countries. But even here there is only weak statistical significance. The index of innovation inputs—a normalized average of how each country ranks on the five input indicators—is positive but statistically insignificant. Output and input indexes were calculated as the average of country rankings on each of the respective components, normalized to 0 to 1 scale, if a country was not missing an observation for more than one of those components.

**In contrast, EAP countries significantly outperform their peers with respect to innovation outputs.** For example, as shown in Table B2.1, EAP countries have 333 percent more patent applications than the rest of the developing world, all else being equal. Similarly, EAP country high-tech exports are 680 percent higher than a typical developing country. The index of innovation outputs—a normalized average of how each country ranks on the three output indicators—for EAP countries is positive and highly significant for EAP countries.

<sup>19</sup> Prepared by Bradley Larson and Deepak Mishra.

**Table B2.1. Developing Countries in East Asia Outperform other Developing Countries in Innovation Outputs, Despite Not Investing Significantly More in Most Innovation Inputs**

*Regression results, by dependent variable*

Type	Dependent variable	GNI per capita	EAP dummy	R <sup>2</sup>	N
Inputs	R&D expenditures (% of GDP)	0.047 ***	0.226	0.25	58
	Researchers in R&D (per thousand people)	0.083 ***	0.299	0.25	50
	Log payments for IP (per capita)	0.495 ***	1.106 **	0.50	104
	Internet users (per capita)	4.393 ***	-2.534	0.58	130
	Management quality index	0.128 ***	0.407	0.65	17
	Normalized average rank of inputs	0.040 ***	0.026	0.61	111
Outputs	Log high-technology exports (per capita)	0.513 ***	2.050 ***	0.35	108
	Log trademark applications (per million people)	0.230 ***	-0.016	0.42	91
	Log patent applications (per million people)	0.357 ***	1.466 ***	0.52	84
	Normalized average rank of outputs	0.048 ***	0.123 ***	0.64	91

Sources: World Bank 2018; World Management Survey 2015.

Note: The dependent variable (Column 2) is regressed on a constant term, gross national income (GNI) per capita (US\$ thousands, Atlas method), and a dummy for the EAP region. \*\* denotes a 95 percent level of significance; \*\*\* denotes a 99 percent level of significance.

### Do EAP countries have more efficient innovation functions?

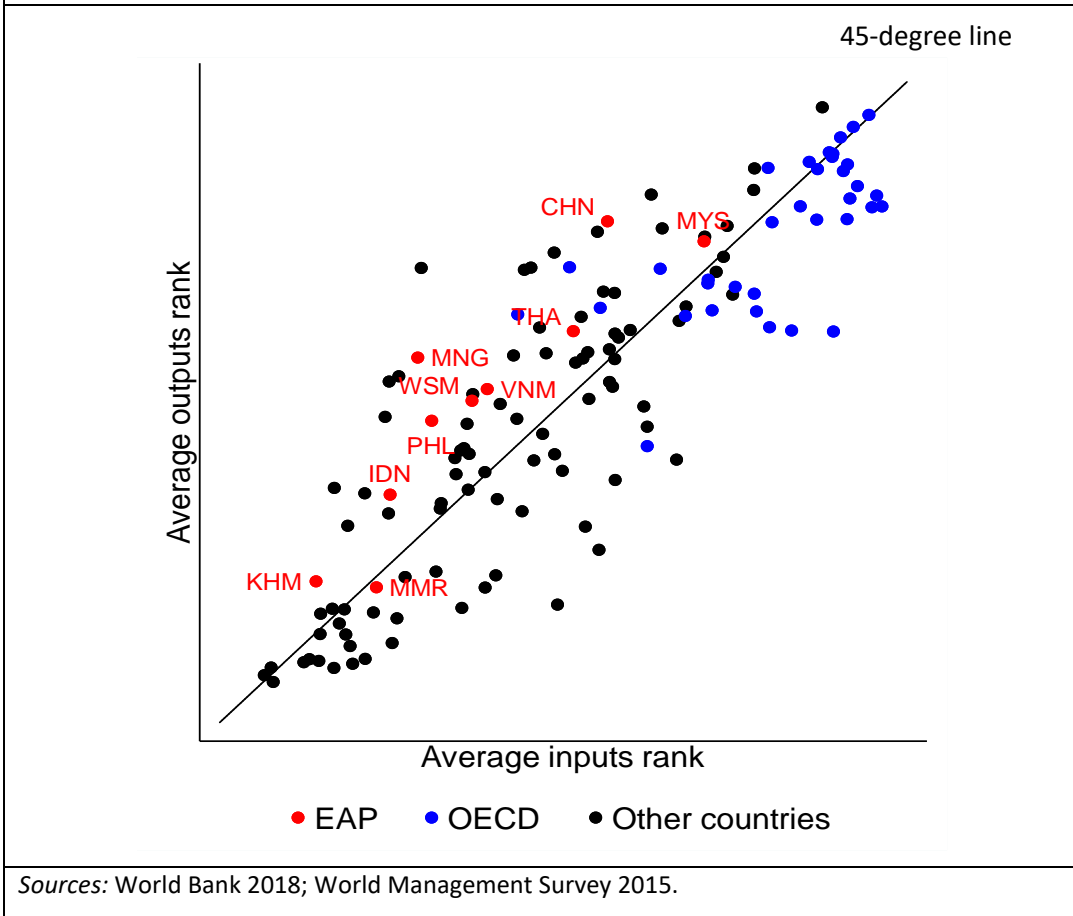
**EAP countries exhibit relatively greater innovation efficiency than the rest of the developing world.**

As shown in Figure B2.1, investment on both innovation inputs and outputs rises with per capita income. So, on average, more inputs yield more outputs. Countries above the 45-degree line are relatively more efficient at converting inputs to outputs. However, on average, EAP countries lag OECD countries in terms of level of innovation inputs and outputs,<sup>20</sup> though not so much on the efficiency of the innovation function.

<sup>20</sup> OECD 2013.

**Figure B2.1. EAP Countries Have Efficient Innovation Systems**

*Normalized average rankings of input and output indicators, by country*



**The higher efficiency at the regional level, however, masks considerable variation.** For example, per capita R&D expenditure in China is significantly higher, and growing faster, than any country at its stage of development. At the same time, Vietnam spends relatively little on R&D. Interestingly, both China and Vietnam significantly outperform their global peers with respect to patent applications and high-tech exports. Clearly the underlying production function for innovation differs considerably across EAP countries, and hence the key elements of their innovation policies are likely to be different, as well.

**The big advantage that East Asian countries enjoy relative to their global peers is in having strong “innovation complementarities.”** As Cirera and Maloney (2017) note, the efficiency of the innovation function depends on a broad set of complementarities, such as the business environment, trade and investment policies, competition policies, efficiency of the capital markets, level of protection of intellectual property rights, and the quality of physical and human capital. Many East Asian countries invested heavily in building these complementarities, which underpinned their early development success. But with rising income, the appetite for deeper structural reforms seems to have waned in many of these countries. If East Asian countries are to continue to lead the world in growth and job

creation, they need to pursue a two-pronged strategy of investing more in innovation inputs while accelerating structural reforms to strengthen the complementary factors that influence innovation.

**As Thailand approaches the world technology frontier, R&D for both technological catch-up and innovation can play important roles for supporting long-term economic growth.** For example, Griffith and Van Reenan (2012) find that R&D is important both for technological catch-up and “new to the world” innovation. They point out that much knowledge is acquired through “learning-by-doing” and argue that the further a country lies from the technological frontier, the greater the potential for R&D to generate growth in total factor productivity through technology transfers from countries closer to the frontier. Thailand has been lagging its peers in R&D, in terms of both money spent and number of R&D professionals.

## Creative Destruction

**Creative destruction (Schumpeter 1942) explains how innovation and market forces can drive long-term growth.** Creative destruction, the marriage of science and economics, is a process by which innovation attracts economic resources. The introduction of new products, technologies, business processes, and ideas and inventions in the market, or, in other words, innovation, draws both workers and investment away from less productive firms and gives rise to overall growth as better investment opportunities and better jobs are created. History shows how the steam engine replaced the horse and carriage as well as the sailboat. Mechanics replaced blacksmiths. The steam engine was later replaced by the internal combustion engine. Perhaps autonomous vehicles will usher in a new round of creative destruction. Although uncertain, this never-ending process has nonetheless raised productivity and standards of living.

**There is substantial international evidence that creative destruction drives long-term economic growth.** The majority of empirical research has focused on factor reallocation, particularly labor flows and job creation, as a proxy of creative destruction. Job creation and destruction flows tend to be large and persistent and take place within as opposed to between narrowly defined sectors of the economy, suggesting that innovation often takes place at the narrow sectoral level.<sup>21</sup>

**There is evidence of creative destruction at work in the Thai economy, but it is not widespread, suggesting economic bifurcation, or two Thailands, due to structural impediments.** Amarase, Apaitan, and Ariyapruchya (2013) find that flows of capital associated with factor reallocation from low-productivity firms to high productivity firms occur in narrowly defined sectors, particularly in electronics or those with high export shares. As a result, aggregate productivity growth is boosted. In addition, new firms undergo a selection process whereby innovative firms survive, grow, and become industry leaders. However, protected or less competitive sectors show less flow of capital, less firm entry and exit, and less productive incumbents that grow. The forces of creative destruction are not prevalent throughout all sectors, suggesting that the economy is bifurcated. Apaitan, Ananchotikul, and Disyatat (2017) analyze

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<sup>21</sup> Davis, Haltiwanger, and Schuh (1996) report such findings for the U.S. economy. Foster, Haltiwanger, and Krizan (2001) find that labor reallocation between plants accounts for half of manufacturing productivity growth. Bartelsman, Haltiwanger, and Scarpetta (2004) reports similar evidence in 24 countries. Caballero, Cowan, and Micco (2004) find that labor regulation and protection can hamper creative destruction based on panel data of 60 countries.



export data to find that leading exporting firms can upgrade to sophisticated products, but benefits do not accrue to the bulk of laggard firms.

## Unraveling the Innovation Paradox

**The study by Goni and Maloney (2014) finds that the rates of return to R&D follow an inverted U-shape with distance from the technological frontier.** In other words, the rates of return rise with distance from the frontier and then fall thereafter, potentially turning negative for the poorest countries furthest from the frontier. The study employs a varying coefficient econometric modeling framework.

**We extend the Goni and Maloney (2014) and find that supply-side constraints explain low returns to R&D for developing economics.** See Appendix.

**Firms also cite structural constraints, in particular, skilled personnel, as a key obstacle to productivity and innovation (32 percent).** Other obstacles include cost of financing innovative activity (37 percent) and insufficient knowledge (18 percent). Interestingly, low returns to innovative came last at 6 percent of firms surveyed (Enterprise Survey 2016).

**Firms that use technology such as email or a website tend to exhibit higher average total factor productivity (TFP) in both manufacturing and services.** This pattern is seen across the Association of Southeast Nations (ASEAN), including in Vietnam, China, and Indonesia. (*Note:* Average TFP in firms with websites and/or using email is presented as a percentage of the average TFP of firms using neither technology. One hundred percent represents no difference in the average productivity of these two groups. Cambodia and Lao PDR were excluded from this analysis since they contained too few observations with sufficient data.)

## Policy Challenges

“Necessity is the mother of invention.”  
Plato, *The Republic*

**Investment in complementary inputs that provide the right incentives for investing in innovation are critical to enabling the transition to a high-income, innovation-based economy.** As mentioned, between 1987 and 2015, only 12 of 62 middle-income countries became high income. The experience of these countries shows that key elements for these transitions have been investments in advanced human capital and regulatory reform, as well as R&D and infrastructure. Innovation is a long-term and risky venture that benefits from a supportive regulatory environment, particularly of intellectual property. Other factors include competition policy, data infrastructure, advanced human capital, and intellectual property. Key areas for Thailand include:

- Competition policy
- Service liberalization

- National data strategy
- A skilled workforce
- Intellectual property rights

**Policies to foster innovation depend on effective implementation.** Given the long-term nature of innovation, incentives work only if they are credibly implemented. As such, governance as well as legal design of innovation policies, such as competition policy and intellectual property, will be crucial. The quality of Thailand's government agencies, however, has been in decline compared to its peers (see Figure B1.1). Implementation of the Competition Act and intellectual property rights has also been lackluster.

### Competition Policy

**Competition, both domestic and international, can be an important force for creative destruction and innovation.** Competition lowers firm profit margins and incentivizes firms to innovate to survive. New entrants can also learn from or imitate incumbent firms that have innovated ahead. Ariyapruchya, O-lanthansate and Karnchanasai (2006) finds that Thai firm productivity is highest when firms face goods markets competition, as proxied by firm rents, price distortion including through price controls, industry concentration, ease of entry and exit, and export share. Klapper, Laeven and Rajan (2004) find that stringent barriers to entry inhibit industry growth in European data.

Thailand's competition law under the 1999 Act did not comply with international best practice. Extensive exclusions from competitive scrutiny distorted market outcomes in key sectors of the economy. Under the 1999 Act, SOEs were excluded from the scope of application of competition law. In practice, this has enabled major players in key sectors to abuse their market power and engage in collusive behavior. Other exclusions included farmers and cooperatives as well as any other business specifically exempted by ministerial acts. Most hard-core cartels benefited from exemptions in the law for bid rigging and market sharing agreements among competitors. Furthermore, certain prohibitions included in the 1999 Trade Competition Act targeted legitimate business practices, notably in relation to exclusive distribution agreements either domestic or for importing goods, which is at odds with established best practice.

There was also limited enforcement under the 1999 Trade Competition Act, and no cases have been successfully prosecuted since the establishment of the Trade Competition Commission (TCC). Furthermore, the commission currently consists of high-ranked officials and private sector representatives, and is chaired by the Minister of Commerce, which has hampered its impartiality. Although several complaints were made to the TCC between 1999 and 2015 involving unfair trade practices, restrictive agreements, and abuses of dominant positions, (and 84 cases were decided), none was prosecuted.

The new Trade Competition Act B.E. 2560 (2017) aims to bring Thailand's competition regime in line with international practices and procedures. An independent authority with extensive powers under the new Act will be better equipped to referee the market. The new act will no longer exempt state-owned enterprises, subject to limited circumstances, where SOEs carry out activities by law or cabinet resolution for the necessity of national security, public benefit, or infrastructure. This is a welcome development, but the retention of this carve-out has the potential to be a broad exemption in practice, depending on how widely it is construed. And it does not align with international best practice whereby competition law is applied to all economic agents and activities across sectors. Transparent criteria and restrictive interpretation of exemptions are important to avoid negative impacts.

Subsidies and extended price controls might distort competition and prevent productivity and efficiency gains in key sectors of the economy. Thailand has systematically subsidized several sectors, either directly or indirectly. SOEs enjoy government guarantees on debt and exemptions on debt and exemptions from certain regulations, while sectors such as energy, rubber, and agriculture receive direct government support. At the same time, under the mandate of the of 1999 Price of Goods and Services Act, Thailand has the rights to direct the prices of any good or service. In 2015, the controlled list had 38 goods and 3 services for which manufacturers must have government approval before raising prices or give advance notice of a change in prices; there were another 205 goods and 20 services under periodic surveillance, including Packed Rice, Gasoline, Natural Gas for Vehicles (NGV), Vegetable oil, Finished Meal, Pork, and Liquid Petroleum Gas.

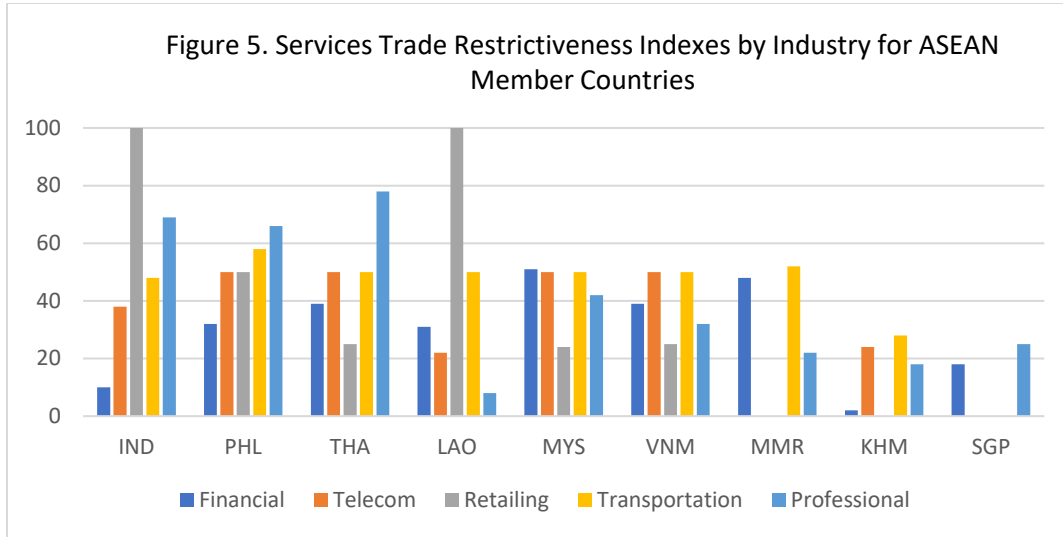
### Service sector liberalization

The service sector can serve as a new driver of growth by harnessing domestic and global competitive forces. Services is becoming increasingly important to growth due to its complementarity with manufacturing, criticality in the global value chain, and rising tradability given technological advances. However, in Thailand, services accounts for approximately half of output, uses a substantial 40 percent of the labor force, and lags behind manufacturing productivity by 30 percent. Unlike many peers, Thailand's service sector share has not grown, is dominated by lower-productivity industries employing lower-skilled workers, and boasts a low share of services exports, which tend to be in "traditional" sectors.

Thailand has on average a more restricted service market, particularly in professional services compared to ASEAN peers and other regions in the world. Examples of successful services liberalization in ASEAN highlight how the combination of private sector initiative and government support can increase service output and exports (for example, Singapore: financial services; Malaysia: higher education; the Philippines: telecommunications-based services). A global World Bank study finds that Thailand has a more restricted service market on average compared to ASEAN peers such as Malaysia and other regions of the world, particularly in professional services such as accounting, legal, architecture, engineering, and management consulting.

### Qualification and certification processes

Integration in services can be deepened considerably by implementing the commitments laid out within the ASEAN Economic Community (AEC) framework agreement on services. The regional economic integration of AEC, a large potential market of 620 million people, offers opportunities for using services and services trade to generate growth in productivity and income. While services contribute between 40 and 70 percent of the gross national income of ASEAN, ASEAN's trade in services represents only 5 percent of world trade in commercial services. Thailand is a signatory to the AFAS commitment to liberalize services, but this has not resulted in significant additional liberalization on the ground. ASEAN has a roadmap to pursue implementation of service sector reforms.



Source: World Bank ASEAN Services Integration Report 2015.

**As set out in the AEC Blueprint, the conclusion and implementation of Mutual Recognition Arrangements (MRAs) is one of the key priorities of economic integration in services.** The MRAs aim to facilitate trade in services by mutual recognition of authorization, licensing, or certification of professional services suppliers. The goal of the MRAs is to facilitate the flow of foreign professionals, taking into account relevant domestic regulations and market demand conditions (ASEAN Secretariat 2009). MRAs in seven occupations under the purview of the ASEAN Economic Ministers have been concluded to date (see Table 2 below). However, domestic regulations have not yet been aligned with the ASEAN MRAs, while some MRAs need to be complemented with further bilateral negotiations to make them operational.

**Table 2. Mutual Recognition Arrangements Concluded Under Purvey of ASEAN Economic Ministers**

Mutual Recognition Arrangement	Signing Date	Implemented Through
Engineering services	December 9, 2005	ASEAN registration (ASEAN Chartered Professional Engineer Coordinating Committee)
Nursing services	December 8, 2006	Bilateral registration
Architectural services	November 19, 2007	ASEAN registration (ASEAN Architecture Council)
Framework Arrangement on Surveying Qualifications		MRA
MRA Framework on Accountancy Services	February 26, 2009	MRA
Medical practitioners		Bilateral registration
Dental practitioners		Bilateral registration
Accountancy	November 13, 2014	MRA

**One issue regarding implementation of the MRAs is the extent to which ASEAN member policies and regulations on the relevant procedures need to be, and have been brought, in accordance with the MRAs (ERIA 2012).** This issue arises because some of the arrangements do not immediately require ASEAN Member States to allow foreign professionals to access their markets, but rather provide that the recognition of the professional accreditations is to be done on the basis of the current laws and regulations of the recognizing country. For example, the MRA on medical professionals establishes that:

“A Foreign Medical Practitioner may apply for registration in the Host Country to be recognized as qualified to practice medicine in the Host Country in accordance with its Domestic Regulations and subject to [...] *any other assessment or requirement* as may be imposed on any such applicant for registration as deemed fit by the [relevant authorities] of the Host Country.]”

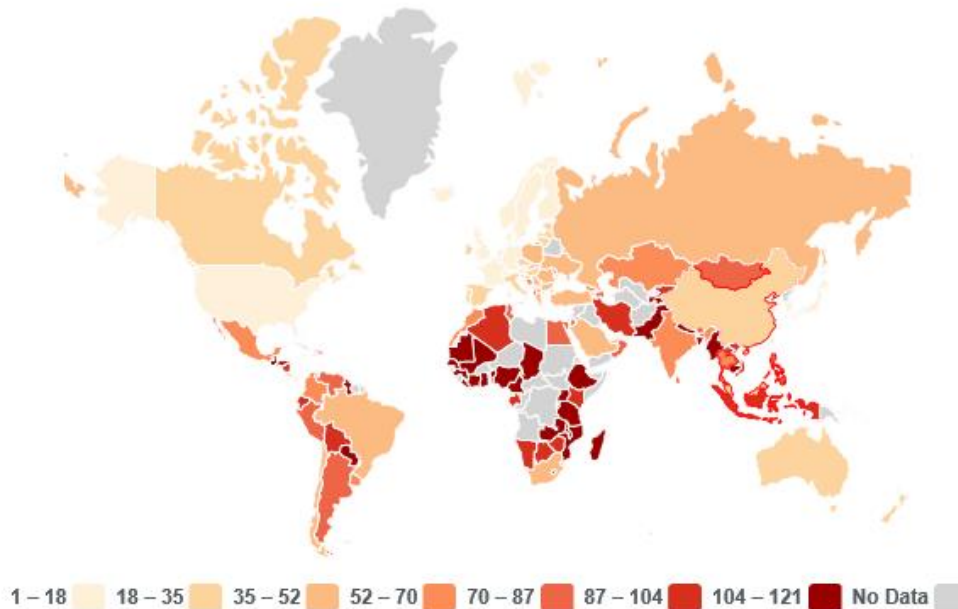
In the case of Thailand, a foreign doctor is required to take an exam in Thai, although less explicitly, the MRAs on engineering and architecture also include references to compliance with domestic laws and regulations that could be interpreted as providing the host countries’ authorities a similar degree of discretion in the process of recognition.

### Intellectual Property

The Government of Thailand has established a 20-year strategy and a plan of reforms to operationalize Thailand’s 4.0 economic model. The reform of the Intellectual Property (IP) sector plays an important role in this strategy. The strategy has been further elaborated by the Department of Intellectual Property (DIP) through the development of its 20-year IP Roadmap. The main features of this Roadmap are (1) IP creation; (2) utilization of IP in business; (3) protection of IPRs; (4) enforcement of IPRs; (5) promotion and protection of GIs; and (6) protection of Genetic Resources (GRs), Traditional Knowledge (TK), and Traditional Cultural Expressions (TCEs). The Government of Thailand has also recently introduced a 300

percent tax reduction scheme on R&D-related expenses to encourage private sector investment in innovation and technology-based industries.

Figure 6. Country Ranking by Number of Patent Applications Filed under Patent Cooperation Treaty (PCT) per Million Population in 2016



Source: Global Innovation Index.

Thailand ranked 69 in number of patent applications filed under the Patent Cooperation Treaty (PCT) per million population in 2016, below Malaysia and China, which ranked 35 and 32, respectively (Figure 6). An analysis of the Thai database for patents, as well as other international databases encompassing data for Thailand, reveals that Thai nationals file fewer patents than in comparator countries, which is symptomatic of a lower number of firms with R&D capacity and a decreased institutional capacity to submit patent applications accompanied by solid claims of originality. Moreover, the low rate of granted patents in Thailand shows that the Department of Intellectual Property (DIP) may have a low rate of efficiency in processing such claims, which seems to be masked by the significant backlog in patents pending.

Patents granted to Thais are fewer and of lower quality compared to nonresidents. In 2015, only 1,364 patents were granted—1,302 to foreigners and only 64 to Thais. *Two conclusions might* be deduced from this type of information: (a) *the* DIP issues very few patents per year, thus increasing its backlog; and (b) Thai patents are normally of low quality, and capacity building will be important to increase the skills of Thai stakeholders to draft higher-level patents.

The capacity of the *DIP* is strained. It normally takes seven to eight years for a patent application to be examined and granted. This delay is significantly longer for patents in the pharmaceutical and biotechnological sector (an average of 12.7 years, in accordance *with the* World Intellectual Property Organization).

The government's ability to achieve the goals of *the* "Thailand 4.0" strategic and economic plan would be significantly improved if Thailand adopted a world-class IP regime. The current system is marred by significant deficiencies in several areas. These include:

- Gaps exist in the IP legal framework for it to be compliant with provisions typical of a "new-generation" FTA
- The level and number of current human resources are not sufficient to administer IP to support the ambitions of the Thailand 4.0 policy
- Current efforts in enforcing IP are not adequate to attract investment—either domestic and foreign—in R&D.

A comprehensive IP reform program could be implemented with a view to enhancing the economy's competitiveness and increasing the population's welfare. The Thai government could capitalize on the need to comply with a "new-generation" Free-Trade Agreement (FTA), such as the Trans-Pacific Partnership (TPP or the FTA with the European Union, as a blueprint to guide the development and implementation of reforms. Reforms of the entire national IP ecosystem could focus on each component of the entire innovation value chain, from R&D to IP creation, and from protection to IP enforcement. The needs assessment conducted in 2016 revealed that the current IP system is perceived by national and foreign investors as mainly inefficient and is one of the most significant deterrents to entry in Thailand. Reforming the IP system would therefore enable Thailand to more effectively attract and maintain investments. In addition, if these granting processes are streamlined, then the potentially adverse effects of some of the legislative tools introduced, in particular, by the TPP and designed to increase the duration of patents, (in case of delays at the DIP or the Food and Drugs Administration) could be nullified.

The government could capitalize on the implementation of a regulatory framework that ensures higher levels of protection of *intellectual property rights*, by "marketing" this factor as a tool to attract *foreign direct investment*, predominantly in strategic sectors that the government intends to target and promote (and, in particular, in innovative sectors). This could be achieved through promotional events, investor forums, media advertisement, and so forth.

*The literature*<sup>22</sup> demonstrates that while the key determinants in a decision to undertake investment in a foreign country remain, in most cases, the size of the market, labor costs, and the availability of skilled workers, raw materials, and efficient infrastructure, IP considerations increasingly play a significant role not only in the decision to invest (or not) in a given country, but also in any subsequent determination to remain in such a country or to move elsewhere. It is intuitive, therefore, that multinational companies, particularly those operating in IP-intensive sectors (such as ITC, innovation, entertainment, pharmaceutical/chemical, and so forth) would not feel comfortable bringing their valuable technologies into countries where *intellectual property rights* are not adequately protected and enforced.

After more than a decade, Thailand has been removed from the U.S. Priority Watch List for intellectual property policies and enforcement due to corrective actions the country has taken. The U.S. Trade Representative has now added Thailand to the lower Watch List category. This indicates that *the United States* and probably other trading partners see significant challenges in the field of IP protection and enforcement. Thailand's rank in the *World Economic Forum* Global Competitiveness Sub-Index for intellectual property protection has declined since 2007 to reach 106/138 in 2017 (Figure 7). This has obvious negative consequences for Thailand as a business destination and capacity to attract new

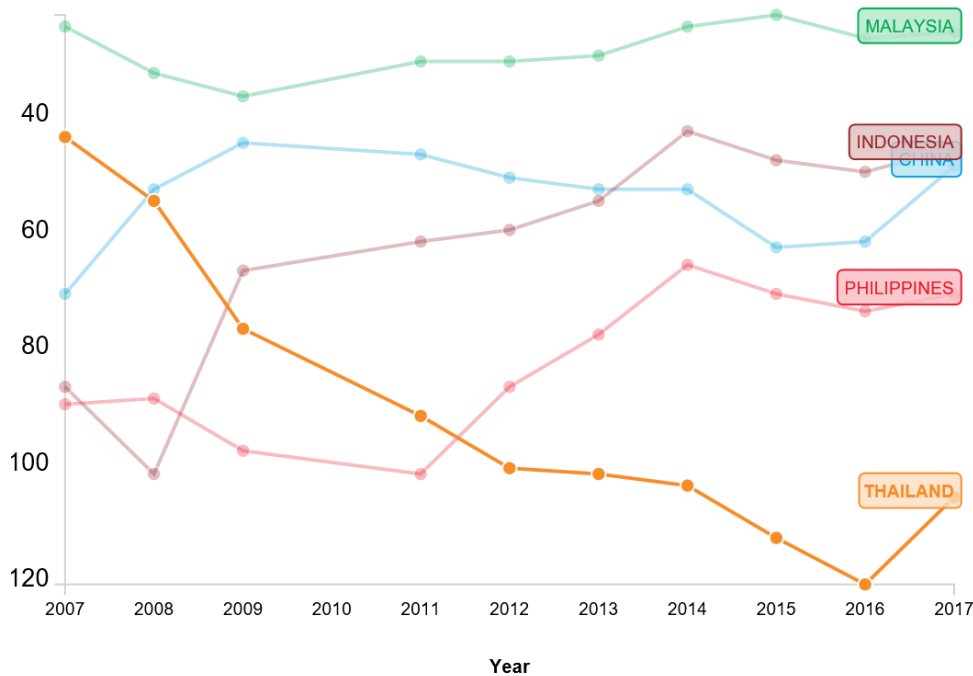
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<sup>22</sup> See, for example, ERIA 2013.



investors, particularly but not only from the United States, in higher-value-added industries that use and produce intellectual property.

Figure 7. Intellectual Property Protection (Rank)



Source: World Economic Forum Global Competitiveness Index.

A comprehensive IP reform program could include the following actions:

- Amendment of the existing IP regulatory framework to ensure compliance with a TPP-like regime
- Further streamline and automate procedures and processes at the DIP, the FDA, and other institutions mandated to support innovation
- Provide the DIP with enhanced financial autonomy, enabling it to retain stronger competencies to implement its mandate
- Enhance the institutional capacity of all IP-related agencies, including all relevant enforcement agents, ranging from judges and personnel of the Intellectual Property and International Trade Court, to police and custom officials, and private and public sector lawyers
- Improve IP teaching and training in the country
- Launch a comprehensive awareness-raising program aimed at improving the public understanding of the link between IP and Thailand 4.0 policy.



Investment in advanced human capital is key to the transition to a high-income, knowledge-based economy. Between 1987 and 2015, only 12 of 62 middle-income countries became high income.<sup>23</sup> The experience of these countries shows that key elements for these transitions have been investments in advanced human capital as well as R&D and infrastructure. Furthermore, research (McKinsey 2013) shows that the marginal returns from investment in human capital are 40 percent higher than investment in R&D. The fact that human capital is a necessary precondition to make other investments work is confirmed by the 2016 Human Capital Report by the World Economic Forum, according to which countries that are better at managing human capital tend to be better off.

Workforce development policies help shape a country's human capital pool to meet the needs of an innovative knowledge-based economy. Workforce development policies include the following areas, each one with a specific set of objectives: (a) education—creates the next generation of workers; (b) training—targets skills development for current labor market needs; (c) upskilling—helps current workers adapt to the changing labor market; and (d) migration and talent attraction—can fill skills gaps in the short term. Coordination among these policies will be crucial to build the skills and human capital for the shift to the knowledge-based economic model envisioned as part of the Thailand 4.0 aspiration.

Skills monitoring systems are designed to address skill shortages and are often applied to training, education, and migration policy. In the United Kingdom and Australia, occupations and skills imbalances monitoring procedures, and the structures for formulating regularly published “skilled occupation shortages lists” have been established and are continuously maintained. These procedures combine “top-down” analysis of key labor market data with “bottom-up” input from and validation by industry. In both countries skills imbalance monitoring is used to inform and prioritize a broad range of human capital policies, from the curriculum standards that have to be met by academic and technical-vocational education providers to scholarships, apprenticeships, public employment programs, and fiscal and immigration incentives used to tap the international supply of skills. Recently, Malaysia has also introduced a similar tool—the Critical Occupation List—to inform both immigration and human resource development policies.

### National Data Strategy

Data are the new “natural resource”<sup>24</sup> and can help firms raise productivity and innovation. In the Thailand Enterprise Survey, firms that use IT technology show higher resources. Globally, the importance of data can be seen from the fact that 6 of the top 10 companies in the world by market capitalization are companies that are in the business of data. These include Apple (US\$752 billion), Alphabet (US\$579.5 billion), Microsoft (US\$507.5 billion), Amazon (US\$427 billion), Facebook (US\$407.3 billion), and Tencent Holdings (US\$277.1 billion).<sup>25</sup> Data are becoming increasingly valuable and will have huge spillovers in other sectors. Given their sheer potential for impact across industries and sectors, we consider data to be the most important digital asset that deserves focused attention.

Developing a national strategy on data would be beneficial for Thailand. Currently, Thailand's approach to data is limited to the promotion of open data in government and integrating data for providing better

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<sup>23</sup> Antigua and Barbuda, Chile, Hungary, the Republic of Korea, Malta, Oman, Poland, Portugal, the Seychelles, St. Kitts and Nevis, Trinidad and Tobago, and Uruguay.

<sup>24</sup> *Fortune* 2016.

<sup>25</sup> Forbes rankings for 2017 of the World's Biggest Public Companies (<https://goo.gl/pK7vXV>).

services to citizens and businesses. We suggest that Thailand look at data from a broader perspective (including private sector data). For example, an increasing amount of data will be generated by machines or processes related to the Internet of Things, including factories of the future and autonomous connected devices and systems. However, no comprehensive policy frameworks exist with regards to nonpersonal machine-generated data or to the conditions in which such data can be exploited or traded.

The European Union<sup>26</sup> is in the process of developing a framework for data access that could help inform Thailand's approach, revolving around the following objectives:

1. Improving access to anonymous machine-generated data
2. Facilitating and incentivizing the sharing of such data
3. Protecting investments and assets, ensuring fair sharing of benefits among data holders, processors, and application providers within value chains
4. Avoiding disclosure of confidential data
5. Minimizing lock-in effects, especially for SMEs and startups and private individuals.

A national strategy on data could touch on these as well as issues of (a) data standardization; (b) free flow of data; (c) access to machine-generated data; (d) liability and safety issues related to data; (e) establishing 311 type of data services to facilitate the location, processing, and brokering of data; (f) creation of data maps; (g) providing support to data matching services; and (h) helping grow data exchanges and markets. Most of these interventions, for example, underpin Korea's recent Master Plan for the Intelligent Information Society.<sup>27</sup> Malta, which currently holds the Presidency of the European Union, is also developing a National Data Strategy<sup>28</sup> that could serve as a source of insights and lessons for Thailand.

Timely progress in this agenda would be aided by the appointment of a Chief Data Officer (CDO) within the Ministry of Digital Economy and Society, to lead the work on data standards, data governance, data security, data sharing, metadata management, data quality, and data architecture. The position of CDO could also be considered by other government ministries, departments, and agencies, given the pivotal importance of data across all sectors.

#### *Keystone initiative on data:*

A keystone initiative on data could be to transition to a requirement for insuring data assets in Thailand, which could be facilitated through a public-private partnership on cyber-risk reinsurance. This is likely to have the following cascading impacts:

1. It would incentivize companies and government agencies to take stock of their data, assign value to their data, and secure their data assets.
2. It would introduce a market mechanism to ensure data security, as cyber-risk insurance premiums would rise for data assets that are not secure.

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<sup>26</sup> European Commission, Building a European Data Economy, January 2017.

<sup>27</sup> Mid to Long Term Masterplan in Preparation for the Intelligent Information Society, (<https://goo.gl/3x7TTt>).

<sup>28</sup> "Malta is establishing a holistic plan to manage data as an enterprise asset," Malta Information Technology Agency, June 14, 2017 (<https://goo.gl/vfzxQX>).

3. The model would act as a check on high valuations of data, as inflated valuations would result in inflated premiums.
4. It would help take stock of data on a continuing basis within government and the private sector, resulting in better information on data availability, and data valuations. This would in turn help in the creation of data markets, and better regulation of data flows.
5. The initiative could help develop cyber-risk assessment skills in Thailand promoted largely by the private sector.
6. Thailand would emerge as one of the most secure data locations internationally.
7. Thailand could potentially become a test bed and learning platform for global insurance companies in cyber-risk insurance.
8. The initiative could also provide opportunities for the development of blockchain-based insurance models that track data assets, thereby lowering costs of insurance and supporting innovations in Thailand.

**One important but neglected area for future study is firm managerial capability for innovation.** For the private sector in developing countries, Cirera and Maloney (2017) find that the adoption of better firm-level managerial and organizational practices is a critical factor in innovating in products, processes, and upgrading the quality of their goods. These practices are also the building blocks to developing more sophisticated innovation projects that include the invention of new products and technologies.

**Innovation policy is challenging to implement especially for emerging markets such as Thailand.** Emerging-market ministries and agencies may lack human capital and effective organizational structures at a time when designing and implementing innovation policy is becoming even more complex given technological progress. The report proposes a conceptual framework, the “capabilities escalator,” where policies to support firm upgrading are sequenced in accordance with the level of capabilities of the private sector, as well as of policy makers and institutions, and ratchet up through progressively higher stages of sophistication.

## Box 4. Thailand's New Competition Act: Will it Deliver?

Thailand's 2017 Competition Act is aimed at raising competitiveness through greater competition, but yet-to-be developed guidelines will prove critical for enforcement effectiveness. The act touches on many important aspects such as governance of the competition agency, merger control thresholds, anticompetitive agreements, and exemptions. However, the most important aspect is implementation, on which the Thai Competition Commission cannot boast a great track record. The previous Competition Act was created in 1999 to replace the ineffective 1979 Anti-monopoly Act by strengthening enforcement. Although 100 complaints were filed, the 1999 act resulted in only one successful prosecution. The 2017 Act is an improvement, but it remains to be seen how the commission will develop critical guidelines called for in the new act that will determine the effectiveness of the new regulatory framework.

The new law incorporates some positive features. For example:

- It limits the (former general) carveouts for state-owned enterprises to only those that provide for national security, public interest, the interests of society, or the provision of public utilities. Although these carveouts could be interpreted broadly, it seems that the intention is to maintain a narrow interpretation.
- It supports the advocacy role of the commission to propose measures to embed competition in business regulation.
- It strengthens the prohibition to hardcore cartels and limits the burden to firms considered dominant (formerly with market shares as low as 30 percent).
- It raises the level of fines to 10 percent of the violator's turnover, following most international examples.
- It enables the commission to order remedies to redress market conditions after a competition violation or merger.
- It covers private damages as a mechanism to further incentivize compliance.

However, concerns regarding enforcement remain.

- **The new act maintains a number of exclusions from its scope of application.** First, the exclusion of sectors with specific competition provisions in their laws, creates either fully exempted sectors or at best different treatment among operators in different sectors and enforceability problems, especially given the lack of independence of sector regulators responsible for prosecuting anticompetitive conduct in their respective sectors. This seems to be the case, at least, for telecom, energy, and insurance. Other exclusions include farmers and cooperatives as well as those based on the narrow definitions of Section 5, such as the exclusion of non-for-profit organizations from the scope of application of the law. Businesses associations may play a critical role in enabling anticompetitive agreements among their members, and constitute a recurrent element in a large number of cartels.

- **Moreover, tackling anticompetitive behavior will remain challenging due to broad prohibitions—even for legitimate business practices—such as the possibility to grant individual exemptions for anticompetitive behavior and the maintenance of suboptimal sanctions, among other factors.**
  - *Market operators can request/obtain permission to carry out any prohibited anticompetitive practice (including hardcore cartels and abuses of dominance) to “facilitate business operations.”* In responding to these requests, the commission can only order measures to limit anticompetitive effects in the case of abuses of dominance, but not in case of collusion agreements. (Section 59)
  - *Certain prohibitions included in the act account for fully legitimate business practices and noncompetition-related behavior.* This is the case of the prohibition of exclusive distribution agreements, either domestic (Section 55.3) or for the purpose of importing goods (Section 58). Similarly, Sections 50.4 and 57 prohibit conduct that does not typically constitute competition violations. The former qualifies “intervening in the business operation of others without any appropriate reason” as an abuse of dominant position and the latter refers to unfair commercial practices.
  - *The new act fails to introduce a leniency policy to uncover cartels.* Leniency for the first member that provides information on the existence of a cartel has become a critical tool for anticartel policy, with some countries getting most of their convictions following leniency applications. An effective leniency program could help in collecting the necessary evidence to build solid antitrust cases, especially in a setup of criminal enforcement where the standard of proof required is high.
  - *The use of market shares to determine a dominant position might chill competition on the merits.* While some of the harshness of the previous act against dominant firms has been eliminated, the new act still proposes the use of a market share threshold to define dominance (Section 5).
  - *Suboptimal penalties may limit the effectiveness of the act.* While the fines for hardcore cartels and abuses of dominance have increased to a maximum of 10 percent of the annual turnover, they are criminal in nature, which requires a higher standard of proof and cannot be accorded by the commission, but have to be ordered by a tribunal. Moreover, jail time (up to two years) is possible instead of a fine. Typically, this is reserved for hardcore cartels only, while the act also includes abuses of dominance. (Section 72). Therefore, the powers of the commission itself regarding antitrust violations are limited to cease and desist orders and remedies.

Merger control also appears to be challenging due to a combination of multiple notification methods/tests, paired, in some cases, with low fines for lack of notification. Section 51 of the act divides mergers and acquisitions among those that may significantly lessen competition (which require post-merger notification, that is, this creates the problem of unscrambling the egg) and those that may result in the creation of a monopoly of dominant position (which require pre-merger notification). First, the difference between the two categories is blurry. Typically, those transactions that may

significantly lessen competition are those that create or strengthen a dominant position. Second, lack of post-merger notification only entails an administrative fine of US\$5,000. To a large extent, the effectiveness of the Thai merger policy will depend on how the commission develops its merger control powers through guidelines.

Finally, the absence of specific obligations to apply a competition filter to state aid and other quasi-fiscal incentives may further distort market outcomes. The Government of Thailand systematically subsidizes several sectors, either directly or indirectly, and price controls are common across sectors. No matter how worthy the goals are that the government intends to promote through subsidies/fiscal/quasi-fiscal measures, the implementation of a comprehensive competition policy in Thailand could minimize their potential distortions through a systematic application of a pro-competition analytical framework. This type of analysis requires an understanding of four elements: (1) whether the measure is granted by the state or through a state entity, (2) to an economic agent performing economic activities, (3) creating a selective advantage, (4) which has an impact on competition. However, these elements are typically toned down by some caveats such as a de minimis amount under which the measure will be considered nonsignificant. For instance, the categories covered by quasi-fiscal measures in Thailand—such as subsidies to farmers, or aid to SMEs or startups—are those where an individual analysis on a case-by-case is not typically required. Instead, developing a framework to assess the transparency of schemes, including clear requirements to access aid and cost allocation, could ensure that the quasi-fiscal measures achieve their goals while do not incur into ancillary restrictions or market distortions.

## Appendix. The Relationship between the Rates of Return to R&D Investment and Distance to the Technological Frontier

A study by Goni and Maloney (2014), employing a varying coefficient (VC) econometric modeling framework, finds that the rates of return to R&D follow an inverted U-shape with distance from the technological frontier. In other words, the rates of return rise with distance from the frontier and then fall thereafter, potentially turning negative for the poorest countries furthest from the frontier.

However, Goni and Maloney (2014) may miss the impact of supply-side factors such as human capital and regulatory environment on returns to R&D. Goni and Maloney's basic VC model (using no instruments) is in effect a random coefficient model (that is, random intercept and slope coefficients), where the coefficients are allowed to vary over different units (that is, countries) characterized by the distance from the world technological frontier. We suspect that the random coefficient specification could result in the model being mis-specified and the estimated regression coefficients inconsistent. This problem is referred to as endogeneity in econometrics.

One straightforward approach to handling endogeneity is to estimate the within-unit effects of the observed covariates, which can be achieved by including fixed effects for each cross-sectional unit. The inclusion of the fixed effects renders the mean structure of the dependent variable to be saturated, so that the regression coefficients represent only the longitudinal effects. Endogeneity can therefore be avoided by using this approach.

First, we employ a growth accounting framework (Solow 1956; Swan 1956) to investigate the contribution of R&D expenditure to economic growth. Specifically, an endogenous growth model (Romer 1990) employed here assumes that the residual growth factor unaccounted for by the conventional capital and labor inputs is due to technological innovation created in the R&D sectors using the existing stock of knowledge, human capital, and R&D facilities. Human capital is controlled for through labor adjusted for quality. In one of our model specifications, we will also distinguish between the R&D activities conducted by the business and the public sector. The contribution of public R&D expenditure to economic growth could be the more relevant parameter for the economic analysis conducted here.

The random coefficient model specification is estimated next, where both the intercept and the slope coefficient of the R&D intensity variable are permitted to vary randomly. The coefficient estimates are displayed in the "Random coef" column of Table 1. This specification is most comparable with the basic VC model of Goni and Maloney (2014), and the expected value of the gross rate of return to R&D investment turns out to be 25.9 percent (p-value 0.067). This rate of return is only about a third of the estimated return obtained using the fixed effects model specification from the previous section. For convenience, we reproduce the estimates in the "Fixed effects" column of Table 1.

**Table 1. Comparison of Random Effects, Random Coefficient, and Fixed Effects Estimates of Key Regression Coefficients**

Model	Random effects	Random coef <sup>a</sup>	Fixed effects
Total R&D intensity (t-1)	0.221	0.259*	0.772*
	(0.161)	(0.141)	(0.411)
Trade openness	0.018*	0.019*	0.021*
	(0.011)	(0.010)	(0.011)
Observations	1,051	1,051	1,051
R-squared			0.313
Number of countries	68	68	68

Note: a. Only the mean slope coefficients are reported for this model specification. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The basic VC coefficient estimates of the rates of return to R&D in Goni and Maloney (2014) show zero or negative returns not only for poor countries far away from the world technological frontier, but also for many rich countries near the world frontier. This finding is counterintuitive since these rich countries invest significant shares of their GDP in R&D. We assert that these low return estimates are a result of the misspecification arising from unobserved country heterogeneity discussed in the preceding paragraphs.

In addition to the basic VC model, Goni and Maloney (2014) also estimated extended versions of the VC model using instrumental variables in an attempt to deal with the endogeneity problem. Nevertheless, the resulting coefficient estimates still show negative returns not only for poor countries, but also for rich countries near the world frontier.

In this study, we employ a two-step procedure in an attempt to reduce the bias in the rates of return to R&D estimates in a random coefficient model context. Specifically, in the first step we estimate the standard fixed effects model (equation (7)), which produces consistent regression coefficient estimates. We then construct the “purified TFP growth” where the error term  $\hat{\mu}_{it}$  is the growth in log TFP after netting out the estimated time effects and the effects of control variables other than lagged R&D intensity.

In the second step, we regress  $\hat{\mu}_{it}$  on lagged R&D intensity using the random coefficient modeling framework. The estimation results are presented below in Table 2.



**Table 2. Two-Step Model Estimation Results**

Variables	Mean coefs		Random part	Estimates
Total R&D intensity (t-1)	0.508***		Var(R&D intensity (t-1))	0.242*
	(0.111)			(0.121)
Intercept	-0.007***		Var(Intercept)	0.000227***
	(0.002)			(0.000060)
			Cov(R&D intensity (t-1),Intercept)	0.000579***
				(0.000026)
Observations	1,051			
Number of countries	68			

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

The estimated returns to R&D are still inconsistent in this two-step procedure, since it is impossible to control for all cross-country endogeneity using only the observed covariates. Nevertheless, the framework conceptually reduces the bias in the return estimates.

Countries far from the technological frontier face higher returns to R&D. It can be seen from Table 2 that the mean return to R&D is now estimated at 50.8 percent, which is almost twice as large as the estimated mean return obtained using the standard random coefficient model found in other studies.

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