



THAILAND

SELECTED ISSUES

June 2018

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THAILAND

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Approved By
**Asia and Pacific
Department**

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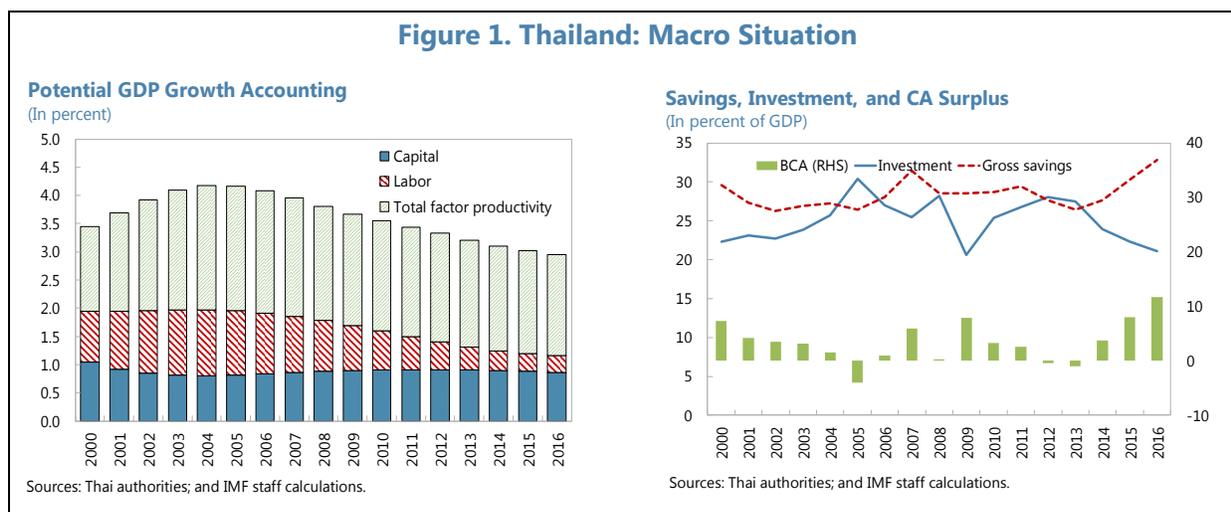
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THAILAND: FISCAL POLICY AND INCLUSIVE GROWTH¹

A semi-structural model is used to simulate the impact of fiscal structural reforms on economic growth, inflation, current account balance, and public finances. Simulation results indicate that structural reforms enabling higher infrastructure investment, stronger labor participation, and more efficient taxation can raise growth significantly and contribute to addressing domestic and external imbalances.

A. Introduction

1. Thailand's cyclical and structural challenges have contributed to its high current account surplus and are expected to impact growth in the short and long term. During 2013-15, growth slowed down significantly. While the export and tourism sectors have since regained strength, other sectors of the economy have yet to take part in this renewed dynamism. Consumption and investment have remained sluggish, partly due to high household debt and a slow trickle down of growth to household income. This has resulted in a high current account surplus. At the same time, rapid population aging will soon become a drag on potential growth, as it has an impact on the size of the work force and productivity growth (Figure 1).



2. The current environment provides an opportunity for fiscal policy to support structural reform and stimulate the economy, while safeguarding fiscal sustainability. Under currently low international interest rates, low inflation, and sluggish domestic demand, fiscal stimulus would help bring output closer to potential, steer inflation towards the target, and support external rebalancing. Moreover, fiscal policy in support of structural reform would not only boost demand in the short term, but also lead to higher potential growth by raising the capital stock and productivity, and providing better incentives for labor force participation. As expenditure pressures

¹ Prepared by Dirk Muir and Manrique Saenz.

are likely to rise in the longer term because of population aging, revenue mobilization should also form part of the longer-term structural agenda to safeguard fiscal sustainability.

3. Staff has recommended a number of fiscal structural reforms to support the economy, several of which are already part of the authorities' agenda. These include improving public investment management and scaling up public infrastructure investment over the next five years, possibly frontloading some of the Eastern Economic Corridor projects (Box 1 of the Staff Report); better targeting of social expenditures to address poverty and inequality, including through the appropriate implementation of the Low-Income Earners Registry and the Government Welfare Program (Box 1); a broad strategy to prepare for expenditure pressures associated with aging; gender-inclusive policies to improve female labor force participation; and a tax reform in the longer term to mobilize resources needed to address expenditure pressures from population aging.

4. This paper focuses on the impact of key structural fiscal reforms on growth and other macro variables. It simulates the impact of: (i) a public infrastructure push; (ii) labor market policies, including an increase in the pensionable age and in provision of childcare services; and (iii) a change in the composition of taxes from income taxes to value added tax (VAT) to shed light on the desired composition of additional taxes to be levied in the longer term. The specific assumptions behind each policy package and the corresponding simulation results are described below.

B. Model Features and Key Assumptions

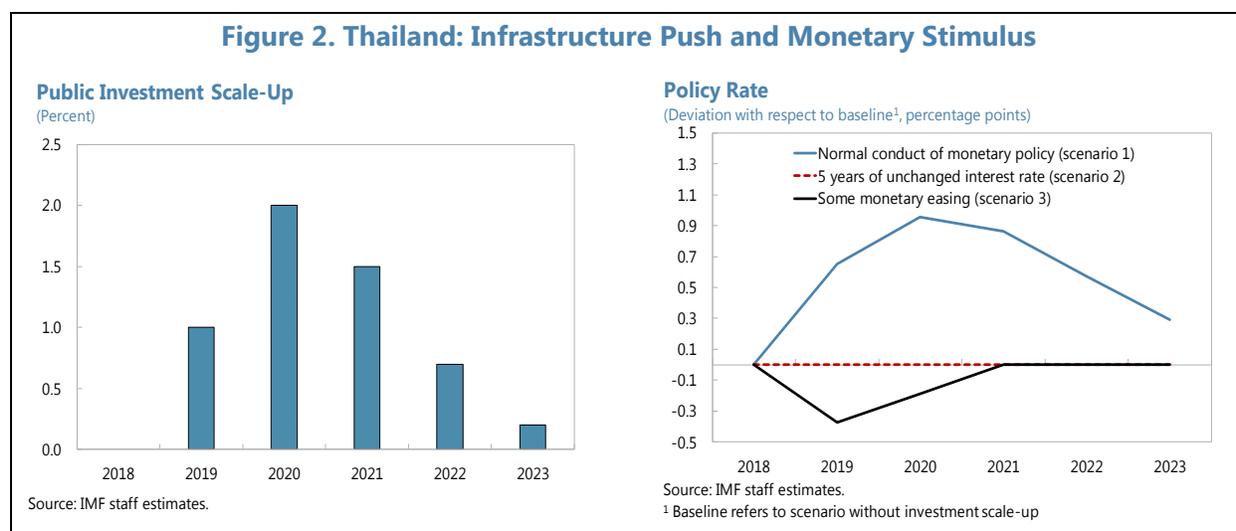
5. The simulations are based on APDMOD, a module of the IMF's Flexible System of Global Models.² This is a semi-structural model of the global economy, with individual blocks for 16 Asian countries, and 8 additional regions to represent the rest of the world. The model has a rich fiscal sector with 7 possible instruments, including spending on consumption, infrastructure, and transfers, lumpsum taxation on households, and distortionary taxation on consumption, labor, and capital. Only some, "saving", households hold debt as a source of wealth, which allows them to smooth consumption in the face of shocks or policy changes. Other "low-income" households cannot save effectively and live only from their current income. These non-Ricardian properties allow for a powerful role for fiscal policy in both the short and long terms. Monetary policy is assumed to follow an inflation targeting regime, implemented with an interest rate reaction function based on the output gap and forecasted inflation (the "standard rule"), but can also be modified to follow alternative rules.

² See Andrieu and others (2015) for a detailed description; and Corbacho and others (forthcoming) for a recent application to Asian economies.

C. Simulations and Results

Infrastructure Push

6. An infrastructure push was simulated, amounting to a cumulative 5 percentage points of GDP increase in public investment, mostly frontloaded in the first three years (Figure 2, left chart). This roughly amounts to fully implementing the projects planned under the EEC.³ In combination with the infrastructure push, three versions of the interest rate reaction function (Figure 2, right chart) are simulated: (i) normal conduct of monetary policy characterized by the standard rule, where the interest rate increases as the inflation and output gaps increase (scenario 1); (ii) monetary accommodation by keeping the policy rate unchanged with respect to the baseline scenario, throughout the five years of fiscal stimulus (scenario 2); and (iii) policy rate easing for two years followed by policy rates unchanged, both with respect to the baseline scenario (scenario 3).

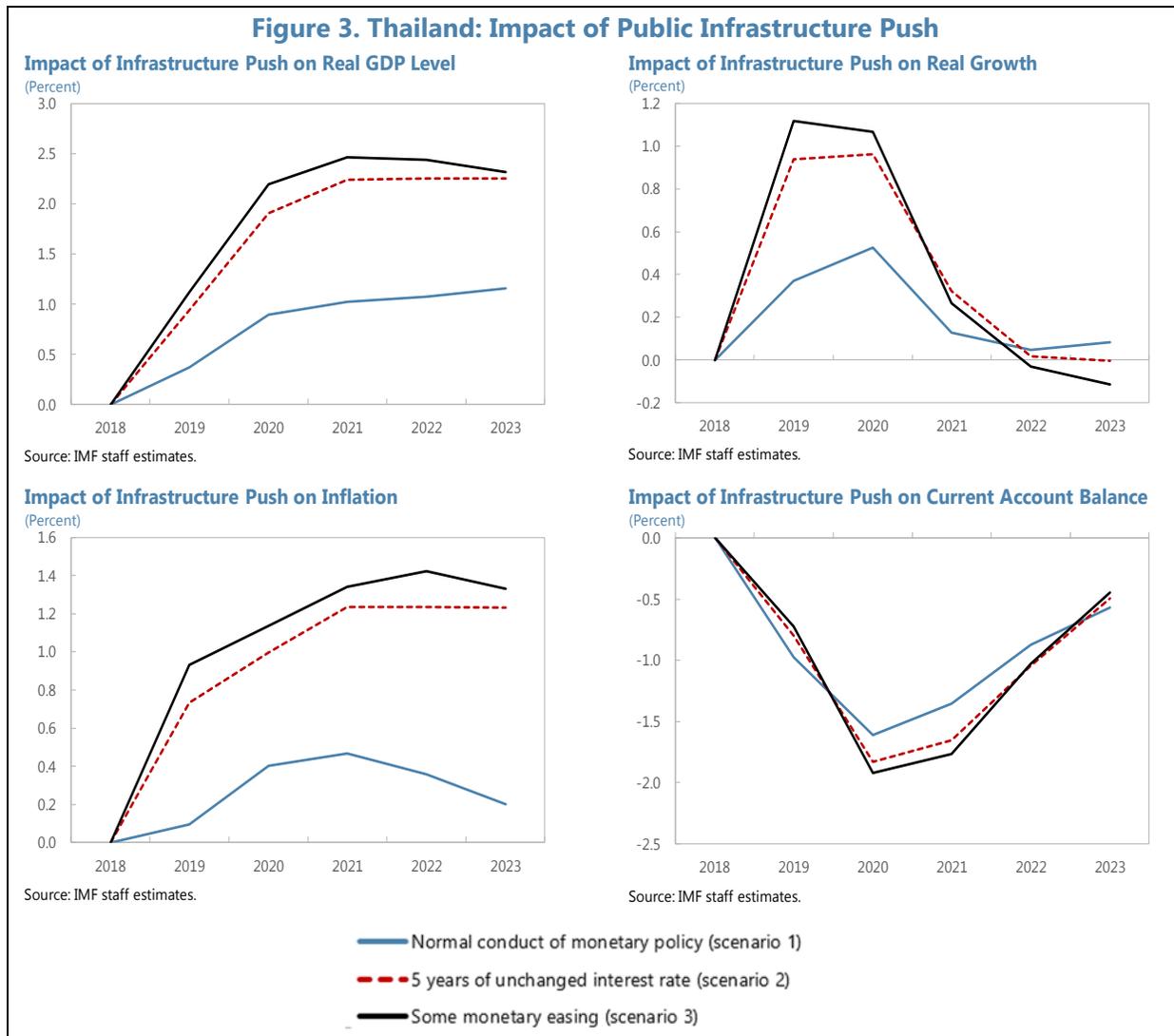


7. The results point to a significant increase in GDP and inflation, and a substantive, albeit temporary, reduction in the current account balance. The results (Figure 3) point to a total increase in output and inflation, under monetary easing, amounting to 2.3 percentage points and 1.2 percentage points, respectively, over a five-year span. Growth increases most during the first two years, when the bulk of the infrastructure scale-up takes place, and reverses thereafter as infrastructure investment winds down.⁴ The impact on growth and inflation is significantly higher under monetary easing than under the standard rule that tightens monetary policy in response to the fiscal stimulus. Staff would not recommend monetary easing just to compound the fiscal impact, as monetary policy should focus on the inflation objective. However, given staff's recommendation

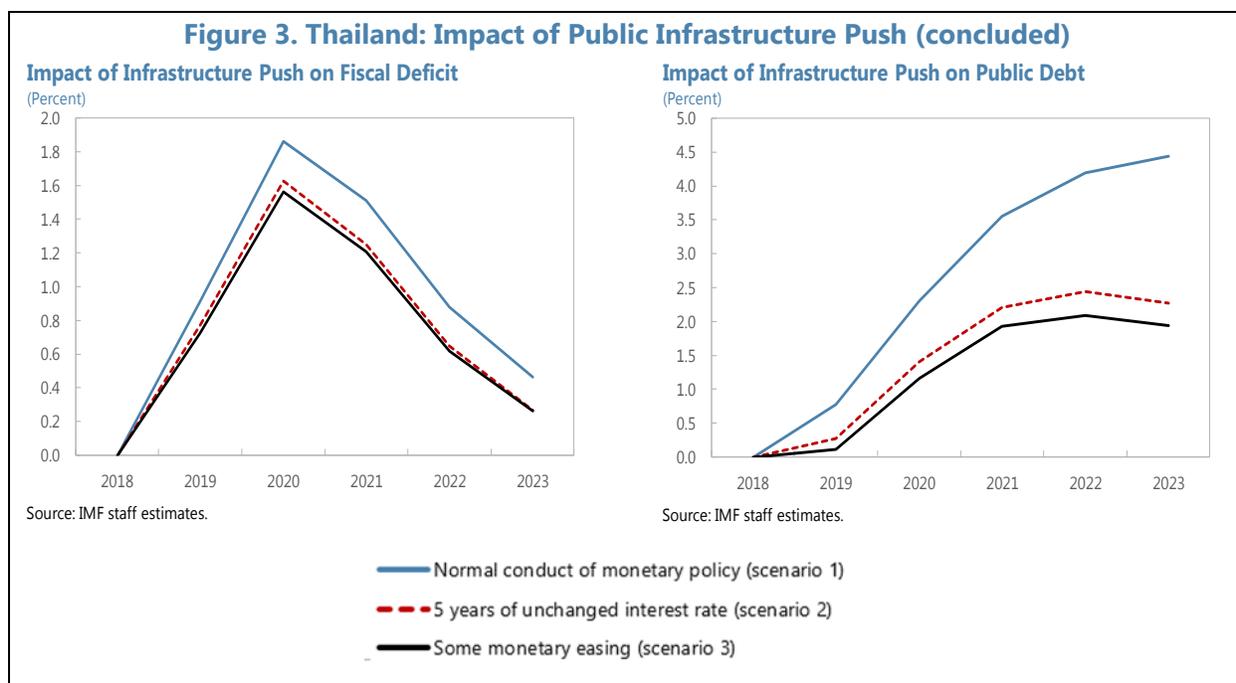
³ As described in Box 1 of the Staff Report, the baseline scenario assumes only partial implementation of the infrastructure scale-up under the EEC.

⁴ The temporary public investment scale-up increases output not only in the short run but also in the long run as it leads to a higher capital stock and higher potential GDP.

for monetary easing in the current juncture, combining it with fiscal stimulus would help attain inflation and growth objectives. The temporary infrastructure push also reduces the current account balance, especially during years two and three.⁵ Finally, the infrastructure push leads to a temporary increase in the fiscal deficit and a higher public debt, especially under scenario 1, where monetary policy is tightened. The stronger nominal growth and lower interest rates under scenarios 2 and 3 significantly attenuate the impact on public debt, which increases close to 2 percentage points in these scenarios rather than 4.4 percentage points under scenario 1.



⁵ Since, under the baseline scenario (without these additional 5 percentage point of GDP in infrastructure investment), the current account balance is projected to be on a declining path, the above simulation implies that the current account surplus drops more steeply during the first few years but then converges to the baseline path over the longer term.



Labor Sector Reform

8. Two reforms that directly impact the labor market are simulated: (i) a permanent increase in the retirement age by 2 years and (ii) an increase in the provision of childcare services by 0.25 percent of GDP per year, leading to higher female labor force participation. At 55, the retirement age in Thailand is lower than the average for Asia (57), for emerging markets in Europe (61) and Latin America (62), and for advanced economies outside of Asia (64). Increasing the retirement age raises labor force participation of the cohort directly affected.⁶ The budget gains from a higher retirement age are assumed to be distributed among retirees in the form of higher pensions. The cost of childcare services is assumed to be borne by saving households through a progressive increase in personal income tax (PIT).⁷ Although women's participation rate in Thailand (60.8 percent) is relatively high by international perspective, it still lags that of men (77.5 percent).

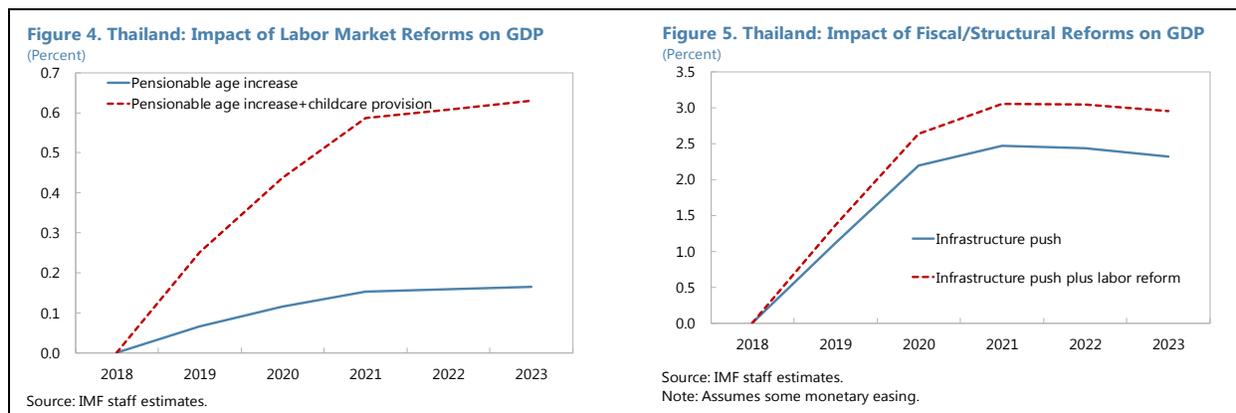
9. The impact of labor market reforms on real GDP can be large. Figure 4 shows the impact of these measures on real GDP over a 5-year period. The two measures together lead to a 0.6 percentage point increase in real GDP, with child-care services having a larger contribution.

10. Taken together, the infrastructure investment and labor market reform can have a significant impact on output in the short and long term, especially under monetary easing.

⁶ Estimates found in Bouis and Duval (2011), originally calculated for the OECD.

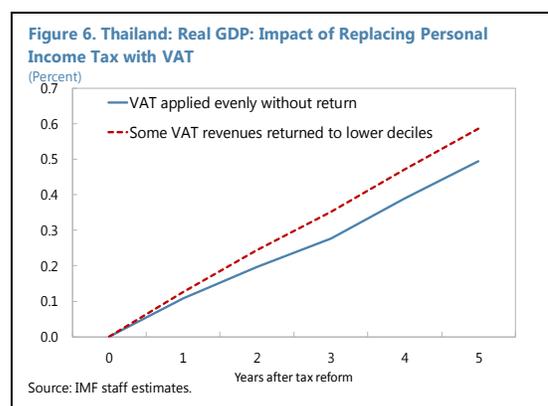
⁷ The impact of the provision of childcare services on labor force participation is calibrated based on estimates for OECD by Bassanini and Duval (2006). The impact of PIT on labor supply reflects Thailand-specific calibration of the model's parameters.

The joint impact of the infrastructure scale-up and labor market reform on output over a 5-year period would amount to 3 percent (Figure 5) assuming monetary easing.



Tax Reform: Value Added vs. Income Taxes

11. Given that revenue mobilization is likely to be necessary in the long term, an informed decision will be needed on which taxes to raise. The design of the VAT in Thailand is broadly in line with best practices, with a single rate, broad base, and low compliance gaps. However, the rate of 7 percent is one of the lowest in the world and, therefore, an increase in this rate would be an adequate option for revenue mobilization. While the VAT is generally estimated to produce a smaller drag on output than income taxes, it can be more regressive. This section looks at the additional output obtained when using the VAT instead of income taxes to raise additional fiscal revenues and the possibility of compensating low-income earners to attenuate the impact of VAT on the lower incomes deciles.⁸ There are two scenarios: (i) VAT collection is increased by 1.5 percent of GDP, which is offset by cuts of 0.75 percent of GDP in both PIT and corporate income tax (CIT);⁹ (ii) VAT collection is increased by 1.75 percent of GDP, offset by cuts of 0.75 percent of GDP in both PIT and CIT and a 0.25 percent of GDP rebate of the VAT increase to low-income households.



12. Relying on VAT is preferable over income taxes to mobilize fiscal revenues in the future. Without compensating low-income households, a tax reform raising VAT results in a more

⁸ The Low-Income Earners Registry currently being developed as part of the Government Welfare Program would be instrumental in implementing the VAT rebate to the lower deciles suggested below.

⁹ Revenue mobilization recommended by staff in the long run would include an increase in VAT rates, but not a cut in PIT and CIT, given the need for additional revenues to address expenditure pressures from population aging in the future. The implied increase in the VAT tax rate is roughly 2 percentage points to generate 1.5 percent of GDP in additional revenues.

efficient economy with 0.5 percentage points more in GDP over 5 years, compared to a tax reform relying on higher income taxes (Figure 6). When a rebate is provided to lower income deciles in order to protect their disposable income, the resulting real GDP is another 0.1 percent of GDP higher – in total, 0.6 percent of GDP higher than under an increase in income taxes. The stronger impact is because low-income households have a higher propensity to consume than saving households.

D. Conclusion

13. Structural reforms enabling higher infrastructure investment, stronger labor participation, and more efficient taxation could help raise growth and address domestic and external imbalances. Scaling up public infrastructure investment and providing appropriate incentives for labor force participation would boost growth and inflation in the short term and reduce the current account surplus over the medium term. It would also lead to higher potential output over the longer term by raising the capital stock and productivity, and offsetting some of the drag from aging on the number of workers. As revenue mobilization will be necessary in the medium to long term, relying on VAT and compensating lower income deciles rather than relying on income taxes could lead to a more efficient tax composition and higher growth.

Box 1. The Low-Income Earners Registry and the Government Welfare Program

Thailand has reduced poverty at an impressive rate over the last three decades. The national poverty rate dropped from 67 percent in 1986 to 10 percent in 2014, while extreme poverty also declined sharply. Until recently, however, welfare transfers were universal or categorically targeted, leading to large inclusion and exclusion errors. The recently implemented government welfare program should help reduce inclusion and exclusion errors through better targeting.

The authorities are looking for ways to improve current social transfer programs. Social transfers in Thailand are heavily skewed towards contributory social insurance type benefits, which exclude informal workers and their family members. In recent years, the Thai authorities have taken a number of steps to improve the coverage and impact of their social assistance schemes, but these efforts have essentially focused on categorical benefits, including a universal old age allowance.

The government's current development plan (National Economic and Social Development Plan 2017-21), includes the establishment of a registry of low income earners intended to facilitate more effective targeting of newly introduced social assistance benefits. Registration into this database took place during April-May 2017, through specialized financial institutions (Bank of Agriculture and Agricultural Cooperatives, Government Savings Bank, and Krung Thai Bank) and local governments. There are currently 14.2 million people registered, of which 11.4 million qualified for the state welfare benefits. Given that the current registry is based on self-declared information, venues to cross check this information are necessary. In this context, the small number of people filing personal income tax returns and the lack of reliable asset registries are a challenge.

The Government Welfare Program was rolled out in 2017 to address chronic poverty. This program feeds from the low-income earners registry, in order to determine who qualifies. Recent measures under this program include a proxy means tested scheme paying cash benefits and transportation subsidies. Under the recently rolled-out National e-Payment Master Plan, low-income earners with yearly income between 30,000 and 100,000 baht (roughly US\$950 and US\$3,000, respectively) could buy goods from 'Blue Flag' stores worth 200 baht per month using an electronic welfare card. Those with yearly income below 30,000 baht could buy up to 300 baht monthly with this card. Low-income earners also receive a discount for three months on cooking gas and may be eligible for bus and train fares each worth 500 baht. In 2018, the program is also providing occupational training to help low-income earners achieve and sustain better living standards and increase their income.

Improvements to the social welfare program should be part of the Government agenda to ensure adequate targeting of social expenditures. Two key areas of work for ensuring the effectiveness of the program are: (i) improving the ability to cross-check data provided to assess eligibility; and (ii) building a strategy based on a comprehensive view of central and local welfare schemes currently in place.

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THAILAND: FINANCIAL CONDITIONS¹

Indicators of a country's overall financial conditions are very relevant for monetary policy. This paper shows that Thai financial market conditions do not appear to impair the monetary policy transmission mechanism. Strongly influenced by global factors, financial conditions in Thailand have been favorable over recent years, but have however improved less than in ASEAN-4 neighboring countries.

A. Introduction

1. Indices of financial conditions summarize the information content of several financial variables. Financial markets nowadays comprise many different segments: sovereign and corporate bond markets, foreign exchange market, stock markets, and others. While an efficient market should provide a consistent pricing across asset classes and financial instruments, for monetary policy purposes it is useful to summarize financial conditions by means of indices aimed at capturing the situation across several markets. But even within a single market segment the number of financial instruments regularly traded is often large nowadays, providing a true data rich environment in which the selection of the indicators is to some extent inevitably arbitrary. Similarly, a direct link between the estimated financial conditions indices and monetary policy cannot be established without resorting to auxiliary models, and is beyond the scope of this paper. However, it is plausible to assume that monetary policy is one of the main factors behind developments in overall financial conditions, and therefore to interpret evidence on financial conditions in the context of the monetary policy stance.

2. Against this background, this paper looks at two different but complementary indicators. These two indicators are the *Financial Stress Index* (EM-FSI introduced by Balakrishnan, Danninger, Elekdag, and Tytell, 2009) and a *Financial Conditions Index* (FCI by Koop and Korobilis, 2014). In addition to cross checking the information of the two indices, we will exploit their properties to explore two main questions: (i) what has been the evolution of financial conditions in Thailand over recent years? and (ii) what are the main drivers behind those conditions? For both questions we will also compare Thailand's conditions with available international evidence, which may however be different for each indicator.

B. Gauging Financial Conditions in ASEAN-4 Countries

3. The EM-FSI was designed to get quantitative evidence into the capacity of the financial system to contribute to the monetary transmission mechanism. The optimal transmission of monetary policy stimulus hinges on well functioning financial intermediation through the financial system. The degree of financial "stress" in the system, defined as a period of impaired financial intermediation, can therefore be useful information to assess the potential effect of monetary policy.

¹ Prepared by Juan Angel Garcia.

4. The EM-FSI comprises information about five key variables.²

- The “*banking-sector beta*” is the standard capital asset pricing model (CAPM) beta, which captures the move in banking stocks relative to the overall stock market (values higher than one may therefore reflect episodes in which banking sector valuations become (relatively) riskier).
- *Stock market returns* are computed as the year-on-year change in the stock index multiplied by minus one, so that a decline in equity prices corresponds to higher market-related stress.
- *Stock market volatility* is a time-varying measure of market volatility obtained from a GARCH (1,1) specification, using autoregressive month-over-month real returns.
- *Sovereign debt spreads* is defined as the bond yield minus the 10-year United States Treasury yield using JPMorgan EMBI Global spreads.
- The *EMPI* captures exchange rate depreciations and declines in international reserves.

Higher values of the index denote greater stress in the financial system, and point to a potentially impaired transmission of monetary policy through the financial system. An important advantage of the EM-FSI is that it is available for most neighboring countries, which allows for not only looking at the evolution of the index in Thailand over recent years, but also comparing it to other large neighboring economies.

5. The EM-FSI suggests that overall financial conditions have remained accommodative in Thailand over recent years.

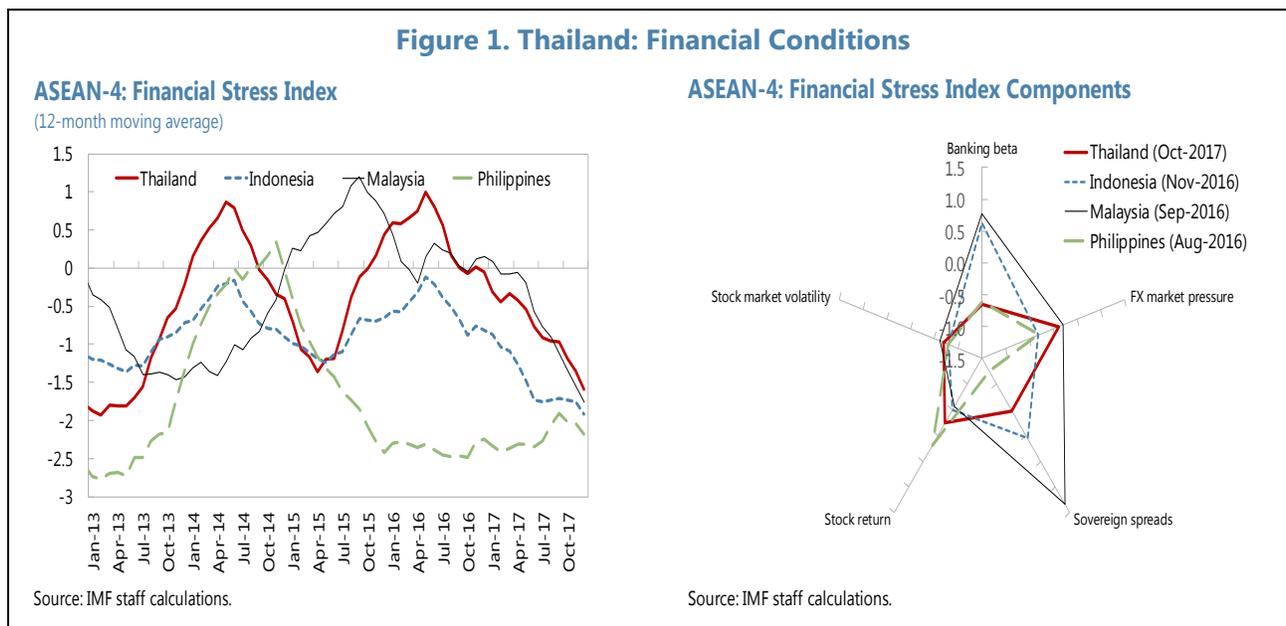
However, a comparison of financial conditions with other countries suggest that despite the very low level of monetary policy rates, financial conditions in Thailand remain somewhat “*tighter*” than those in the ASEAN–4 neighboring countries (Figure 1, left panel).³ While market conditions improved following the last interest rate cut in May 2015, the fact that policy rates have been kept constant since then while other ASEAN–4 countries have introduced further policy stimulus—motivated by macroeconomic and especially inflation developments in 2016 and 2017—may explain the more favorable conditions in their markets.

6. Recent Thai financial market conditions appear to be sufficiently good not to impair the monetary policy transmission. Since financial intermediation would be crucial for the transmission of monetary policy, the EM-FSI provides a gauge of how current conditions in Thai financial markets could transmit monetary policy. Overall, developments in the EM-FSI suggest that financial market conditions do not appear to impair the monetary policy transmission mechanism.

² The choice of variables is to a large extent motivated to guarantee the construction of the index across a large number of countries, while at the same time combining information over several key market segments. For further details on the rationale behind the variables chosen as part of the index and sub-index definitions see Balakrishnan, et al (2009).

³ The FSI methodology does not allow for statistical evidence on differences across countries’ indices, but evidence across countries and time suggests that quantitative differences in the FSI as the ones shown in Figure 1 can be attributed to specific macro-financial events.

At the same time, since the policy rate in Thailand has been on hold since May 2015 while some neighboring countries have lowered policy rates since then, it is also possible to compare conditions at the dates in which other central banks lowered interest rates by looking at all components of the index (Figure 1, right panel). That comparison suggests that conditions in the Thai financial system remain relatively better than when those other countries cut rates in recent years.



C. Main Factors Behind Financial Conditions

7. The FCI summarizes a broader set of financial sector variables. This paper provides additional robustness to the measurement of financial conditions by the calculation of an alternative index. The FCI proposed by Koop and Korobilis (2014) builds on the literature on time-varying parameter vector autoregression and dynamic factor models.⁴ This approach has two main advantages. First, it can control for (current) macroeconomic conditions. Second, it allows for a dynamic interaction between the FCIs and macroeconomic conditions, which can also evolve over time. Importantly, the FCI allows for widening the financial sector coverage by combining 19 macroeconomic and financial indicators that help assess the influence of price of risk (e.g., term spread), leverage (e.g., credit to GDP), external factors (e.g., VIX) and macroeconomic conditions (e.g., GDP growth) to the overall financial conditions (Table 1). In that sense, the FCI can be interpreted as an extension of the FSI, which mainly uses “price of risk” indicators.

8. The estimation of FCI corroborates the main insights from the EM-FSI. In particular, the time series evolution of the index corroborates the favorable financial conditions experienced in Thailand (and several other emerging economies) over recent years.

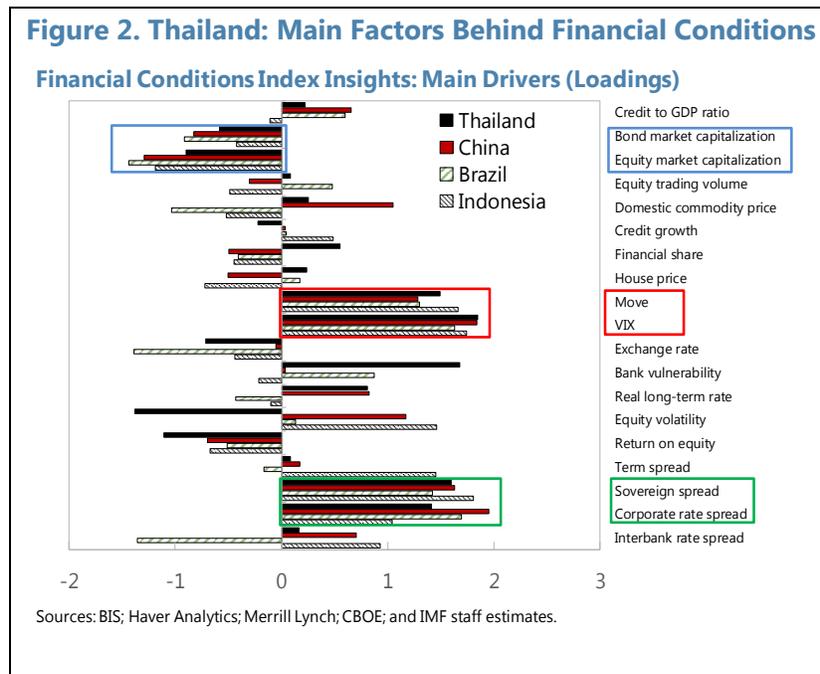
⁴ Our empirical approach follows the application of Koop and Korobilis (2014) methodology as described in detail in Chapter 3 of the IMF GFSR (2017), October.

Table 1. Thailand: Variables Used in the Calculation of the FCI

Variables	Description	Source
Domestic-Level Variables		
Term Spreads	Yield on 10-year government bonds minus yield on three-month treasury bills.	Bloomberg LP.; and IMF staff.
Interbank Spreads	Interbank interest rate minus yield on three-month treasury bills.	Bloomberg LP.; and IMF staff.
Change in Long Term Real Interest Rate	Percentage point change in the 10-year government bond yield, adjusted for inflation.	Bloomberg LP.; and IMF staff.
Corporate Spreads	Corporate yield of the country minus yield of the benchmark country. JPMorgan CEMBI Broad is used for emerging market economies where available.	Bloomberg LP.; and Thomson Reuters Datastream.
Equity Returns (local currency)	Log difference of the equity indices.	Bloomberg LP.
House Price Returns	Log difference of the house price index.	Bank for International Settlements; Haver Analytics; and IMF staff.
Equity Return Volatility	Exponential weighted moving average of equity price returns.	Bloomberg LP.; and IMF staff.
Change in Financial Sector Share	Log difference of the market capitalization of the financial sector to total market capitalization.	Bloomberg LP.
Credit Growth	Percent change in the depository corporations claims on private sector.	Bank for International Settlements; Haver Analytics; and IMF, International Financial Statistics database.
Sovereign Spreads	Yield on 10-year government bonds minus the benchmark country's staff yield on 10-year government bonds.	Bloomberg LP.; and IMF staff.
Banking Sector Vulnerability	Expected default frequency of the banking sector.	Moody's Analytics, CreditEdge; and IMF staff.
Exchange Rate Movements	Change in U.S. dollar per national currency exchange rate.	IMF, Global Data Sources; IMF, International Financial Statistics; and Bloomberg LP.
Domestic Commodity Price Inflation following Gruss (2014), which combines international commodity	A country-specific commodity export price index constructed prices and country-level data on exports and imports for individual commodities. Change in the estimated country-specific commodity export price index is used.	Bloomberg LP.; United Nations, COMTRADE database; IMF, Global Data source; and IMF staff.
Trading Volume (equities)	Equity markets' trading volume, calculated as level to 12-month moving average.	Bloomberg LP.
Market Capitalization (equities)	Market capitalization of the equity markets, calculated as level to 12-month moving average.	Bloomberg LP.
Market Capitalization (bonds)	Bonds outstanding, calculated as level to 12-month moving average.	Dealogic; and IMF staff.
Change in Credit-to-GDP	Change in credit provided by domestic banks, all other sectors of the economy, and nonresidents in percent of GDP.	Bank for International Settlements; Haver Analytics; and IMF staff.
Real GDP Growth	Percent change in the GDP at constant prices.	IMF, World Economic Outlook database.
Industrial Production Growth	Percent change in the industrial production index.	Haver Analytics; and IMF, Global Data Source Statistics database.
Global-Level Variables		
VD	Chicago Board Options Exchange Market Volatility Index.	Bloomberg LP.; Haver analytics
MOVE	Merrill Lynch Option Volatility Estimate Index.	Bloomberg LP.
Source: IMF staff calculations.		
Note: BIS = Bank for International Settlements; CEMBI = Corporate Emerging Markets Bond Index; MOVE = Merrill Lynch Option Volatility Estimate Index; VIX = Chicago Board Options Exchange Volatility Index.		

9. The improvement in Thai financial conditions over recent years appears to reflect the very favorable conditions in global financial markets. The estimated factor loadings provide valuable information on the main drivers of financial conditions. In the absence of further monetary policy stimulus, Thai financial conditions over recent years have instead benefitted from the significant decline of market volatility in global markets, both in the bond and the stock markets. Despite the recent and gradual normalization of monetary policy in the United States, the significant accommodative monetary policy stance worldwide is likely to be the main factor behind those favorable global financial conditions. In addition, the significant development of capital markets in emerging economies and the limited spreads on their bond markets (relative to the United States) are the other main factors behind the favorable financial conditions. Available evidence suggests that this has been indeed the situation for other emerging economies like Brazil, China, and

Indonesia as well, despite their very different macro-financial challenges compared to Thailand.⁵ Furthermore, as most other emerging (and developed) economies also benefit from those conditions, these findings for the FCI are fully consistent with the interpretation of differences in the EM-FSI across ASEAN-4 countries as most likely reflecting differences in domestic monetary policy stance over recent years.



D. Conclusion

10. Overall evidence suggests that financial conditions in Thailand have been favorable over recent years, but remain vulnerable to a tightening of conditions in global financial markets. The monetary policy transmission may have weakened somewhat in recent years, but there is no evidence of financial conditions impairing the monetary transmission mechanism. Importantly, evidence suggests that domestic monetary policy stance could have been more supportive for financial conditions over recent years. Global financial conditions were also found to have been a major contributor to the favorable financial conditions in Thailand. Looking ahead, a reversal of those conditions or their likely tightening over the coming years—not only as interest rates adjust to the ongoing normalization of U.S. monetary policy but also in terms of market volatility and risk pricing—may require counterbalancing domestic measures if an accommodative monetary policy stance is to be maintained for some time.

⁵ The analysis also reveals that other variables may be of particular importance for specific countries, such as bank vulnerability in the case of Thailand.

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THAILAND: SYNERGIES BETWEEN MONETARY AND MACROPRUDENTIAL POLICIES¹

A dynamic stochastic general equilibrium (DSGE) model tailored to the Thai economy is used to explore the performance of alternative monetary and macroprudential policy rules when faced with shocks that directly impact the financial cycle. In this context, the model shows that a monetary policy focused on its traditional inflation and output objectives accompanied by a well targeted counter-cyclical macroprudential policy yields better macroeconomic outcomes than a lean-against-the-wind monetary policy rule under a wide range of assumptions.

A. Introduction

1. A key objective of the Thai monetary authorities is to lift inflation back to target without unduly stimulating household debt and housing prices. Over the last decade, Thailand has seen a significant increase in household debt (Figure 1). At the same time, low interest rates in advanced economies and a strong external position have contributed to exchange rate appreciation and a drop in the inflation rate below the target range. Even though growth in household debt in percent of GDP started declining and interest rates in advanced economies began rising, the level of household debt remains high and inflation continues to show weak dynamics.

2. Macroprudential measures can be a useful complement to monetary policy in addressing potential pockets of vulnerability to financial stability. While monetary policy provides only one instrument (interest rate), counter-cyclical macroprudential tools could provide a useful complement, especially when real and financial cycles do not coincide. The Thai authorities already implemented three main macroprudential measures: (i) limits on loan-to-value ratio in the property market, (ii) limits on credit card and personal loans, and (iii) dynamic loan loss provisioning.² Recent empirical studies suggest that some of these measures have been effective in stabilizing credit cycles.³ However, it remains an open question which type of policy combination of monetary and macroprudential policies would be most effective in dealing with both real and financial cycles. For instance, there have been active debates on whether monetary policy should address financial stability or focus on inflation and output stability. The type of macroprudential policy measures could also make a substantial difference in the outcome of its combination with monetary policy.

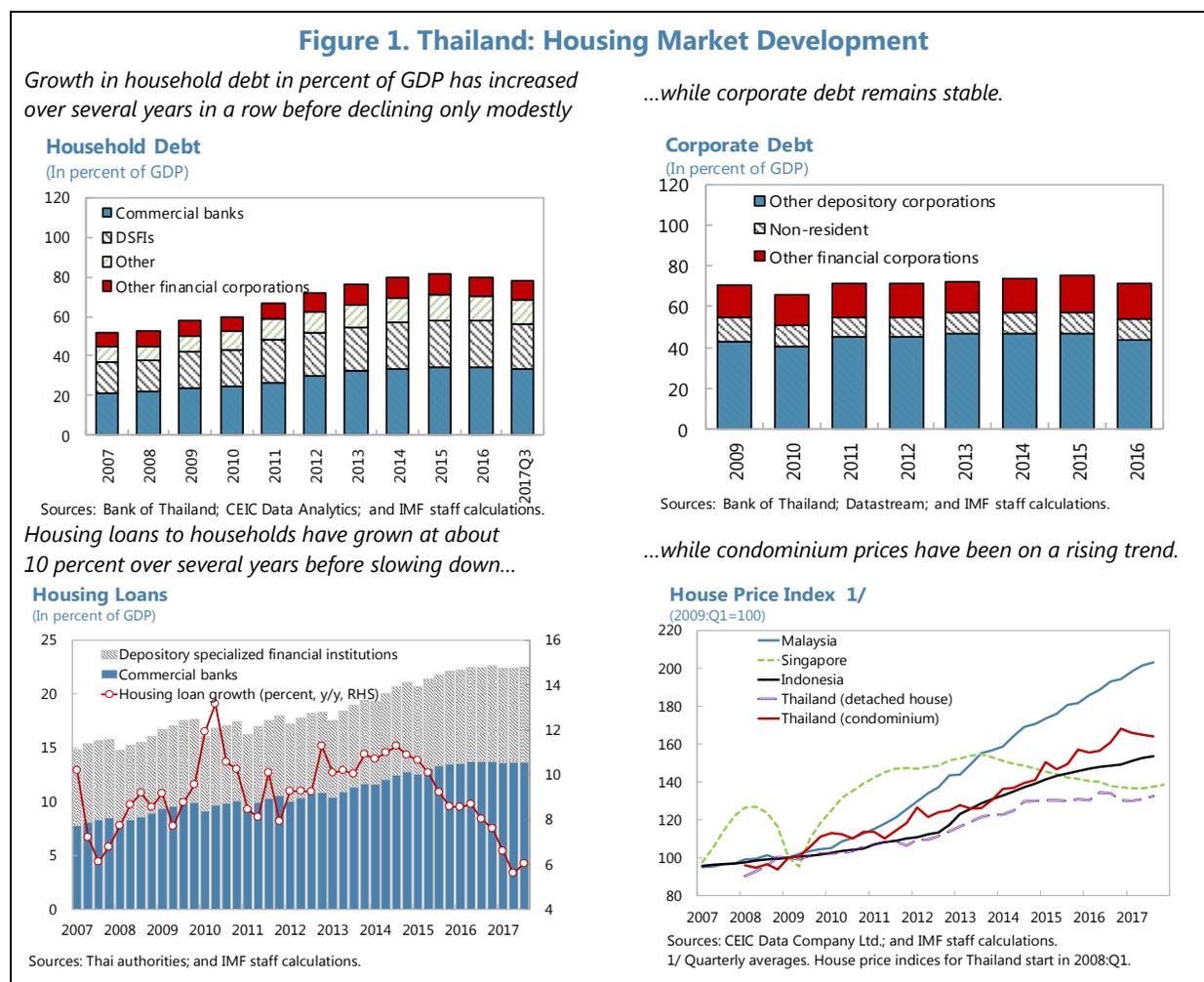
3. Using a DSGE model tailored to the Thai economy, this paper sheds light on the following issues: (i) the combination of monetary and macroprudential policies that would be most

¹ Prepared by Ichiro Fukunaga and Manrique Saenz.

² Bank of Thailand (2017) provides an overview of Thailand's macroprudential framework.

³ Pongsaparn et al. (2017) shows that the Bank of Thailand's measures on LTV ratio have been effective in moderating housing credit growth. In the global context, a cross-country panel regression analysis of the effects of macroprudential measures on household credit growth across advanced and emerging market economies, including Thailand, is reported in the October 2017 GFSR Chapter 2, Box 2.5 (IMF, 2017).

effective for Thailand in dealing with both real and financial cycles; and (ii) the appropriate choice of macroprudential tool in such policy combination.

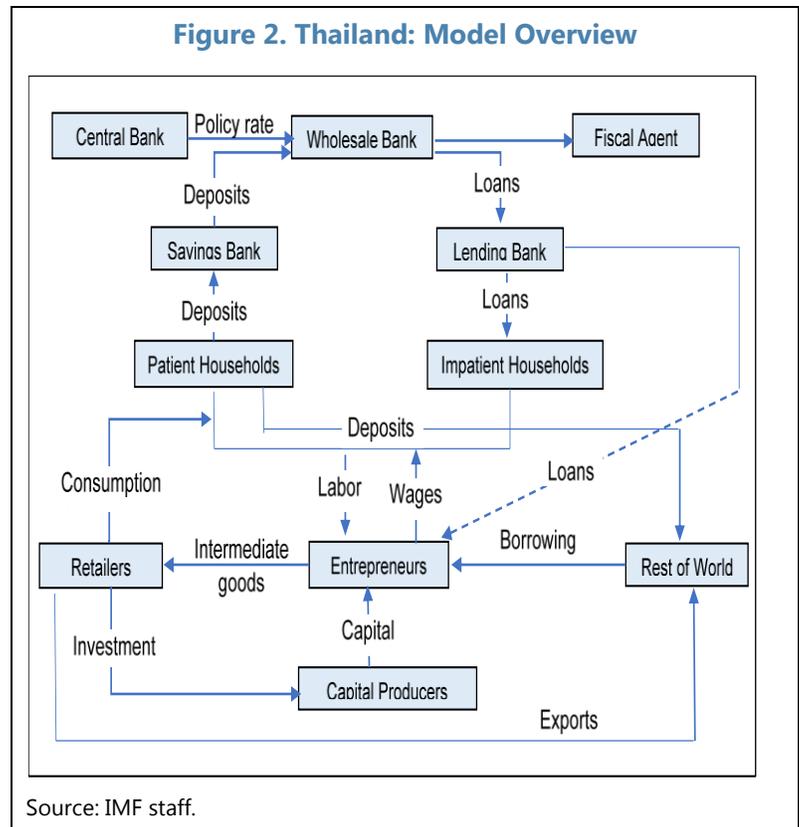


B. Model Features and Key Assumptions

4. The joint effects of monetary and macroprudential policies are assessed using an open-economy DSGE model. The analysis aims to explore various conditions under which the use of macroprudential measures can (or cannot) improve macroeconomic outcomes within a plausible (including counterfactual) range of parameters and assumptions. Since there are a growing number of DSGE models that incorporate macroprudential measures in a variety of ways and different models focus on different aspects of financial frictions and economic environment (Box 1), choosing a relevant model and tailoring it to the current context of the Thai economy is crucial. It is also important to note that quantitative implications may be highly dependent on model specifications and calibrations.

5. To tailor to the Thai economy, the model incorporates a fully specified banking sector, household and corporate debt, and external borrowing.⁴ It is based on a New Keynesian DSGE model for small open economies with price rigidities and financial frictions. Under these frictions, inflation stability and financial stability improve welfare. The banking sector, which intermediates funds from patient households to impatient households and entrepreneurs, plays a crucial role for policy transmission.⁵ The brief descriptions of private economic agents, namely households, entrepreneurs, and banks, are as follows (Figure 2 depicts the relationships between agents in this economy).

- There are two types of households, patient (with a lower intertemporal discount rate) and impatient,⁶ who both derive utility from consumption, leisure, and housing. In equilibrium, the patient households save part of their income, which is invested in domestic bank deposits and foreign bonds. Impatient households end up borrowing to consume and purchase houses.
- Entrepreneurs borrow from domestic banks and from abroad to purchase capital. They also hire labor and produce goods that are then sold to retailers who subsequently sell to the consumers, capital producers, and foreign markets in a monopolistically competitive environment.



- Banks can lend to the government, entrepreneurs, or households. Interest rates are sticky because banks face quadratic costs associated with changes in interest rates. At the same time, bank borrowing is subject to macroprudential measures.

6. Monetary and macroprudential policies are described by policy reaction functions. Two separate policy functions are incorporated: one for the monetary policy interest rate that follows a

⁴ The framework of Anand, Delloro, and Peiris (2014) is extended to incorporate housing sector and household debt, following Gerali et al. (2010). Details of the model will be explained in the forthcoming working paper.

⁵ The banking sector in the model encompasses all types of financial intermediaries (including Specialized Financial Institutions) and does not distinguish different mandates and business models among them.

⁶ "Impatient households" can also be interpreted as liquidity-constrained households in this model.

Taylor rule; and the other for a macroprudential policy measure, specifically either a cap on household loan-to-value (LTV) ratio or a minimum bank capital adequacy ratio (CAR). For each policy reaction function, we consider two variants. The two variants of the Taylor rule are as follows:

- a. Standard Taylor rule—focused on inflation and output gap

$$i = \alpha_1 \times \text{inflation gap} + \alpha_2 \times \text{output gap}$$

where i is the policy interest rate, *inflation gap* is the difference between actual inflation and the target, and *output gap* is the difference between actual and potential output.

- b. Modified Taylor rule—focused on inflation, output, and credit gaps

$$i = \alpha_1 \times \text{inflation gap} + \alpha_2 \times \text{output gap} + \alpha_3 \times \text{credit gap}$$

where *credit gap* is the difference between the actual stock of household credit and its steady-state level.⁷

The two variants for a macroprudential measure are as follows:

- a. Constant LTV (or CAR) rule: The cap on LTV applied to household credit (or the minimum CAR applied to bank credit) is kept constant.
- b. Countercyclical LTV (or CAR) rule: The cap on LTV applied to household credit decreases (or the minimum CAR applied to bank credit increases) as the stock of household (or bank) credit increases relative to its steady-state value.

7. The performance of policy combinations is evaluated in terms of the volatilities of inflation, output, and housing loans in response to specific types of shocks. The following three combinations of policy rules are compared: (i) a standard Taylor rule with a LTV (or CAR) rule, (ii) a standard Taylor rule with a counter-cyclical LTV (or CAR) rule, and (iii) a modified Taylor rule with a constant LTV (or CAR) rule.⁸ As relevant types of shocks faced by the Thai economy, a negative world interest rate shock (monetary easing in advanced economies) and a positive shock to domestic housing demand are considered.

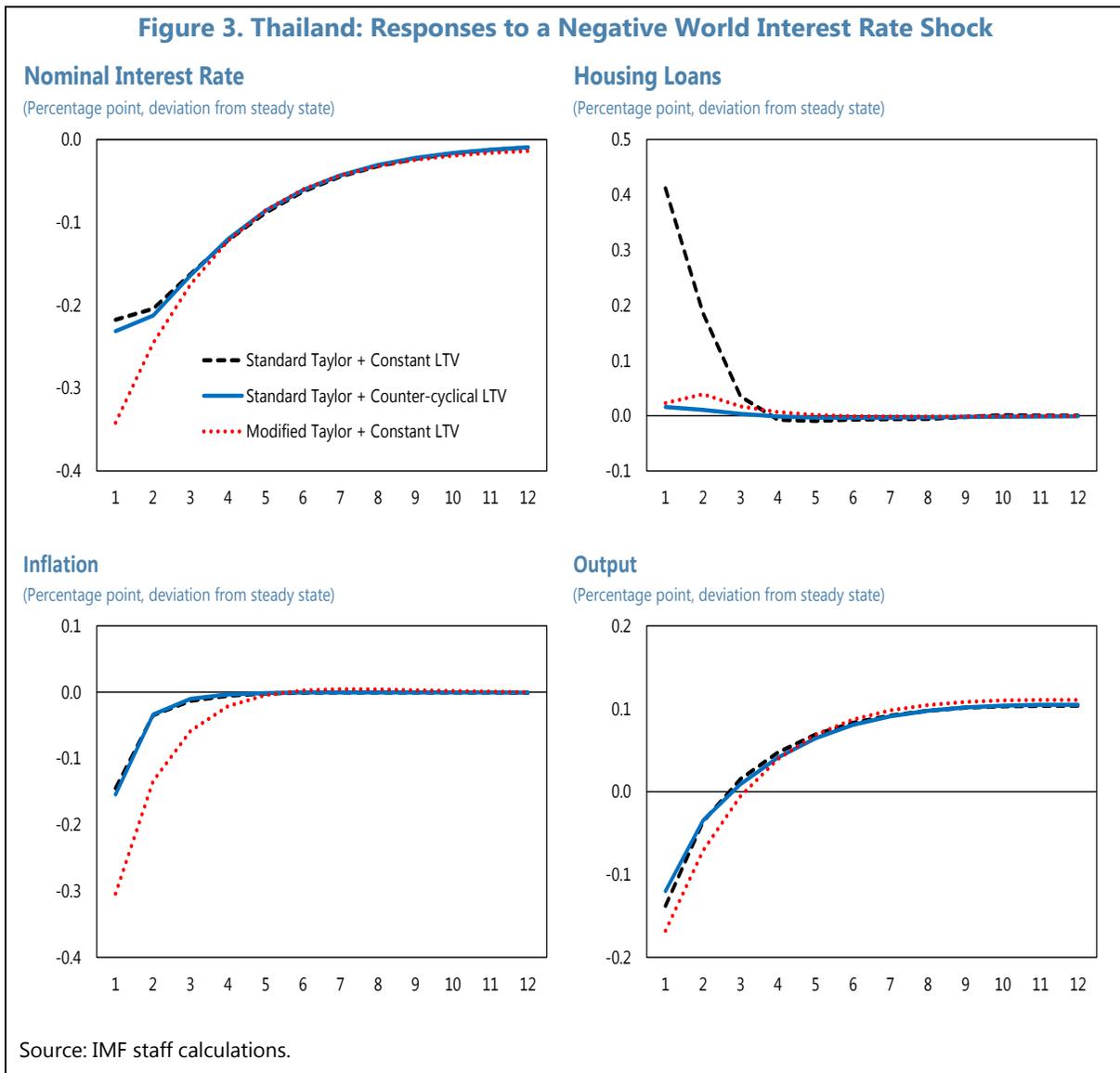
C. Results

8. A counter-cyclical LTV rule performs better than the modified Taylor rule in response to a negative world interest rate shock. A negative world interest rate shock causes appreciation pressure of the domestic currency and triggers domestic monetary easing, which can lead to

⁷ Using some alternative financial gaps, including a house price gap, does not change the results substantively.

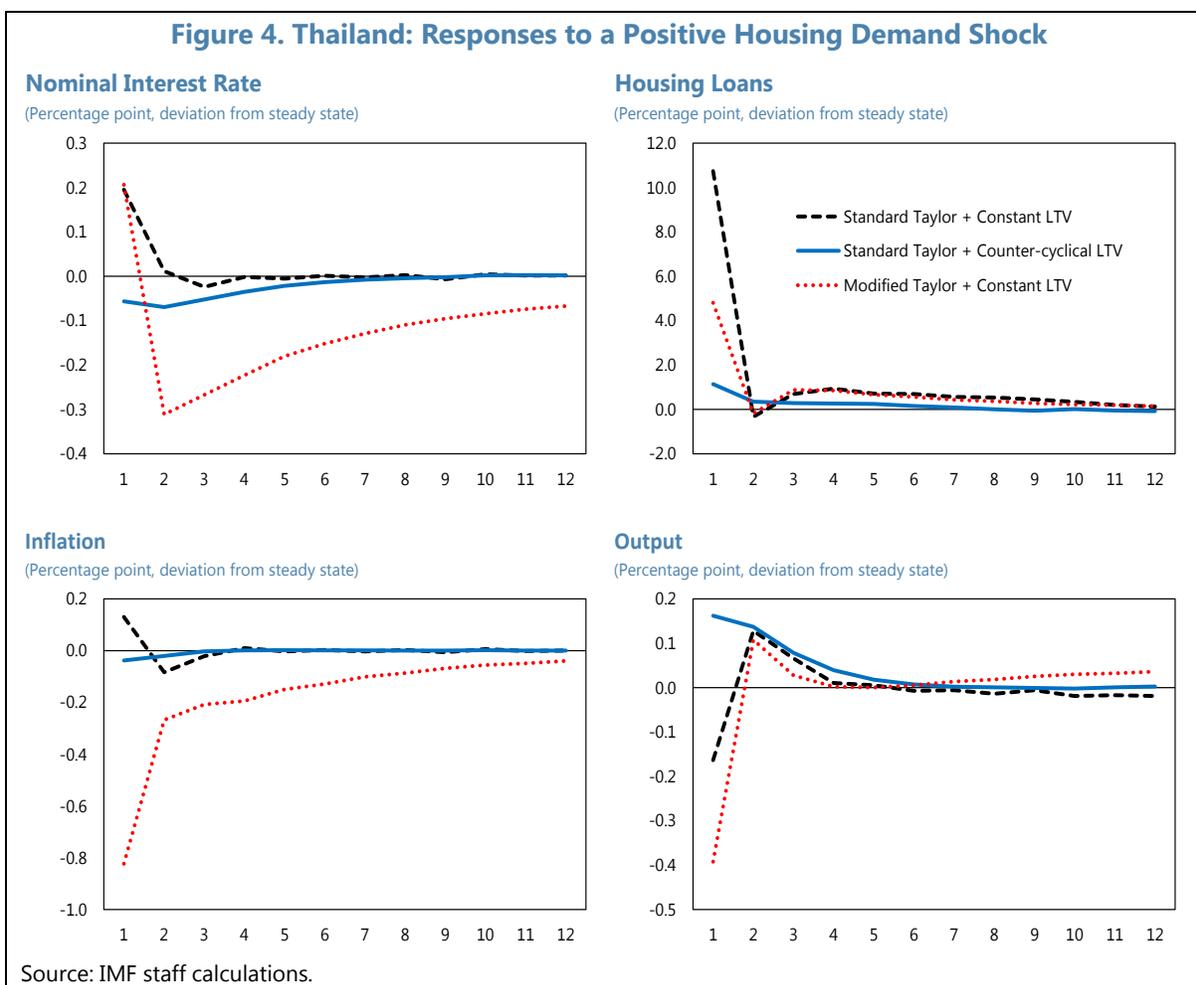
⁸ Another possible combination of policy rules, namely a modified Taylor rule with a counter-cyclical LTV rule, is examined in Corbacho et al. (2018). Its outcomes fall in the middle of those of (ii) and (iii).

housing market overheating (Figure 3). The growth of housing loans is contained to a similar extent under both the counter-cyclical cap on LTV ratio and the modified Taylor rule.⁹ However, the negative impact of the shock on inflation and output is much larger under the modified Taylor rule than the counter-cyclical LTV rule. As a result, the modified Taylor rule requires a larger cut in the nominal interest rate while the reduction in the real interest rate is relatively small. Therefore, the counter-cyclical LTV rule performs better in terms of stabilizing inflation, output, and housing loans.



⁹ For illustrative purpose, we set some large values to the parameters of the policy responses to credit gaps in the counter-cyclical LTV rule and the modified Taylor rule.

9. A similar result is obtained in the case of a positive housing demand shock (Figure 4). With the counter-cyclical LTV rule, the growth of housing loans is contained without raising the nominal interest rate. By contrast, raising the interest rate following the modified Taylor rule causes a substantial decline in inflation and output while insufficiently containing growth in housing loans.



10. The above results are robust to a wide range of parameter values. For instance, when inflation is less sensitive to output volatility (i.e., the slope of Philips Curve is flatter) compared with the benchmark model, the performance of the modified Taylor rule in terms of stabilizing inflation gets closer to, but does not get better than, that of the counter-cyclical LTV rule. This implies that the limited effectiveness of monetary policy on inflation does not necessarily justify the reaction of monetary policy to financial stability concerns. Similarly, some impairment of the monetary policy transmission in the banking sector (e.g., lower pass-through to the loan interest rate) does not change the result that the counter-cyclical LTV rule performs better than the modified Taylor rule.

11. Broader macroprudential measures could perform worse than the modified Taylor rule. If a targeted macroprudential measure such as the household LTV cap is not available and instead a broader measure such as counter-cyclical bank minimum capital adequacy ratio (CAR) is

used, the performance of the latter is, in some cases, worse than the modified Taylor rule. In the case of a negative world interest rate shock, the counter-cyclical CAR ‘overkills’ the growth of housing loans (without sufficiently dampening corporate loans), which leads to a more severe reduction in output compared with the modified Taylor rule. In the case of a positive housing demand shock, however, the counter-cyclical CAR still performs better than the modified Taylor rule. Therefore, the appropriateness of monetary policy reaction to financial stability concerns depends on the availability of targeted macroprudential measures as well as the nature of shocks faced by the economy.

12. The above findings should be interpreted in context. As noted above, targeted macroprudential measures may not always be available. A number of factors may limit availability, such as reliable data, resources for implementation, and jurisdictional constraints. At the same time, cases of weak effectiveness or leakage of macroprudential measures are relatively uncertain and untested. It is also important to note that different types of shocks from those considered above—shocks to the world interest rate and domestic housing demand—may change the above conclusion.

D. Conclusion

13. Targeted macroprudential measures can provide a useful complement to monetary policy in the current context of the Thai economy. Active use of targeted macroprudential measures, to the extent it is available, is likely to achieve better macroeconomic outcomes by allowing monetary policy to focus on inflation and output stabilization while effectively containing financial risks from rising housing loans.

Box 1. Monetary and Macroprudential Policies in DSGE Models

Monetary policy rules that react to financial stability concerns have been studied extensively in recent DSGE models. Standard monetary policy rules that react to inflation and output could lead to growing financial risks under financial frictions (such as collateral borrowing constraints), in which case a monetary policy that also targets financial stability by “leaning against the wind” could be welfare improving. DSGE models compare this benefit with the cost from short-term deviations from inflation and output targets and the corresponding welfare losses. While some models strongly support the case for leaning against the wind (e.g., Gambacorta and Signoretti 2014), other models show that the implied deviations from standard policy rules are quantitatively small (e.g., Curdia and Woodford 2010). Moreover, the case for leaning against the wind may be even weaker in small open economies, where the impact of such policy on international capital flows may exacerbate macroeconomic and financial stability concerns.

More recent DSGE models incorporate various types of macroprudential policy and study its relationship with monetary policy. These models typically find that monetary and macroprudential policies are complements rather than substitutes, in the sense that it is optimal to use these policies together rather than use one policy to achieve the same outcomes as the other (e.g., Angelini et al. 2014). Macroprudential policy could help alleviate tensions between monetary and financial stability objectives because real and financial cycles are not always synchronized and macroprudential policy, especially when targeted at addressing specific financial risks, is generally more effective than monetary policy in dampening financial cycles at a lower cost to output.

The relationship between monetary and macroprudential policies is, in general, highly dependent on the nature of shocks and financial frictions.¹ Many recent models suggest that it is optimal to mainly use macroprudential policies in a wake of financial shock that leads to financial stability concerns. By contrast, in response to a (positive) productivity shock, limiting credit by tightening macroprudential policies may be misguided and runs counter to accommodative monetary policy for supporting inflation. The latter conclusion, however, could be reversed if lending by individual banks endogenously affect overall financial riskiness even in the case of a non-financial (productivity) shock, which could make tight macroprudential policies optimal.

¹ IMF (2012) discusses this issue extensively.

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THAILAND: IMPLICATIONS OF REGIONAL FINANCIAL INTEGRATION¹

Despite substantial progress in regional integration in recent years, financial integration in ASEAN has yet to catch up. Our analysis finds that improving regulatory and institutional quality and reducing restrictions on capital flows can promote regional financial integration. The empirical evidence also suggests that regional financial integration can help ASEAN better weather global shocks, foster economic rebalancing, and achieve higher economic growth. Financial integration, however, pose challenges and risks. A gradual approach would therefore be appropriate for promoting regional financial integration.

A. Introduction

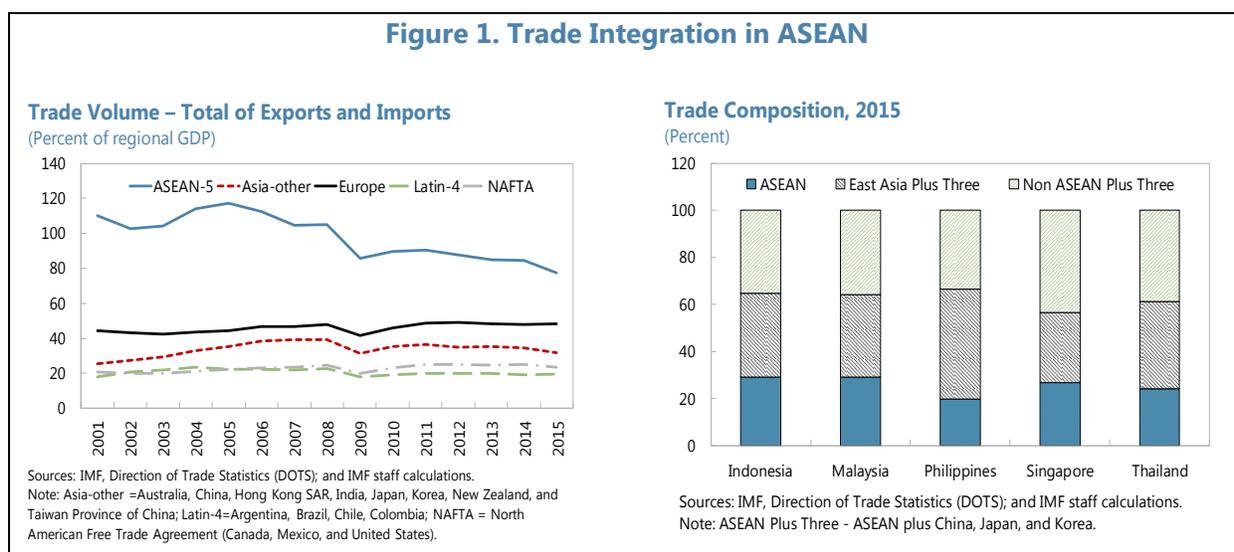
- 1. Recent years have witnessed substantial progress in regional economic integration among the ASEAN-5, and more broadly among all ASEAN economies.** As a major milestone on the integration agenda, the ASEAN Economic Community (AEC) came into being in 2015. The AEC Blueprint had been the key vehicle for achieving the free flow of goods, services, investment, and skilled labor, as well as a freer flow of capital within the region. Its successful implementation led to the creation of the AEC five years earlier than the initially planned date of 2020. A successor blueprint, AEC Blueprint 2025, lays out a 10-year vision for regional economic integration.
- 2. Financial integration is a critical component of this broader regional economic integration agenda.** Recognizing that financial integration complements trade flows, in 2011 ASEAN leaders adopted a financial integration framework, envisaging a more integrated financial region by 2020. Subsequently, in the AEC Blueprint 2025, the leaders have outlined the move toward financial liberalization and freer capital flow for the next decade.
- 3. Against this background, this paper addresses three questions:** (i) What is the current status of financial integration in ASEAN-5? (ii) What are the key drivers of financial integration? and (iii) What are the benefits and costs?
- 4. This paper is structured as follows.** After the second section takes stock of the current status of financial integration in ASEAN-5, the third section analyzes the drivers of financial integration based on a financial gravity model. The fourth section explores the benefits of financial integration. The closing section draws conclusions and policy implications for Thailand.

B. Current State of Regional Financial Integration

- 5. ASEAN-5 economies are increasingly integrated in trade, both globally and regionally.** Global trade integration in these economies, measured by the ratio of total trade to regional GDP,

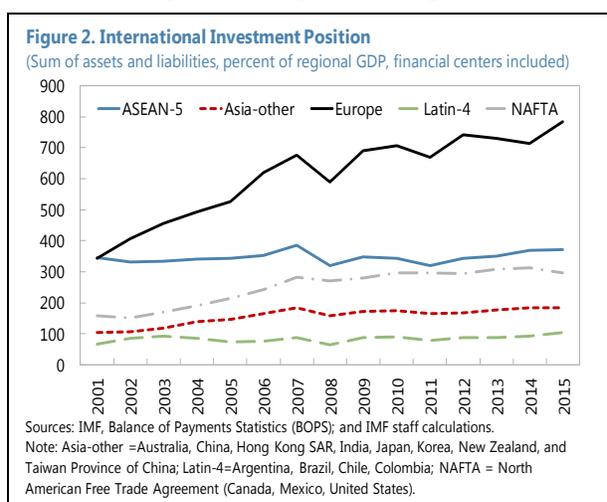
¹ Prepared by Yiqun Wu (APD) and Xiaohui Wu (IMF summer intern).

reached 76 percent in 2016 (panel 1 of Figure 1). In fact, trade openness in this region is already higher than the average in advanced economies and other Asian countries. A closer look shows that the ASEAN-5 economies' trade with each other accounted for a large share of their total trade. In 2015, about 60 percent of trade in ASEAN-5 was transacted within ASEAN Plus Three economies (panel 2 of Figure 1).² Intraregional trade has benefited from trade liberalization across the region (almost all goods in the region are now traded at zero tariff) and from participation in global value chains.



6. Financial integration in ASEAN-5 has also risen, partly driven by trade. Figure 2 shows that ASEAN-5's overall financial integration, measured by the sum of cross-border asset and liability holdings, is quite high, lagging behind only Europe. But if financial centers such as Singapore are excluded from the sample, the overall financial integration level for the rest of the ASEAN-5 countries ranks quite low, lagging all regions except Latin America.

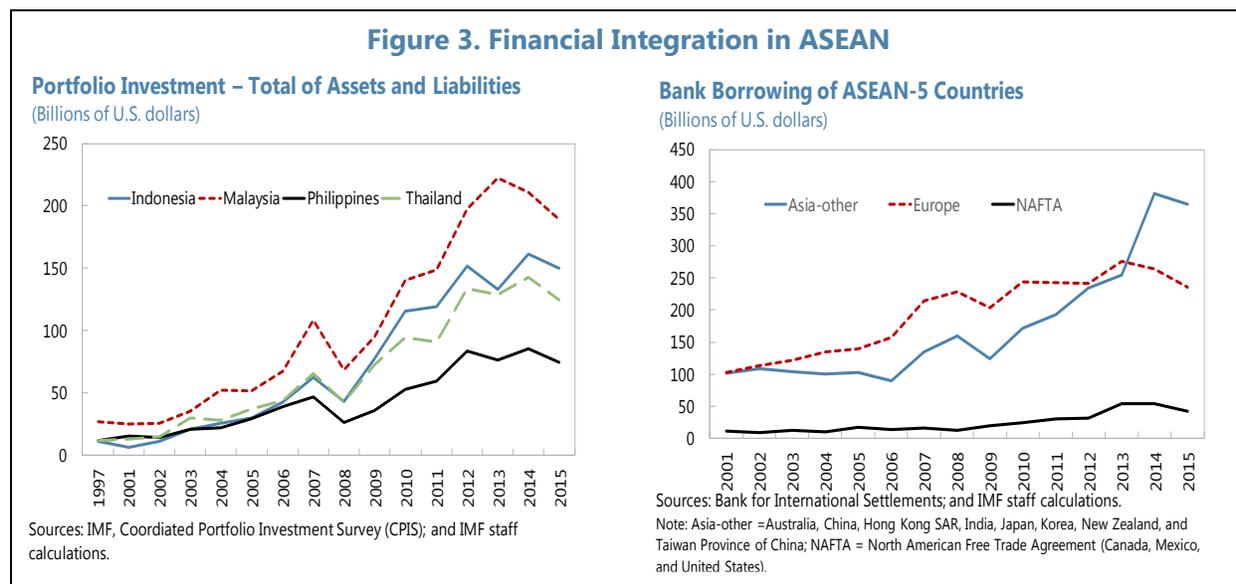
7. Given lack of data to track all financial flows, financial integration is examined based on data from portfolio flows. Data from bank flows are used as a robustness check.³ Although foreign direct investment still dominates trade-driven financial flows, the portfolio investment position has experienced an upward trend since the Asian financial crisis, despite setbacks during 2008 (panel 1 of Figure 3). The share of bank



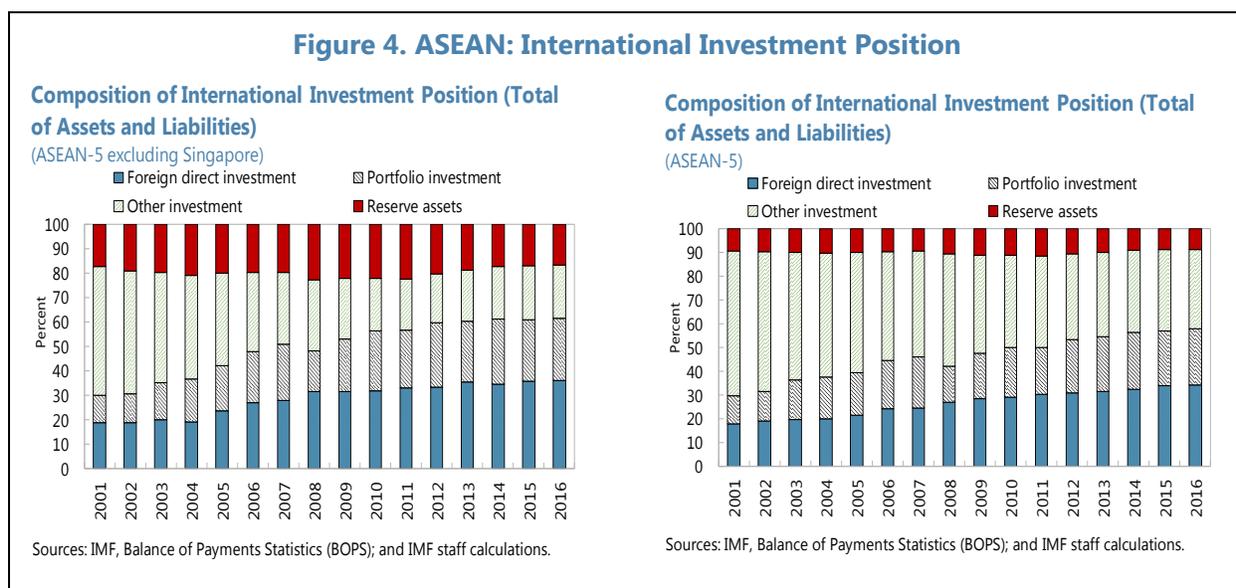
² The Plus Three economies are China, Japan, and Korea.

³ Using bank flows in the regressions for robustness check does not alter the conclusions.

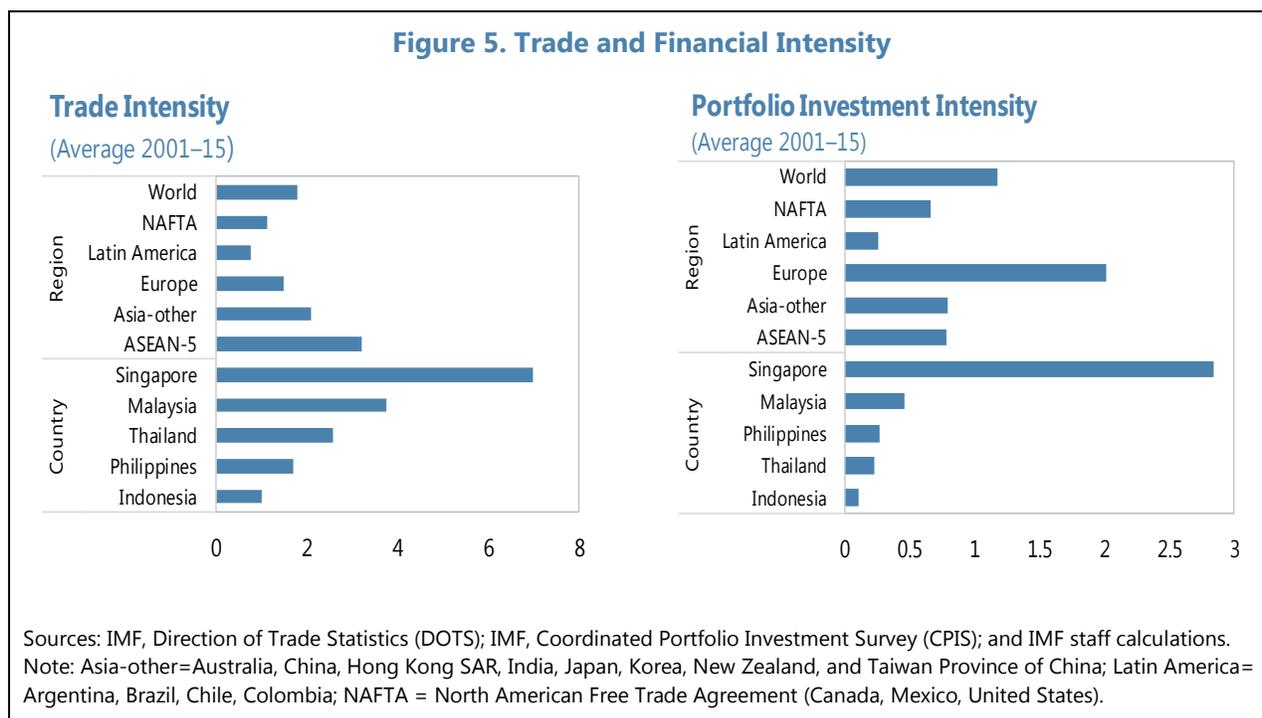
borrowing of ASEAN-5 economies has also grown, with intraregional bank borrowing growing especially fast since the global financial crisis (panel 2 of Figure 3).



8. Portfolio investment has become increasingly important over the years, as reflected in its increasing share in the total international investment position (Figure 4). Portfolio investment accounted for more than 20 percent of the total international investment position as of 2016, up from 12 percent in 2001. Excluding Singapore, whose banking position is especially large, the share of portfolio investment has exceeded the share of other investment, and was below only the share of foreign direct investment.



9. However, the degree and pace of financial integration in ASEAN are not commensurate with those of trade integration. This discrepancy can be illustrated by comparing the intensity scores for trade and portfolio investment.⁴ Trade intensity of the ASEAN-5 economies during 2001–2015 was higher than all other regions (panel 1 of Figure 5). In contrast, their portfolio investment intensity was lower than the world average, and in fact was only about one-third of their trade intensity (panel 2 of Figure 6).

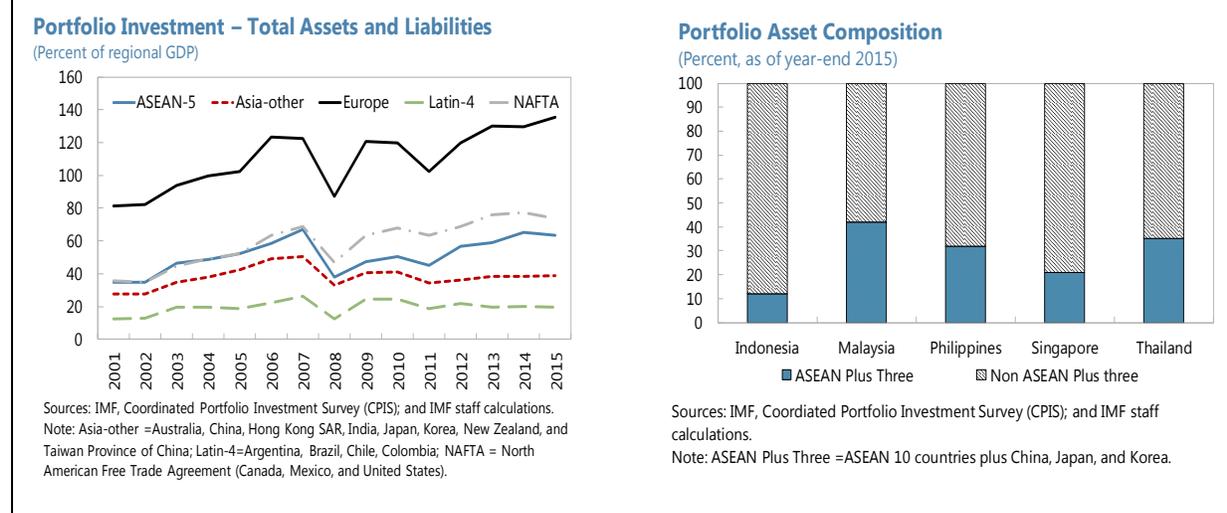


10. Financial integration in ASEAN-5 is lagging when using other metrics. Although the portfolio investment position (sum of assets and liabilities) was about 60 percent of GDP in 2015, this ratio would drop to about 20 percent if Singapore were excluded, which is much lower than Europe or NAFTA (panel 1 of Figure 6). The share of intraregional portfolio investment is also relatively low in the ASEAN-5 economies if portfolio asset composition is considered (panel 2 of Figure 6).

⁴ The trade intensity score is calculated as a country's share in global trade as a proportion of its GDP share. Portfolio investment intensity is defined in a similar way. The intensity score formula is:

$$intensity_{it} = \frac{\left(\frac{f_{it}}{\sum_{i=1}^n f_{it}} \right)}{\left(\frac{GDP_{it}}{\sum_{i=1}^n GDP_{it}} \right)}, \text{ where } f_{it} \text{ is the sum of imports and exports or the sum of portfolio investment assets}$$

and liabilities for country i at time t ; n is the number of countries in the sample.

Figure 6. Portfolio Investment in ASEAN

C. Drivers of Regional Financial Integration

11. The drivers of financial integration in ASEAN are examined using a financial gravity model based on cross-border portfolio investment.⁵ In addition to standard gravity factors, the model analyzes the role of regulatory and institutional quality as well as capital controls measures.⁶ Empirical evidence suggests that lower regulatory and institutional quality, as well as restrictions on cross-border capital flows, negatively affect regional financial integration.⁷

12. Gravity models of trade predict that bilateral trade flows will be proportional to market size and inversely proportional to distance between trading partners. The gravity relationship arises when trade costs and barriers increase with distance. Similarly, gravity models of asset trade (e.g., Portes and Rey 2001) show that distance, which proxies for information asymmetry, has a negative impact on bilateral asset trade flows. Countries with geographic proximity usually have more knowledge and a better understanding of each other due to the ease of interaction; this is especially important for information-intensive financial investment.

13. The baseline gravity equation includes indicators for market size and information asymmetry. Two additional variables, bilateral trade volume and a common language indicator, are used as a proxy for information asymmetry. The analysis is based on a panel of 45 economies from

⁵ Alternative financial integration measures such as banking positions are used as robustness checks.

⁶ See Fernández and others (2015).

⁷ For more details and results, see Wu and Wu (2018). Institutional quality is found to be a key factor affecting trade in financial assets. Ananchotikul, Piao, and Zoli (2015) find that the lack of regulatory harmonization has a more negative effect on intra-Asia investment.

1990 to 2015, consisting of ASEAN economies together with representative advanced and emerging market economies. The estimates point to the following findings (Table 1):⁸

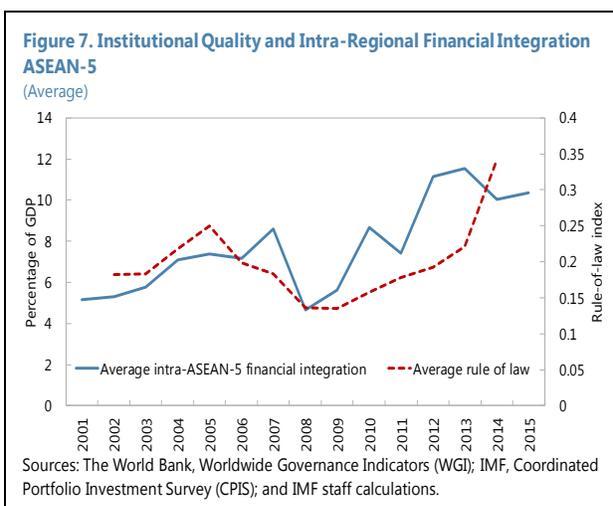
- *Bilateral financial integration increases with trade integration.* The trade coefficient shows that when bilateral trade volume increases by 10 percent, financial holdings increase by more than 4 percent. The results are especially strong for banking position. These findings are consistent with the stylized facts discussed in the previous section: financial integration has gone hand in hand with trade integration.
- *Financial integration increases with market size and common language ties.* Larger market size leads to higher demand for assets and higher asset prices and, in turn, to a greater number of endogenous assets. Estimates also suggest that closer language ties lower transaction costs and foster integration.
- *Financial integration decreases with distance between countries.* Countries with geographical proximity tend to be more integrated financially.

14. The results suggest that institutional quality matters for regional financial integration.

To examine the role of institutional quality, a wide range of institutional indicators are added to the baseline gravity model. They include governance quality, ease of doing business, and political, economic, and financial risks. The coefficients of all indicators are found to be positive and statistically significant, indicating that good institutional quality, including good governance and a business-friendly environment, is linked to greater financial integration (Table 2).

15. Improvements in institutional quality further promote regional financial integration.

Figure 7 shows the positive relationship between the rule-of-law index,⁹ as a proxy for institutional quality, and intra-ASEAN financial integration. A reasonable explanation is that, while global investors are likely to have broader and stable relationships with high-quality clients, regional investors are more vulnerable to poor institutions, and thus benefit more from an improvement in institutional quality. It should be noted, however, that the results for ASEAN-5 economies show a high



⁸ The results are robust when banking position is used as the measure for financial integration.

⁹ This index, taken from the World Bank's Worldwide Governance Indicators database, reflects a country's progress in enhancing law and enforcement and building a trustworthy society. Results are similar when other institutional-quality indicators are used. The results also hold when lagged rule-of-law index and instrumental variable (latitude, fractionalization of language and religion) are used to account for the possible endogeneity of institutional quality.

degree of heterogeneity. The positive effect of the rule-of-law index appears most significant for Thailand, the Philippines, and Singapore.

16. Finally, restrictions on capital flows undermine financial integration. When the baseline gravity model is augmented with capital controls measures from Fernández and others (2015), estimates show that in both equity and debt securities markets, controls restricting nonresidents' purchase of domestic securities or restricting residents' purchase of foreign securities have a significant negative impact on portfolio investment. These results confirm that capital controls are a barrier to trade in financial assets, similar to tariffs and quotas that impede trade in goods and services. Therefore, with continuing efforts toward gradually liberalizing capital accounts, financial integration of ASEAN economies is set to further improve.

D. The Benefits of Regional Financial Integration

17. There are several potential advantages to financial integration, including consumption smoothing, risk sharing, and risk diversification. Regional financial integration could have extra benefits. Better economies of scale would make financial systems within the region more efficient. By growing and deepening local financial markets, financial integration helps develop a “twin engine” financial system and reduces excessive reliance on banks in a bank-centric system. Regional financial integration can also help alleviate countries' reliance on financial centers; this funding diversification is shown to have a buffering effect against global shocks such as the taper tantrum (Park and Shin 2016). Moreover, regional financial integration provides incentives for regional cooperation and enhancement of multilateral safety nets (Kim, Lee, and Shin 2006; Park and Shin, 2016).

Regional Investment and Global Liquidity Conditions

18. Regional financial integration would help ASEAN countries better weather external shocks and spillovers. This was particularly propitious when banks in advanced economies, weakened by the global financial crisis and constrained by tighter financial regulations, began retreating to their home bases. Based on different approaches, results suggest the following:¹⁰

- The investment position within the ASEAN Plus Three economies was less affected by liquidity conditions in the United States.¹¹ This finding is based on using U.S. security broker-dealer sector leverage as an indicator for the U.S. liquidity cycle (Table 3).¹² Change in Europe's M2 for the European liquidity cycle produce similar results.

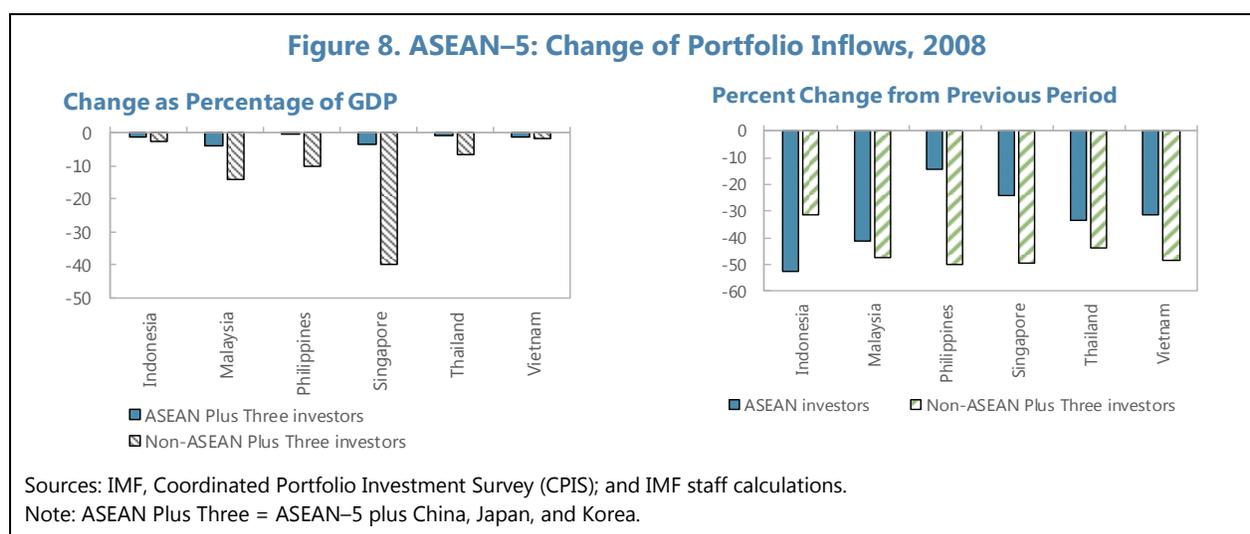
¹⁰ These results are in line with Park and Shin (2016).

¹¹ The results are robust when the region is restricted to ASEAN (although less significant) or ASEAN-5, and robust with or without Singapore.

¹² Adrian, Etula, and Muir (2011) propose U.S. security broker-dealer sector leverage (assets-to-equity) as a better liquidity measure because it is market oriented and reflects timely underlying market conditions. Bruno and Shin (2013) use this leverage as their preferred global liquidity indicator. Our results using the Chicago Board Options

(continued)

- Regional investors were less likely to join global investors in pulling out of investments during the global financial crisis (Figure 8).
- The magnitude of global investors' retreat was proportional to the global financial integration level, measured by the ratio of total cross-border portfolio investment to GDP. The breakdown between ASEAN Plus Three investors and global investors shows that, in most cases, investment from regional investors exhibited less volatility in both absolute and relative terms.¹³



Financial Integration and Rebalancing

19. Regional financial integration can also play an important role in facilitating external rebalancing. ASEAN economies are salient examples of the Lucas paradox (Lucas 1990). Despite substantial development potential and large infrastructure needs, these economies were all net capital exporters with high current account surpluses, averaging about 2 percent of GDP per year during 2009–16.

20. The current account imbalance is affected by structural factors. The current account imbalance a mirror image of the savings-investment gap; the desirable savings-to-investment level, which in turn, is affected by structural factors that are determined or influenced by the financial system.¹⁴ Financial integration can play a key role in affecting such levels. It would lessen the need to rely on countries' own funds and improve access to financial services, and thus provide a net boost to consumption and investment.

Exchange Volatility Index are similar although less significant, whereas using US and EU credit-to-GDP growth as liquidity indicators also yields similar results.

¹³ Portfolio investment from ASEAN-5 economies also exhibits less volatility than that from global investors.

¹⁴ Financial markets are, in essence, the arrangements for processing information in networks of savers and investors (Gochoco-Bautista and Remolona 2012).

21. Regional financial integration can facilitate financing of investment.¹⁵ We estimate a model based on macroeconomic balance approach (similar to Pongsaparn and Unterberdoerster, 2011).¹⁶ The impact of rebalancing is assessed through the change in the current account balance to GDP (the dependent variable). Our results show that deeper financial integration, either global or regional, is associated with lower current account surpluses (Table 4).¹⁷ These findings are in line with those of Pongsaparn and Unterberdoerster (2011), who show that relative to their regional peers, Indonesia, Malaysia, and Thailand would be able to rebalance in a more significant way by moving toward a level of financial integration more consistent with their fundamentals.

Financial Integration and Economic Growth

22. The potential costs of financial integration should not obscure the potential benefits. To quantify the overall effect of financial integration, we look into the relationship between financial integration and economic growth, applying the framework of Eyraud, Singh, and Sutton (2017). We include standard control variables such as trade openness and population growth in our regression, with real GDP growth as the dependent variable. Considering financial integration might be affected by economic growth, we use instrumental variables (IV) methods as well. The instruments used are one-period lag of the financial integration variable and capital control measures from Fernández and others (2015).

23. Table 5 shows the regression results.¹⁸ Columns (1)–(3) evaluate the effect of global financial integration, and columns (4)–(6) show the results for intraregional financial integration. Columns (1) and (4) use ordinary least squares estimation with time fixed effects. To correct for possible endogeneity, columns (2) and (5) use two-stage least squares estimation and columns (3) and (6) use the instrumental variable–generalized method of moments method. The instruments used are one-period lag of the financial integration variable and capital control measures from Fernández and others (2015).

24. Our results show a positive and significant association between global financial integration and economic growth.¹⁹ In similar estimations for regional integration, a positive but statistically weaker association is found between regional financial integration and economic

¹⁵ Our findings that regional investors are less likely to pull out of their investments in the face of a crisis also suggest that regional financial integration is a suitable vehicle for promoting much needed long-term investment, such as in infrastructure. Indeed, through mobilizing savings and lowering financing costs, regional financial integration has been explored as a regional approach for financing infrastructure and other development needs.

¹⁶ For more details, see Wu and Wu (2018).

¹⁷ The ordinary least squares regression includes standard factors affecting the current account, such as the dependency ratio and fiscal balance, and global (regional) financial integration index (z-score). We include year and country fixed effects and use robust standard errors.

¹⁸ Global (regional) financial integration in Table 5 refers to the global (regional) financial integration index (z-score) calculated from portfolio investment data. Using z-scores calculated from FDI data has similar results.

¹⁹ Singapore is not included in this exercise; the results are less significant with Singapore, perhaps because of Singapore's status as a financial center and its higher stage of development.

growth. However, financial integration does not necessarily guarantee net benefits if sound institutional and policy frameworks are not in place.²⁰

E. Conclusion and Policy Implications

25. Financial integration of ASEAN economies is an important component of financial development. This paper shows that regional financial integration in ASEAN economies not only lags their trade integration, but also lags behind financial integration in countries outside the region. When looking into the drivers of financial integration, the analysis finds that improving regulatory and institutional quality and reducing restrictions on capital flows can promote regional financial integration. The paper also provides empirical evidence that regional financial integration helps ASEAN better weather global shocks, fosters economic rebalancing, and is associated with higher economic growth.²¹

26. It is important to recognize that financial integration and greater exposure to international capital markets can also pose challenges and risks. Capital flows, including those intermediated through the banking system, can amplify domestic economic and financial cycles. Cost of contagion would be greater in countries that are more financially integrated with a country where the financial shock originally is from. Harnessing the benefit of financial integration hence requires strong policy frameworks and institutions to safeguard macroeconomic and financial stability.

27. Macroeconomic policies, including exchange rate flexibility, need to play a key role in the management of risks associated with capital flows. A flexible exchange rate can be a critical shock absorber in the event of capital inflow surges. Macroprudential policies, in support of sound macroeconomic policies and strong financial supervision and regulation, can increase countries' resilience to external shocks associated with capital flows, helping contain the buildup of systemic vulnerabilities over time (IMF 2012; 2017).

28. When advancing financial integration, close attention must be paid to financial stability. The opening up of financial markets requires, in the first place, strengthening domestic financial systems and improving macroeconomic fundamentals and, at the regional level, enhancing information sharing, improving surveillance and crisis management, and providing a cross-country safety net. A gradual approach would therefore be appropriate for promoting regional financial integration.

²⁰ For a fuller treatment on the risks and challenges of financial integration, see Obstfeld and Taylor (2004), and Barro and Lee (2011).

²¹ For a discussion of challenges and policy initiatives for ASEAN financial integration in the areas of financial sector liberalization, capital account liberalization, and progress in setting up regional institutions to enhance regional cooperation, see Wu and Wu (2018).

Table 1. Thailand: Baseline Gravity Model

	-1	-2
	Portfolio Assets	Portfolio Assets and Liabilities
GDP Borrower[1]	0.83***	0.77***
	-0.07	-0.07
GDP Lender[2]	0.11	0.70***
	-0.09	-0.08
Distance	-0.51***	-0.39***
	-0.03	-0.02
Trade	0.45***	0.42***
	-0.02	-0.02
Common Language	0.19***	0.28***
	-0.04	-0.04
Constant	-12.35***	-19.95***
	-3.23	-2.69
Year Effect	Yes	Yes
Borrower Effect	Yes	Yes
Lender Effect	Yes	Yes
Observations	18,554	17,732
Adjusted R^2	0.825	0.83

Source: Authors' calculations.
Note: Standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2. Thailand: Drivers of Financial Integration: Institutional Quality

	(1)	(2)
	Portfolio Assets	Portfolio Assets and Liabilities
GDP Borrower	0.78*** (0.02)	0.83*** (0.02)
GDP Lender	0.69*** (0.02)	0.80*** (0.02)
Distance	-0.88*** (0.02)	-0.89*** (0.02)
Trade	0.05** (0.02)	-0.03 (0.02)
Common Language	0.94*** (0.05)	0.97*** (0.04)
Rule of Law Borrower	0.86*** (0.02)	1.53*** (0.02)
Intra-ASEAN Dummy ¹	1.14*** (0.12)	0.85*** (0.11)
Intra-ASEAN Dummy × Rule of Law Borrower ²	0.42*** (0.10)	0.71*** (0.10)
Rule of Law Lender	2.49*** (0.03)	1.47*** (0.02)
Intra-ASEAN Dummy × Rule of Law Lender	-0.02 (0.11)	0.52*** (0.10)
Constant	-17.09*** (0.67)	-18.01*** (0.59)
Year Effects	Yes	Yes
Observations	15,788	15,491
Adjusted R ²	0.636	0.662

Source: Authors' calculations.
Note: Standard errors in parentheses.
¹ Intra-ASEAN dummy equals one when the investment is between ASEAN member countries, zero otherwise.
² Interaction term of the intra-ASEAN dummy and the rule-of-law index in the investment-receiving country.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3. Thailand: Benefits of Financial Integration: U.S. Liquidity Condition		
	(1)	(2)
	Portfolio Assets	Portfolio Assets and Liabilities
GDP Borrower	0.31*** (0.09)	0.17* (0.09)
GDP Lender	-0.03 (0.10)	0.25*** (0.09)
Distance	-0.47*** (0.03)	-0.34*** (0.02)
Trade	0.43*** (0.02)	0.40*** (0.02)
Real per Capita GDP Borrower	1.55*** (0.19)	1.26*** (0.19)
Real per Capita GDP Lender	0.78*** (0.22)	1.06*** (0.21)
Common Language	0.23*** (0.04)	0.33*** (0.04)
US Broker-Dealer Sector Leverage	0.35*** (0.06)	0.16*** (0.05)
Intra-ASEAN+3 Dummy	3.46*** (0.74)	3.23*** (0.67)
Intra-ASEAN+3 Dummy × US Broker-Dealer Sector Leverage	-0.93*** (0.24)	-0.82*** (0.22)
Constant	-14.23*** (1.51)	-20.05*** (1.32)
Borrower Effect	Yes	Yes
Lender Effect	Yes	Yes
Observations	18,554	17,732
Adjusted R^2	0.825	0.830
Source: Authors' calculations.		
Note: Standard errors in parentheses.		
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$		

Table 4. Thailand: Benefits of Financial Integration: Rebalancing

	(1)	(2)	(3)
	Global	Regional	Both
Dependency Ratio	0.32*** (0.10)	0.33*** (0.10)	0.33*** (0.10)
Fiscal Balance	-0.09 (0.05)	-0.09* (0.05)	-0.09* (0.05)
Real GDP Growth	0.05 (0.07)	0.05 (0.07)	0.05 (0.07)
Global Financial Integration	-2.77*** (0.72)		-0.84 (2.12)
Opening Balance of Net Foreign Assets	-0.00** (0.00)	-0.00** (0.00)	-0.00** (0.00)
Population Growth	0.02 (0.57)	0.09 (0.55)	0.07 (0.56)
Oil Income	0.96*** (0.20)	0.97*** (0.20)	0.97*** (0.20)
Regional Financial Integration		-2.95*** (0.71)	-2.15 (2.16)
Constant	-1.35 (5.04)	-6.39 (5.39)	-4.48 (5.91)
Year Effect	Yes	Yes	Yes
Lender Effect	Yes	Yes	Yes
Observations	597	597	597
Adjusted R^2	0.908	0.909	0.908
Source: Authors' calculations.			
Note: Standard errors in parentheses.			
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$			

Table 5. Thailand: Benefits of Financial Integration: Economic Growth

	(1)	(2)	(3)	(4)	(5)	(6)
Trade Openness	-0.79 (0.72)	-1.14* (0.66)	-1.17 (0.83)	-1.03 (0.76)	-0.69 (0.58)	-0.99 (0.76)
Real GDP per Capita	-2.39*** (0.44)	-1.99*** (0.41)	-2.12*** (0.46)	-2.53*** (0.48)	-1.23*** (0.41)	-1.53*** (0.47)
GDP Share of Investment	-0.11 (1.00)	1.63 (1.01)	1.39 (1.04)	-0.42 (1.02)	1.73* (1.05)	1.64 (1.06)
GDP Share of Government Spending	3.00** (1.20)	3.75*** (1.02)	3.72*** (1.29)	3.07** (1.25)	2.70** (1.06)	3.00** (1.21)
Population Growth	0.51 (0.60)	0.42 (0.59)	0.69 (0.63)	0.16 (0.61)	0.56 (0.55)	0.69 (0.61)
Inflation Rate	0.10** (0.03)	0.16*** (0.05)	0.17*** (0.05)	0.11** (0.03)	0.16*** (0.06)	0.18*** (0.05)
Political Risk Index	0.04 (0.05)	0.04 (0.05)	0.04 (0.05)	0.07 (0.05)	0.05 (0.04)	0.06 (0.05)
Global Financial Integration	0.09 (0.10)	0.32** (0.13)	0.31** (0.15)			
Regional Financial Integration				0.13 (0.12)	0.06 (0.14)	0.11 (0.14)
Constant	27.63*** (4.58)	28.04*** (4.00)	28.34*** (4.67)	28.95*** (5.22)	19.49*** (5.12)	21.54*** (5.11)
Year Effect	Yes	No	No	Yes	No	No
Observations	98	84	84	91	74	74
Adjusted R^2	0.609	0.440	0.447	0.590	0.280	0.288
Source: Authors' calculations.						
Note: Standard errors in parentheses.						
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$						

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