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January 2024 Discussion Paper No. 208

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Flexible Inflation Targeting and Macroeconomic Performance: Evidence from ASEAN*

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> This Draft: January 2024 First Draft: October 2023

Abstract

The experience of flexible inflation targeting in ASEAN-5 has been favorable. This paper shows improvements in macroeconomic outcomes consistent with the framework's mandated objectives: lower levels and volatility of inflation, more stable economic growth and a well-functioning financial system. Using difference-in-difference approaches, we find that, for ASEAN-5 and developing countries, the inflation targeting framework mainly benefits adopters in terms of reducing inflation levels. In response to the challenges emanating from capital flow volatility and domestic financial imbalances, over the past 20 years, ASEAN-5 policy frameworks have continuously evolved to incorporate various policy tools. These include, among others, foreign exchange intervention, macroprudential policy, and capital flow measures. A multitude of policy tools is arguably one of the key factors contributing to sound macroeconomic outcomes during the post-targeting periods.

Keywords: flexible inflation targeting, monetary policy, ASEAN, financial stability, integrated policy

JEL Classifications: E52, E58, D78.

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^{*}We thank Piti Disyatat, Phurichai Rungcharoenkitkul, Krislert Samphantharak, Takatoshi Ito, Somkiat Tangkitvanich and participants at the Asian Economic Policy Review conference for their suggestions. The opinions expressed in this paper are those of the authors and should not be attributed to the Bank of Thailand.

1 Introduction

Since New Zealand became the first country to adopt an inflation targeting (IT) framework, 45 countries have followed suit.¹ Following the abandonment of a fixed exchange rate regime, three countries within the ASEAN-5 region adopted IT during the early 2000s, becoming early IT adopters among emerging market economies. These include Thailand, Philippines and Indonesia, whereas Malaysia and Singapore's monetary policy frameworks strive to maintain low and stable inflation but do not explicitly announce inflation targets. Given the 20 years that have elapsed since adoption, a period that has witnessed a series of shocks and crises, this paper aims to provide an assessment of the IT framework in this region. Specifically, we evaluate the macroeconomic performance of the ASEAN-5 inflation targeters in terms of satisfying their monetary policy objectives, and then discuss how their policy framework has evolved to tackle challenges that potentially threaten their economic stability.

The benefits of an IT regime have been widely discussed in the literature (Bernanke and Mishkin, 1997; Svensson, 1997). They range from anchoring inflation expectations to avoiding a time-inconsistency problem that could cause high average inflation. The framework also helps promote policy transparency and accountability. Therefore, it could reduce inflation variability, and if "flexible" it could stabilize output, as well. Despite these benefits, quantitative assessments do not reach a consensus on whether IT fosters better macroeconomic performance relative to alternative regimes. In the context of industrialized countries, Ball and Sheridan (2004) and Lin and Ye (2007) find no evidence that IT improves performance, as measured by the behavior of inflation, output, or interest rates.

For emerging market and developing economies (EMDE), central banks' initial credibility is likely lower than in advanced countries, which may enhance the credibility gained from greater policy transparency (Brito and Bystedt, 2010). In addition, EMDE are undoubtedly hit by larger shocks and face greater difficulties in designing sound domestic macroeconomic policies and institutions (Goncalves and Salles, 2008). Nevertheless, the

¹Based on the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Restrictions 2021.

results from past empirical assessments also remain inconclusive. On the one hand, Batini and Laxton (2007), Lin and Ye (2009) and Vega and Winkelried (2005) show that IT brings significant benefits in terms of stabilizing inflation and expected inflation, while Goncalves and Salles (2008) document lower inflation and also drops in growth volatility. On the other hand, Brito and Bystedt (2010) and Miskin and Schmidt-Hebbel (2007) report no evidence that IT improves economic performance relative to non-targeters.

This paper contributes to the literature by conducting assessments of the IT framework through a case study of ASEAN-5. The experience of ASEAN-5 provides an interesting case study, given that this region was at the center of the Asian Financial Crisis (AFC) in 1997, which then called the credibility of central banks and previous policy frameworks into question. Moreover, in 20 years of experience under IT, we have witnessed large-scale shocks and crises including the Global Financial Crisis (GFC), the COVID-19 pandemic and the recent spike in global inflation, which put the policy framework to the test. The existing research usually has had a post-targeting period of 5–10 years.²

Our results show substantial improvements in ASEAN-5 macroeconomic outcomes during the post-targeting periods. In terms of the attainment of price stability, we observe both lower levels and lesser volatility of inflation. Inflation has also become less persistent, with medium-term inflation expectations being well-anchored despite volatile actual inflation. Moreover, economic growth volatility has declined, while the financial sector has been solid throughout several episodes of macro-financial volatilities. Overall, the objectives of monetary policy in ASEAN-5 have been well satisfied. Nevertheless, when compared to the performance of non-IT developing countries, we find that IT brings benefits to the adopters mainly in terms of lower inflation, whereas improved performance with respect to growth and inflation volatility does not significantly differ across targeters and non-targeters. This implies that other factors are also at play in contributing to good macroeconomic outcomes.

Against the background of favorable performance, ASEAN-5 economies have faced challenges from volatile capital flows and domestic financial imbalances, which worsen monetary policy tradeoffs and eventually macroeconomic outcomes. As a consequence,

 $^{^{2}}$ See also Filardo and Genberg (2010) and Morgan (2013) for earlier assessments of monetary policy frameworks in Asia.

ASEAN-5 central banks, like those in other emerging market economies, have continuously adapted their policy frameworks to tackle these challenges by incorporating various policy tools. These include foreign exchange (FX) intervention, macroprudential policy and, to a lesser extent, capital flow measures. Our paper illustrates the benefits, albeit small, of managed-floating exchange rates acting as a shock absorber. In addition, the existing empirical evidence has so far supported the effectiveness of macroprudential policy in mitigating financial stability risks. A multitude of policy tools are arguably key factors contributing to sound macroeconomic outcomes during the post-targeting periods.

The rest of the paper is organized as follows. In the next section, we provide a brief overview of monetary policy framework in ASEAN-5. Section 3 reviews the macroeconomic performance of inflation targeters, as well as non-targeters, in this region. Section 4 discusses the macroeconomic challenges facing ASEAN-5 and how the central banks respond. Section 5 concludes.

2 Monetary Policy Framework of ASEAN-5

While the exact characteristics of the monetary policy frameworks of ASEAN-5 differ, all central banks in this region emphasize medium-term price stability as the main overriding objective of monetary policy.³ To achieve and maintain price stability, their policy strategy differs. Three countries adopted a full-fledged inflation targeting framework during the early 2000s: Thailand, in 2000; Philippines, in 2002; and Indonesia, in 2005. Thailand adopted the IT framework when its inflation already prevailed at low levels. While targets were initially specified in terms of core inflation, since 2015, the target has been specified in terms of headline inflation. For most periods, the Bank of Thailand applies a range target, which helps enhance policy flexibility, while a point target with a tolerance band, which appears to be a more common form of inflation target, was put in place only from 2015–2019. Meanwhile, in Philippines and Indonesia, there was an initial phase of disinflation, before the central banks applied stable targets. The targets, mostly specified as point targets with a tolerance band, were above 5 percent in the early periods,

³Table 1 provides an overview of current monetary policy frameworks in ASEAN-5.

but are now around 3 percent for both countries. On the other hand, neither Malaysia nor Singapore has announced explicit inflation targets. Given its great trade openness, which renders exchange rates more relevant in output and price stabilization, Singapore has adopted an exchange-rate-based policy framework since the 1980s, using the nominal effective exchange rate as the intermediate target. Meanwhile, Malaysia abandoned a fixed exchange rate regime in 2005.⁴

[Insert Table 1 here]

For inflation targeters, their policy framework is better characterized as "flexible inflation targeting." That is, these central banks also strive for objectives other than low and stable inflation, such as sustainable economic growth in Thailand and exchange rate stability in Indonesia. An interesting feature of the ASEAN-5 IT framework is the emphasis given to maintaining financial stability. In Thailand, the financial-stability objective was made explicit by the central bank, even before the GFC occurred. Meanwhile, Bank Indonesia modified its monetary policy framework in response to the GFC by incorporating a financial-stability objective and macroprudential regulatory framework. In Philippines and Malaysia, the central banks also take into consideration other policy objectives including financial-stability risks, in setting monetary policy. This reflects a great awareness on part of ASEAN-5 central banks of the adverse implications of financial sector imbalances and a prudential aspect of monetary policy. To attain these objectives, all ASEAN-5 inflation targeters, including Thailand, Philippines and Indonesia, as well as Malaysia, use a short-term money market rate, overnight or one week, to signal their monetary policy stance. In Singapore, however, the trade-weighted exchange rate serves as the monetary policy's intermediate and operational target.

A clear statement of policy goals is well supported by the institutional arrangements that give the central bank the independence to pursue these goals, accountability mechanisms, and various modes of communication to help enhance policy transparency and accountability. Central bank communication helps the public understand the policy framework, as well as the rationale for specific policy decisions and helps shape mar-

⁴IMF (2016) and Morgan (2013) regard Singapore and Malaysia as operating under implicit inflation targeting frameworks.

ket expectations. Both targeters and non-targeters communicate with the general public and financial market participants through various means, such as press releases immediately after every policy meeting, the publication of regular monetary policy reports, and the publication of minutes of policy meetings, the latter taking place in Thailand and Philippines. To help the public understand the balance of risks, since 2011, the Bank of Thailand has also published the balance of votes. In terms of accountability mechanisms, parliamentary testimony is a standard approach. In addition, the central banks of Thailand and Philippines also issue an open letter whenever inflation deviates from the target to explain such deviation and detail future policy responses. The past literature documents improvements in transparency, independence, and governance scores for all three ASEAN-5 inflation targeters (Ahsan et al., 2008; Dincer and Eichengreen, 2014), indicating that these countries have successfully adopted many best practices under the IT regime. Low public debt levels, which before the COVID-19 pandemic were around 30 percent of GDP in Thailand and Indonesia or showed a declining trend in Philippines, in part support monetary policy autonomy.⁵

3 Macroeconomic Performance during IT Episode

In our performance assessment, we focus not only on inflation dynamics but also on the attainment of other macroeconomic outcomes consistent with the flexible IT framework, namely stable economic growth and financial stability. On the whole, our assessment shows clear improvements in performance with respect to both macroeconomic and financial stability during the IT episode, despite a volatile economic environment.

⁵Public debt heightened during the COVID-19 pandemic to around 60 percent of GDP in Thailand and Philippines. The public-debt ratio in Indonesia remains low, at 40 percent of GDP. However, the act of monetary financing by Bank Indonesia during the pandemic, while helping to free up fiscal space and enhance policy effectiveness, may raise concerns over central bank independence going forward.

3.1 Price Stability

We first assess performance in terms of achieving low and stable inflation. Figure 1(a) compares inflation levels and volatility during the periods before and after IT adoption.⁶ It is evident that both the levels and volatility of inflation have greatly declined. Particularly in Indonesia and Philippines, where the levels and volatility were over 10 percent in the 1980s and 1990s, inflation after the IT adoption averaged at around 6 and 4 percent, respectively. For these two countries, we also witnessed a consistently declining inflation trend over the IT periods (Figure 2), in line with the process of disinflation. Thailand also saw an improvement in both inflation levels and volatility, though to a lesser extent. Thai inflation during the IT periods. Meanwhile, for non-inflation targeters, both Malaysia and Singapore achieved low and stable inflation even before 2000. It could be said that inflation outcomes in the three IT countries of ASEAN-5 is converging to that of non-IT countries.

[Insert Figures 1 and 2 here]

Examining how often actual inflation meets the target prescribed by the central bank, Table 2 shows that performance differs across countries and time periods. Throughout the IT periods, monthly headline inflation stays within the target roughly 60 percent and 50 percent of the time for Thailand and Indonesia, respectively, but just one-third of the time in Philippines.⁷ Target misses can also be asymmetric, as Indonesia's inflation often exceeds the target range, while Thai inflation usually misses the target from the downside. Inflation performance relative to the target has altered somewhat over the past decade, as inflation in Indonesia has become more stable, as reflected by the lower size of inflation deviations from the target. On the other hand, Thai inflation misses the target more than 70 percent of the time. However, as misses are from the downside due to positive supply shocks, especially declining global oil prices from shale oil production, they are not costly to the economy. Meanwhile, public inflation expectations have been well-anchored during

⁶For Malaysia, we compare the periods before and after the central bank abandoned a fixed exchange rate regime. Meanwhile, 2000Q1 is used as a cutoff period for Singapore.

⁷It is interesting to note that the inflation target range in Thailand is wider than in other countries, at 3.5 percentage points from 2000–2009 and 3.0 percentage points from 2010–2019.

such low-inflation periods. As shown in Figure 2, inflation was also biased downward in Singapore and Malaysia during the late 2010s, pointing toward structural or common issues at play.

[Insert Table 2 here]

Given the lags in policy transmission, missing the target in the short run is not undesirable and does not necessarily translate into losses of credibility. This is particularly the case for low- to middle-income countries, which experience frequent supply shocks affecting food and energy prices, which are mostly short-term in nature. Roger (2009) documents that inflation targeters from this group of countries miss their target ranges frequently, i.e., around 60 percent of the time. In addition, keeping inflation always within the target range is perhaps less sensible, as central banks weigh attaining the inflation target against satisfying other policy objectives or considerations. As shown in Table 2, ASEAN-5's inflation performance relative to the target is overall aligned with that in Roger (2009).

It is crucial to delve further into assessing the behavior of inflation in the event of shocks, particularly inflation persistence and the anchoring of inflation expectations. If inflation persistence is low and inflation expectations are well-anchored, any inflation deviations from the target will likely be short-lived, allowing the central bank to conveniently achieve the target over the medium run.

On inflation persistence, we estimate the AR(4) model for pre-IT and post-IT samples and report the sum of the autoregressive coefficients in Figure 3(a). For ASEAN-5 inflation targeters, we find that estimated inflation persistence is lower than in the past, standing at around a level of 0.2 in Thailand and 0.4 in Philippines and Indonesia. Meanwhile, the persistence level is slightly higher in Singapore, at a level of 0.6, and no inflation persistence is found in the case of Malaysia.⁸ These results coincide with those of BIS (2019), which also find low inflation persistence for emerging countries in Asia and point to the fact that shocks to inflation could die away relatively fast. The evidence is suggestive of well-anchored inflation expectations. We next assess how public inflation expectation

⁸The persistence estimates for Thailand and Malaysia are not significantly different from zero, at 5-percent level.

responds to actual headline inflation. Both the short-term and medium-term expectations of professional forecasters (i.e., Consensus Economics) are explored.⁹ From Figure 3(b), our results show that while actual inflation can influence short-term inflation expectations, it does not significantly affect medium-term expectations in all IT countries. The results indicate that during an IT period, the announced inflation target has been credible. Dany-Knedlik and Garcia (2018), based on their time-varying-coefficient Phillips curve, also find that ASEAN-5 inflation expectations have become more forward-looking over time.

[Insert Figure 3 here]

Last, to complement the above analyses, we assess how domestic inflation responds to a global oil price shock, which has been a crucial source of inflation variability worldwide. Through a local projection approach as in Choi et al. (2018), we examine the impact on both headline and core inflation over eight quarters:

$$\pi_{t+k} = \alpha^k + \sum_{i=1}^{l} \rho_i^k \pi_{t-i} + \beta_k \pi_t^{oil} + \sum_{j=1}^{k} \omega_j \pi_{t+j}^{oil} + \epsilon_t^k,$$
(1)

where π_{t+k} is domestic inflation, with k ranging from 0 to 8, and π_t^{oil} denotes percentage changes in global oil prices. Following Choi et al. (2018), we control for future oil price changes to avoid biasing impulse response estimates. Through this exercise, the responses of core inflation are our focus, as they indicate whether second-round effects on inflation expectations occur or not. From Figure 3(c), we find that for all ASEAN-5 countries the impact of oil price shocks on headline inflation clearly dissipates over time and mostly becomes insignificant after a few quarters. In Indonesia and Malaysia, only the contemporaneous impact is statistically significant. Meanwhile, the responses of core inflation in most cases are small and insignificant, indicating no second-round effects. The exception is Philippines, where a significant impact can be observed in both the short and medium run. Looking at the most recent episode of global high inflation, in 2022, we can observe a more persistent rise of inflation in Philippines, compared to other inflation targeters.

⁹The data is available in a half-yearly frequency. While it is useful to look at the expectations of households and firms, which are more directly involved in the process of price- and wage-setting, the data for some countries is not publicly available.

However, as of July 2023, headline inflation in Philippines had already fallen to 4.7 percent. Meanwhile, in Thailand, it took just 11 months for headline inflation to fall from its peak to below 1 percent, in May 2023. In Indonesia and Malaysia, headline inflation peaked at only 5.95 percent and 4.7 percent, respectively, and was 3.27 and 2.0 percent, respectively, in August 2023.

Part of the success of inflation control among ASEAN-5 inflation targeters may, nonetheless, be attributed to government subsidies and price controls. For example, in Indonesia, subsidies on the prices of fuel and energy-related products represent a large share of government expenditures, which was the case especially before 2015 and during the oil price spike in 2021. The Thai government also utilizes its oil funds to stabilize domestic retail oil and liquid petroleum gas (LPG) prices, when world oil prices reach high levels. In many cases, these measures are important in moderating the sensitivity of domestic inflation to the external environment. However, there have also been periods when the subsidies were unsustainable and their curtailment generated abrupt, though temporary, increases in inflation, such as in Thailand in 2005. In Indonesia, subsidized oil prices were raised by around 30 percent in 2014 and 2022, mainly to alleviate fiscal burdens. More recently, Thailand's oil funds experienced losses of over 120 billion baht (4 billion USD) at the end of 2022, and hence have incurred substantial debt that eventually will need to be paid off in times of lower oil prices. Hence, optimal government intervention toward price stabilization remains a crucial policy question.

All in all, our results suggest clear improvements in inflation performance during the post-targeting periods, as reflected by the declines in three aspects: levels, volatility, and persistence. Medium-term inflation expectations are shown to be well-anchored and do not respond to inflation news. Faced with the global high inflation in 2022, ASEAN-5 central banks were able to bring inflation back or close to the target in a short period of time.

3.2 Stable Economic Growth

Satisfactory inflation behavior may benefit or worsen growth performance. While some hold the view that too restrictive a focus on inflation may derail economic growth, others argue that inflation targeting, if flexible, can improve both inflation and growth stability. In Figure 1(b), we can observe a clear improvement in terms of lower growth volatility in Indonesia and Thailand, whose standard deviations of economic growth during the post-targeting periods decline by 3.0 and 1.3 percentage points, respectively. For the rest of ASEAN-5, there is not much difference in volatility during the pre-IT and post-IT periods. However, it is interesting to note that if the COVID-19 episode is excluded from the post-targeting sample, all the IT countries, as well as Malaysia, reduced their growth volatility by more than two percentage points.¹⁰

In examining growth performance, it is also useful to look at the development of output gaps, a measure of economic slack that is at least conceptually a signal of future inflationary pressures. In Figure 4, we show percentage deviations of real gross domestic product (GDP) from its trend based on a one-sided Hodrick–Prescott filter. Except from the two large crises, namely the GFC from 2008–2009 and the COVID-19 pandemic, the output of inflation-targeting countries has been roughly in line with the economy's potential. Malaysia's economic activity also shares this feature. Moreover, in the face of the GFC, every ASEAN-5 country has seen a fast economic recovery, as it takes less than a year to close the output gaps from the crisis trough.

[Insert Figure 4 here]

Our paper next asks whether improvements in both inflation and growth performance in part reflect the central bank's commitment to inflation and growth stabilization. In this subsection, we present estimates of the Taylor rule, which show monetary policy reaction function to deviations of inflation and output from target. Output deviations are in the form of output gaps, as shown above. The Taylor-rule equation also allows for interest rate persistence, while testing for the role of exchange rates in influencing monetary policy decisions (Ghosh et al., 2016):

$$i_t = \alpha + \rho i_{t-i} + \beta_\pi (\pi_t - \pi_t^T) + \beta_y \hat{y}_t + \beta_{er} \Delta E R_t + \epsilon_t.$$
(2)

¹⁰Due to long-run monetary neutrality, we do not focus on the impact of IT on the levels of economic growth. However, our data suggests that in all countries, except Philippines, economic growth declines.

For Singapore, given that nominal effective exchange rates (NEER) are the main policy instrument, we replace the policy rate with annual percentage changes in NEER as a dependent variable. The results, as reported in Table 3, show that policy rates in all three IT countries significantly react to inflation deviations away from the target. However, we fail to find a significant estimate for Malaysia, whose policy rate mainly reacts to changes in output gaps. In Singapore, the NEER are found to be adjusted in a way consistent with price stability; that is, greater inflationary pressures will lead to an NEER appreciation. For IT countries, we also show that policy rates significantly react to output gaps, despite the β_y estimate for Thailand and Indonesia being weakly significant. During both the GFC and the COVID-19 pandemic, we see all ASEAN-5 central banks adjust their main policy instrument quickly and forcefully to stabilize economic activity. Nevertheless, we do not find a significant monetary policy response to exchange rate movements in IT countries. Our results with respect to the ex ante policy reaction, therefore, suggest that the central bank responds to developments of inflation and output in a way consistent with its policy objectives, which may in part contribute to better overall performance.

[Insert Table 3 here]

3.3 Financial Stability

Given the extensive focus on financial stability by ASEAN-5 inflation targeters, our performance assessment also covers this area. While there is a lack of agreed-upon metrics for financial stability, a noticeable feature in this region is the absence of financial and banking crises in the post-targeting periods.¹¹ This is largely attributed to post-AFC reforms to bolster banking system soundness, more prudent risk management practices by banks, a reduction in private sector vulnerabilities and a shift toward a policy framework that is less prone to exchange rate misalignment. The banking and financial sectors have been solid during both the GFC and the COVID-19 pandemic, helping to support policy transmissions and economic recoveries.

Figure 5 reports selected financial-stability indicators. The ratios of credit to GDP and credit growth are often used to signal imbalances within the financial sector, as they

¹¹See, for example, the systemic banking crises database by Laeven and Valencia (2020).

can predict the likelihood and extent of upcoming financial crises (Borio, 2012; Schularick and Taylor, 2012). We show the private non-financial credit-to-GDP ratios of ASEAN-5 in Figure 5(a). Despite an increasing trend over the past two decades, the ratios are still far below the level preceding the AFC, especially in Thailand, Indonesia, and Malaysia. Gradually, the ratios have improved. Based on the International Monetary Fund's *Global Financial Stability Report, September 2011: Grappling with Crisis Legacies*, which regards an increase in the credit-to-GDP ratio above 3 percent as an indicator for a credit boom and excessive financial stability risks, no evidence of abrupt increases in the ratio is observed in ASEAN-5 inflation targeters, except in Singapore. In Indonesia and Philippines, it is interesting to note that private credit remains well below 50 percent of GDP, reflecting the relatively small size of the financial sector and substantial heterogeneity in financial sector development within ASEAN-5.

[Insert Figure 5 here]

Given the still-dominant role of banks in the ASEAN-5 financial system, we also report indicators reflecting the soundness of the banking sector, in Figure 5(b). First, the ratios of nonperforming loans to total loans (NPL) have continuously declined since the AFC, which raised NPL to an exceptionally high level, such as 45 percent in Thailand. ASEAN-5's NPL during the 2010s is on average 2.2 percent and has not risen much in the face of COVID-19 pandemic, partly thanks to swift policy responses by the central bank and the government and to changes in regulations governing distressed loan classification. Meanwhile, the capital adequacy ratios, which indicate the banks' loss-absorbing capacity, continue increasing and stay above 15 percent during the 2010s, a level well beyond regulatory capital requirements. This evidence indicates the strength of the banking sectors. How much credit should be given to IT for achieving financial stability depends on which position you take regarding the interaction of monetary and macroprudential policies. One extreme view is that financial-stability objectives should be handled by macroprudential policy, while another extreme view would put a certain responsibility on monetary policy.

3.4 Performance Relative to Non-Inflation Targeters

While the previous subsections have shown well-achieved macro-financial stability, one may argue that such achievements may be due to other factors, such as declining global shock volatility. Many studies mentioned in the introduction note that non-inflation targeters also enjoy improvements in their macroeconomic performance. Moreover, a seminal paper by Ball and Sheridan (2004) suggests that the improvement in inflation and growth performance of the targeters may just reflect "regression to the mean." That is, those countries tend to adopt IT during times of poor economic performance, and therefore, they will likely see their problems diminish regardless of whether or not they adopt IT. Figure 1(a) suggests that this might be the case for Indonesia and Philippines.

Therefore, to provide some evidence regarding marginal contributions by the IT framework, we apply a "difference-in-difference" (DiD) exercise by comparing changes in macroeconomic performance after IT adoption and using non-targeters as a control group. Since we only have three inflation targeters within ASEAN-5, we pool them together with other developing countries that adopt IT. Our sample includes 52 developing countries, 30 of which are inflation targeters.¹² Our annual data are from 1980–2022, where we examine three performance indicators, namely inflation levels, inflation volatility and growth volatility, where volatility is based on five-year rolling standard deviations. Evidently, most non-targeters in our sample have also experienced better economic outcomes in the past two decades.

First, we apply a cross-sectional regression as in Ball and Sheridan (2004), where the dependent variable is the difference in economic outcomes across the pre- and posttargeting periods. For non-targeters, we use the year 2002 as a cutoff period. Importantly, we control for outcomes in the pre-targeting periods, to account for regression to the mean. As shown in Row 1 of Table 4, developing countries that adopt IT see significantly lower levels of inflation relative to non-targeters. In particular, IT adoption is associated with a decline of 1.9 percentage points in inflation levels, which is weakly significant at the 10 percent level. However, we do not observe any significant difference for real GDP growth

 $^{^{12}{\}rm The}$ results should be viewed with caution, since they reflect the performance of a broader set of inflation targeters.

and inflation volatility across targeters and non-targeters. Since countries may adopt IT frameworks in different time periods, we rely on three additional methods to estimate the treatment effects under staggered treatment adoption: (i) the stacked DiD regressions introduced in Cengiz et al. (2019) (ii) Callaway and Sant'Anna (2021) (CA)'s approach and (iii) the event-study estimates of Sun and Abraham (2021) (SA), each of which helps avoid biases that may arise from treatment effect heterogeneity. The results shown in Rows 2–4 are broadly in line with those in the first row, as the estimated impact of IT adoption on inflation levels is always significant, with estimates always larger than 2.5 percentage points. However, we find a significant decline in inflation volatility, only when stacked DiD is employed (Row 3). Our findings differ slightly from those in Bhalla et al. (2023), who to our knowledge have conducted the most recent IT assessment and do not find any marginal benefits of IT. All in all, our findings suggest that IT benefits adopters mainly in terms of lower inflation.¹³

[Insert Table 4 here]

4 Challenges and Issues

While ASEAN-5 inflation targeters have achieved macroeconomic and financial stability well over the past two decades, they face challenges that prompt them to continuously adapt their monetary policy frameworks. This section discusses these challenges, which emanate from volatile global capital flows and domestic financial sector imbalances, as well as how the central banks adapt their frameworks and policy toolkit to combat them. Consequently, the policy framework accompanies multiple policy tools to achieve multiple objectives, which is arguably one of the most important factors helping ASEAN-5 maintain economic stability.

¹³For a robustness check, we also limit an inflation-targeter sample to only three ASEAN-5 countries and apply CA and SA estimators. We find lowering inflation levels has smaller benefits, while benefits become evident in terms of lower growth volatility.

4.1 Capital Flows and Exchange Rate Volatility

One of the main challenges facing ASEAN-5 concerns volatile capital flows and the associated exchange rate volatility. Given financial globalization, ASEAN-5, like other emerging market economies, have been exposed to large swings in capital flow. As shown in Figure 6(a), global capital flowed into this region during the period leading up to the GFC. Capital inflows, particularly portfolio investment flows, intensified after the GFC, as advanced countries set their policy rates at unprecedentedly low levels while devising quantitative easing measures that resulted in abundant global liquidity. Meanwhile, a reversal of flows is evident in times of crises and an unexpected shift in the monetary policy of advanced countries, such as the taper tantrum episode. Such swings in capital flow, which reflect alternating global risk sentiment, in turn affect exchange rates (Figure 6(b)), domestic financial conditions, and real economic activity. IMF (2016) shows that shifts in the monetary policy of advanced countries and global risk sentiment significantly impact domestic financial conditions, namely commercial bank rates and long-term government bond yields, particularly in Indonesia and Philippines. The influence of global factors on domestic financial conditions means that monetary policy transmissions may sometimes be weakened. Due to its large current account deficit, Indonesia was particularly vulnerable during the taper tantrum, experiencing a flow reversal and currency depreciation, and prompting the government and the central bank to adopt a pro-stability policy at the expense of short-term economic growth.¹⁴ Meanwhile, Thailand has encountered a different problem, as its strong external positions render the Thai baht a safe haven. The trend appreciation of the Thai baht affects an export-oriented economy.

[Insert Figure 6 here]

Considering the impact from exchange rate fluctuations, ASEAN-5 inflation targeters are somewhat insulated from the passthrough to domestic inflation. As shown in Figure 6(c), the exchange rate pass-through to domestic inflation is estimated to be low, standing at around 0.05, lessening a concern over price stability. As discussed in BIS (2019), however, exchange rate swings would still have macroeconomic effects by influencing export

¹⁴After the GFC, Philippines experienced significant deviations of short-term interbank rates from the policy rate, leading the central bank to modify its monetary operation framework.

firms' profits and activity, given the rather limited scope for hedging exchange rate risk through financial derivatives.¹⁵

In response to this challenge, the central banks in ASEAN-5 have mainly resorted to FX intervention to deal with excessive exchange rate volatility.¹⁶ Table 5 compares the volatility of bilateral exchange rates vis-à-vis the US dollar for ASEAN-5 and selected advanced countries. The exchange rate volatility of ASEAN-5 currencies is evidently lower than that of advanced currencies. Unsurprisingly, the Singaporean dollar is the least flexible, given its role as a policy instrument. Among targeters, Thailand and Philippines appear to have a limited degree of exchange rate flexibility, reflecting their high degree of trade openness. On the other hand, the Indonesian rupiah shows greater flexibility, although less so during the 2010s. Table 5 also shows that the effects of intervention persist over the longer run, as illustrated by the standard deviations of monthly and yearly returns of ASEAN-5 exchange rates, which remain lower than advanced currencies. This evidence indicates that ASEAN-5 central banks have a fear of floating.

[Insert Table 5 here]

The adverse effects of exchange rate fluctuations raise the question of whether exchange rate flexibility actually improves or worsens macroeconomic stability. Advocates of flexible exchange rates claim that exchange rates act as shock absorbers when they move with economic fundamentals. We attempt to answer this question in the context of emerging market economies in Asia and Latin America. Under the structural vector autoregression (VAR) model, we identify exogenous exchange rate shocks and standard fundamental shocks including demand, supply and monetary policy shocks that originate from either the domestic or the global economy. Based on historical decomposition

¹⁵The Asian EMs are less exposed to the financial channel of the exchange rate when compared to other emerging countries given lower external debt and relatively lower foreign participation in local-currency markets.

¹⁶Capital flow measures (CFM) have also been utilized but to a lesser degree (Zhang and Zoli, 2016). As discussed in Warjiyo (2022), such CFM as a minimum holding period for Bank Indonesia certificates and limits on offshore borrowing by banks, were implemented to deal with a post-GFC inflow episode. Both measures were then relaxed in response to the taper tantrum. In addition, several measures to help contain risk exposures for both banks and non-financial corporations have been put in place, such as the regulations issued in 2014 on the hedging and liquidity ratios of firms' external debt. In Philippines, the central bank used caps on banks' non-deliverable forward positions to mitigate speculative flows. Meanwhile, to enable two-way exchange rate movements, Thailand mainly relies on continued relaxations of capital outflow measures.

and counterfactual analyses, we quantify (1) the negative impact on real GDP growth volatility from exchange rate shocks and (2) the benefits to reducing growth volatility whenever exchange rates respond to fundamental shocks. As shown in Figure 6(d), we show that ASEAN-5 economies mostly receive net benefits, albeit small, from their managed exchange rate fluctuations. This is particularly so when the economies experience global and domestic demand shocks. This finding supports the notion that independent monetary policy and flexible exchange rates, with a certain degree of FX intervention, can work together in supporting macroeconomic stability.

4.2 Sector-Specific Financial Stability Risks

While Section 3.3 points toward overall financial sector stability, this may mask risks and imbalances that may emerge in specific sectors. That is, imbalances could still accumulate against the backdrop of overall macroeconomic and financial stability, and contribute to systemic financial-stability risks that impair macroeconomic conditions over the medium term. In this subsection, we highlight two sources of financial imbalance. First, Figure 7(a) shows vulnerability in the household sector, where we can observe high household debt levels in Thailand, reaching 90 percent of GDP. The increase occurs mainly in the early 2010s and becomes a restraint on domestic consumption activity. Second, Figure 7(b) shows developments in the housing sector, where we can observe periods of high and sustained growth in house prices during the early 2010s, in part propelled by capital inflows. Rising house prices in these periods appear to coincide with high and accelerated mortgage growth, especially in Indonesia and Philippines. These developments raise concerns over credit-driven housing price cycles.

[Insert Figure 7 here]

Whether monetary policy should lean against the build-up of financial risk is a longstanding debate. To guard against domestic financial sector imbalances, ASEAN-5 however mainly relies on macroprudential measures, which are a more targeted instrument. While the design and governance structure of macroprudential frameworks varies across countries, many of these tools are at the disposal of the central bank, or the central bank is part of the decision-making process. Zhang and Zoli (2016) show that, compared to other regions, Asian economies appear to have made greater use of macroprudential tools, especially housing-related measures, reflecting their concerns over risks within the housing sector. Based on Figure 7(c), which shows the number of macroprudential policy actions by ASEAN-5, we also observe the frequent use of housing-related measures, including limits to loan-to-value ratios, property taxes, and other mortgage loan restrictions. Capital regulations and liquidity risk measures are also in place, as consistent with international regulatory standards. Moreover, reserve requirements have been utilized frequently, although this policy may instead be considered a monetary instrument. Figure 7(d) adds that macroprudential policy has been implemented in great numbers since the GFC.

Macroprudential policy, which targets financial vulnerabilities more directly, helps alleviate the policy tradeoffs facing monetary policy whenever economic and financial cycles do not coincide and provides a degree of freedom for monetary policy. So far, empirical evidence argues in favor of the effectiveness of macroprudential tools in influencing variables such as credit, asset prices, and the amplitude of financial cycles.¹⁷ However, a handful of empirical work studies the context of ASEAN-5. Based on a sample of 13 Asian economies, including ASEAN-5, Zhang and Zoli (2016) show that macroprudential policy can help curb housing price growth, credit growth, and bank leverage. Moreover, Kim et al. (2019) find that contractionary macroprudential policy has significant negative effects on both credit and output. For Thailand alone, LTV measures are shown to have an impact on banks' risk-taking behavior (Tantasith et al., 2018). More research is needed to understand the effectiveness of this policy.

4.3 Use of Integrated Tools

The two challenges mentioned above underlie the evolution of monetary policy frameworks in ASEAN-5, and emerging market economies more generally, toward one that integrates multiple policy tools. This more holistic nature for a policy framework is well recognized in both academic and policy discussions under the so-called "integrated policy

¹⁷Strengthening Macroprudential Policies in Emerging Asia: Adapting to Green Goals and Fintech, published by the OECD, provides a comprehensive review of the literature.

framework," "integrated inflation targeting" or "macro-financial stability frameworks" (Agénor and da Silva, 2023; Basu et al., 2020; Borio et al., 2023).

The COVID-19 crisis also saw central banks expanding their policy toolkit further to counter economic shocks. Since the policy rate cut, ASEAN-5 central banks have employed a wide range of measures to forestall the adverse feedback loops between real and financial sectors. These include reducing reserve requirements, easing macroprudential and microprudential regulations, purchasing government bonds, and etc. In addition, to alleviate the debt burden and ensure sufficient financing to the real sector, a few central banks also applied a debt moratorium and specialized lending with a government credit guarantee. The complementarity of policy tools is of the essence in times of crisis, given the pressing need to address the vulnerability and stresses happening in various markets and sectors.

While managing macroeconomic and financial stability with multiple instruments can help alleviate policy tradeoffs and promote efficiency, it also poses challenges in terms of instrument coordination, especially when the transmission channels of the different instruments overlap. To better coordinate policy actions, we recommend further improvements to the current framework in several aspects: (1) *Develop an analytical framework or tools* to enable impact and welfare analyses of multiple policy instruments (Adrian et al., 2020; Basu et al., 2020); (2) *Understand policy interactions*, especially when policies are devised in different directions. Could the implementation of one policy improve or worsen the effectiveness of the other?; (3) *Design institutional arrangements* that facilitate policy coordination; (4) *Communicate policy effectively*, to enhance public understanding of the rationales for integrated policy actions.

5 Conclusion

Our paper uses ASEAN-5 as a case study to provide an assessment of the inflation targeting framework. We document clear improvements in macroeconomic outcomes among inflation targeters during post-targeting periods, and show that these economies are able to withstand large-scale economic shocks and crises quite well. Given the extensive focus on financial stability by ASEAN-5 central banks, our paper therefore also provides assessment in this area, where we show that financial and banking sectors have been solid throughout the IT periods. However, the degree to which this improved macroeconomic performance is attributable to IT adoption is open to question. Based on a broader sample of developing countries, we find that IT brings benefits mainly in terms of reducing inflation levels, whereas the improved performance associated with inflation and growth volatility does not significantly differ across targeters and non-targeters. More research can be done to identify the sources of sound macroeconomic performance in developing-country and ASEAN-5 contexts. One of the key factors contributing to good macroeconomic outcomes in this region is arguably the multitude of policy tools at the central banks' disposal. Further development of analytical and institutional frameworks for integrated policy actions, along with a better understanding of policy interactions would increase the efficiency of monetary policy frameworks in combating any upcoming challenges.

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A Country List for the Dif-in-Dif Estimation

- Inflation targeter: Chile, Colombia, Costa Rica, Czech Republic, Dominican Republic, Georgia, Guatemala, Hungary, India, Indonesia, Israel, Jamaica, Kazakhstan, Kenya, Korea, Mexico, Moldova, Paraguay, Peru, Philippines, Poland, Russia, Seychelles, South Africa, Thailand, Uganda, Ukraine, Uruguay, Uzbekistan
- Non-inflation targeter: Algeria, Botswana, China, Croatia, Côte d'Ivoire, Egypt, Estonia, Hong Kong, Iran, Jordan, Latvia, Lithuania, Malaysia, Mauritius, Morocco, Nigeria, Pakistan, Panama, Singapore, Slovenia, Taiwan, Trinidad and Tobago, Tunisia

| Singapore | Price stability | | | | | Exchange rate-based | policy framework | S\$NEER floating | within policy band | | Intervention operations | in the spot FX market | Monetary and Invest- | ment Policy Meeting (2) | | | Yes | | | | | Yes (Bi-annually) | | | | Yes | | Yes | |
|-------------|----------------------------|--------------------------|------------------------|-------------------------|-------------------------|--------------------------|----------------------------|------------------------------|---------------------------|------|--------------------------|-----------------------|-------------------------|-------------------------|---------|----------------|-----------------|-----------------|------|----------------|--------------|--------------------|----------------|------------------|---------------|------------------|---------|------------------|-------|
| Malaysia | Price stability while giv- | ing due regard to devel- | opments in the economy | | | | | | | | Overnight policy rate | | Monetary Policy Com- | mittee (6) | | | Yes | | | | | Yes (Q) | | | | Yes | | Yes | |
| Philippines | Price stability | | | | | Inflation targeting (Jan | 2002) | Inflation in range of | $3\%{\pm}1\%$ | | The overnight reverse | repurchase rate | Monetary Board (8) | | | | Yes | | | Yes | | Yes (Q) | | Yes | | Yes | | Yes | |
| Indonesia | Price stability | | | Exchange rate stability | and financial stability | Flexible inflation tar- | geting (July 2005) | Inflation at $3\%\pm1\%$ and | $2.5\%\pm1\%$ in 2023 and | 2024 | BI 7-day (reverse) repo | rate | Board of Governors (12) | | | | Yes | Yes | | | | Yes (Q, M) | | | | Yes | | Yes | |
| Thailand | Price stability | | | Sustainable growth and | financial stability | Flexible inflation tar- | geting (May 2000) | Headline inflation in | range of $1-3\%$ | | 1-day bilateral reporate | | Monetary Policy Com- | mittee (6) | | | Yes | Yes | | Yes | | Yes (Q) | | Yes | | Yes | | Yes | |
| Variable | Primary Objec- | tive(s) | | Other Objec- | tive(s) | Monetary Policy | $\operatorname{Framework}$ | Intermediate Tar- | get | | Main Policy In- | strument | Policy Board | (Meeting Fre- | quency) | Communications | - Press Release | - Press Confer- | ence | - Highlight of | MPC Meetings | - Inflation Report | Accountability | - Open Letter if | Missed Target | - Report to Par- | liament | De Jure Indepen- | dence |

Table 1: An Overview of Monetary Policy Frameworks in ASEAN-5

Source: Central banks' websites

| | F | Mean Absolute | | | | | |
|------------|----------|---------------|----------|----------|------------|-----------------|---------------|
| | N | Ionthly Dat | a | Year | ly Average | Deviations from | |
| | Total | Above | Below | Total | Above | Below | Target Center |
| Theiland | 37.37% | 6.05% | 31.32% | 30.43% | 4.35% | 26.09% | 1.11 |
| Thanand | (71.20%) | (12.00%) | (59.20%) | (60.00%) | (10.00%) | (50.00%) | (1.39) |
| Indonesia | 52.94% | 36.65% | 16.29% | 50.00% | 38.89% | 11.11% | 1.83 |
| muonesia | (45.60%) | (28.00%) | (17.60%) | (60.00%) | (40.00%) | (20.00%) | (1.25) |
| Dhilipping | 64.98% | 29.18% | 35.80% | 52.38% | 23.81% | 28.57% | 1.60 |
| 1 mappines | (58.40%) | (25.60%) | (32.80%) | (50.00%) | (20.00%) | (30.00%) | (1.39) |

Table 2: Inflation Performance Relative to Target

Note: While Thailand's inflation target is specified for core inflation until 2014, we show inflation performance based on headline inflation to enable cross-country comparison. The assessment periods are from the start of IT until May 2023. In parentheses, we report performance since 2013.

Source: Authors' calculations

| | (1) | (2) | (3) | (4) | (5) | |
|---------------------|----------------|----------------|----------------|----------------|------------------------|--|
| Dependent Variable: | Thailand | Indonesia | Philippines | Malaysia | Singapore | |
| Dependent variable. | Policy rate(%) | Policy rate(%) | Policy rate(%) | Policy rate(%) | $\%\Delta \text{NEER}$ | |
| Lagged dep. var. | 0.887*** | 0.763*** | 0.940*** | 0.894*** | 0.716*** | |
| | (0.0318) | (0.0316) | (0.0231) | (0.0355) | (0.0572) | |
| Inflation gap | 0.0779^{***} | 0.204^{***} | 0.0880^{***} | 0.00462 | | |
| | (0.0146) | (0.0270) | (0.0188) | (0.0117) | | |
| Output gap | 0.0253^{*} | 0.0743^{*} | 0.0682*** | 0.0528^{***} | 0.100^{**} | |
| | (0.0131) | (0.0445) | (0.0153) | (0.00782) | (0.0476) | |
| $\%\Delta$ in E/R | 0.000218 | -0.00158 | 0.00376 | -0.00453* | | |
| | (0.00496) | (0.00655) | (0.00640) | (0.00249) | | |
| Inflation | | | | | 0.267^{***} | |
| | | | | | (0.0678) | |
| Constant | 0.214^{***} | 1.263^{***} | 0.221^{*} | 0.300^{***} | -0.0799 | |
| | (0.0701) | (0.199) | (0.113) | (0.105) | (0.160) | |
| Observations | 91 | 70 | 84 | 75 | 113 | |
| R-squared | 0.934 | 0.963 | 0.962 | 0.920 | 0.720 | |

Table 3: Taylor Rule Estimation

Note: p < 0.01, p < 0.05, p < 0.1. Standard errors are shown in parentheses. This table shows the sensitivity of the policy rate on its own lag, deviations of inflation from target (%), output gaps (%) and annual percentage changes in bilateral exchange rates against the US dollar. For Singapore, nominal effective exchange rates are used as a policy stance variable.

| Inflation Level | Inflation Volatility | Growth Volatility | Fixed Effects Included |
|--------------------|---|--|--|
| -1.877* | -0.912 | -0.421 | |
| (0.952) | (0.555) | (0.399) | |
| -4.607*** | -2.197*** | -0.077 | Country by Stack, |
| (0.857) | (0.608) | (0.259) | Time by Stack |
| -2.679** | -0.666 | 0.236 | |
| (1.114) | (0.696) | (0.234) | |
| -3.483*** | -0.406 | 0.458 | Country, Time |
| (1.053) | (0.645) | (0.358) | |
| | Inflation Level -1.877^{*} (0.952) -4.607^{***} (0.857) -2.679^{**} (1.114) -3.483^{***} (1.053) | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | $\begin{array}{c cccc} Inflation & Inflation & Growth \\ Inflation & Volatility & Volatility \\ \hline -1.877^* & -0.912 & -0.421 \\ (0.952) & (0.555) & (0.399) \\ -4.607^{***} & -2.197^{***} & -0.077 \\ (0.857) & (0.608) & (0.259) \\ -2.679^{**} & -0.666 & 0.236 \\ (1.114) & (0.696) & (0.234) \\ -3.483^{***} & -0.406 & 0.458 \\ (1.053) & (0.645) & (0.358) \\ \end{array}$ |

 Table 4: Effects of Inflation Targeting Adoption on Macroeconomic Outcomes

Note: p < 0.01, p < 0.05, p < 0.1. Standard errors are shown in parentheses. The sample includes 52 developing countries, 30 of which are inflation targeters. Sample periods are from 1980–2022. Inflation and growth volatility is measured by five-year rolling standard deviations. Row (1) show the results from a cross-sectional regression as in Ball and Sheridan (2004). The dependent variable is the difference between averages of the macroeconomic outcomes during the pre-IT and post-IT periods. For non-inflation targeters, we use the year 2002 as a cutoff period. The results in Row (2) are based on stacked DiD regressions introduced in Cengiz et al. (2019), where we estimate static treatment effects. Row (3) shows weighted-average estimates of treatment effects across adoption groups and time, based on Callaway and Sant'Anna (2021)'s method, where robust standard errors are reported. We also use countries that are not yet treated as controls. Row (4) presents the results of event-study estimates of Sun and Abraham (2021), where we report a Wald test on average of dynamic treatment effects. For (2) and (4), standard errors are clustered at the country level. For all regressions, we exclude observations featuring a hyperinflation episode (i.e., annual inflation exceeding 50 percent). In addition, a country in the sample must have sufficient observations during pre-IT periods (i.e., more than nine years). Sources: IMF WEO and the authors' calculation

| | S.D. | of Daily F | leturn | S.D. | of 20-day I | Return | S.D. of 250-day Return | | | | |
|-----|---------|------------|-----------|---------|-------------|-----------|------------------------|---------|-----------|--|--|
| | Pre-AFC | IT-2010 | 2011-2023 | Pre-AFC | IT-2010 | 2011-2023 | Pre-AFC | IT-2010 | 2011-2023 | | |
| THB | 0.21 | 0.30 | 0.35 | 0.53 | 1.66 | 1.84 | 1.61 | 7.21 | 5.82 | | |
| IDR | 0.13 | 0.62 | 0.39 | 0.47 | 3.42 | 2.34 | 0.76 | 11.04 | 7.29 | | |
| MYR | 0.23 | 0.38 | 0.40 | 1.26 | 1.69 | 2.13 | 3.14 | 6.30 | 7.91 | | |
| PHP | 0.35 | 0.39 | 0.32 | 1.43 | 1.80 | 1.46 | 6.11 | 7.45 | 5.35 | | |
| SGD | 0.21 | 0.31 | 0.33 | 0.84 | 1.47 | 1.45 | 3.67 | 4.60 | 4.54 | | |
| JPY | 0.70 | 0.68 | 0.58 | 3.29 | 2.84 | 2.59 | 13.11 | 8.64 | 11.06 | | |
| KRW | 0.20 | 0.75 | 0.54 | 0.95 | 3.39 | 2.31 | 5.41 | 14.30 | 6.77 | | |
| AUD | 0.50 | 0.92 | 0.69 | 1.89 | 4.10 | 2.89 | 4.54 | 14.61 | 9.76 | | |
| GBP | 0.57 | 0.66 | 0.58 | 2.15 | 2.91 | 2.44 | 4.37 | 11.36 | 8.16 | | |

Table 5: Volatility of Exchange Rates of ASEAN-5 and Selected Advanced Countries' Currency against the US Dollar

Note: Volatility is measured by the standard deviation of exchange rate returns. Pre-AFC periods are from 1993 to May 1997. IT = IT starting periods for Thailand, Philippines, and Indonesia, August 2005 for Malaysia, and 2000 for the rest. The latest data is June 2023. JPY = Japanese yen, KRW = Korean won, AUD = Australian dollar, GBP = British pound Sources: Reuters and the authors' calculation



Figure 1: Inflation and Growth of ASEAN-5

Note: The arrowhead represents the periods from a year of IT adoption to 2023Q2. For Malaysia and Singapore, the starting periods are 2005Q1 and 2000Q1 respectively. Meanwhile, a circle at the end of an arrow represents the periods from 1983Q1 for real GDP growth and 1981Q1 for headline inflation to a year before IT adoption. The mean and standard deviations are calculated from year-over-year quarterly data.

Source: (a) CEIC, FRED, IMF (b) Oxford Economics



Figure 2: Actual Inflation, Expected Inflation and Inflation Target

(a) Thailand

(b) Indonesia

Note: For point targets with tolerance bands, we show the target midpoint in green and the tolerance bands in red, while for range targeting, the target ranges are shown in red. Starting in 2000, Bank Indonesia announced an inflation target; however, a full-fledged inflation targeting framework was not adopted until July 2005 onward.

Sources: CEIC, Consensus Economics and central bank websites



Figure 3: Evaluating Inflation Dynamics



Note:(a) The data show inflation persistence based on the sum of all AR(4)-model coefficients for the pre-IT and post-IT periods. Sample periods are from 1983Q1 to 2023Q2. Colored bars show 95-percent confidence intervals from the Wald test. (b) The figure shows the sensitivity of one-year-ahead and five-year-ahead Consensus inflation expectations to actual inflation during IT-adoption periods. Coloured bars represent 95-percent confidence intervals. (c) The results from a local projection showing the impact of a one-percentage-point change in world oil prices on domestic headline and core inflation (%QoQsa) over eight quarters. The dashed lines indicate 95-percent confidence bands. The sample starts from the year that IT was adopted.





Note: The output gap is calculated as deviations of real GDP from its trend based on a one-sided Hodrick–Prescott filter.

Source: Oxford Economics and authors' calculation



Figure 5: Financial Stability Indicators

Note: NPL is expressed as a ratio to gross loans. Sources: (a) BIS, CEIC, World Bank (b) CEIC, FRED, Monetary Authority of Singapore





(c) Exchange Rate Pass-Through to Headline Inflation



(b) ASEAN-5 Exchange Rates against the



Note: (a) The sum of direct, portfolio and other investments. We do not include capital flows to Singapore since their size far exceeds the flows to other countries. (c) The regression of consumer price inflation (%QoQsa) on percentage changes in bilateral exchange rates against the US dollar, their four lags and controls. We report the sum of all coefficients on exchange rates, where 95percent confidence intervals are from the Wald tests. (d) The results are from a two-country Bayesian structural VAR model, where the US represents a foreign country. Shocks, including demand, supply, monetary policy and exchange rate shocks, are identified using zero and sign restrictions. Blue bars show the negative impact of exchange rate shocks on real GDP growth volatility, whereas grey bars show the benefits of exchange rate flexibility, as measured by a reduction in growth volatility due to the exchange rate responding to fundamental shocks. Sources: (a) IMF BOP/IIP Statistics (b) Reuters (c),(d) authors' calculation



Figure 7: Sector-Specific Financial Stability Risks and Macroprudential Regulations

(b) House Price Growth



(c) Number of Macroprudential Policy Actions by Instrument Types

(d) Number of Macroprudential Policy Actions over Time



Note: (c) The figure shows the number of macroprudential policy actions implemented by ASEAN-5 from 2000–2021. Macroprudential policy is classified into 16 groups. CCB = countercyclical capital buffer; Conservation = capital conservation buffer; Capital = capital requirements; LVR = limit on bank leverage; LLP = loan loss provision requirements; LCG = limit on credit growth; LoanR = loan restrictions conditioned on loan or lender characteristics; LTV = limit to loan-to-value ratios; DSTI = limit to the debt-service-to-income ratio; Liquidity = measures to mitigate liquidity and funding risks; LTD = limit to the loan-to-deposit ratio; LFX = limit on net or gross open FX positions; RR = reserve requirements; SIFI = measures to mitigate risks from systemically important financial institutions; OT = others such as stress testing, restrictions on profit distribution. (d) The figure shows the accumulated number of actions (excluding RR) over time, where a tightening action = +1 and a loosening action = -1.

Sources: (a),(b) CEIC and BIS (c),(d) Integrated Macroprudential Policy Database