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Working Paper (WP/24-11)

Monitoring Non-Resident Portfolio Flows in ASEAN+3: Analytical Framework and Database

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October 2024

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Monitoring Non-Resident Portfolio Flows in ASEAN+3: Analytical Framework and Database

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October 2024

Abstract

Volatile capital flows pose perpetual challenges for surveillance, policymaking, and investing, notably in ASEAN+3 emerging market economies. Hence, the ability to monitor these flows on a timely basis and assess the vulnerability of equity and debt markets to sell-offs by non-resident (NR) investors are crucial. The objective of this paper is twofold: First, we construct a timely, high-frequency database of NR portfolio flows for ASEAN+3 economies by identifying and transparently stitching together relevant official series. And then, we use the data to develop a framework for assessing risks of sudden outflows. Our analysis reveals that ASEAN+3 markets with larger NR investor positions tend to be more sensitive to changes in global asset prices and yields, and there is evidence that positioning affects the size of NR portfolio outflows during episodes of market stress. However, this work is preliminary, and further and more rigorous research are necessary to develop a more comprehensive framework for analyzing short-term capital flows.

JEL classification: C32, C33, F21, G11

Keywords: balance of payments, capital flows, debt securities, equities, high-frequency, international investment position, non-resident portfolio flows, positioning

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[2] The authors would like to thank colleagues at the Bangko Sentral ng Pilipinas for useful comments. All remaining mistakes are the responsibility of the authors.

Abbreviations

AE	advanced economy
ASEAN	Association of South-East Asian Nations
ASEAN+3	ASEAN plus China (including Hong Kong), Japan, Korea
BoP	balance of payments
EME	emerging market economy
IIF	Institute of International Finance
IIP	international investment position
IMF	International Monetary Fund
NR	non-resident
OECD	Organisation for Economic Co-operation and Development

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"When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done"

~ John Maynard Keynes
The General Theory of Employment, Interest, and Money, 1936

I. Introduction

Capital flows have been both boon and bane for the ASEAN+3 region. Capital inflows help to deepen and broaden financial markets and fund economic activity. However, capital flows into many emerging market economies (EMEs) in the region can be large compared to the size and depth of their domestic economies and financial systems. The result is a build-up in imbalances that threaten financial stability, potentially triggering capital reversals, with attendant implications for economic growth (Claessens and Ghosh 2013; IMF 2019; Oeking and Gabriella 2022). In 1997, the "overheating" economies in the Asian region experienced sharp withdrawals of portfolio investment and bank loans, which precipitated the Asian financial crisis and left a trail of economic devastation in its wake. Although the impact was much less severe during the global financial crisis, several of the region's economies—particularly the ASEAN EMEs and Korea—also saw significant drawdown in portfolio investments by non-residents (NRs) during this period (Figure 1).

The observed volatility of ASEAN+3 portfolio flows around market events underscores the capricious nature of short-term NR investment.[3] The evidence suggests that increased NR participation in EME financial assets also exposes local markets to contagion and spillover risks from elsewhere, exacerbating capital flow volatility (Lee, Park, and Byun 2012). In this context, NR investor holdings of ASEAN+3 EME debt securities has increased markedly relative to foreign exchange reserves since the global financial crisis (NR investment in equities have remained relatively stable) (Figure 2). Coupled investors' tendency for "herd behavior" in some Asian markets during "down" or crises periods (Persaud 2000; Kallberg, Liu, and Pasquariello 2005; Bui, Nguyen, and Nguyen 2015; Ju 2020; Vidya, Ravichandran, Deorukhkar 2023), any shock would likely result in intensified outflows. Less discussed but increasingly important is that EMEs have growing influence in financial markets, leading to further realignment in global investment flows (Tombini 2024).

Hence, the ability to more accurately anticipate sharp capital outflows as well as detect the vulnerability of markets to sell-offs and retrenchments by NR investors are crucial for surveillance and policymaking purposes. For Regional Financing Arrangements, it could provide early warning of when liquidity support facilities might be called upon; for central banks and financial supervisors, it may mean strategizing on when, which, and how capital flow management or macroprudential policy measures could preemptively be implemented (AMRO 2022). At the macro level, high-frequency information on NR portfolio flows and market positioning trends and metrics by NR investors are important indicators.[4] Analyses of market positioning is typically undertaken by asset managers (albeit sometimes at a micro level) on the basis that, *ceteris paribus*, uncrowded trades tend to be more profitable than

[3] Pagliari and Hannan (2017) provides a detailed analysis of the evolution of volatility for different types of EMDE capital flows and their push and pull determinants.

[4] In the context of this working paper, we define market positioning as the share of non-resident investor holdings of domestic local currency denominated securities.

crowded ones (Hirsch 2012; Constable 2019; Kullberg and Shi 2019; Manley 2023), and hence, NR investors should shift their holdings from the latter to the former.

However, the availability and consistency of NR portfolio investment flow and stock data across ASEAN+3 economies and their frequencies pose important challenges for any analysis. In this region, high-frequency statistics on NR investments are typically published by different agencies across economies or even within each economy. The sources comprise central banks, finance ministries, financial regulators, securities exchanges and/or, in some cases, the information for the same market and asset class may be released by more than one agency. Another complication is that these series may differ in definition, thus adding to the difficulty in obtaining comparable information.

Financial account information on NR portfolio stocks and flows for individual economies are published by national authorities but constraints exist. These data series typically adhere to the Sixth Edition of the IMF's Balance of Payments and International Investment Position Manual (BPM6) (IMF 2013). Portfolio investment liabilities in the balance of payments (BoP) represent the net inflow of NR investments into equity and debt markets, while the international investment position (IIP) portfolio investment liabilities represent the corresponding stock values, adjusted for valuation effects. Although standardized, this information is not ideal for monitoring NR flows and positioning in local currency assets, for the following reasons:

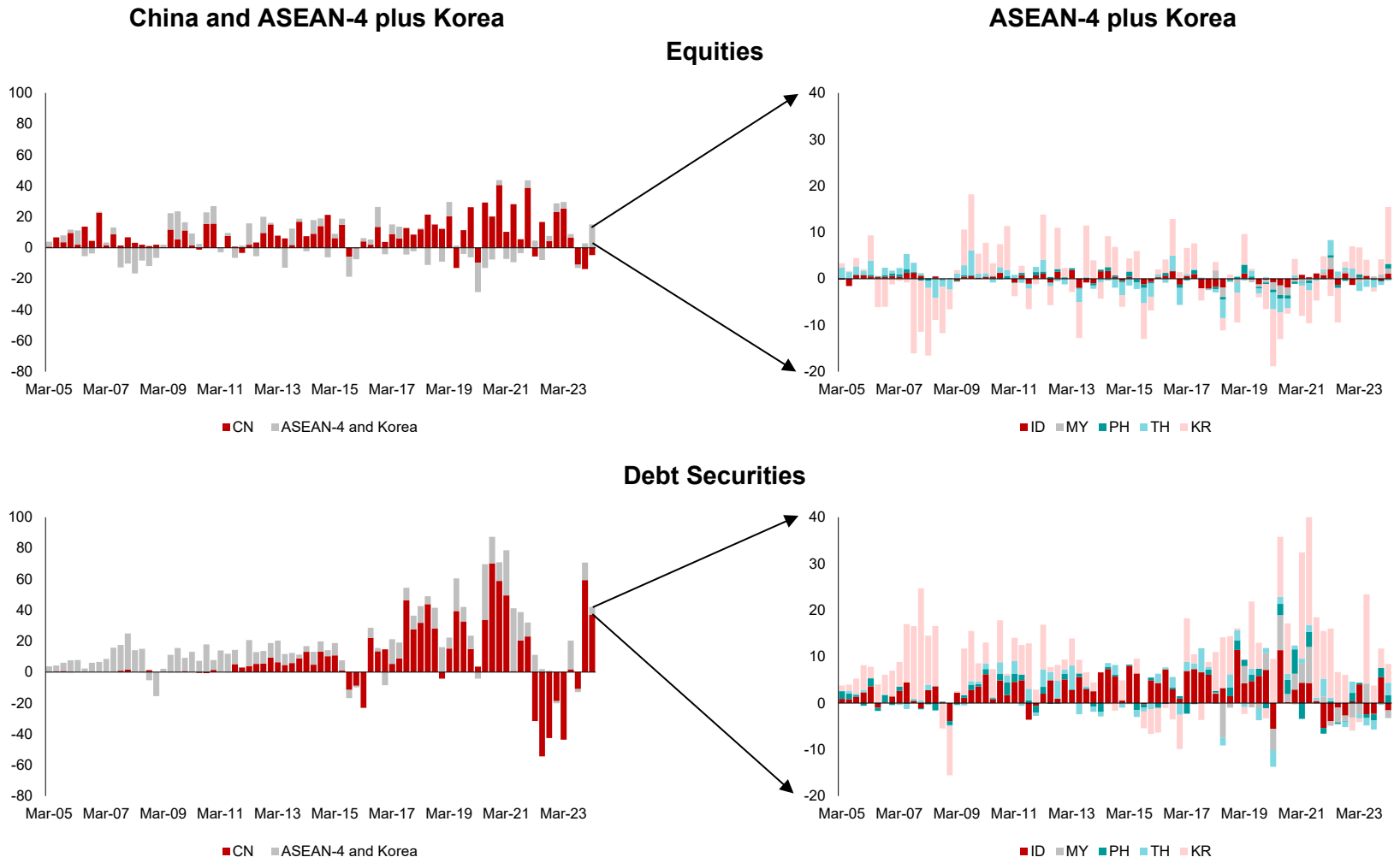
- Where available, the data are typically released on a quarterly basis, with a lag of between one to two quarters, and hence lack the requisite timeliness necessary for close monitoring of capital flows.

- The quarterly frequency of the data complicates the reconciliation of valuation effects with concurrent changes to both asset values and exchange rates.

- BoP and IIP data cover a broader range of information, which may include securities traded outside organized or other financial markets, as well as securities denominated in non-local currencies issued by domestic issuers.[5] The inclusion of non-local currency securities—which form a much smaller share of ASEAN+3 financial markets—could still distort the estimated impact of NR investments in equity and bond markets, given that they may not truly reflect NR investor sentiment toward domestic assets (including exchange rate risk).

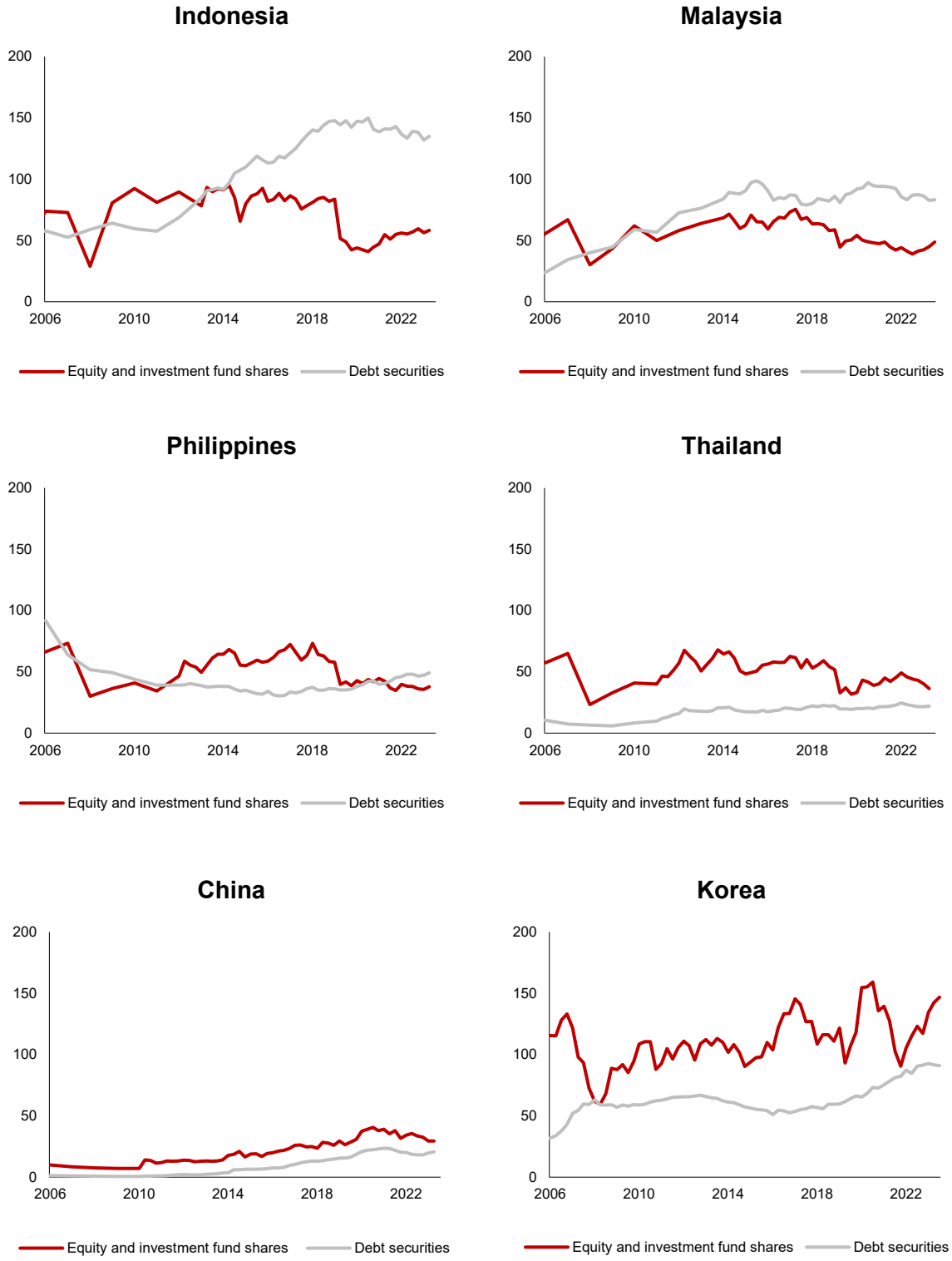
[5] IMF (2013) defines portfolio investment as crossborder transactions and positions involving debt or equity securities, other than those included in direct investment or reserve assets. It covers, but is not limited to, securities traded on organized or other financial markets. Securities are debt and equity instruments that have the characteristic feature of negotiability, that is, their legal ownership is readily capable of being transferred from one unit to another unit by delivery or endorsement. Securities are designed to be traded, usually on organized exchanges or “over the counter.”

Figure 1. Selected ASEAN+3: Non-Resident Net Portfolio Investment Flows
(Billions of US dollars)



Sources: National authorities via Haver Analytics; and authors' calculations.
Note: Malaysia's portfolio debt flows are only included from 2018Q1 onwards because of data unavailability. CN = China; ID = Indonesia; KR = Korea; MY = Malaysia; PH = the Philippines; TH = Thailand.

Figure 2. Selected ASEAN+3: International Investment Position, Portfolio Investment Liabilities
(Percent of official reserve assets)



Sources: National authorities via Haver Analytics; and authors' calculations.
Note: Series are extended backwards using annual data when quarterly data are unavailable.

The objective of this paper is twofold. It aims to: (1) outline the construction of a timely, high-frequency database of NR portfolio flows for ASEAN+3 economies; and (2) use that data to develop an analytical framework for assessing risks of sudden outflows. This project is motivated by the following considerations:

- ***Transparency in the construction of existing high-frequency capital flow data.*** The Institute of International Finance (IIF) and Organisation for Economic Co-operation and Development (OECD) are two oft-cited sources of high-frequency capital flow data, which are based on official BoP information reported by national authorities and other higher frequency data from various agencies. But, the proprietary methodology used by the former to estimate daily frequencies for selected series is opaque, while the monthly data published by the latter lack granularity and/or timeliness.

- ***Need for an analytical framework for monitoring NR portfolio flows.*** It is important to be able to identify risks of sudden and sharp capital withdrawals from a particular economy, to inform pre-emptive policy action. In this context, NR investor positioning in equity and debt markets—defined as the shares of NR holdings in these assets relative to their respective outstanding amounts—could provide early indications of build-ups in NR capital inflows that could be quickly reversed.

This paper lists the data series that are stitched together to enable timely monitoring of NR portfolio flows in selected ASEAN+3 economies, which are then used to develop an analytical framework for assessing outflow risks. Unfortunately, not all economies report daily portfolio flow data—daily equity flows are published for Indonesia, Korea, Malaysia, the Philippines, Thailand and Vietnam, while daily debt flows are available for Indonesia, Korea and Thailand. Monthly data are reported for other economy-asset pairs. We also detail the data series and methodology used to estimate NR investor positioning in these assets. Our analysis reveals that ASEAN+3 markets with larger NR investor positions tend to be more sensitive to changes in global asset prices and yields and has some effect on the size of NR portfolio outflows during episodes of market stress. However, this work is preliminary and further and more rigorous research are necessary to develop a more comprehensive framework for analyzing short-term capital flows.

The rest of the paper is structured as follows: Section II describes our data sources and how daily NR portfolio flows for individual ASEAN+3 markets and the corresponding NR investment positions are estimated. Comparisons with existing capital flow databases are also presented. Section III provides a preliminary framework for monitoring ASEAN+3 portfolio flows. Section IV concludes.

II. Data Sources and Estimations

Original data for compiling NR portfolio flows into domestic asset markets as well as the corresponding stock values differ across ASEAN+3 economies and by asset class. The sources of such data also vary widely or there may be overlaps among reporting authorities (Appendix I). Main data considerations are broadly classified as follows:

- ***Stock versus flow.*** The data are reported in the form of either stock of NR investment or the related flow (change in the stock) in NR investment, based on actual amounts of NR transactions that have entered or left a particular market. In the absence of valuation changes, the flow should be equal to the change in stock. However, valuation changes play a significant role, as suggested by observed divergences in the data for equity and debt security flows relative to the changes in corresponding NR stock holdings—more so for equities than debt securities (Figures 3 and 4).[6] In markets where either stock or flow data are not available, certain assumptions may be necessary in estimating the missing data points.

- ***Frequency.*** The data may be published on a daily, weekly, monthly, or quarterly basis. Higher frequency of data releases are more timely and afford greater flexibility (for conversion into other frequencies), granularity (in observing trends around specific dates), and accuracy of estimations (such as adjustments for valuation effects). However, many NR portfolio investment data series published by national authorities are available only at monthly or quarterly frequencies.

- ***Scope.*** Ideally, coverage should be restricted to local currency-denominated equities and bonds traded in domestic markets in order to study the impact of NR investors on domestic markets. Investments in domestic currency tradable financial securities are more susceptible to sudden stops and reversals in portfolio flows and hence are well-suited for analyzing the effects of "hot money" flows.

How we estimate NR portfolio flows and investor positioning is dependent on available data. Naturally, high-frequency data on equity and debt security transactions (flows) by NRs are preferred, while NR holdings of security (stock data) where available are useful for estimating investor positioning. Quarterly BoP and IIP data, which are largely available for our sample economies serve as useful benchmarks for the flow and stock data respectively. In this regard, many ASEAN+3 stock exchanges publish net daily, weekly, or monthly equity transaction amounts by NR investors. Similar data are also available for several of the region's bond markets. The advantage of daily net transaction information is that it reflects the net flows from NR investors and any distortion by asset valuation effects is minimal. BoP data, upon publication, can be used to verify the flow statistics. Our estimates are found to closely track those of the IIF and OECD, but all three show some divergence from the corresponding BoP series in some instances (Box 1).

For monitoring purposes, high-frequency flow data alone are insufficient for estimating the positions taken by NR investors in a particular asset market. Over time, changes in the NR holdings in an asset may be quite different from those implied by corresponding flows into or

[6] Most debt security data are reported in notional terms, which may be different from their actual market values. Therefore, actual portfolio flows may diverge from reported flows. Hence, it is practically impossible to estimate the actual magnitude of flows. In this regard, the reported data may more usefully be applied to estimate the direction of high-frequency flows and positioning by non-resident investors.

out of that asset because original purchases may increase or decrease significantly in value when asset prices change. Nonetheless, flow data are crucial inputs for estimating NR investor positioning in markets, where available:

- ***Portfolio equity flows.*** Some ASEAN+3 markets publish stock data on NR holdings of domestic equities on a monthly basis—which we use as the starting point for estimating high frequency NR holdings of domestic equities in the current period. If stock data are unavailable, we use quarterly IIP data instead. The lagged IIP series are "bootstrapped" using high-frequency and more timely flow data. Specifically, the reported (from NR holding or IIP statistics) or estimated (otherwise) stock amount for the previous period is adjusted for valuation changes, as follows:

  (1) *Estimated stock (t) = Actual or estimated stock (t*–1*) * (*1 + *Change in benchmark equity index between t*–1 *and t) + Flow (t)*,

  where,
  Actual stock (t) is the latest end-of-period data point available on NR holdings of domestic equities or IIP statistics; and
  Estimated stock (t) is the bootstrapped data point for *t* based on *Actual or Estimated Stock (t*–1*)* and *Flow (t)*.

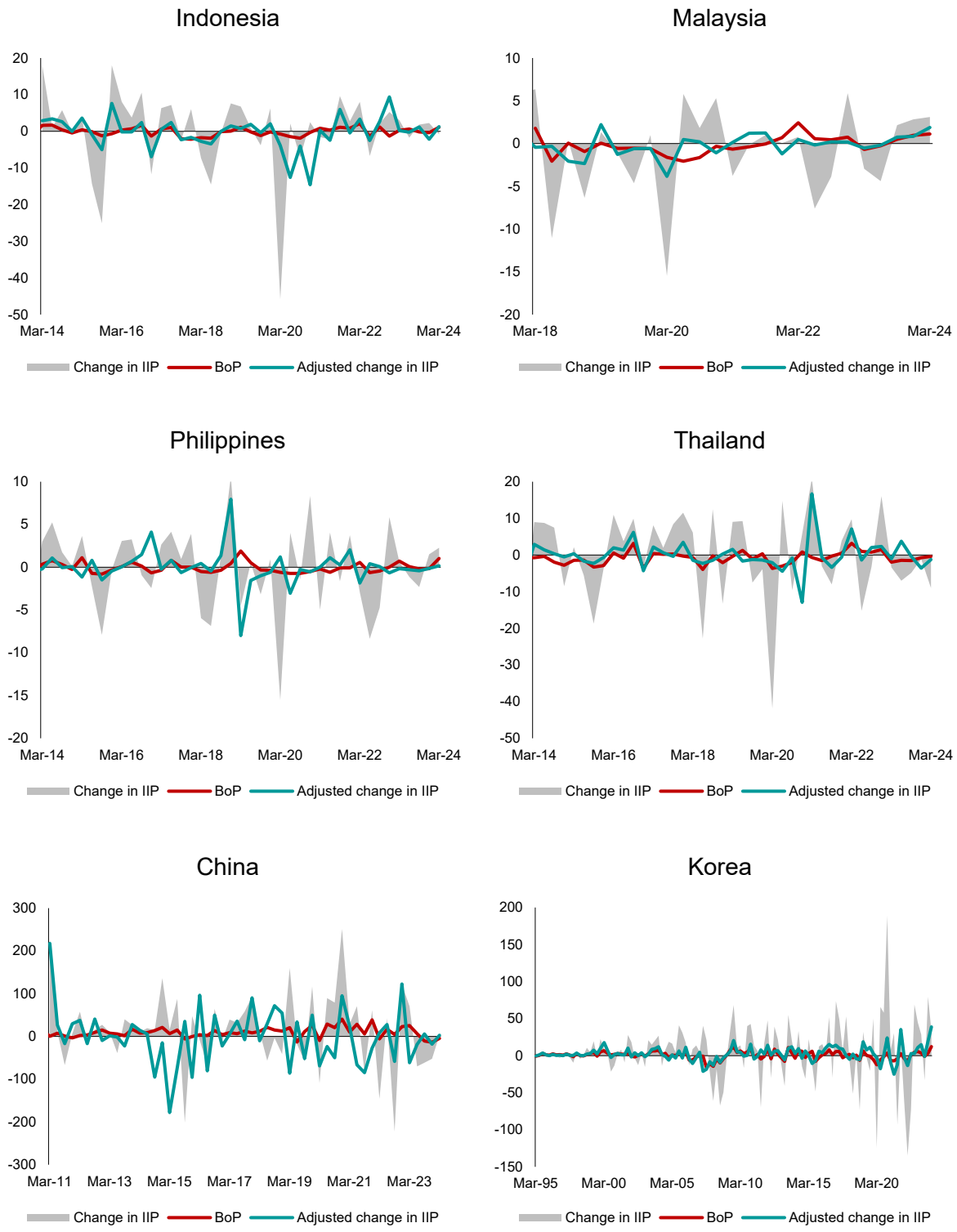
  The latest positioning by NR investors is then estimated by extrapolating the stock as a percentage of domestic market capitalization, such that:

  (2) *Positioning (t) = Estimated stock (t) / Stock market capitalization (t)*

- ***Portfolio debt flows.*** Many markets in the region report either the NR holdings of outstanding debt security amounts or the net purchase amounts on a daily basis. As both these data are published at face value for most ASEAN+3 markets, reconciliation between daily and monthly data is more straightforward, except for the change in NR holdings due to redemptions. In other words, the daily net purchase amounts does not include redemption related flows. The data, which are reported at face value, also remove the requirement of valuation adjustments for estimation purposes. Data at face value are useful for studying the effect of NR investors on bond markets but may not be ideal for estimating the dollar amount of flows, given that they neglect coupon payments and valuation effects.

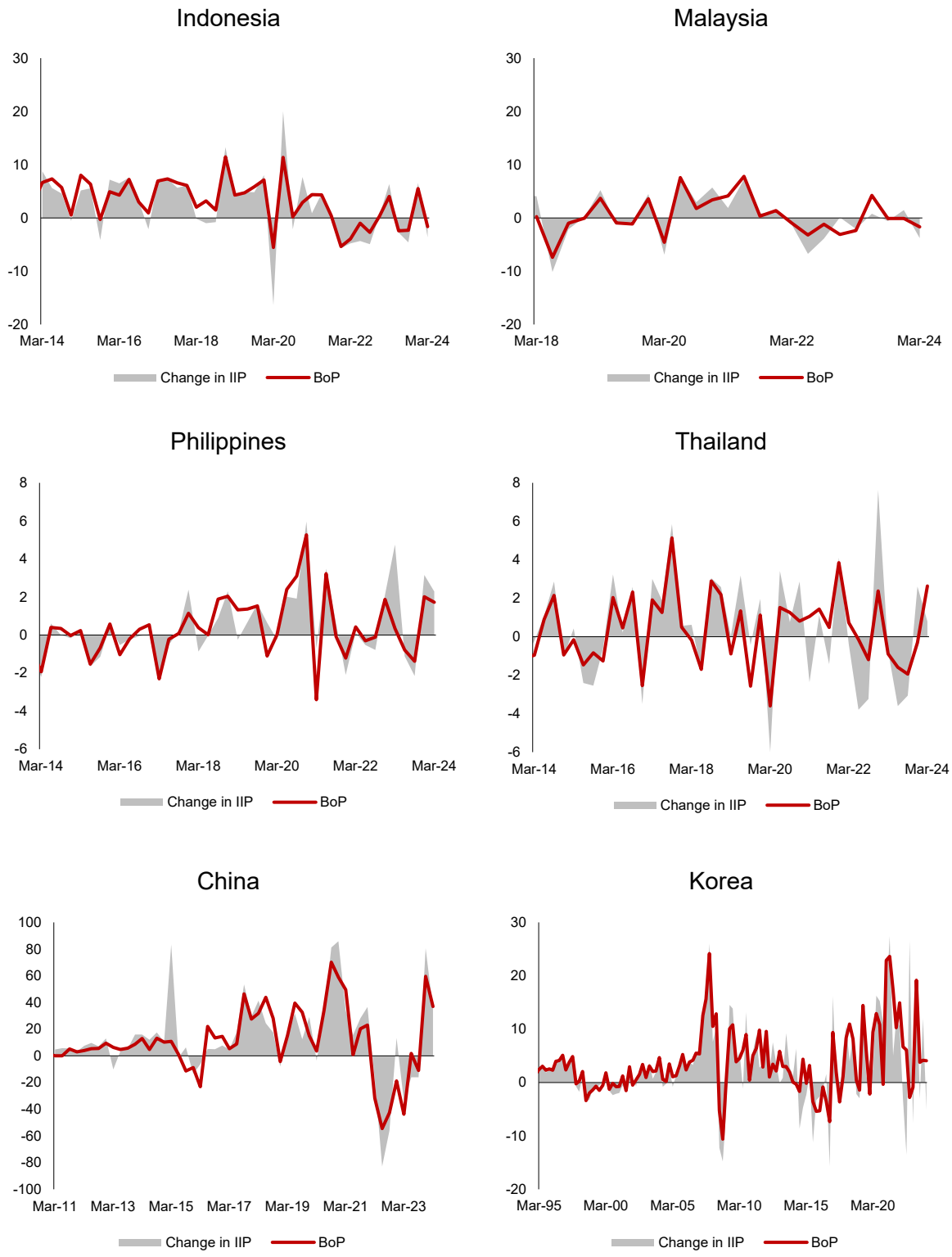
Backtests indicate that NR investor positioning projected using equations (1) and (2) is usually not too different from that estimated using eventually-published stock or IIP data. Estimation errors are typically higher for equities, which have much larger price variances (risks) than debt securities, on average (Figures 5 and 6), because there is more certainty about the income flows of the latter. For debt security flows, estimation errors occur when only the high frequency net purchase data—which exclude redemption-related flows—are available; otherwise, the lower frequency stock data on holdings of debt securities capture the effect of redemptions.

Figure 3. Selected ASEAN+3: Portfolio Investment Flows versus Changes in IIP—Portfolio Investment Liabilities, Equities and Investment Fund Shares
(Billions of US dollars)



Sources: National authorities via Haver Analytics; and authors' estimates.
Note: Adjusted change in IIP accounts for valuation effects due to changes in equity prices (proxied by benchmark equity index) and exchange rate against the US dollar.

Figure 4. Selected ASEAN+3: Portfolio Investment Flows versus Changes in IIP—Portfolio Investment Liabilities, Debt Securities
(Billions of US dollars)



Sources: National authorities via Haver Analytics; and authors' calculations.

Box 1. Deconstructing Non-Resident Portfolio Flow Databases

Information on NR portfolio flows and holdings may be found in the BoP and IIP, respectively, for most economies. However, such information is typically published on a quarterly basis and hence lack the timeliness necessary for high frequency monitoring. In the ASEAN+3 region, only Japan, Korea, and the Philippines publish monthly BoP data. Our database, together with those by the IIF and OECD, offer higher frequency data compiled from other official sources. However, a comparison across the three databases points to differences in compilation:

- The IIF publishes daily and monthly NR portfolio flow series (depending on the economy). It tracks EME portfolio flows using official data sources (Koepke and Farnham 2015). Daily data are usually obtained from stock exchanges and central banks, where available, and aggregated using a bottom-up model approach to calculate monthly series. The IIF then applies the latest reported quarterly BoP datapoint to calibrate previously estimated monthly datapoints (IIF 2018).

- The OECD publishes monthly NR portfolio flow data series that are also collected from official sources. The OECD database covers both AEs and EMEs (de Crescenzio and Lepers 2021). However, its database is only updated on a quarterly schedule, such that two or three datapoints may be released at the same time.

- Our database provides daily and, where unavailable, monthly portfolio flows, also obtained from official sources. In contrast to the IIF and OECD, we focus specifically on ASEAN+3, covering more economies in this region than the other two, and we offer transparency in detailing each underlying data series and how they are transformed and stitched together (Appendix I).

Encouragingly, our constructed NR portfolio flow database is highly comparable with those by the IIF and OECD. Using the BoP as a benchmark, we calculate correlations between the **estimated** portfolio flows of individual ASEAN+3 economies with their corresponding BoP series, for each database (Box Table 1):

- Our monthly flow series is similar with the IIF's monthly series vis-à-vis the BoP. The exceptions are China and the Philippines, where the latter's monthly model-estimated series are more closely correlated with the BoP because of the recalibrations after the fact, following publication of actual BoP readings. The perfect correlations observed between the OECD's series for Japan, Korea, and the Philippines and the corresponding BoP series are attributable to the OECD's use of actual monthly BoP NR portfolio equity and debt flows for these economies.

- Our daily series aggregated to quarterly frequency track BoP data similarly to the IIF ones. For example, our aggregated daily equity flows for Indonesia and Korea have correlations of 0.72 and 0.96 with the BoP, respectively, over the 2014–24 period, compared to 0.75 and 0.96 for the IIF data.

- Our daily series aggregated to quarterly frequency is also comparable to the IIF's and OECD's monthly series when both are also aggregated to quarterly frequency, for the same economies.[1/] For instance, our aggregated equity flow series for Malaysia has a correlation of 0.93 with the BoP, similar to the correlation attained by the IIF's aggregated series. Our aggregated debt flow series for Korea has a 0.93 correlation with the BoP data, just a touch lower than the aggregated IIF and OECD series.

Aside from the different methodologies used in this paper and by the IIF and OECD, the make-up of the underlying data used also plays a big part in their observed deviations from the actual BoP series. For example, large deviations between our aggregated equity flows and the BoP occur in some periods, while discrepancies between our aggregated debt flows and their corresponding BoP flows are more frequent and larger (Box Figure 1). The differences may be explained by the following:

- Transactions on domestic stock exchanges, such as equity investments or withdrawals by NR direct investors who own at least 10 percent of voting power in domestic enterprises are classified under direct investments in the BoP. They are hence excluded from NR portfolio investments under the IMF's BPM6 guidelines (IMF 2013). As a result, our high-frequency equity flow series may be markedly different from BoP flows at particular points in time where large-scale direct investments occur. BoP data also capture private equity and venture capital transactions that are not included in stock exchange information.

- Official high-frequency debt flow statistics do not incorporate all debt components covered in the BoP. For example, high-frequency debt flows for Indonesia and Korea only capture local-currency denominated government securities and listed bonds, respectively. In contrast, debt securities covered in the BoP

statistics include bills, bonds, commercial paper, and other debt instruments that are denominated in both local and foreign currencies.

Box Table 1. Selected ASEAN+3: Correlation of Portfolio Flow Databases with Corresponding BoP Flows

Equity

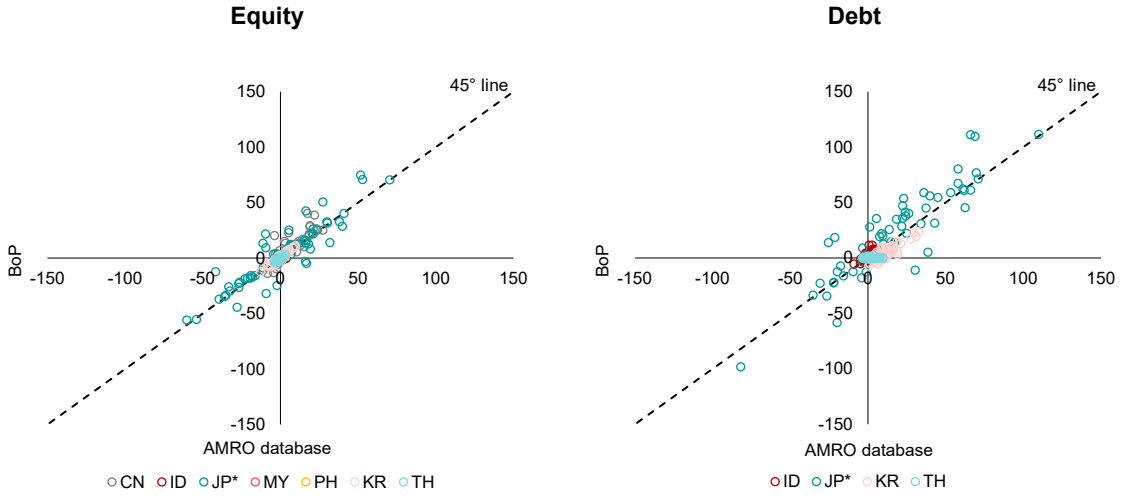
	CN	ID	JP*	KR	MY	PH	TH	VN
AMRO (daily/weekly*)	0.83	0.72	0.98	0.96	0.93	0.68	0.85	0.68
AMRO (monthly)	0.71	0.72	0.98	0.96	0.94	0.68	0.85	0.72
IIF (daily)		0.75		0.96		0.69	0.85	0.70
IIF (monthly)	0.92	0.75		0.97	0.93	0.90	0.85	0.70
OECD (monthly)	0.78		1.00	1.00		1.00		

Debt

	CN	ID	JP*	KR	MY	PH	TH	VN
AMRO (daily/weekly*)		0.73	0.86	0.93			0.14	0.33
AMRO (monthly)	0.88	0.73	0.86	0.93	0.79	0.27	0.21	0.34
IIF (daily)		0.76					0.11	
IIF (monthly)	0.94	0.76		1.00	0.79	1.00	0.11	
OECD (monthly)	0.95	0.73	1.00	1.00	0.79	1.00	0.58	

Sources: National authorities via Haver Analytics; , CEIC; , and Bloomberg Finance L.P.; and authors' estimates.
Note: Correlation is computed between Q1 2014 and Q4 2023 for all series except China's (from Q1 2015), Malaysia's (from Q1 2018), and Vietnam's (from Q3 2016) because of data unavailability. China stopped publishing its daily NR equity flow data from August 2024. Highest frequency for Japan is weekly. BoP data for Vietnam includes both equity and debt flows. CN = China; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = the Philippines; TH = Thailand; VN = Vietnam.

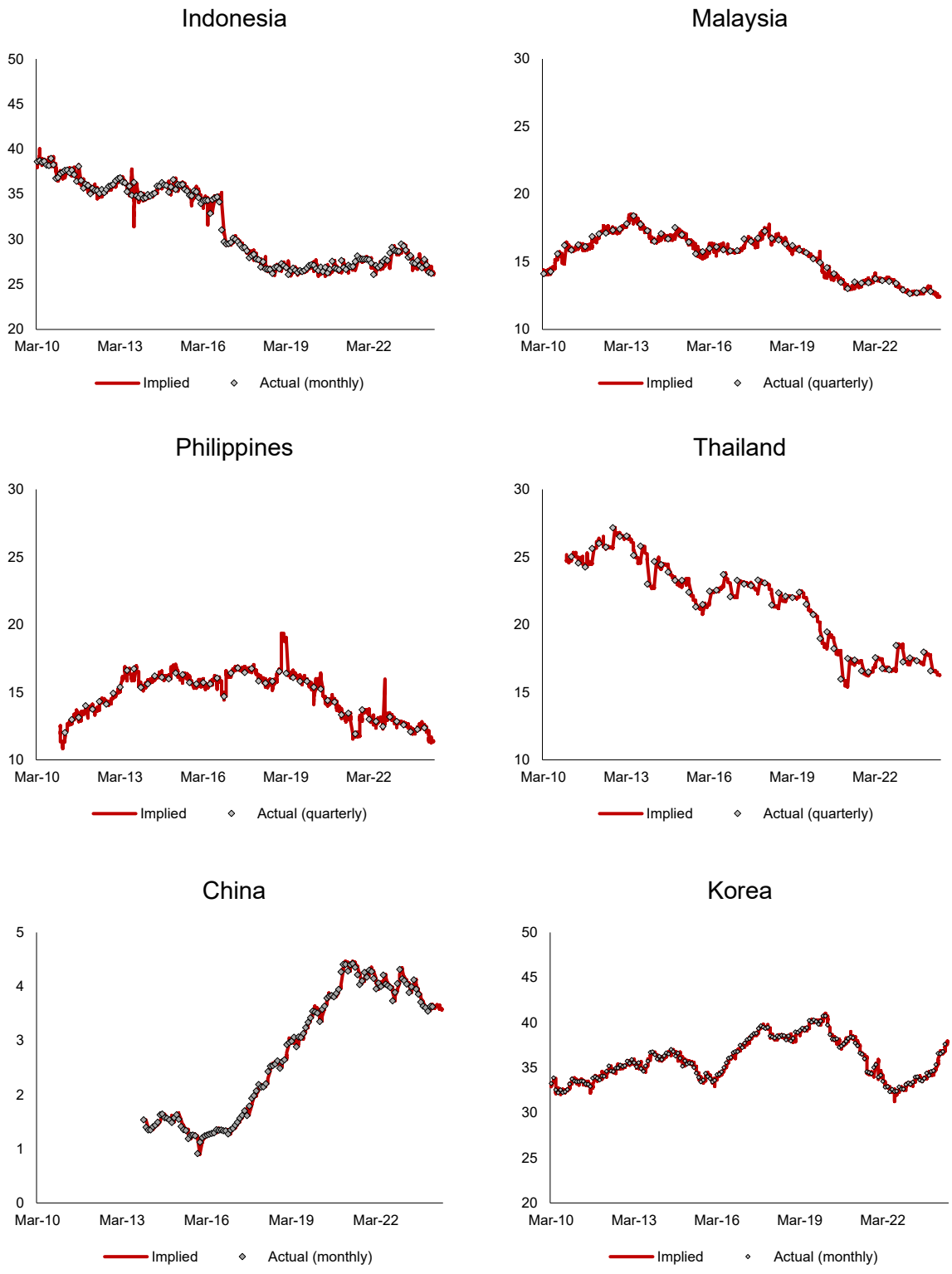
Box Figure 1. Comparison of Authors' High-Frequency Aggregated Flows with BoP Flows
(Billions of US dollars)



Sources: National authorities via Haver Analytics; CEIC; Bloomberg Finance L.P.; and authors' estimates.
Note: Daily flows data are aggregated to quarterly frequency for all economies except Japan, which is aggregated from weekly flows data.
CN = China; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = the Philippines; TH = Thailand.

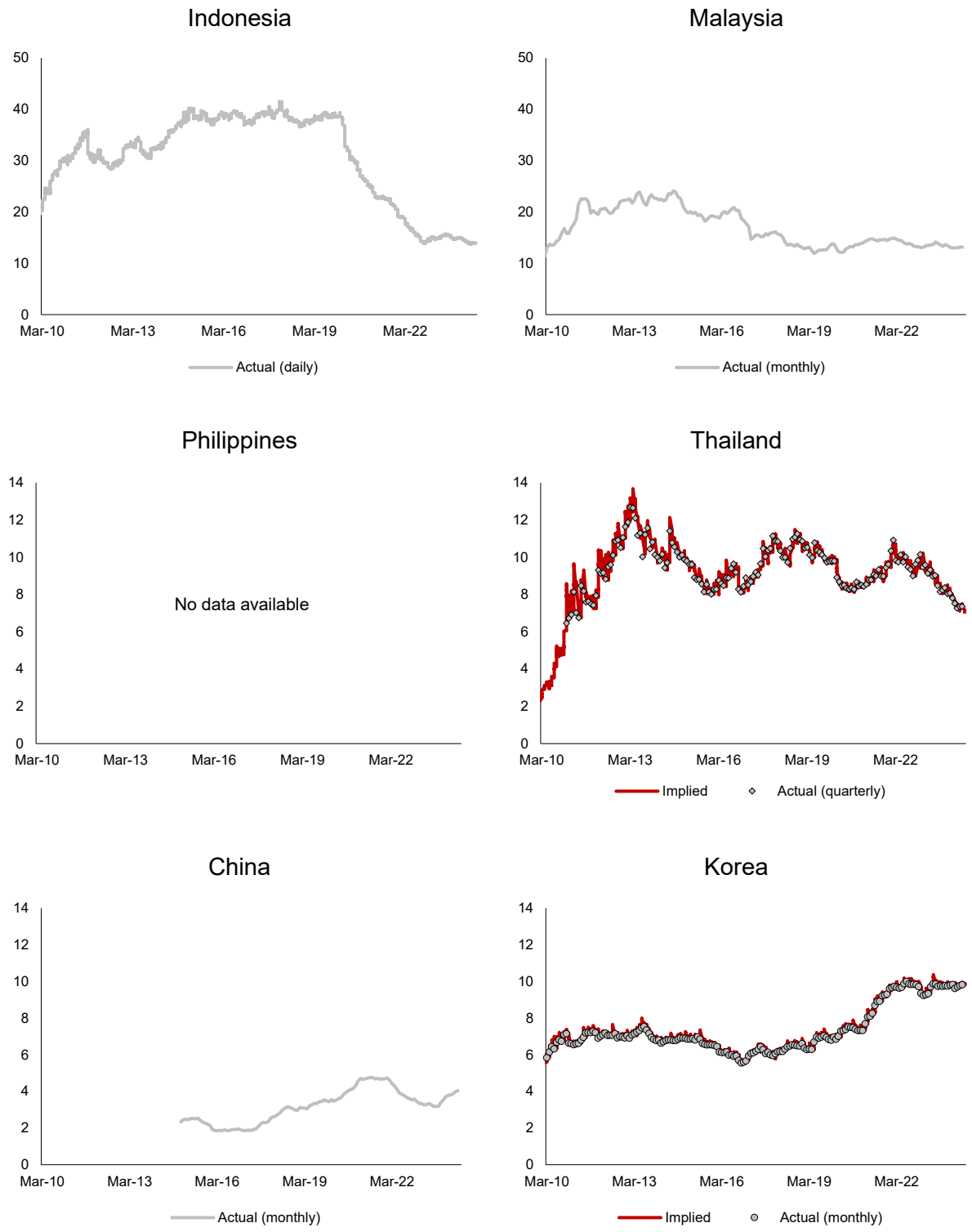
1/ They include China's equity flows, Korea's debt flows, Japan's equity and debt flows, Malaysia's equity flows, Vietnam's debt flows.

Figure 5. Selected ASEAN+3: Implied versus Actual Non-Resident Positioning, Equities
(Percent)



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: NR positioning is computed based on actual stock data published by China, Indonesia; and Korea, and on IIP data for Malaysia, the Philippines and Thailand. Implied positioning is estimated by bootstrapping daily flows with lower-frequency actual stock or IIP data.

Figure 6. Selected ASEAN+3: Implied versus Actual Non-Resident Positioning, Debt Securities
(Percent)



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: NR positioning is computed based on actual daily stock data published by Korea and Thailand. Implied positioning is estimated by bootstrapping daily flows with lower frequency actual stock data.

III. Analysis and Results

NR investor participation in domestic markets offers several benefits but also risks. It enhances liquidity, lowers funding costs, and diversifies the investor base (IMF 2020). Moreover, higher levels of NR investor positioning often reflect greater financial openness and more attractive domestic assets. However, a larger presence of NR investors also implies greater dependence on foreign funding and increases the exposure of domestic market to global market fluctuations. NR investors tend to be more sensitive to risk-return considerations compared to domestic investors, and frequently rebalance their portfolio allocations in response to global market conditions (Park and others 2018). For example, NR investors may react more strongly to broad movements in the US dollar relative to domestic investors given that they are more exposed to currency mismatch risks (Wooldridge 2020).

Consequently, domestic markets with large NR investor positions are likely to be more sensitive to adverse global developments and at greater risk of significant capital outflows. In this context, estimates of NR investor positioning in ASEAN+3 equity and debt markets may be a useful metric for identifying risks of potential sharp capital outflows associated with NR portfolio investments. Specifically, the extent of NR positioning could explain the sensitivity of domestic asset prices to global market fluctuations and provide a sense of the potential magnitude of capital outflows that an economy could be exposed to during adverse episodes. To evaluate if such a relationship exists for ASEAN+3, we undertake the analysis in two steps, separately for equity and debt markets:

- **First step**. We first run individual regressions for each economy to obtain quarterly sensitivities of the domestic markets to global market movements (i.e., a simple market model):

  (3) $$Domestic_{ijt} = \alpha_{it} + \beta_{it} Global_{US,t} + \mu_{ijt}$$

  where,
  $Domestic_{ijt}$ is the daily return of domestic asset *j* (equity index or 10-year bond) for economy *i* in quarter *t*;
  $Global_{US,t}$ is the daily return of the corresponding US asset (equity index or 10-year treasury yield) in quarter *t*; and
  μ_{ijt} is the error term.

- **Second step**. Using the estimated quarterly sensitivities of individual economies obtained in the first step, β_{it}, we run a fixed-effects panel regression to assess the average impact of NR investor positioning on domestic market sensitivity to global market fluctuations:

  (4) $$\beta_{it} = \beta_0 + \beta_1 Positioning_{i,t-1} + \chi_i + \psi_t + \varepsilon_{it}$$

  where,
  β_{it} is the estimated sensitivity of the domestic equity index return (10-year bond yield) for economy *i* to the US equity index return (10-year treasury yield) obtained in equation (3), in quarter *t*;
  $Positioning_{i,t-1}$ is the NR investor positioning in the corresponding domestic equity or debt market for economy *i* in quarter *t*–1;
  χ_i is the economy *i* fixed effect; ψ_t is the time fixed effect; and ε_{it} is the error term.

The results of our equation (4) regression confirm that markets in the ASEAN+3 region with larger NR investor positioning tend to be more sensitive to global market fluctuations. Specifically, a 10 percentage-point increase in NR investor positioning is associated with a 7 and 10 percentage-point increase in the sensitivity of domestic equity and debt markets, respectively (Figure 7). The results suggest that global developments do indeed have greater influence on NR debt investors. These findings are consistent with IMF (2020), which shows that NR debt flows into and out of EMEs are largely driven by global financial conditions, while NR equity flows are more influenced by domestic factors, such as economic growth.

A comparison between broad changes in NR investor positioning and sensitivity of domestic markets to global market fluctuations at the economy level reveals differences across regional markets. Most ASEAN+3 financial markets except Korea show reductions in their sensitivities toward global market movements in the past year (2023Q3 to 2024Q2) compared to full-year 2016, in tandem with lower NR positions (Figure 8). In contrast, domestic markets in China have been less responsive toward global market developments during the same period despite an increase in NR investor positions. These differences underscore the importance of economy-specific considerations when designing policy to address volatile capital flows (AMRO 2022).

We also look into individual episodes when significant capital outflows from ASEAN+3 markets occurred. To evaluate whether the degree of NR positioning influences corresponding changes in NR asset holdings, we run regressions on multiple stress episodes, separately for equity and debt markets:[7]

(5) $$\Delta Holding_{ik} = \gamma_0 + \gamma_1 Positioning_{ik} + \epsilon_{ik}$$

where,
$\Delta Holding_{ik}$ is the percentage change in NR equity or debt holdings in economy *i* during stress episode *k*;
$Positioning_{ik}$ is the NR investor position in the corresponding equity or debt market of economy *i* at the start of stress episode *k*; and ϵ_{ik} is the error term

We find that larger NR positions tend to result in greater proportional reductions in NR asset holdings during several identified stress episodes, which appear intuitive. Specifically:

- Declines in NR investor holdings relative to positioning in equity markets are significant for two stress episodes during the period under consideration, namely, the 2016 US Presidential election; and the 2018 US-China trade tensions (Figure 9). Meanwhile, NR investor holdings relative to position in debt markets are significant for the 2018 US-China trade tensions and the 2020 COVID-19 shock.

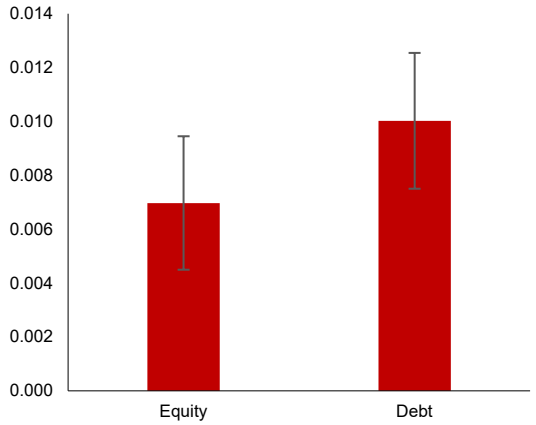
- The significantly positive relationship between China's equity market sell-off and NR investor positioning appears counter-intuitive initially, i.e., markets with lower foreign positioning saw larger outflows. In this case, the source of the shock was the volatility in Chinese assets, and hence, despite having low foreign positioning, the reduction in NR investor holdings was more severe. Excluding China, the relationship between

[7] Stress episodes are defined as the month when the trigger event happened to the month when the aggregated NR asset holdings of the region bottomed.

outflows and positioning across other markets turns negative and is consistent with other stress episodes.

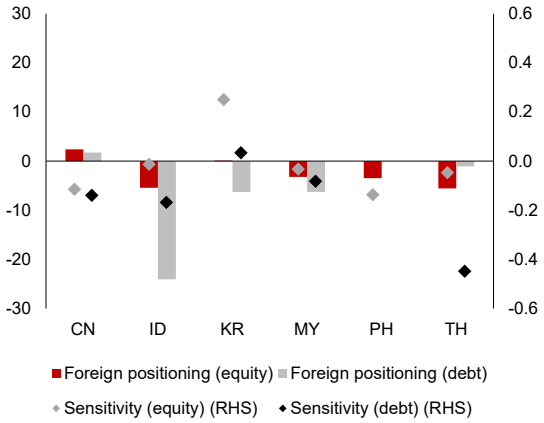
- However, it is obvious that other factors not captured in our model also play important roles, given the low R-squared observed in some of the results. Hence, these findings should be considered preliminary—further (and more rigorous) analysis will be necessary for a more conclusive determination.

Figure 7. Selected ASEAN+3: Regression (4) Coefficients on Sensitivity of Domestic Equity and Debt Markets to Non-Resident Investor Positioning



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: Panel regression for equity market includes China, Indonesia, Malaysia, the Philippines, Korea, and Thailand; panel regression for debt market includes China, Indonesia, Malaysia, Korea, and Thailand.

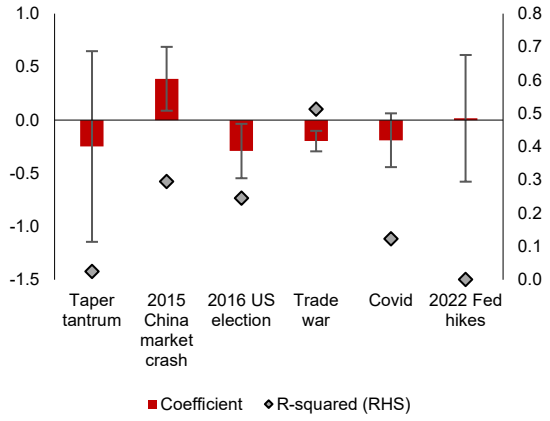
Figure 8. Selected ASEAN+3: Changes in Non-Resident Investor Positioning and Regression (3) Sensitivity to Global Markets, 2016 to 2024
(Percentage points)



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: Changes are based on the differences between positioning as of the end of 2016 (average of 2016Q1 to 2016Q4) and as of 2024Q2 (average of 2023Q3 to 2024Q2). CN = China; ID = Indonesia; KR = Korea; MY = Malaysia; PH = the Philippines; TH = Thailand.

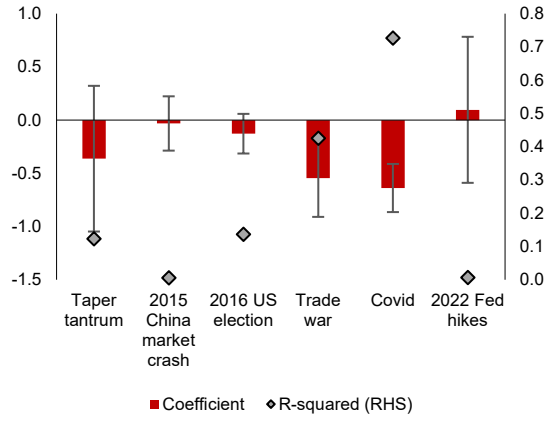
Figure 9. Selected ASEAN+3: Regression (5) Results on Sensitivity of Asset Holdings to Non-Resident Investor Positioning during Stress Episodes

Non-Resident Equity Holdings



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: Regression analyses for selected stress episodes include China, Indonesia, Malaysia, the Philippines, Korea, and Thailand; China is excluded from the taper tantrum episode because of data unavailability.

Non-Resident Debt Holdings



Sources: Bloomberg Finance L.P.; CEIC; national authorities via Haver Analytics; and authors' estimates.
Note: Regression analyses for selected stress episodes include China, Indonesia, Malaysia, Korea, and Thailand; China is excluded from the taper tantrum episode because of data unavailability.

IV. Conclusion

Capital flow volatility arising from greater international financial integration continues to vex EMEs. Sustained large surges in capital inflows cause buildups in economic imbalances, and financial sector vulnerabilities manifest when shocks occur. The outcome is typically large outflows or "sudden stops" that negatively impact financial stability and consequently, economic growth. From a policymaking perspective, it is thus important to be able to monitor volatile capital flows on a high-frequency basis, as well as have early indications of any sustained inflows in capital that lead to imbalances and subsequent sharp retrenchments. In this context, our paper aims to: (1) construct a transparent, easily replicable, high-frequency portfolio flow database for ASEAN+3; and (2) use those data series to develop a framework for identifying incipient risks of sharp capital withdrawals.

Our capital flow compilation for (selected) ASEAN+3 offers several advantages: (1) our information is sourced from national authorities and are thus official data; (2) the data are timely and available at high frequency for most economy-asset combinations in our sample, and can thus facilitate timely monitoring of risks; (3) our underlying data series can easily be obtained from publicly accessible third party sources, such as Bloomberg, CEIC and/or Haver Analytics, and are thus widely available; (4) our selection of the raw data and construction of the derived data series are transparent and our outputs can be corroborated against official BoP data; and (5) we provide better coverage of ASEAN+3 economies for users who are interested in undertaking surveillance of this region.

We are also able to develop an exploratory framework for analyzing the risks of impending sharp capital outflows from individual ASEAN+3 economies, using our timely, high-frequency database. We estimate the positioning of NR investors in domestic asset markets to assess the risks of sudden retrenchments. Our preliminary evidence suggests that higher NR investor positioning is positively correlated with greater domestic asset sensitivity to global assets, and that there is some evidence that positioning affects the size of NR portfolio outflows during episodes of market stress, especially when the investor sentiment sours towards the broader emerging market asset space. Hence, this indicator could be used by authorities as part of their arsenal in anticipating and managing the effects of adverse spillovers from global markets. However, further and more rigorous research needs to be done in this area toward developing a more comprehensive framework for analyzing volatile portfolio flows.

Although most economies typically have little control over global developments that impact capital flows, there is wide consensus that macroeconomic fundamentals and institutional quality influence their volatility, especially in EMEs. Broner and Rigobon (2006), Alfaro, Kalemli-Ozcan, and Volosovych (2007), Mercado and Park (2011), and Cavallo, Izquierdo, and León-Díaz (2020) find that institutional quality explains in part the differences in capital flow volatility across economies. Correspondingly, Claessens and Ghosh (2013) argues that EMEs tend to be more vulnerable to larger shocks, in part because they have less economic and political stability—those shocks tend magnify and propagate because of weaker structural and institutional characteristics. IMF (2020) notes that while stronger domestic fundamentals do not necessarily lead to surges in portfolio flows, they help mitigate outflows—larger pullbacks tend to occur from economies with weaker fundamentals.

Nonetheless, policies employed by EMEs to deal with volatile capital flows should take into account country-specific characteristics. Claessens and Ghosh (2013) observes that EMEs are likely to have to use more unorthodox combinations of macroeconomic, macroprudential,

and capital flow management policy tools. The authors argue that appropriate, pragmatic policy options would depend on the cause and nature of capital flows, and prevailing domestic conditions and objectives. Lee, Park, and Byun (2012) argues that the differential and time-varying effects of various policy variables on capital flows contributes to the difficulty in designing any universal framework to reduce their volatility. At a broader level, Mercado and Park (2011) and Lee, Park, and Byun (2012) underscore the importance of global and regional economic and policy cooperation to manage volatile capital flows, especially to EMEs. Last but not least, AMRO (2022) emphasizes the importance of country specificities when considering capital flow management measures in the ASEAN+3 region—in terms of the influence of the different types of capital flows and the extent and duration of their impact, and consequently, the need for flexibility in managing those flows.

Appendix I. Construction of Database

Appendix Table 1. Selected ASEAN+3: Data Series Used to Build Portfolio Flow Database, Transformations, and Corresponding Sources

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
Equities					
Brunei	n.a.	n.a.	n.a.	–	–
Cambodia	n.a.	n.a.	n.a.	–	–
China	Daily/Weekly*	Hong Kong Exchanges & Clearing	• HKEX Stock Connect: Shanghai Northbound: Buy Trades • HKEX Stock Connect: Shanghai Northbound: Sell Trades • HKEX Stock Connect: Shenzhen Northbound: Buy Trades • HKEX Stock Connect: Shenzhen Northbound: Sell Trades	Net difference between buy trades and sell trades	Computation of daily non-resident net equity flows for non-resident flows through Stock Connect program and estimating market positioning
		Shanghai Stock Exchange	• Shanghai Stock Exchange Market Capitalization	Ratio of current and previous period's market capitalization from all stock exchanges	Adjusting for changes in valuation and computation of market positioning
		Shenzhen Stock Exchange	• Shenzhen Stock Exchange Market Capitalization		
	Monthly	The People's Bank of China	• Domestic RMB Financial Assets Held Abroad: Equities	Converted from stock to flow values and adjusted for valuations	Computation of monthly non-resident net equity flows and computation of market positioning
		Shanghai Stock Exchange	• Shanghai-Shenzhen-300 Stock Price Index	Ratio of current and previous period stock price index	Adjusting for changes in valuation
	Quarterly	State Administration of Foreign Exchange	• BOP Portfolio Investment Liabilities: Equity Securities	–	Quarterly non-resident net equity flows
Hong Kong	Daily/Weekly*	Hong Kong Exchanges & Clearing	• HKEX Main Board Market Capitalization	–	Computation of market positioning
		Shanghai Stock Exchange	• Shanghai-Hong Kong Stock Connect: Southbound: Buy Trades • Shanghai-Hong Kong Stock Connect: Southbound: Sell Trades	Net difference between buy trades and sell trades	Computation of market positioning
		Shenzhen Stock Exchange	• Shenzhen-Hong Kong Stock Connect: Southbound: Buy Trades • Shenzhen-Hong Kong Stock Connect: Southbound: Sell Trades	Net difference between buy trades and sell trades	Computation of market positioning
	Monthly	n.a.	n.a.	–	–

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
	Quarterly	Census and Statistics Department	• BOP Portfolio Investment Liabilities: Equity & Investment	–	Quarterly non-resident net equity flows
Indonesia	Daily/Weekly*	Indonesia Stock Exchange	• JSX Foreign Buy Trades Turnover Value • JSX Foreign Sell Trades Turnover Value	Net difference between buy trades and sell trades	Computation of daily non-resident net equity flows and market positioning
			• JSX Market Capitalization (CEIC:13607601)		Computation of market positioning
		Financial Times	• Jakarta Composite Stock Price Index	Ratio of current and previous period's stock price index	Adjusting for changes in valuation
	Monthly	Indonesia Financial Services Authority	• Foreign Equity Securities Ownership	Converted from stock to flow values	Computation of monthly non-resident net equity flows and market positioning
	Quarterly	Bank Sentral Republik Indonesia	• BOP Portfolio Investment Private Sector Liabilities: Equity Securities	–	Quarterly non-resident net equity flows
Japan	Daily/Weekly*	Ministry of Finance Japan	• Non-residents' Net Investment in Domestic Equity & Investment Fund Shares*	–	Weekly non-resident net equity flows
	Monthly	Tokyo Stock Exchange	• Foreign Purchase of TSE Listed Stock • Foreign Sales of TSE Listed Stock	Net difference between buy trades and sell trades	Computation of monthly non-resident net equity flows
		Bank of Japan/Ministry of Finance	• BOP Portfolio Investment Liabilities: Equity & Investment Fund Shares	–	Monthly non-resident net equity flows
	Quarterly	n.a.	n.a.	–	–
Korea	Daily/Weekly*	Bank of Korea	• Foreign Net Equity Purchases on KOSPI • Foreign Net Equity Purchases on KOSDAQ	Sum of net purchases of equity	Computation of daily non-resident net equity flows and market positioning
			• KRX Market Capitalization [KOSPI & KOSDAQ]	–	Computation of market positioning
		Korea Stock Exchange	• KOSPI 200 Stock Price Index	Ratio of current and previous period stock price index	Adjusting for changes in valuation
	Monthly	Financial Supervisory Service	• Foreigners Stock Purchases • Foreigners Stock Holdings	–	Computation of monthly non-resident net equity flows and market positioning
		Bank of Korea	• BOP Portfolio Investment Liabilities: Equity Securities	–	Monthly non-resident net equity flows
	Quarterly	n.a.	n.a.	–	–
Lao PDR	n.a.	n.a.	n.a.	–	–
Malaysia	Daily/Weekly*	Bursa Malaysia	• Net Foreign Portfolio Investment	–	Computation of daily non-resident net equity flows and market positioning
			• KLSE Market Capitalization	–	Computation of market positioning
		Financial Times	• FTSE Bursa Malaysia KLCI Stock Price Index	Ratio of current and previous period stock price index	Adjusting for changes in valuation
	Monthly	Bursa Malaysia	• Foreign Institutional Buy Trade Value • Foreign Retail Buy Trade Value • Foreign Institutional Sell Trade Value • Foreign Retail Sell Trade Value	Net difference between buy trades and sell trades	Computation of monthly non-resident net equity flows

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
	Quarterly	Department of Statistics, Malaysia	• BOP Portfolio Investment Liabilities: Equity/Investment Fund Shares	–	Quarterly non-resident net equity flows
		International Monetary Fund	• BOP Portfolio Investment Liabilities: Equity	–	Quarterly non-resident net equity flows
Myanmar	n.a.	n.a.	n.a.	–	–
Philippines	Daily/Weekly*	Philippine Stock Exchange	• PSE Net Foreign Trade Turnover Value	–	Computation of daily non-resident net equity flows and market positioning
			• PSE Market Capitalization	–	Computation of market positioning
		Financial Times	• Manila Composite Stock Price Index	Ratio of current and previous period stock price index	Adjusting for changes in valuation
	Monthly	Bangko Sentral ng Pilipinas	• Foreign Portfolio Investment: Net BSP Registered PSE Listed Securities	–	Monthly non-resident net equity flows
			• BOP Portfolio Investment: Liabilities: Equity & Investment Fund Shares	–	Monthly non-resident net equity flows
	Quarterly	Bangko Sentral ng Pilipinas	• IIP Portfolio Investment Liabilities: Equity & Investment Fund Shares	Counted as non-resident holdings at the end of each month	Computation of daily market positioning
Singapore	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	n.a.	n.a.	–	–
	Quarterly	Singapore Exchange	• SGX Market Capitalization	–	Computation of market positioning
		Department of Statistics Singapore	• IIP Portfolio Investment Liabilities: Equity & Investment Fund Shares	Converted from stock to flow values	Computation of quarterly non-resident net equity flows and market positioning
Thailand	Daily/Weekly*	The Stock Exchange of Thailand	• SET Foreign Investors Turnover Buy Value • SET Foreign Investors Turnover Sell Value • MAI Foreign Investors Turnover Buy Value • MAI Foreign Investors Turnover Sell Value	Net difference between buy trades and sell trades	Computation of daily non-resident net equity flows and market positioning
			• SET Market Capitalization • MAI Market Capitalization	Sum of market capitalization from all stock exchanges	Computation of market positioning
		Bank of Thailand	• Bangkok SET Stock Price Index	Ratio of current and previous period stock price index	Adjusting for changes in valuation
	Monthly	The Stock Exchange of Thailand	• SET Foreign Buy Trades • SET Foreign Sell Trades • MAI Foreign Buy Trades • MAI Foreign Sell Trades	Net difference between buy trades and sell trades	Computation of monthly non-resident net equity flows
	Quarterly	Bank of Thailand	• BOP Portfolio Investment Liabilities: Equity Securities: Other Depository Corporations • BOP Portfolio Investment Liabilities: Equity Securities: Non-Depository Financial Corporations	Sum of BOP line items	Computation of quarterly non-resident net equity flows

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
			• BOP Portfolio Investment Liabilities: Equity Securities: NFC, Households, NPISHs		
			• IIP Portfolio Investment Liabilities: Equity Securities	Counted as daily non-resident holdings at the end of each month	Computation of daily market positioning
Vietnam	Daily/Weekly*	Hanoi Stock Exchange	• Net Foreign Purchases	–	Computation of daily non-resident net equity flows
	Monthly	State Securities Commission of Vietnam	• Net Foreign Purchases of Listed Shares • Net Foreign Purchases of Registered Shares	Sum of net purchases of listed and registered shares	Computation of monthly non-resident net equity flows
	Quarterly	n.a.	n.a.	–	–
Debt Securities					
Brunei	n.a.	n.a.	n.a.	–	–
Cambodia	n.a.	n.a.	n.a.	–	–
China	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	The People's Bank of China	• Domestic RMB Financial Assets Held Abroad: Bonds	Converted from stock to flow values	Computation of monthly non-resident net debt flows and market positioning
		ChinaBond	• Bond Outstanding	–	Computation of market positioning
			• Foreign Investors Bond Holding	Converted from stock to flow values	Computation of monthly non-resident net debt flows
		Bond Connect Company Limited	• Foreign Bond Holdings	Converted from stock to flow values	Computation of monthly non-resident net debt flows
	Quarterly	State Administration of Foreign Exchange	• BOP Portfolio Investment Liabilities: Debt Instruments	–	Quarterly non-resident net debt flows
Hong Kong	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	n.a.	n.a.	–	–
	Quarterly	Census and Statistics Department	• BOP Portfolio Investment Liabilities: Debt Securities	–	Quarterly non-resident net debt flows
Indonesia	Daily/Weekly*	Directorate General of Debt Management	• IDR Government Securities Held by Foreigners	Converted from stock to flow values	Computation of daily non-resident net debt flows and market positioning
			• Holdings of Tradable IDR Government Securities	–	Computation of market positioning
	Monthly	n.a.	n.a.	–	–
	Quarterly	Bank Sentral Republik Indonesia	• BOP Portfolio Investment Liabilities: Private Debt Securities • BOP Portfolio Investment Liabilities: Public Debt Securities	Sum of BOP line items	Computation of quarterly non-resident net debt flows
Japan	Daily/Weekly*	Ministry of Finance Japan	• Foreigners' Net Purchase of Domestic Short-Term Debt Securities* • Foreigners' Net Purchase of Domestic Long-Term Debt Securities*	Sum of short-term and long-term debt securities	Weekly non-resident net debt flows
	Monthly	Bank of Japan/Ministry of Finance	• BOP Portfolio Investment Liabilities: Debt Securities	–	Monthly non-resident net debt flows
	Quarterly	n.a.	n.a.	–	–

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
Korea	Daily/Weekly*	Financial Supervisory Service	• Foreigners' Net Purchase in Bonds	–	Computation of daily non-resident net debt flows and market positioning
		Korea Exchange	• Total Bonds Outstanding	–	Computation of market positioning
	Monthly	Financial Supervisory Service	• Foreigners' Net Investments	–	Monthly non-resident net debt flows
			• Foreigners' Bond Holdings	Counted as daily non-resident holdings at the end of each month	Computation of daily market positioning
		Bank of Korea	• BOP Portfolio Investment Liabilities: Debt Securities	–	Quarterly non-resident net debt flows
	Quarterly	n.a.	n.a.	–	–
Lao PDR	n.a.	n.a.	n.a.	–	–
Malaysia	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	Bank Negara Malaysia	• Foreign Holdings of Ringgit-Denominated Debt Securities	Converted from stock to flow values	Computation of monthly non-resident net debt flows and market positioning
			• Debt Securities in the Primary Market	–	Computation of market positioning
	Quarterly	Department of Statistics, Malaysia	• BOP Portfolio Investment Liabilities: Debt Securities	–	Quarterly non-resident net debt flows
Myanmar	n.a.	n.a.	n.a.	–	–
Philippines	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	Bangko Sentral ng Pilipinas	• Foreign Portfolio Investment: Net Government Securities • Foreign Portfolio Investment: Net BSP Registered Other Peso Denominated Debt Instruments	Sum of line items	Computation of monthly non-resident net debt flows
			• BOP Portfolio Investment Liabilities: Debt Securities	–	Quarterly non-resident net debt flows
	Quarterly	n.a.	n.a.	–	–
Singapore	Daily/Weekly*	n.a.	n.a.	–	–
	Monthly	n.a.	n.a.	–	–
	Quarterly	Department of Statistics Singapore	• IIP Portfolio Investment Liabilities: Debt Securities	Converted from stock to flow values	Computation of quarterly non-resident net debt flows
Thailand	Daily/Weekly*	The Thai Bond Market Association	• Total Outright Net Trading Value of Foreign Companies	–	Computation of daily non-resident net debt flows and market positioning
	Monthly	Bank of Thailand	• Debt Securities Held by Non-residents	Converted from stock to flow values	Computation of monthly non-resident net debt flows
			• Outstanding Debt Securities	Counted as daily non-resident holdings at the end of each month	Computation of daily market positioning
	Quarterly	Bank of Thailand	• BOP Portfolio Investment Liabilities: Debt Securities: Other Depository Corporations • BOP Portfolio Investment Liabilities: Debt Securities: Non-Depository Financial Corporations • BOP Portfolio Investment Liabilities: Debt Securities: NFC, Households, NPISHs	Sum of BOP line items	Computation of quarterly non-resident net debt flows

Economy	Dataset				
	Frequency	Source	Series	Transformations	Purpose
Vietnam	Daily/Weekly*	Hanoi Stock Exchange	• Bond Outright Trading of Foreign Investors: Buy Value • Bond Outright Trading of Foreign Investors: Sell Value	Net difference between buy trades and sell trades	Computation of daily non-resident net debt flows
	Monthly	State Securities Commission of Vietnam	• Net Bond Purchases of Foreign Investors	–	Computation of monthly non-resident net debt flows
	Quarterly	n.a.	n.a.	–	–

Sources: CEIC; Haver Analytics; Bloomberg Finance L.P.; and authors' compilation.
Note: Series are either denominated in or converted to US Dollars. Higher frequency series are aggregated into lower frequency series. * refers to weekly series. China stopped publishing its daily NR equity flow data from August 2024.

Appendix Table 2. Selected ASEAN+3: Available Tickers from Data Providers for Data Series Used to Build Portfolio Flow Database

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
Equities						
Brunei	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China	Daily/Weekly*	Hong Kong Exchanges & Clearing	• HKEX Stock Connect: Shanghai Northbound: Buy Trades	• F924CNB@INTDAILY	• 359265677	
			• HKEX Stock Connect: Shanghai Northbound: Sell Trades	• F924CNS@INTDAILY	• 359265697	
			• HKEX Stock Connect: Shenzhen Northbound: Buy Trades	• F924ZNB@INTDAILY	• 454808517	
			• HKEX Stock Connect: Shenzhen Northbound: Sell Trades	• F924ZNS@INTDAILY	• 454808527	
		Shanghai Stock Exchange	• Shanghai Stock Exchange Market Capitalization	• S924SCT@INTDAILY	• 3792501	• MCSHTOT Index
		Shenzhen Stock Exchange	• Shenzhen Stock Exchange Market Capitalization	• S924ZLK@INTDAILY	• 3790401	• MCSZTOT Index
	Monthly	The People's Bank of China	• Domestic RMB Financial Assets Held Abroad: Equities	• N924Z1AK@EMERGEPR		• CNFBFINA Index
		Shanghai Stock Exchange	• Shanghai-Shenzhen-300 Stock Price Index	• N924FKAE@EMERGEPR		• SHSZ300 Index
	Quarterly	State Administration of Foreign Exchange	• BOP Portfolio Investment Liabilities: Equity Securities	• N924BPLE@EMERGEPR	• 368511247	
Hong Kong	Daily/Weekly*	Hong Kong Exchanges & Clearing	• HKEX Main Board Market Capitalization	• S532HTK@INTDAILY	• 16744401	• HKMCMB Index
		Shanghai Stock Exchange	• Shanghai-Hong Kong Stock Connect: Southbound: Buy Trades	• F924STP@INTDAILY	• 359265717	
			• Shanghai-Hong Kong Stock Connect: Southbound: Sell Trades	• F924STS@INTDAILY	• 359265737	
		Shenzhen Stock Exchange	• Shenzhen-Hong Kong Stock Connect: Southbound: Buy Trades	• F924ZTP@INTDAILY	• 454808597	
			• Shenzhen-Hong Kong Stock Connect: Southbound: Sell Trades	• F924ZTS@INTDAILY	• 454808607	
	Monthly	n.a.	n.a.	n.a.	n.a.	n.a.
	Quarterly	Census and Statistics Department	• BOP Portfolio Investment Liabilities: Equity & Investment	• N532BPLE@EMERGEPR	• 349505901	
Indonesia	Daily/Weekly*	Indonesia Stock Exchange	• JSX Foreign Buy Trades Turnover Value		• 13610001	• JASXFBAT Index

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
			• JSX Foreign Sell Trades Turnover Value		• 13610401	
			• JSX Market Capitalization		• 13607601	• JAMCTOTL Index
		Financial Times	• Jakarta Composite Stock Price Index	• S536JKC@INTDAILY		• JCI Index
	Monthly	Indonesia Financial Services Authority	• Foreign Equity Securities Ownership		• 315749102	
	Quarterly	Bank Sentral Republik Indonesia	• BOP Portfolio Investment Private Sector Liabilities: Equity Securities	• N536ALVE@EMERGEPR	• 356968247	
Japan	Daily/Weekly*	Ministry of Finance Japan	• Non-residents' Net Investment in Domestic Equity & Investment Fund Shares*	• F158ISN@INTWKLY		• JSIHSTCK Index
	Monthly	Tokyo Stock Exchange	• Foreign Purchase of TSE Listed Stock	• ISNRVAP@JAPAN		
			• Foreign Sales of TSE Listed Stock	• ISNRVAS@JAPAN		
		Bank of Japan/Ministry of Finance	• BOP Portfolio Investment Liabilities: Equity & Investment Fund Shares	• BNFPIEL@JAPAN	• 353665967	
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Korea	Daily/Weekly*	Bank of Korea	• Foreign Net Equity Purchases on KOSPI	• F542KPN@INTDAILY		
			• Foreign Net Equity Purchases on KOSDAQ	• F542KQN@INTDAILY		
			• KRX Market Capitalization [KOSPI & KOSDAQ]	• S542CEK@INTDAILY		
		Korea Stock Exchange	• KOSPI 200 Stock Price Index	• S542SP2@INTDAILY	• 28394501	• KOSPI2 Index
	Monthly	Financial Supervisory Service	• Foreigners Stock Purchases	• N542MEIP@EMERGEPR	• 298890704	• KOSBSTM Index
			• Foreigners Stock Holdings	• N542MPEI@EMERGEPR	• 298892404	
		Bank of Korea	• BOP Portfolio Investment Liabilities: Equity Securities	• N542BPLE@EMERGEPR	• 354285857	
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Lao PDR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	Daily/Weekly*	Bursa Malaysia	• Net Foreign Portfolio Investment			• MATPENET Index
			• KLSE Market Capitalization		• 31117101	
			• FTSE Bursa Malaysia KLCI Stock Price Index	• S548KLS@INTDAILY	• 219702802	• FBMKLCI Index
	Monthly	Bursa Malaysia	• Foreign Institutional Buy Trade Value	• N548FK12@EMERGEPR	• 348186102	

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
			• Foreign Retail Buy Trade Value	• N548FK22@EMERGEPR	• 348186202	
			• Foreign Institutional Sell Trade Value	• N548FK14@EMERGEPR	• 348187302	
			• Foreign Retail Sell Trade Value	• N548FK24@EMERGEPR	• 348187402	
	Quarterly	Department of Statistics, Malaysia	• BOP Portfolio Investment Liabilities: Equity/Investment Fund Shares	• N548BPLQ@EMERGEPR	• 508513877	
		International Monetary Fund	• BOP Portfolio Investment Liabilities: Equity		• 479816867	
Myanmar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	Daily/Weekly*	Philippine Stock Exchange	• PSE Net Foreign Trade Turnover Value		• 410438747	• VUPHBNET Index
			• PSE Market Capitalization		• 222195902	
			• Manila Composite Stock Price Index	• S566MNC@INTDAILY		• PCOMP Index
	Monthly	Bangko Sentral ng Pilipinas	• Foreign Portfolio Investment: Net BSP Registered PSE Listed Securities	• N566MP@EMERGEPR	• 419361247	
			• BOP Portfolio Investment: Liabilities: Equity & Investment Fund Shares	• N566APLE@EMERGEPR	• 354875401	
	Quarterly	Bangko Sentral ng Pilipinas	• IIP Portfolio Investment Liabilities: Equity & Investment Fund Shares	• L566PEDQ@EMERGEPR	• 360513477	
Singapore	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	n.a.	n.a.	n.a.	n.a.	n.a.
	Quarterly	Singapore Exchange	• SGX Market Capitalization	• N576FKSC@EMERGEPR	• 378267257	• WCAUSING Index
		Department of Statistics Singapore	• IIP Portfolio Investment Liabilities: Equity & Investment Fund Shares	• L576PEQ@EMERGEPR	• 365369307	
Thailand	Daily/Weekly*	The Stock Exchange of Thailand	• SET Foreign Investors Turnover Buy Value		• 37576401	• THIVNET$ Index
			• SET Foreign Investors Turnover Sell Value		• 37576501	
			• MAI Foreign Investors Turnover Buy Value		• 348995502	
			• MAI Foreign Investors Turnover Sell Value		• 348995602	
			• SET Market Capitalization		• 37577601	• MCTB Index
			• MAI Market Capitalization		• 37579501	
		Bank of Thailand	• Bangkok SET Stock Price Index	• S578BST@INTDAILY	• 37572701	• SET Index
	Monthly	The Stock Exchange of Thailand	• SET Foreign Buy Trades	• N578F8RS@EMERGEPR	• 39983901	
			• SET Foreign Sell Trades	• N578F8SS@EMERGEPR	• 39984001	
			• MAI Foreign Buy Trades	• N578F8MR@EMERGEPR		

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
			• MAI Foreign Sell Trades	• N578F8MS@EMERGEPR		
	Quarterly	Bank of Thailand	• BOP Portfolio Investment Liabilities: Equity Securities: Other Depository Corporations	• Q578ALED@EMERGEPR	• 309589702	
			• BOP Portfolio Investment Liabilities: Equity Securities: Non-Depository Financial Corporations	• Q578ALEF@EMERGEPR		
			• BOP Portfolio Investment Liabilities: Equity Securities: NFC, Households, NPISHs	• Q578ALEH@EMERGEPR		
			• IIP Portfolio Investment Liabilities: Equity Securities	• L578PEDQ@EMERGEPR	• 368291827	
Vietnam	Daily/Weekly*	Hanoi Stock Exchange	• Net Foreign Purchases	• F582NTL@INTDAILY		• VNDXENET Index
	Monthly	State Securities Commission of Vietnam	• Net Foreign Purchases of Listed Shares	• N582FVFL@EMERGEPR		
			• Net Foreign Purchases of Registered Shares	• N582FVFR@EMERGEPR		
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Debt Securities						
Brunei	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	The People's Bank of China	• Domestic RMB Financial Assets Held Abroad: Bonds	• N924ZAAD@EMERGEPR		• CNFBFINN Index
		ChinaBond	• Bond Outstanding	• N924FBDB@EMERGEPR		
			• Foreign Investors Bond Holding	• N924B3EI@EMERGEPR		
		Bond Connect Company Limited	• Foreign Bond Holdings	• N924B5F@EMERGEPR		
	Quarterly	State Administration of Foreign Exchange	• BOP Portfolio Investment Liabilities: Debt Instruments	• N924BPLS@EMERGEPR	• 368511257	
Hong Kong	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	n.a.	n.a.	n.a.	n.a.	n.a.
	Quarterly	Census and Statistics Department	• BOP Portfolio Investment Liabilities: Debt Securities	• N532BPLS@EMERGEPR	• 349506201	
Indonesia	Daily/Weekly*	Directorate General of Debt Management	• IDR Government Securities Held by Foreigners	• F536SFX@INTDAILY		• IDGBFRGN Index
			• Holdings of Tradable IDR Government Securities	• F536ST@INTDAILY		• IDGBTOTL Index
	Monthly	n.a.	n.a.	n.a.	n.a.	n.a.

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
	Quarterly	Bank Sentral Republik Indonesia	• BOP Portfolio Investment Liabilities: Private Debt Securities	• N536ALVS@EMERGEPR	• 356968257	
			• BOP Portfolio Investment Liabilities: Public Debt Securities	• N536ALUS@EMERGEPR	• 356968187	
Japan	Daily/Weekly*	Ministry of Finance Japan	• Foreigners' Net Purchase of Domestic Short-Term Debt Securities*	• F158ISBN@INTWKLY		
			• Foreigners' Net Purchase of Domestic Long-Term Debt Securities*	• F158IBN@INTWKLY		• JSIHBOND Index
	Monthly	Bank of Japan/Ministry of Finance	• BOP Portfolio Investment Liabilities: Debt Securities	• F158IBN@INTWKLY	• 353665997	
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Korea	Daily/Weekly*	Financial Supervisory Service	• Foreigners' Net Purchase in Bonds		• 299143504	• KOSBNET$ Index
		Korea Exchange	• Total Bonds Outstanding			• KRBATTAL Index
	Monthly	Financial Supervisory Service	• Foreigners' Net Investments	• N542MPID@EMERGEPR	• 329171002	
			• Foreigners' Bond Holdings	• N542MPD@EMERGEPR	• 228443602	
		Bank of Korea	• BOP Portfolio Investment Liabilities: Debt Securities	• N542BPLD@EMERGEPR	• 354285957	
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Lao PDR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Malaysia	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	Bank Negara Malaysia	• Foreign Holdings of Ringgit-Denominated Debt Securities	• N548FXTM@EMERGEPR	• 56941102	• MAFDTOTL Index
			• Debt Securities in the Primary Market	• N548FZD@EMERGEPR		
	Quarterly	Department of Statistics, Malaysia	• BOP Portfolio Investment Liabilities: Debt Securities	• N548BPLD@EMERGEPR	• 508513887	
Myanmar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	Bangko Sentral ng Pilipinas	• Foreign Portfolio Investment: Net Government Securities	• N566MPG@EMERGEPR	• 419361257	
			• Foreign Portfolio Investment: Net BSP Registered Other Peso Denominated Debt Instruments	• N566MPO@EMERGEPR	• 419361267	
			• BOP Portfolio Investment Liabilities: Debt Securities	• N566APLS@EMERGEPR	• 354229001	
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.
Singapore	Daily/Weekly*	n.a.	n.a.	n.a.	n.a.	n.a.
	Monthly	n.a.	n.a.	n.a.	n.a.	n.a.

Economy	Frequency	Source	Series	Ticker		
				Haver	CEIC	Bloomberg
	Quarterly	Department of Statistics Singapore	• IIP Portfolio Investment Liabilities: Debt Securities	• N566APLS@EMERGEPR	• 365369317	
Thailand	Daily/Weekly*	The Thai Bond Market Association	• Total Outright Net Trading Value of Foreign Companies	• F578XNX@INTDAILY	• 318575001	
	Monthly	Bank of Thailand	• Debt Securities Held by Non-residents	• N578FDAG@EMERGEPR	• 320775501	• THODNRES Index
			• Outstanding Debt Securities	• N578FD@EMERGEPR	• 320775601	• THODTOTL Index
	Quarterly	Bank of Thailand	• BOP Portfolio Investment Liabilities: Debt Securities: Other Depository Corporations	• Q578ALDD@EMERGEPR	• 309590702	
			• BOP Portfolio Investment Liabilities: Debt Securities: Non-Depository Financial Corporations	• Q578ALTF@EMERGEPR		
			• BOP Portfolio Investment Liabilities: Debt Securities: NFC, Households, NPISHs	• Q578ALDH@EMERGEPR		
Vietnam	Daily/Weekly*	Hanoi Stock Exchange	• Bond Outright Trading of Foreign Investors: Buy Value		• 456482027	
			• Bond Outright Trading of Foreign Investors: Sell Value		• 456482047	
	Monthly	State Securities Commission of Vietnam	• Net Bond Purchases of Foreign Investors	• N582FVFD@EMERGEPR		
	Quarterly	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: CEIC; Haver Analytics; Bloomberg Finance L.P.; and authors' compilation.
Note: Series are either denominated in or converted to US Dollars. Higher frequency series are aggregated into lower frequency series. * refers to weekly series. Tickers in merged cells represent the sum of the corresponding series. China stopped publishing its daily NR equity flow data from August 2024.

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