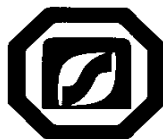


WORKING PAPER 05/2022

The Currency Composition of Asia's International Investments

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Table of Contents

	Page
Abstract	iv
1. Introduction	1
2. Currency Composition Data and Stylized Facts	3
2.1 Currency Composition of International Investment Position Dataset	3
2.2 Stylized Facts	4
3. Empirical Specification	5
4. Empirical Results	6
5. Concluding Remarks	8
References	9

List of Figures and Tables

Figure 1. Total International Investment Assets and Liabilities Currency Shares, Asia and Pacific Economies	10
Figure 2: International Debt Assets and Liabilities Currency Shares, Asia and Pacific Economies	10
Figure 3: International Equity Assets and Liabilities Currency Shares, Asia and Pacific Economies	11
Table 1: Descriptive Statistics Regressors	11
Table 2: Determinants of International Debt Asset Currency Shares	12
Table 3: Determinants of International Debt Liabilities Currency Shares	12
Table 4: Determinants of International Equity Assets Currency Shares	13
Table 5: US Dollar Currency Share and US Dollar Trade Invoicing	13

The Currency Composition of Asia's International Investments

Paulo Rodelio Halili* and Rogelio Mercado**

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Abstract

This paper examines the importance of trade ties, macro-financial volatilities, and US dollar trade invoicing in explaining Asia's international investment assets and liabilities denominated in world currencies, including the US dollar (USD), euro (EUR), pound sterling (GBP), Japanese yen (JPY) and Chinese yuan (CNY). The results show heterogeneous patterns of relevant covariates across different currencies. More importantly, the estimates offer evidence that the region hedges its currency risk by investing in US dollar denominated assets as greater US dollar trade invoicing significantly covaries with greater debt asset holdings denominated in US dollar.

Keywords: currency composition, international investment assets and liabilities, trade invoicing, bilateral trade, macro-financial volatilities

JEL Codes: F31, F36, F41

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1. Introduction

Understanding the currency composition of international investment assets and liabilities provides vital information on currency mismatches as well as an estimated magnitude of valuation effects due to currency fluctuations.¹ In particular, analysis on external holdings currency composition will greatly aid external sector macro-surveillance work by identifying potential sources and impacts of currency risks imbedded in the external sector balance sheets. Empirical and policy papers have not fully explored these areas due to the lack of detailed data on currency denomination of external sector asset holdings and liabilities for a wide set of economies with varying international investment compositions and overall external balance positions over time. Nonetheless, over the past decade or so, various international initiatives were undertaken with the aim of compiling data on the currency composition of international assets and liabilities. For instance, the Bank for International Settlements now reports the currency denomination of cross-border bank loans and debt securities across its various datasets, such as Debt Securities Statistics, Global Liquidity Indicators, among others. In addition, the International Monetary Fund's Coordinated Portfolio Investment Survey (CPIS) now provides portfolio data disaggregated by sectors and the currency of denomination.

Consequently, several studies have used these data sources as well as detailed survey data or estimation techniques to explore this strand of literature. Galstyan et al. (2020) used CPIS data on currency composition of international portfolio holdings and found that currency bias is prevalent in the case of US dollar and euro denominated holdings. Benetrix et al. (2019) extended the previous studies of Lane and Shambaugh (2010) and Benetrix et al. (2015) to understand the evolution of currency exposures of cross-border positions. Earlier papers focused on the covariates of foreign currency exposures. Lane and Shambaugh (2010), Benetrix et al. (2015), and Benetrix and Lane (2016) find that volatilities of inflation, exchange rates, and asset returns explain cross-country variation of external holdings. Burger et al. (2018) show that the share of a country's bonds denominated in investors' currencies is an important determinant of the amount of cross-border investment it receives. Since US investors account for large share of bond holdings, economies that issue more US dollar denominated bonds tend to have more US bond holders. These studies highlight two main features of the currency composition of international investment holdings. First, a significant share of international investment assets and liabilities are denominated in US dollar. Second, macro-financial risk measures appear relevant in explaining covariation of currency compositions, particularly for portfolio investments.

Another strand of literature on the currency composition of international investments alludes to the importance of US dollar trade invoicing. The empirical literature on trade invoicing or pricing shows the dominant role of the US dollar in merchandise trade invoicing primarily due to strategic complementarities in price setting as well as through global value chains (Georgiadis et al., 2021). Gopinath and Stein (2021) provide a theoretical discussion on the link between US dollar trade invoicing and holdings of US dollar assets. The authors show that when trade is invoiced in US dollar, there will be a greater demand for dollar deposits, which banks, in turn, must back with dollar-based revenues through loans or holdings of foreign assets.² An alternative view argues that the dominance of US dollar financing stems from firms' desire to reduce the mismatch

¹ For instance, following Lane and Shambaugh (2010), given a negative foreign currency exposure of 50% and gross position of 100% of GDP, a 10% depreciation of the exchange rate will generate a valuation loss of 5% of GDP.

² See also Goldberg and Tille (2005) for further discussion.

between the currencies of their revenues, i.e., exports, and those of their financing, i.e., foreign debt liabilities (Adler et al., 2020; Akinici and Queralto, 2019; and Gabaix and Maggiori 2015).

This paper brings these two strands of literature together by assessing the relevance of trade ties, macro-financial volatilities, and US dollar trade invoicing in explaining the shares of international investment assets and liabilities denominated in US dollar (USD), euro (EUR), pound sterling (GBP), Japanese yen (JPY) and Chinese yuan (CNY) for Asia and the Pacific economies. The focus on these five global currencies merits consideration as these currencies account for around 84% of Asia's total international asset holdings, and around 72% of the region's debt liabilities. Put differently, this study investigates whether the covariates identified in the literature on cross-border portfolio allocation exhibit differential patterns by the currency of denomination; and whether the dominance of US dollar trade invoicing relates to the preference for US dollar asset holdings and/or US dollar financing of Asia and the Pacific economies.

While this study follows the approach of Galstyan et al. (2020), it differs in several aspects. First, it considers the currency composition shares of international investment position, instead of portfolio asset holdings across various currency denominations. Second, this paper uses the Benetrix et al. (2019) dataset, which allows for the decomposition of different types of investments. In particular, the empirical analysis separates debt and equity-type investments, as domestic and "other" currency denominations are greater for equity investments given that the equity issued by a country is assumed to be denominated in its local currency. Third, the sample coverage focuses on selected Asia and Pacific economies from 2000 to 2017 with available data.

The focus on Asia and Pacific economies warrants several justifications. First, almost half of the region's international asset holdings were denominated in US dollar in 2019. In fact, Asia's debt holdings denominated in US dollar was around 63%; while half of its debt liabilities were denominated in US dollar (ADB, 2021). Given that the region holds considerable shares of its international investment assets and liabilities in US dollar, fluctuations in the US dollar value would have greater valuation effects for the region, compared to other regions with lower US dollar shares. Second, as around 87% of the region's merchandise good exports and 77% of its merchandise imports from 2000 to 2019 were invoiced in the US dollar (ADB, 2021), this relatively high US dollar trade invoicing, compared to advanced economies and other emerging and developing economies, may reinforce hedging motives and thereby support the region's preference for US dollar denominated assets. This paper seeks to provide empirical evidence on this conjecture.

This paper proceeds as follows. Using data on the currency shares of equity and debt-type investments sourced from Benetrix et al (2019), the empirical specification captures the covariates and controls which could explain the currency shares of the five main currencies of USD, EUR, GBP, JPY and CNY. The covariates include bilateral trade to capture economic ties, stock of international debt or equity assets or liabilities, and per capita income which act as controls. To capture the macro-financial volatilities, inflation and asset returns volatilities are included along with the correlation of bond or equity returns between the domestic and reference economy for which assets and liabilities are denominated, i.e., US, euro area, UK, Japan, and China. Previewing the results, the estimates highlight the importance of economic ties and macro-financial volatilities in determining the currency composition of Asia's international investments. However, there are heterogeneous patterns observed across currencies based on the significance and

estimated significance. Moreover, the results also show that the region hedges its currency risk as it invests more in US dollar denominated assets.

Next, the empirical analysis is extended by assessing the significance of the share of US dollar in Asia's trade invoice on the US dollar share of the region's international debt assets and liabilities, and equity assets. Using the Boz et al. (2022) dataset, the specification drops bilateral imports, and replaces it with the US dollar share in trade invoice. The results show that higher US dollar trade invoicing is significantly correlated with higher holdings of US dollar denominated international debt and equity asset holdings.

The results in this paper highlight: (i) the importance of economic ties and macro-financial volatilities in determining the currency composition of Asia's international investments, although there are differences across currency denomination; and, (ii) evidence that the Asia and Pacific economies hedge their currency risks by investing in US dollar denominated assets as greater US dollar trade invoicing significantly covaries with greater debt asset holdings denominated in US dollar.

The rest of the paper is structured as follows. Section 2 discusses the Benetrix et al. (2019) data and presents some stylized facts. Section 3 provides the empirical specification and data sources. Section 4 discusses the results, while Section 5 provides concluding remarks.

2. Currency Composition Data and Stylized Facts

2.1 Currency Composition of International Investment Position Dataset

A dataset on currency breakdown of the international investment assets and liabilities offers useful information on the degree of global financial integration, currency mismatches, and foreign currency exposures. On the degree of global financial integration, the data on currency breakdown of international investments will show that economies with a common currency would be more financially integrated, compared to other economies, such as the case for euro area countries. On currency mismatches, the currency composition of international investment assets and liabilities will provide information of net long and net short currency positions. For example, net short position, i.e., larger gross international liabilities in foreign currency than international assets in foreign currency (known as "original sin" in Eichengreen et al. 2005), exposes emerging and developing economies to adverse valuation effects if the domestic currency weakens. Lastly, the aggregate foreign currency exposure, as defined by Lane and Shambaugh (2010), provides a measure of the overall sensitivity of a country's external balance sheet to a uniform movement of its domestic currency against all foreign currencies. Consequently, a dataset on the currency composition of international investment holdings offers useful information on external vulnerability and will greatly aid macro-financial surveillance work.

This paper uses the Benetrix et al. (2019) dataset on cross-border currency exposures of international investment assets and liabilities. Thus far, this dataset is the most comprehensive as it provides the currency breakdown of international investment positions of five major currencies, including the US dollar, euro, British pounds, Japanese yen, and Chinese yuan. The dataset also provides the breakdown on domestic and other currencies. The dataset is available for 50 advanced and emerging economies from 1990 to 2017. For Asia and the Pacific economies, the dataset includes Australia; China; Hong

Kong, China; India; Indonesia; Japan; Korea; Malaysia; New Zealand; Pakistan; the Philippines; Singapore; Sri Lanka; and, Thailand.

The Benetrix et al. (2019) dataset extends the previous estimates of Lane and Shambaugh (2010) and Benetrix et al. (2015). A key refinement of their dataset is the expansion of available actual data, made possible through the IMF survey on the currency composition of the main components of the international investment position (IIP). The new data obtained from the IMF's survey were complemented with other sources of actual data, including: (i) banks' cross-border positions reported to the Bank for International Settlements (BIS) available through its Locational Banking Statistics (LBS); (ii) data on the currency composition of portfolio equity and debt assets from the IMF's Coordinated Portfolio Investment Survey (CPIS); and, (iii) portfolio debt data reported to the European Central Bank (ECB). Moreover, in cases where actual data were missing, the estimates on currency denomination were used. In some cases, these estimates have been refined to allow for a different treatment of equity and debt in foreign direct investment (FDI).³ In short, the Benetrix et al. (2019) dataset includes more actual data, previously inaccessible to Lane and Shambaugh (2010) and Benetrix et al. (2015); and presently offers a comprehensive and detailed dataset on the currency composition of international investment assets and liabilities.

2.2 Stylized Facts

Figure 1 presents the average shares of Asia's total international investment assets and liabilities from 2000 to 2010 and 2011-2017. Several key features are noted. First, half of the total international investment assets for both periods were denominated in US dollars, indicating the dominance of the US dollar in the region's external financial asset holdings as well as the US dollar's reserve currency status. Second, the shares of US dollar, euro, and Japanese yen in the regional total investment assets have declined from 2000-2010 to 2011-2017, while the shares of other currencies, and Chinese yuan have increased, implying the willingness of the region's investors to hold assets in other currencies. Third, most of the region's total investment liabilities were denominated in domestic currency. In fact, the share of domestic currency has increased between the periods. The share of the US dollar in the region's total investment liabilities stayed the same, while the shares of the euro, British pound sterling, and Japanese yen declined and the shares of other currencies and Chinese yuan slightly increased.

Focusing on total international debt assets and liabilities, Figure 2 again emphasizes that most of Asia's international debt assets are denominated in US dollar.⁴ The shares of euro, British pound sterling, and Japanese yen had witnessed significant drops, while the share of other currencies had almost doubled between 2000-2010 and 2011-2017. For debt liabilities, almost half of Asia's international debt liabilities were denominated in US dollar. The shares of the euro, British pound sterling, and Japanese yen had declined between the two periods. In fact, the shares of the euro and Japanese yen had dropped by half between the two periods. In contrast, the shares of domestic currency and other currencies had increased between 2000-2010 and 2011-2017. This implies that although the US dollar remains the dominant currency in the region's international debt liabilities, the shares of other currencies and domestic currency in the region's debt liabilities have gone up in 2011-2017.

³ Refer to the Appendix of Benetrix et al. (2019) for the detailed discussion on data sources and estimation techniques used in constructing the dataset.

⁴ International debt assets include FDI debt, portfolio debt, other investments, and official reserve assets. Debt liabilities include FDI debt, portfolio debt, and other investments.

For total equity assets and liabilities, Figure 3 shows that almost half of the region's equity assets were denominated in other currencies as it is assumed that the currency composition of equity assets closely tracks the geographic distribution of equity investments.⁵ Around one-fourth of equity assets were denominated in US dollars. For the Asian economies in the sample, a significant share of equity assets was denominated in Chinese yuan. For equity liabilities, these are assumed to be denominated in local currency. Taken together, Figures 2 and 3 imply that fluctuations in the US dollar value would have greater impact on Asia's debt-type foreign assets and liabilities, compared to equity investments and liabilities.

In summary, around half of Asia's international investment assets were denominated in the US dollar, while half of Asia's international investment liabilities were denominated in local currency and only a quarter was denominated in US dollar. This indicates that the region has more US dollar denominated assets than US dollar denominated liabilities. This net long position in US dollar means that the region has more US dollar denominated asset holdings compared to its US dollar denominated liabilities, notwithstanding that a significant share of US dollar denominated foreign assets are official reserve assets.

3. Empirical Specification

The objective of the paper is to assess the determinants of international debt and equity assets and liabilities denominated in various currencies. Accordingly, we focus on the currency denominated shares of international assets and liabilities by estimating the following specification:

$$s_{it}^j = \theta' x_{i,t-1} + \varepsilon_{it} \quad (1)$$

where (s_{it}^j) is the currency share of international debt and equity assets and liabilities denominated in currency $j \in (\text{USD}, \text{EUR}, \text{GBP}, \text{JPY}, \text{CNY})$ of economy i in year t , and $x_{i,t-1}$ is a row vector of controls with θ column vector of coefficients. ε_{it} is the error term.

The regressors capture the economic ties between countries in the context of gravity-type regressions on international investment holdings, as well as the macroeconomic and financial volatilities in relation to the risk exposures, following Galstyan et al. (2020). The vector of controls includes the log of imports of economy i at time t from the economy with the reference currency to proxy for bilateral information flows and trade ties, domestic credit as a share of GDP, as well as the five-year rolling volatility of inflation to reflect macroeconomic volatility.

Following Galstyan et al. (2020), various measures of financial markets uncertainty and correlations across equity returns and bond yields are included as these tend to influence asset holdings in an incomplete market environment. For debt investment regressions, the controls include the annual volatility of weekly long-term bond yields and the annual correlation of weekly yields between country i and the country of reference currency. For equity investment regressions, the vector of controls also includes the annual volatility of weekly equity returns, and the annual correlation of weekly equity returns between

⁵ International equity assets include FDI equity and portfolio equity, while international debt assets and liabilities include portfolio debt (bonds) and other investments.

country i and the country of reference currency.⁶ In addition, the log of per capita GDP and the share of aggregate holdings in each asset class to GDP are added as additional controls. For all specifications, the regressors are lagged by one period (year) to reduce potential endogeneity due to reverse causality. The empirical specification (Equation 1 above) is estimated using ordinary least squares with time-fixed effects to control for global or common shifts across countries through time. Robust standard errors are used in the estimation. Equation 1 is estimated for debt asset and liabilities as well as equity assets. Currency shares for equity-type liabilities, including foreign direct and portfolio equity liabilities, are assumed to be denominated in local currency.

On data sources, the dependent variables refer to the currency shares of international investment assets and liabilities, taken from Benetrix et al. (2019). The currency shares for equity-type investment assets and liabilities are derived values, given the total and debt investment currency shares. For the regressors, bilateral imports are sourced from the IMF's Direction of Trade Statistics. Data on domestic credit provided by the financial sector to the private sector as a share of GDP, as well as per capita GDP in constant 2015 dollars are sourced from the World Bank's World Development Indicators. The macroeconomic volatility measure is computed as the five-year rolling standard deviation of the annual change in consumer price index from the IMF's World Economic Outlook. Weekly data on stock price indices, and long-term bond yields are sourced from Bloomberg and the CEIC Database. These indicators are used to derive the annual volatility of weekly equity returns, the annual correlation of weekly equity returns between country i and the country of the reference currency (US, euro area, UK, Japan, and China), the annual volatility of weekly long-term bond yields, as well as the annual correlation of weekly yields between country i and the country of the reference currency. Data on merchandise export and import US dollar invoicing is taken from Boz et al. (2022).

The complete dataset comprises 14 Asia and the Pacific economies with annual values over the period 2000 to 2017, totalling to around 260 observations. The Asia and the Pacific sample includes Australia; China; Hong Kong, China; India; Indonesia; Japan; Korea; Malaysia, New Zealand; Pakistan; the Philippines; Singapore; Sri Lanka; and Thailand.

Table 1 presents the descriptive statistics of the regressors. It shows that among the reference economies, the Asia and the Pacific sample has the least bilateral imports with the UK. For the regional sample, equity returns are more volatile than bond yields. Interestingly, bond yield and equity return correlations appear weakest with China, compared to US, euro area, and UK, perhaps implying that the region is more financially integrated with the rest of the world than within the region.

4. Empirical Results

Table 2 presents the results on the covariates for currency shares of international debt assets, which include FDI debt, portfolio debt, other investment, and official reserve assets. The estimates reveal that higher bilateral trade with the US and China are significantly associated with higher shares of USD and CNY in international debt holdings. This finding provides evidence of hedging of currency risk as noted by Obstfeld and Rogoff (2001). The results for UK and Japan have the opposite signs, showing that higher bilateral imports from UK and Japan are significantly associated with lower pound sterling and Japanese yen denominated debt asset holdings. Higher inflation volatility is

⁶ We measure equity returns as natural log changes for the weekly domestic equity price indices, and then take the yearly average of weekly returns to derive the annual values.

significantly correlated with higher shares of GBP and JPY debt asset holdings. This could be interpreted to suggest that investors in economies with high inflation volatility seek to hold safe-haven currencies as a potential hedge against price uncertainty (Benetrix and Lane, 2016). Higher volatility of domestic bond yield is significantly associated with greater proportions of international debt assets denominated in USD and CNY, but lower share for EUR. This provides evidence for an USD safe-haven status. The estimates in Table 2 also indicate that higher international debt holdings significantly covary with higher shares for USD and CNY, and lower shares for GBP and JPY. In addition, economies with higher per capita incomes tend to have lower share of debt assets denominated in US dollar but higher share denominated in GBP. Interestingly, apart from per capita income, factors that significantly covary with US dollar are the same as those which significantly covary with CNY.

For international debt liabilities, Table 3 shows that stronger bilateral trade with US, Japan, and China are significantly associated with higher shares of international debt liabilities denominated in USD, JPY, and CNY. This provides evidence linking bilateral imports with cross-border debt financing denominated in the currency of the import partner. However, the result is opposite for the euro. Higher macroeconomic volatility is significantly associated with higher shares of international debt liabilities in EUR, GBP, and JPY, and lower share for USD. Greater bond yield volatility is strongly associated with higher debt liabilities denominated in USD, while stronger correlation between domestic and Chinese bond yields is significantly associated with a higher share of debt liabilities denominated in CNY. Large external debt stock is strongly correlated with higher debt liabilities denominated in USD, JPY, and CNY, but fewer debt liabilities denominated in EUR. Lastly, more developed economies in the region tend to have a lower share of their international debt liabilities denominated in USD and JPY, but a higher share in EUR, suggesting that more advanced economies in the region have more diversified foreign currency denominated debt liabilities.

Table 4 presents the estimates for international equity assets. The results show that higher bilateral imports from the euro area, UK, and China are significantly associated with higher shares of EUR, GBP, and CNY in international equity holdings. The estimate for USD is insignificant, while that for JPY show the opposite sign. Higher macroeconomic volatility is significantly correlated with a higher share of EUR in the region's international equity assets, but a lower share for GBP. Greater volatility of domestic equity return is significantly associated with greater proportion of international equity assets denominated in CNY, but lower shares for EUR and GBP. The results also provide evidence that economies tend to invest in currencies of countries with similar domestic characteristics. In particular, the coefficient on the correlation between stock market returns is positive and significant for USD and EUR. This finding, while partly consistent with Lane and Milesi-Ferretti (2008) who reported positive and statistically significant coefficients for bilateral equity holdings, also highlights the importance of the currency of denomination in explaining the implications of synchronized returns for portfolio diversification, consistent with Galstyan et al. (2020). The results presented in Table 4 also show that higher international equity holdings significantly covaries with higher shares for GBP and CNY, and lower shares for USD, EUR, and JPY. Moreover, economies with higher per capita income tend to have a lower share of equity assets denominated in EUR and CNY but higher shares denominated in USD and JPY.

We extend the previous analysis by considering the significance of US dollar trade invoicing on the region's international debt holdings and liabilities as well as international equity assets. In the case of the US, the region's bilateral imports tend to

be lower compared to the share of the region's exports and imports invoiced in US dollar as shown by Mercado et al. (2022). Consequently, we estimate Equation (1) by using trade invoicing data for selected Asia and the Pacific economies taken from the Boz et al. (2022) dataset, instead of using bilateral imports data for the US. The results, presented in Table 5, indicate that a higher share of exports invoiced in USD is significantly associated with higher international debt assets and liabilities denominated in US dollar. In addition, a higher share of imports invoiced in USD is significantly correlated with a higher share of international debt and equity assets denominated in USD. Importantly, these findings on the region's currency composition of international investment debt and equity assets and liabilities, provide evidence for the hedging of currency risks, particularly in terms of the US dollar.

In summary, the results highlight the importance of economic ties and macro-financial volatilities in determining the currency composition of Asia's international investments, although there are differences across currency denomination. More importantly, the estimates provide evidence that the region hedges its currency risk by investing in US dollar denominated assets.

5. Concluding Remarks

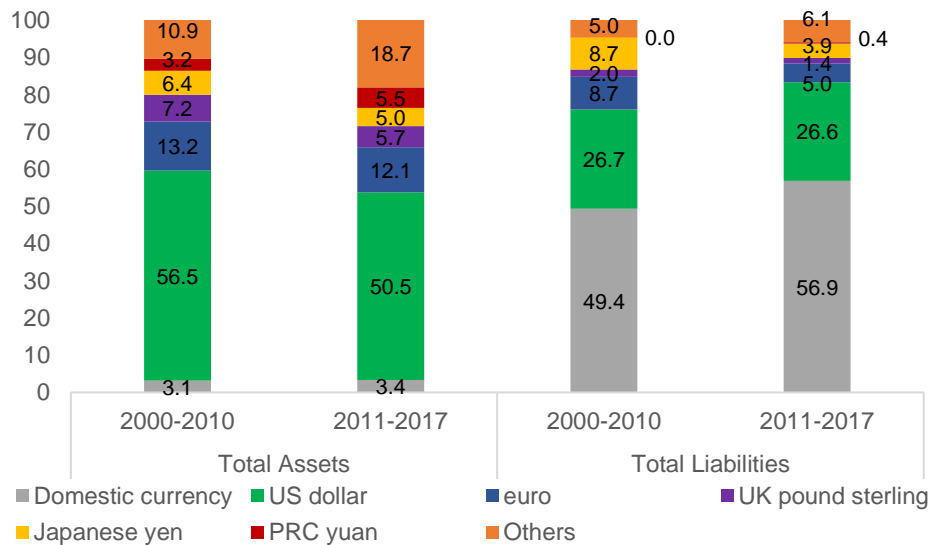
This paper aims to assess the relevant factors in explaining the shares of international debt and equity assets and liabilities denominated in five main currencies, namely: US dollar (USD), euro (EUR), British pound sterling (GBP), Japanese yen (JPY) and Chinese yuan (CNY). The findings shed light on the relevance of gravity-type factors such that the bilateral imports from the country with the reference currency are associated with larger holdings denominated in the currency of the reference country. Furthermore, the estimates indicate that domestic price uncertainty and the risk associated with asset price movements impact the currency shares of cross-border investments. However, these observations indicate heterogeneous patterns across currencies, as earlier suggested by Galstyan et al. (2020). More importantly, the results offer new evidence that Asia and Pacific economies hedge their currency risks by investing in US dollar denominated assets as greater US dollar trade invoicing significantly covaries with greater debt asset holdings denominated in US dollar.

The dominance of the US dollar in Asia's international investment assets and liabilities point to several risks, including US monetary policy spillovers and their impact on global liquidity and the balance sheet and welfare effects of large exchange rate fluctuations between the US dollar and local currency. The empirical results capture the hedging of currency risk as US imports are associated with larger share of debt assets denominated in USD. In this regard, sequencing of currency internationalization could consider the suggestions of Eichengreen (2010). From an empirical point of view, data on the currency composition of foreign assets can prove to be useful for macro-surveillance in understanding the distribution of macro-financial risks and propagation of international shocks. Moreover, understanding the heterogeneous significance of various macro-financial risks across currency holdings of international investment assets and liabilities warrants theoretical modelling and further empirical tests.

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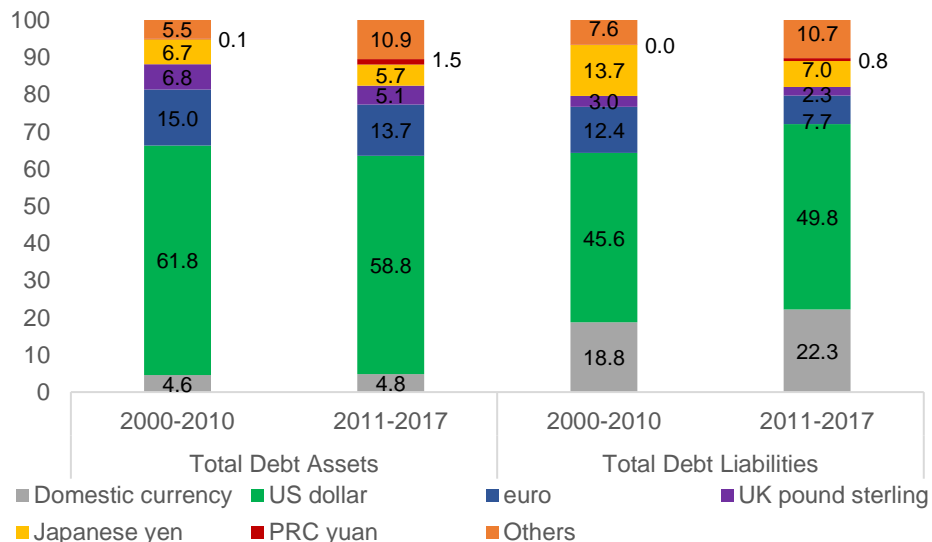
Figure 1. Total International Investment Assets and Liabilities Currency Shares, Asia and Pacific Economies (%)



PRC = People's Republic of China, UK = United Kingdom, US = United States.

Note: Values refer to average period averages. The economies included in the calculation are Australia; Hong Kong, China; India; Indonesia; Japan; Malaysia; New Zealand; Pakistan; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; and Thailand.

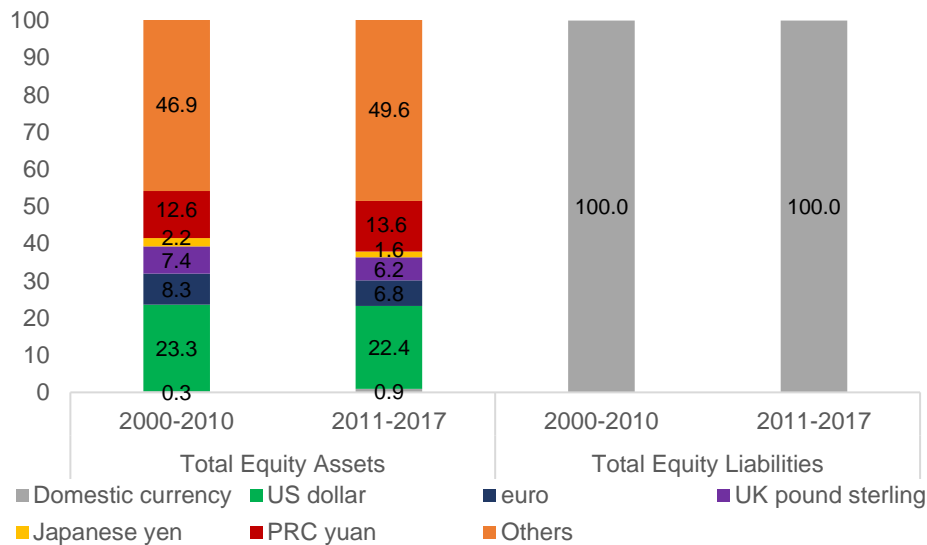
Figure 2: International Debt Assets and Liabilities Currency Shares, Asia and Pacific Economies (%)



PRC = People's Republic of China, UK = United Kingdom, US = United States.

Note: Values refer to average period averages. Debt includes FDI debt, portfolio debt, and other investments. Debt assets also include official reserves. The economies included in the calculation are Australia; Hong Kong, China; India; Indonesia; Japan; Malaysia; New Zealand; Pakistan; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; and Thailand.

Figure 3: International Equity Assets and Liabilities Currency Shares, Asia and Pacific Economies (%)



PRC = People's Republic of China, UK = United Kingdom, US = United States.

Note: Values refer to average period averages. Equity includes FDI equity and portfolio equity. The economies included in the calculation are Australia; Hong Kong, China; India; Indonesia; Japan; Malaysia; New Zealand, Pakistan, the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; and Thailand.

Table 1: Descriptive Statistics Regressors

Variable	Obs	Mean	Std. Dev.	Min	Max
Bilateral imports with US	266	2.21	0.18	1.63	2.48
Bilateral imports with Euro Area	266	2.22	0.15	1.79	2.50
Bilateral imports with UK	266	2.01	0.16	1.68	2.31
Bilateral imports with Japan	247	2.21	0.17	1.69	2.50
Bilateral imports with PRC	245	2.20	0.45	-2.26	2.52
Inflation volatility	266	2.31	3.84	0.22	31.83
Bond yield volatility	225	0.41	0.35	0.00	2.30
Equity return volatility	264	2.26	0.99	0.66	5.47
Bond yields correlation with US	222	0.45	0.51	-1.00	0.99
Bond yields correlation with Euro Area	222	0.43	0.50	-0.91	1.00
Bond yields correlation with UK	222	0.42	0.51	-1.00	0.99
Bond yields correlation with Japan	222	0.38	0.48	-0.93	1.00
Bond yields correlation with PRC	174	0.28	0.55	-0.88	1.00
Equity returns correlation with US	264	0.44	0.25	-0.41	0.91
Equity returns correlation with Euro Area	264	0.45	0.26	-0.30	0.91
Equity returns correlation with UK	264	0.44	0.26	-0.34	0.93
Equity returns correlation with Japan	264	0.44	0.28	-0.40	1.00
Equity returns correlation with PRC	264	0.24	0.28	-0.27	1.00
Debt assets %GDP	230	133.86	217.69	6.68	762.50
Debt liabilities %GDP	230	100.98	133.69	12.82	523.68
Equity assets %GDP	230	72.23	154.14	0.04	833.35
Per capita GDP	266	2.19	0.16	1.89	2.40

Notes: Bilateral imports and per capita income are in natural log values.

Source: Authors' calculations.

Table 2: Determinants of International Debt Asset Currency Shares

VARIABLES	(1) USD	(2) EUR	(3) GBP	(4) JPY	(5) CNY
L.bilateral imports	4.762*** (0.497)	-0.021 (0.351)	-0.875*** (0.262)	-0.448* (0.257)	0.462** (0.198)
L.inflation volatility	-0.537 (0.844)	-0.039 (0.469)	0.907*** (0.264)	1.282*** (0.369)	-0.062 (0.143)
L.bond yield volatility	10.921*** (2.594)	-4.621*** (1.629)	-0.962 (0.984)	-0.132 (1.426)	1.212* (0.703)
L.bond yields correlation	-2.992 (2.433)	-0.877 (1.322)	1.107 (0.722)	0.208 (1.114)	0.407 (0.305)
L.debt assets	0.020*** (0.003)	-0.002 (0.002)	-0.003*** (0.001)	-0.003*** (0.001)	0.003* (0.002)
L.per capita income	-5.260*** (0.774)	-0.157 (0.443)	1.237*** (0.262)	0.085 (0.322)	0.020 (0.128)
Observations	196	196	196	179	143
R-squared	0.472	0.203	0.223	0.222	0.354

Notes: The dependent variables are currency shares of USD, EUR, GBP, JPY, and CNY in international debt assets. Bilateral imports in natural log values refer to Asian economy with the economy who issues the specific currency. Inflation volatility refers to the 5-year rolling standard deviation of domestic inflation. Bond yield volatility is the annual standard deviation of weekly domestic bond yield. Bond yields correlation is the annual correlation between domestic bond yield and bond yield of the economy with reference currency. Debt assets are stock of total debt assets in percent of GDP. Per capita income is the natural log value of GDP per capita. All regressors are lagged by one period. All regressions include time dummies. ***, **, and * denote significance at 1%, 5% and 10%, respectively.

Table 3: Determinants of International Debt Liabilities Currency Shares

VARIABLES	(1) USD	(2) EUR	(3) GBP	(4) JPY	(5) CNY
L.bilateral imports	3.232*** (0.985)	-2.384*** (0.634)	-0.248 (0.188)	1.522*** (0.489)	0.219* (0.112)
L.inflation volatility	-3.095** (1.459)	3.922*** (0.827)	0.519* (0.295)	2.816*** (1.041)	-0.008 (0.084)
L.bond yield volatility	14.510*** (4.510)	-2.798 (3.273)	-1.004 (0.933)	0.500 (3.311)	0.536 (0.335)
L.bond yields correlation	1.219 (3.270)	-2.704 (1.732)	-0.193 (0.557)	0.478 (2.894)	0.371** (0.165)
L.debt liabilities	0.036*** (0.006)	-0.011*** (0.003)	-0.002 (0.001)	0.018*** (0.005)	0.004** (0.002)
L.per capita income	-3.630*** (1.123)	3.265*** (0.661)	0.356 (0.227)	-1.564** (0.785)	0.026 (0.088)
Observations	196	196	196	179	143
R-squared	0.201	0.362	0.080	0.346	0.402

Notes: The dependent variables are currency shares of USD, EUR, GBP, JPY, and CNY in international debt liabilities. Bilateral imports in natural log values refer to Asian economy with the economy who issues the specific currency. Inflation volatility refers to the 5-year rolling standard deviation of domestic inflation. Bond yield volatility is the annual standard deviation of weekly domestic bond yield. Bond yields correlation is the annual correlation between domestic bond yield and bond yield of the economy with reference currency. Debt liabilities are stock of total debt liabilities in percent of GDP. Per capita income is the natural log value of GDP per capita. All regressors are lagged by one period. All regressions include time dummies. ***, **, and * denote significance at 1%, 5% and 10%, respectively.

Table 4: Determinants of International Equity Assets Currency Shares

VARIABLES	(1) USD	(2) EUR	(3) GBP	(4) JPY	(5) CNY
L.bilateral imports	0.861 (0.862)	2.218*** (0.489)	1.038** (0.457)	-0.360*** (0.135)	1.440* (0.845)
L.inflation volatility	0.353 (0.549)	1.591*** (0.096)	-0.156* (0.083)	-0.027 (0.029)	-0.305 (0.221)
L.equity return volatility	-1.892 (1.385)	-1.775** (0.718)	-2.030** (0.789)	-0.022 (0.237)	3.109* (1.636)
L.equity returns correlation	27.485*** (5.339)	16.630*** (2.515)	1.347 (3.364)	2.253 (1.456)	5.156 (9.201)
L.equity assets	-0.064*** (0.005)	-0.011*** (0.002)	0.010*** (0.002)	-0.002** (0.001)	0.106*** (0.006)
L.per capita income	4.236*** (0.711)	-2.427*** (0.681)	-0.547 (0.478)	0.794*** (0.197)	-3.097*** (0.882)
Observations	215	215	215	198	202
R-squared	0.538	0.493	0.173	0.315	0.637

Notes: The dependent variables are currency shares of USD, EUR, GBP, JPY, and CNY in international debt liabilities. Bilateral imports in natural log values refer to Asian economy with the economy who issues the specific currency. Inflation volatility refers to the 5-year rolling standard deviation of domestic inflation. Equity return volatility is the annual standard deviation of weekly domestic stock price returns. Equity returns correlation is the annual correlation between domestic equity return and equity return of the economy with reference currency. Equity assets are stock of total equity assets in percent of GDP. Per capita income is the natural log value of GDP per capita. All regressors are lagged by one period. All regressions include time dummies. ***, **, and * denote significance at 1%, 5% and 10%, respectively.

Table 5: US Dollar Currency Share and US Dollar Trade Invoicing

Dependent Variable:	(1)	(2)	(4)	(3)	(5)	(6)
	Debt assets USD	Debt assets USD	Debt liabilities	Debt liabilities	Equity assets USD	Equity assets USD
Currency share trade invoice:	exports in USD	imports in USD	exports in USD	imports in USD	exports in USD	imports in USD
L.trade invoice in USD	0.386*** (0.109)	0.960*** (0.094)	0.492*** (0.061)	0.210 (0.167)	-0.093 (0.062)	0.248** (0.103)
L.Inflation volatility	0.512 (1.438)	1.095 (0.960)	2.095 (1.352)	1.058 (1.654)	0.267 (0.572)	0.177 (0.568)
L.bond yield (equity return) vol	3.034 (4.956)	3.127 (3.868)	1.191 (4.206)	12.097** (4.968)	-0.145 (1.661)	-1.726 (1.771)
L.bond yields (equity returns) corr	-8.348** (3.193)	-3.435 (2.450)	-1.977 (2.416)	-4.367 (3.189)	16.478** (7.899)	9.136 (8.048)
L.debt (equity) assets (liabilities)	0.149*** (0.052)	-0.151*** (0.038)	-0.234*** (0.035)	-0.207*** (0.068)	0.056 (0.068)	0.158* (0.085)
L.per capita income	-7.248 (10.599)	45.106*** (9.168)	54.206*** (10.225)	38.992*** (10.625)	34.642*** (10.896)	46.663*** (10.572)
Observations	108	107	108	107	111	110
R-squared	0.409	0.738	0.702	0.533	0.494	0.506

Notes: The dependent variables are US dollar currency shares in international debt and equity assets and liabilities. Exports and imports invoices in US dollar are sourced from Boz et al. (2022) dataset. Inflation volatility refers to the 5-year rolling standard deviation of domestic inflation. Per capita income is the natural log value of GDP per capita. All regressors are lagged by one period. All regressions include time dummies. ***, **, and * denote significance at 1%, 5% and 10%, respectively.