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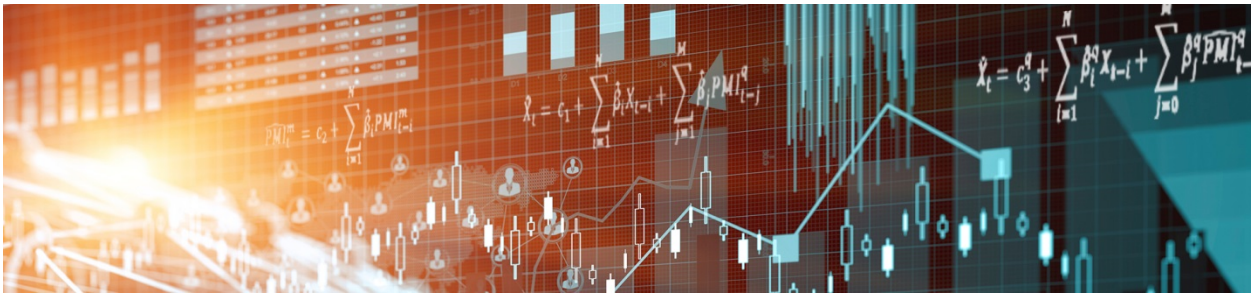
The Size and Destination of China's Portfolio Outflows



by Rose Cunningham, Eden Hatzvi and Kun Mo

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The Size and Destination of China's Portfolio Outflows

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Abstract

The size of China's financial system raises the possibility that the liberalization of its capital account could have a large effect on the global financial system. This paper provides a counterfactual scenario analysis that estimates what the size and direction of China's overseas portfolio investments would have been in 2015 if China had had no restrictions on these outflows. In such a scenario, China's holdings of overseas portfolio assets would have been between US$1.5 trillion and US$3.2 trillion (13 to 29 per cent of Chinese GDP), or 5 to 12 times its actual holdings of US$281 billion. Our model estimates that these additional holdings would have been predominantly directed to the world's deepest financial markets, especially the United States, while emerging-market economies would have received little additional portfolio investment. These results suggest that the liberalization of Chinese portfolio outflows may not prove disruptive to the global financial system, although it could have important implications for China.

Bank topics: Balance of payments and components; Econometric and statistical methods; International topics
JEL codes: C23, F21, G15, F32

Résumé

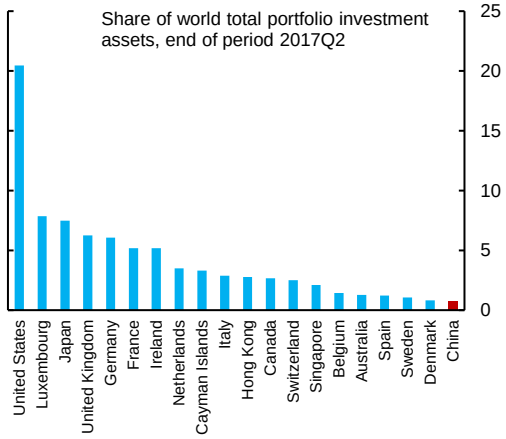
Vu la taille du système financier chinois, la libéralisation du compte de capital du pays pourrait avoir une grande incidence sur le système financier mondial. Cette étude s'appuie sur une analyse contrefactuelle pour estimer ce qu'auraient été la taille et la destination des placements étrangers de la Chine en 2015 si ces sorties de capitaux n'étaient soumises à des restrictions. Selon ce scénario, le portefeuille d'actifs étrangers de la Chine aurait été compris entre 1,5 et 3,2 billions de dollars US (de 13 à 29 % du PIB du pays), soit de 5 à 12 fois la taille du portefeuille actuel de 281 milliards. D'après les estimations de nos modèles, ces avoirs supplémentaires auraient surtout été investis dans les marchés financiers les plus profonds du monde, en particulier le marché des États-Unis. Les pays émergents, pour leur part, n'auraient reçu qu'une fraction limitée de ce surcroît. Ces résultats semblent montrer que la libéralisation des placements étrangers de la Chine ne perturberait pas le système financier mondial, mais pourrait avoir d'importantes conséquences pour le pays.

Sujets : Balance des paiements et composantes; méthodes économétriques et statistiques; Questions internationales
Codes JEL : C23, F21, G15, F32

1. Introduction

China's financial system is one of the largest in the world. However, unlike other large economies, its financial system is relatively closed, due to strict regulatory controls on both inflows and outflows of capital. In particular, portfolio flows are tightly controlled. Therefore, despite its large financial system, China invests very little in foreign financial markets (**Chart 1**). This generates economic distortions and costs since residents are restricted from fully diversifying their portfolios to include offshore investments. In addition, China's domestic formal financial markets are relatively undeveloped so there are few domestic investment vehicles beyond bank deposits, which pay low interest rates. These conditions, combined with China's high savings, have led to large increases and volatility in asset prices such as those for domestic real estate and stocks. The capital account restrictions have also shielded the Chinese financial system from competition, which likely makes it relatively inefficient (Kruger and Pasricha 2016).

Chart 1: Total international portfolio investment assets



Source: IMF CPIS database via Haver Analytics

Last observation: 2017Q2

Chinese authorities recognize these costs and aim to gradually liberalize China's capital account. This has led to growing interest among policy-makers and researchers. Opening up China's large and growing financial system could have a transformative effect on the international financial system in much the same way that China's ascension to the World Trade Organization affected the global economy (e.g., Lowe 2017; Kruger and Pasricha 2016).

This paper provides a counterfactual scenario analysis that estimates what China's portfolio asset allocation to various economies would be if China were to liberalize its capital account. We focus on portfolio flows since they are the more restricted elements of China's capital account and there is potential for Chinese residents to significantly increase their overseas portfolio investments. While recipient economies could benefit from these flows, they may have to manage the financial stability implications arising from capital inflow volatility. This is especially a concern for emerging-market economies (EMEs), as their financial markets are generally shallower. Thus, capital flow surges or sudden stops can have significant impacts on their financial markets and real activity.

Building on Forbes (2010) and Bayoumi and Ohnsorge (2013), we estimate panel models based on standard portfolio allocation factors as well as gravity-type variables. We then use these models to calculate the distribution of China's portfolio investments under various scenarios. We find that capital account liberalization could lead to a significant increase in China's holdings of offshore portfolio assets, about 5 to 12 times the current level, consistent with

existing estimates. Bilateral portfolio allocation depends on market size, governance indicators, the extent of capital controls and gravity variables, as well as global factors such as risk aversion. We estimate that Chinese portfolio allocation will be directed mostly toward the largest financial markets, such as the United States, the euro area and Japan. In contrast, smaller advanced economies and EMEs, including the Asian-Pacific EMEs that border China, would receive only minor inflows.

The main contribution of this paper is our estimated distribution of China's portfolio investment. To the best of our knowledge, this is the first paper that has attempted to estimate the country-specific patterns of bilateral portfolio investment from China to recipient countries. More broadly, our analysis contributes to understanding the determinants of bilateral capital allocation, and helps address the gap in the literature on portfolio outflows.

The remainder of the paper is structured as follows. Section 2 provides a brief literature review and section 3 describes the data. Section 4 outlines the paper's methodology and highlights the model's estimates. Section 5 describes how we apply the model's results to China for a scenario analysis on China's account liberalization and discusses the results of that analysis. Section 6 concludes.

2. Related literature

A large literature examines the size and direction of international capital flows, particularly flows from advanced economies to EMEs. Standard portfolio theory predicts that investors maximize expected returns for a given level of variance of those returns. In the international context, this implies that, with no costs to invest in a given country, each investor would hold a portfolio consisting of domestic and foreign assets in proportion to each country's share of world capital markets. However, when the marginal cost to invest in different countries is non-zero, investor holdings would differ from the world market portfolio.

Empirical work by Portes and Rey (2005), Lane and Milesi-Ferretti (2008) and Forbes (2010) shows that in addition to market size, an economy's asset allocation can depend on gravity-type variables, capital controls and governance. Even after controlling for these factors, portfolio allocations differ from global market shares, with economies displaying significant home bias. Koepke (2015) and Guichard (2017) provide excellent reviews of the literature on determinants of inflows or outflows. Koepke (2015) finds that EME portfolio inflows are positively affected by asset return indicators in the recipient country and interest rate and growth rate differentials between the recipient and source countries. Increases in global risk aversion (proxied by the Volatility Index [VIX]) have a negative effect, as do increases in country-specific risk indicators. Guichard (2017) notes that several recent studies that model cross-border flows also include financial development and financial openness of recipient countries as explanatory variables. Eichengreen, Gupta and Masetti (2017) find that portfolio outflows respond negatively to increased global risk aversion and that EME outflows have become more sensitive to global risk aversion measures over time.

Several papers estimate the potential size of global asset reallocations following China's capital account liberalization. One set of papers calculates the potential effect of capital account

liberalization by assuming that either China's stock of asset holdings or the level of capital flows converge to some metric. For example, Hooley (2013) assumes that the stock of China's international investment position (IIP), both assets and liabilities as a share of gross domestic product (GDP), converges to that of the United States. This, combined with forecasts for China's GDP and an assumption of declining home bias, leads him to estimate that by 2025 China's IIP would increase by 25 percentage points of GDP from 2012 levels. Similarly, Kruger and Pasricha (2016) assume that the stock of China's private assets and liabilities as a share of GDP converge to the G20 average. This would lead to an increase of US$9.8 trillion in China's private asset holdings and US$10 trillion in China's private liabilities over 20 years. Hatzvi, Meredith and Nixon (2015) calculate that if China's gross portfolio flows were 5 per cent of its GDP—consistent with that of South Korea and Malaysia—they would have amounted to US$530 billion in 2015. This would have been equivalent to 20 per cent of global portfolio flows, substantially higher than China's actual share of 7 per cent of gross flows in 2015.

Another group of papers project the effects of China's capital account liberalization by estimating regression models using data from a panel of economies (excluding China) and then applying the estimated coefficients to China. He et al. (2012) estimate separate regressions for portfolio inflows and outflows as functions of capital account openness, trade openness, market development, GDP, the savings rate and the equity return differential with the United States. They find that capital account liberalization would have led the stock of portfolio assets to increase by 25 percentage points of GDP from 2010 to 2020, or US$5.2 trillion. The corresponding estimate for inflows was 16 percentage points of GDP, or US$3.7 trillion. Similarly, Sedik and Sun (2012) estimate separate regressions for capital inflows and outflows as a function of capital controls, economy risk, interest rates and GDP. Applying the results to China, they find that had China partially liberalized its capital account starting in 2012, capital inflows and outflows would have increased by US$380 billion and US$240 billion, respectively, by 2016.

Bayoumi and Ohnsorge (2013) estimate a model (building off Forbes 2010) with gravity-type variables to explain an economy's asset allocation—notably distance and trade—as well as an economy's financial development variables, i.e., size of financial markets as a share of global markets, capital account openness, governance, return differentials and return correlations. They find that applying the estimated coefficients to China implies that capital account liberalization would increase China's foreign asset holdings by 15 to 25 percentage points of GDP (i.e., by US$2.0 trillion to US$3.2 trillion, using 2017 GDP), while China's foreign liabilities would increase by 2 to 10 percentage points of GDP (US$0.3 trillion to US$1.3 trillion).

3. Data

We analyze data on the stock of bilateral investment positions between countries from the International Monetary Fund (IMF) Coordinated Portfolio Investment Survey (CPIS) data set. These annual data are available for both advanced and emerging-market economies. We are particularly interested in the relationship between bilateral portfolio allocations and the role

of capital controls. The next section discusses some recent data on global portfolio investment and the extent of capital controls.

For the panel model estimation, our sample contains data from 39 countries, including 20 advanced economies and 19 EMEs, for 2005 to 2013. Specifically, we have 732 bilateral pairings for a regression on equity allocations and 835 bilateral pairings for a regression on debt allocations. Our fully balanced panels contain 6,588 observations for equity regressions and 7,515 observations for debt regressions.[1] As in other studies, we exclude observations involving offshore financial centres as defined by the IMF (Luxembourg, Switzerland, Singapore and Hong Kong). The inclusion of data from financial centres can distort the analysis on the relative importance of different determinants of international portfolio allocations; their international investment flows stem from their role as intermediaries in the global financial system so their financial services sectors operate (by definition) on a scale that is much larger than their domestic economies would imply. Similarly, China is not included in our estimations due to limited data on China in the CPIS data set. Therefore, we estimate the model and apply the coefficients to China to predict China's outflows.

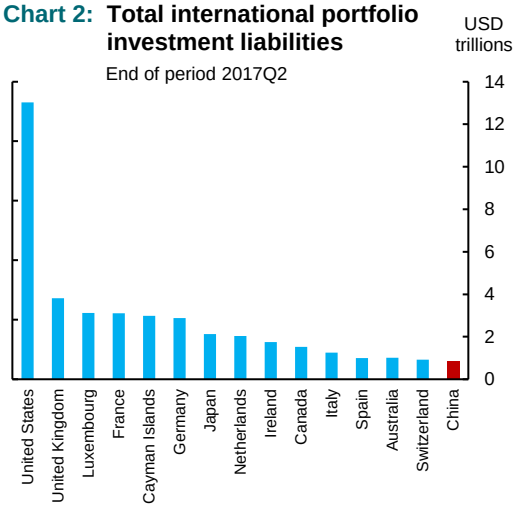
Appendix A provides further details on data sources, countries and variable construction. Summary statistics for the estimation sample are given in **Table A-3** and **Table A-4**.

Patterns of global portfolio investment

Overseas portfolio investments are typically directed to the largest markets (**Chart 2** and **Chart 3**). The United States is the main recipient of portfolio inflows, accounting for over half of the stock of global portfolio investment in 2016 as it accounts for 40 per cent of global equity and bond market capitalization. Other large financial markets such as those in the euro area and Japan also receive considerable inflows. In contrast, EMEs make up a small share of global equity and bond market capitalization and also receive a small share of global portfolio allocation.

[1] We create a fully balanced panel, so pairings with any missing observations were dropped from the sample.

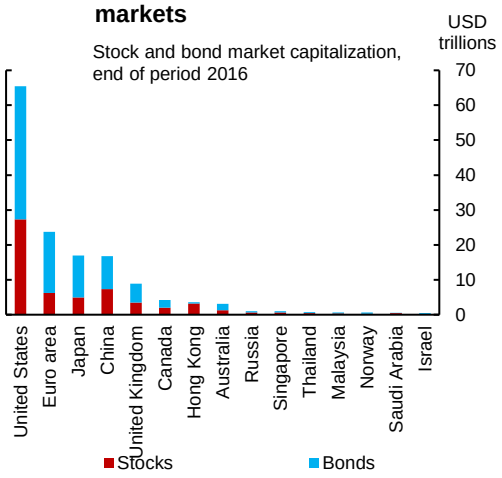
Chart 2: Total international portfolio investment liabilities



Source: IMF CPIS database via Haver Analytics

Last observation: 2017Q2

Chart 3: Size of major debt and equity markets



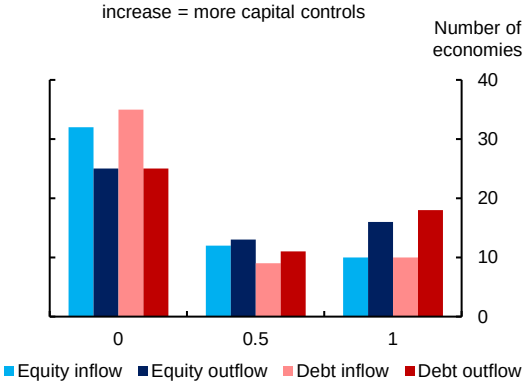
Sources: IMF, BIS and World Bank via Haver Analytics

Last observation: 2016

Although portfolio theory suggests that investors should hold a world market portfolio, in practice, portfolio investments are disproportionately allocated to home markets, consistent with previous findings of home bias (see Coeurdacier and Rey 2013, among others). In particular, we find that on average, less than one-third of a country's equity and debt investment portfolio is allocated to foreign economies and the share of the portfolio invested in a foreign economy is on average about three times smaller than the share of that foreign market in the world. The summary statistics show that specific bilateral investment allocations are typically relatively small. Less than 1 per cent of a country's total equity investment goes to another country on average, while an average of 2 per cent of its total bond investment is allocated to a given destination country.

While global portfolio flows are sizable, they are affected by outflow capital controls in source economies and inflow controls in destination economies. We use capital control classifications from Fernández et al. (2015), whereby capital flow restrictions are sorted into three regimes: 0, 0.5 and 1, with 0 representing an economy mostly open to portfolio inflows/outflows. Roughly half the country-year observations in our data are classified as having low levels of portfolio capital controls (either inflows or outflows), and the other half are roughly evenly split between medium and high levels of capital controls (**Chart 4**). Importantly, medium and high levels of capital controls tend to occur in EMEs. China is classified as having a high level of controls.

Chart 4: Distribution of capital control indexes



Source: Fernández et al. 2015

Last observation: 2013

4. Panel model estimates of portfolio outflows

Model

We follow Forbes (2010) and Bayoumi and Ohnsorge (2013) and estimate a model of international portfolio asset allocation in which the allocation determinants reflect investment returns and costs. Specifically, we estimate the following panel regression model twice—once for equity and once for debt portfolio assets:

$$S_{ijt} = \beta_1 M_{jt} + \beta_2 K_{it} + \beta_3 K_{jt} + \beta_4 G_{it} + \beta_5 G_{jt} + \beta_6 D_{ij} + \beta_7 TrGDP_{ijt} + \beta_8 MGDP_{it} + \beta_9 MGDP_{jt} + \beta_{10} RD_{ijt} + \beta_{11} RC_{ijt} + \theta' Z_{i,j,t} + \delta_t + \varepsilon_{ijt} \quad , \qquad (1)$$

where the dependent variable, S_{ijt}, is the share of economy *i*'s total equity or debt assets (domestic and foreign) that is invested in economy *j*. The first explanatory variable, M_{jt}, is *j*'s share of the global equity or bond market. In a frictionless world, asset allocations should reflect the size of an economy's financial markets relative to global markets, and the estimated coefficient would be 1. However, since most economies display significant home bias (among other frictions), the coefficient is expected to be less than 1.

We also include a set of variables to capture policy-related determinants of overseas portfolio allocation. In particular, we include capital outflow restrictions in the source economy (K_{it}) and inflow restrictions in the destination economy (K_{jt}), both of which should increase costs to investors and lower portfolio allocations. The other policy-related variables are governance standards (*G*) in the source and destination economies. Following Forbes (2010) and Bayoumi and Ohnsorge (2013), we construct an index of governance using the first principal component of the level of the six governance indicators published by the World Bank.

Our expectation is that portfolio allocation will be higher for a destination economy with better governance. However, the expected sign for governance in the source economy is ambiguous. Good governance at home lowers the relative cost of investing at home, and therefore could reduce bilateral investment in any foreign economy. In contrast, better-governed economies tend to have fewer restrictions on portfolio outflows, implying a positive coefficient.

Next, we include two gravity-type variables to proxy for closeness between economies *i* and *j,* as these ties could reduce asymmetric information costs for investors: distance, D_{ij}; and bilateral trade as a share the source economy's GDP, $TrGDP_{ijt}$. A source economy is expected to invest more in a destination economy that is geographically closer and with which it has more trade links.

We also include several measures of financial market development and market factors that the literature indicates could affect bilateral portfolio allocation. The larger the size of the equity/debt market as a share of GDP (*MGDP*), the greater the liquidity, the lower the cost of investing and the higher the allocation to that country. An increase in return differentials (RD_{ijt}), calculated as the return in the source economy less destination returns, is expected to decrease the allocation to the foreign economy, implying a negative coefficient. Increases in return correlations, (RC_{ijt}), are expected to lower *i's* allocation to *j*, as the benefits from diversification are reduced.

Finally, $Z_{i,j}$ is a vector of other controls: GDP growth in both the source and destination economies, a dummy variable for advanced economies, and global risk aversion measures (VIX and 10-year US Treasury yields).[2] ε_{ijt} is the error term.

Estimation strategy

In estimating the model in equation (1), two main econometric challenges can arise: the potential heteroskedasticity across the economy pairs; and potential auto-correlation in the error terms. The latter may occur due to the relatively slow adjustment of the explanatory variable, as well as limited time variation within each economy pair for some of the explanatory variables (e.g., distance). As in Forbes (2010) and Bayoumi and Ohnsorge (2013), we address these concerns by estimating the model using a feasible generalized least squares (FGLS) estimator, which controls for heteroskedastic error terms, as well as auto-correlated error terms within each bilateral pairing (but assumes error terms are uncorrelated across pairings). The auto-correlation is assumed to follow a simple AR(1) process and can vary across economy pairings. We do not include a constant in our preferred FGLS specifications, reflecting the presence of variables that have little within-panel time variations (i.e., distance) and global variables that have no across-panel variations (i.e., VIX and 10-year US Treasury yields).

Stationarity is less likely to be a concern in estimating our model as the panel data set has a large cross-sectional dimension and many of our variables are represented in ratios rather than levels. Indeed, using the panel unit root test proposed by Pesaran (2007), we find all variables to be stationary.

As a robustness check, we also present a specification with time dummies (one per year); these are meant to control for any aggregate trends that may occur. The time dummies are found to be highly significant and appear to pick up the dampening effects of the financial crisis on cross-border portfolio flows (i.e., we find large negative time effects for 2008 and 2009). The estimated coefficients in this alternative specification are consistent with the preferred specifications, except for variables that vary across time but not across pairings (i.e., the VIX and 10-year US Treasury yields).

In another robustness check, we estimate our model using a random-effects methodology with a robust estimator by clustering on each economy pairing. The random-effects approach is less efficient than the FGLS approach, but does not require a strong assumption regarding the true nature of heteroskedasticity in the data. In addition, a panel-level constant is included with these specifications. Results from this alternative estimation approach are shown in **Table B-2** of Appendix B. The signs on the coefficients are broadly similar across the two different methodologies, although the estimated coefficient for capital flow restrictions tends to be larger in the random effects estimation. This means that the random effects model implies larger portfolio outflows from China upon liberalization.

Since the bilateral holdings or the denominator in the dependent variable may be a component of the measures of financial market development (*MGDP*) in the source or destination

[2] The 10-year US Treasury yield is included only in the equity regressions.

variable, we also estimate versions of our preferred specification using instrumental variables. Following the approach of Bayoumi and Ohnsorge (2013), we instrument equity market size by stock market value traded as a percentage of GDP, and bond market size is instrumented by private debt as a share of total domestic debt outstanding.[3]

Finally, we are interested in obtaining the predicted shares of total portfolio investment allocated abroad. Unfortunately, the FGLS estimator does not constrain the predicted values to be between 0 and 1. We therefore also estimate the model and obtain predictions from a panel generalized estimating equation (GEE) model with a probit link, which assumes the dependent variable has a binomial distribution. The signs on the estimated coefficients are largely similar across the two estimators, although the GEE model finds geographical closeness is an even more important determinant for portfolio allocation than in the FGLS results.

Baseline model results

The results from the baseline regressions for both equity and debt are broadly in line with our priors (**Table 1** and Appendix B) and with previous studies. Moreover, the main results are robust to the inclusion of time fixed effects.

As expected, the estimated coefficient on the destination economy's share of global financial markets is economically and statistically significant for both equity and debt regressions. **Chart 5** shows the predicted allocation share when each variable is set to the sample mean value. The share of the global financial markets variable ranks below governance in the source economy and distance using this metric. However, major markets such as the United States are much larger than the mean, such that the size of the coefficient directs predicted asset allocations to these markets. The size of the coefficient on global market share is consistent with Bayoumi and Ohnsorge (2013). The estimated coefficient is also statistically different from 1, suggesting a preference for home bias even though our regressions have already controlled for a number of market-specific characteristics.

[3] The results for these robustness tests are shown in Appendix B and they are very similar to our preferred specifications. The correlation of the equity instrument with equity market cap as a share of GDP is 43 per cent, while its correlation with the dependent variable is low at -7 per cent. First-stage regressions generate highly significant coefficient estimates of 0.33 and 0.35, for source and destination economies, respectively. For bond markets, the correlation of the instrument variable with total debt outstanding as a share of GDP is 33 per cent, while its correlation with the dependent variable is just 13 per cent. First-stage regressions generate highly significant coefficient estimates of 0.36 and 0.56, for source and destination economies, respectively.

Table 1: Estimated coefficients of preferred specifications

	Equity		Debt	
	Baseline	**With time dummies**	**Baseline**	**With time dummies**
Destination market cap (% of world market cap)	0.121***	0.126***	0.092***	0.104 ***
Outflow restriction in source	-0.044***	-0.050***	-0.098***	-0.139***
Inflow restriction in destination	0.028**	0.018	0.011	-0.112***
Governance in source	0.168***	0.149***	0.250***	0.230***
Governance in destination	0.021***	0.010	0.025***	0.014
Distance	-0.058***	-0.137***	-0.050***	-0.429***
Bilateral trade (% of source GDP)	0.136***	0.134***	0.161***	0.110***
Market cap in source (% GDP)	-0.001***	-0.001***	-0.003***	-0.003***
Market cap in destination (% GDP)	0.000***	0.000	0.000	-0.002***
Return differential	-0.002*	-0.002**	N.A.	N.A.
Return correlation	0.148***	0.103***	N.A.	N.A.
Real GDP growth in source	-0.003***	0.000	-0.006***	-0.001
Real GDP growth in destination	-0.004***	-0.002*	-0.004***	0.002
VIX	-0.003***	0.064***	-0.003***	0.28***
US 10-year Treasury yield	0.004	-0.015*	N.A.	N.A.
Dummy for advanced economies	0.097***	0.090***	0.500***	0.356***
Wald statistics	2055	2074	2428	2147

Notes: The dependent variable is the share of economy *i*'s total portfolio investment (domestic and foreign) in economy *j*. The model is estimated with panel FGLS estimation. *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. The Wald statistics show estimated coefficients are jointly significant. Results shown in this table correspond to specifications 1, 2, 6 and 7 shown in Appendix B, which provides further details on estimation results and alternative specifications.

In line with previous literature on the gravity effects on asset allocation, we find that closeness between two economies, either in terms of geographic distance or their trading relationship, tends to boost cross-border portfolio investment. Specifically, the estimated coefficients on distance and relative trade shares carry the expected signs and are statistically significant in most specifications, with distance estimated to be economically more important than trade at the sample mean values.

In terms of capital controls, outflow restrictions at the source economy tend to lower cross-border equity and debt investment and this effect is statistically significant and robust to various model specifications. Conversely, inflow restrictions at the recipient economy do not seem to be as effective, as they are not statistically significant and often do not have the expected sign. These findings are consistent with those of Portes and Rey (2005), Lane and Milesi-Ferretti (2008), Forbes (2010) and Bayoumi and Ohnsorge (2013).

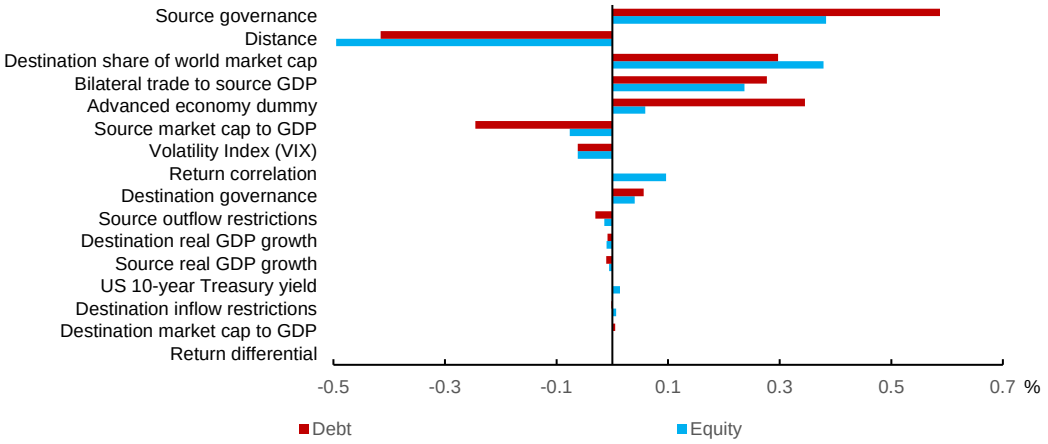
As expected, improvements in governance in the destination country increase the foreign investment allocated to that country, though the effect is economically small. In contrast, the large and significant positive coefficient estimate for the source economy's governance variable suggests better-governed economies are more likely to have greater portfolio investment abroad, allowing their residents to diversify their portfolios or seek higher returns

abroad. This “hands-off” approach toward capital outflows seems to dominate any increased incentive to invest at home as governance improves.

One potentially important issue is the high degree of contemporaneous correlation of -0.55 between the governance measures and capital controls.[4] Since the governance measures exhibit greater variation compared with capital control measures (which have only three regimes), their estimated coefficient may be capturing some of the variation that is attributable to capital controls. Indeed, the estimated coefficient on capital controls is four to five times larger in specifications that exclude the governance measures. Alternative specifications that exclude the governance measures are shown in Appendix B.

Chart 5: Relative importance of regression coefficients

Coefficients multipled by variables' sample mean values, bilateral share of source country's total assets



Source: Bank of Canada calculations

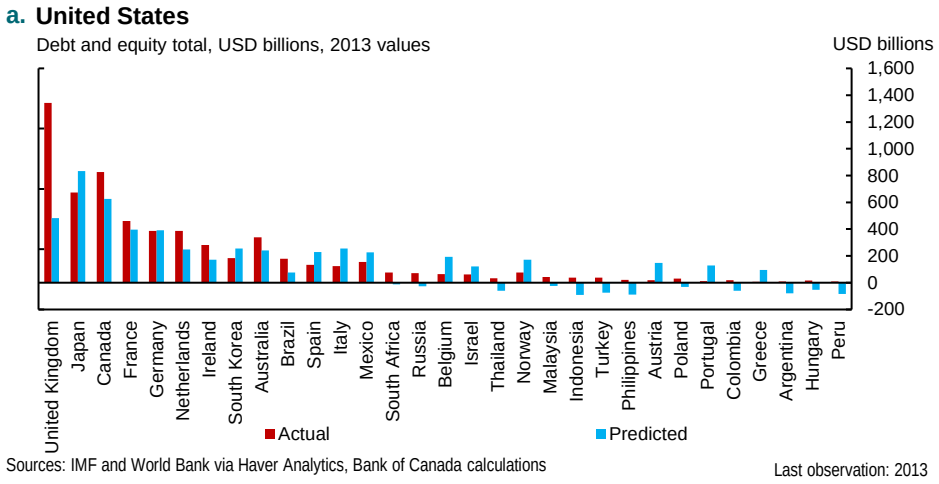
The coefficients on market capitalization as a share of GDP in the source and destination economies are generally of the anticipated sign, but not statistically significant in all specifications. This is similar to the findings of Bayoumi and Ohnsorge (2013), but in contrast to Forbes (2010), who estimates a sizable and statistically significant negative coefficient on this variable in the source economy (but with only the United States as the modelled destination).

As in previous papers, we find a positive and statistically significant coefficient on the correlation of returns, inconsistent with diversification motives. It’s possible that the correlation variable is picking up information asymmetries that are not captured by the gravity variables (Bayoumi and Ohnsorge 2013). The variables capturing return differentials are also insignificant, broadly consistent with Bayoumi and Ohnsorge (2013) but in contrast to Forbes (2010). A pickup in global risk sentiment, as proxied by the VIX, tends to lower cross-border investment. In contrast, the coefficient on the US 10-year Treasury yield is small and not of the expected sign.

[4] All six World Bank governance indicators are also individually highly correlated with capital controls.

Overall market depth, policy variables and closeness measures appear to be the main determinants of shares of portfolio investment (**Chart 5**). Robustness tests indicate that our results are broadly consistent across different estimators (FGLS, random effects and panel GEE). The model appears to explain the data fairly well.[5] The Wald statistic for the joint significance test of all variables is strongly significant in all specifications. The residuals are generally small relative to the standard deviations of our dependent variables (summary statistics on the residuals are reported in **Table B-3** and **Table B-4** of Appendix B). However, when we analyze the results by source country, we see the models tend to overpredict foreign asset holdings for advanced economies but underestimate holdings for EMEs. Our models can also make fairly accurate in-sample predictions for portfolio allocations of various source economies. The overall correlation between actual and predicted allocations for the whole sample is 0.39 for equities and 0.59 for debt. By country, the correlations vary more widely, in part because some countries, especially EMEs, can have few bilateral investment partners so the model performs less well. For countries where we have many observations and many investment relationships, we see high correlations between actual and predicted allocations. For example, the predicted international portfolio allocations for the United States, Canada and South Korea in 2013 are broadly in line with actual values (**Chart 6**).

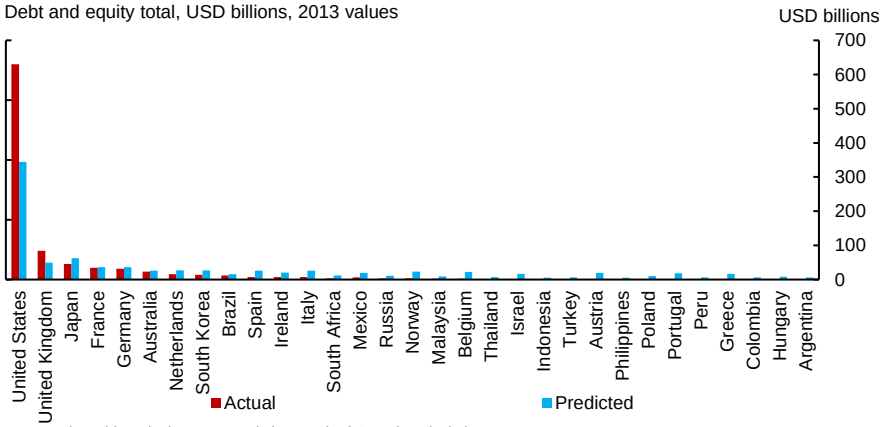
Chart 6: Foreign asset holdings by destination



[5] Random effects estimation results are shown in Appendix B and GEE results are available upon request from the authors. There is no standard goodness-of-fit measure for FGLS regressions; however, as in previous studies that use this estimator, we report the Wald statistic and review the actual and predicted values.

b. Canada

Debt and equity total, USD billions, 2013 values

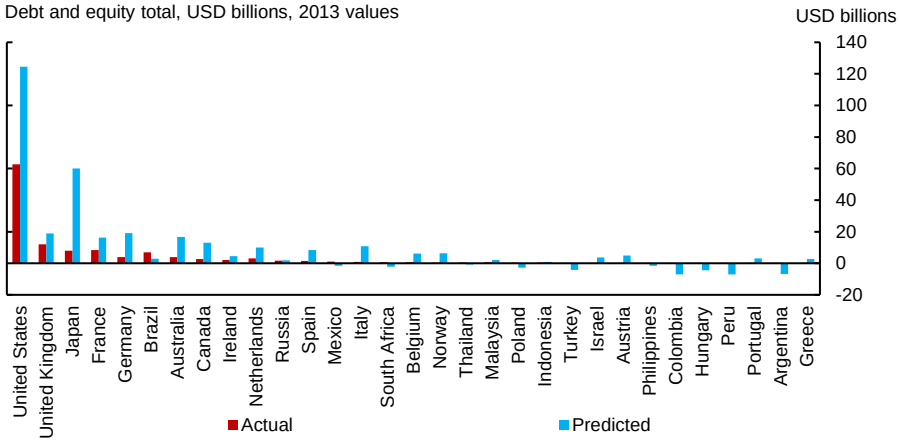


Sources: IMF and World Bank via Haver Analytics, Bank of Canada calculations

Last observation: 2013

c. South Korea

Debt and equity total, USD billions, 2013 values



Sources: IMF and World Bank via Haver Analytics, Bank of Canada calculations

Last observation: 2013

5. Predicting China's portfolio outflows: scenario analysis

Methodology

Next, we estimate the size and direction of China's portfolio investment abroad in both full and partial capital account liberalization scenarios. Note that these scenarios are not meant as a forecast for any specific time in the future, as such a forecast would involve projecting how each of the independent variables would evolve for China and for receiving economies. Rather, this exercise is meant to provide a sense of the marginal changes from China's liberalization of portfolio outflows. Moreover, this is a partial equilibrium exercise. We do not capture potential feedback from possible changes in the patterns of gross portfolio inflows. Nor do we attempt to model any related changes that may occur to other components of the capital account as investors reallocate from one type of capital to another.

Table 2: Distribution of governance quality measure by degree of capital outflow restrictions

	Mean	25th percentile	Median	75th percentile
Level of equity outflow restrictions				
Low	3.0	2.0	3.2	4.0
Medium	2.1	0.9	3.1	3.7
High	0.5	-0.6	0.0	1.2
Level of debt outflow restrictions				
Low	3.2	2.1	3.3	4.1
Medium	2.1	0.7	3.1	3.6
High	0.2	-0.6	-0.2	1.0

Note: China had a governance score of -1 in 2015. For the scenario analysis, we assume governance in China will improve to 0.5 and 3.0, which are the average scores of economies with high levels of equity outflow restrictions and low levels of equity outflow restrictions, respectively.

To construct these scenarios, we apply the estimated coefficients from our preferred models (**Table 1**; columns 1 and 5 of **Table B-1**) and use data from 2015 for the variables. Specifically, we first assume that all the explanatory variables take on their 2015 values in all the potential destination economies.[6] We then need to make appropriate assumptions for China. For the capital outflow restrictions variable, we assume the variable takes the value of zero for China in the full liberalization scenario and 0.5 for the partial liberalization scenario. In addition to capital controls, the regression results indicate that quality of governance in the source economy (China) will be an important determinant of portfolio investment allocated abroad. As noted above and shown in **Table 2**, stronger capital outflow controls are correlated with weaker governance in the source economy. (**Table 2** provides more detail on the governance measure values for different degrees of capital controls.) The calculations for China's capital outflows in the liberalization scenarios will be sensitive to assumptions about its governance (as well as its capital controls). We therefore report a range of results, based on different assumptions for China's governance variable.[7] For the low end of the range, we assume that governance measures in China take a value of 0.5, equal to the average for economies in our sample that have a high level of equity outflow restrictions (**Table 2**). For the high value of the

[6] 2015 is the last year for which we have data for most explanatory variables. Capital control measures reported by Fernández et al. (2015) were available only through 2013, and we simply assume they remained unchanged from their latest values.

[7] As another approach to develop appropriate governance measure values, we also estimate an ordered probit model to predict the thresholds of our measure of governance associated with the three capital account openness classifications. The model estimates a threshold of around -0.4 for switching between a capital account classification of 1 (most restrictive) to 0.5 (half-restricted), and a threshold of around 0.4 for switching between 0.5 and 0 (the exact threshold varies depending on equity and debt restrictions and the treatment of outliers). While the coefficient on governance is statistically significant, the model struggled to predict the economies in the half-restricted classification, likely because that classification has the widest variance in terms of governance.

governance measure we assume China's governance is 3.0, equivalent to the average of sample economies with a low level of equity outflow restrictions.[8]

Liberalization scenario results

We estimate that if China had no portfolio capital account restrictions in 2015, its holdings of offshore portfolio assets would have been US$1.5 trillion to $3.2 trillion (13 to 29 per cent of 2015 GDP), of which over half would be allocated to debt markets (**Table 3** and **Table 4**).[9] These estimates are US$1.2 trillion (10 percentage points of GDP) to US$3 trillion (27 percentage points of GDP) higher than actual offshore portfolio assets in 2015. These results suggest that if China were to fully liberalize its capital account, its investments in overseas financial markets would increase significantly. Our results are consistent with previous papers.[10] He et al. (2012) estimate that by 2020 China's holdings of offshore foreign portfolio assets would increase by 25 percentage points of GDP from 2010 levels; Bayoumi and Ohnsorge's (2013) estimate is that China's asset holdings would increase to 15–25 per cent of GDP.

The estimate for China's overseas asset holdings does not change commensurately under a partial liberalization scenario, reflecting the importance of the governance variable. Specifically, in our baseline scenario China's offshore asset holdings increase by between US$1.1 trillion and US$2.8 trillion (10 to 25 percentage points of GDP), which is only US$0.1 trillion less than in the full liberalization scenario.

[8] Our assumptions on governance in the equity and debt scenario analysis are based on the average score according to the level of equity outflow restrictions. Results do not change materially if we assume governance to take on the average score according to the level of debt outflow restrictions.

[9] Our models predict that in 2015 China would not have had any international portfolio allocation with its actual level of portfolio restrictions and governance measures, reflecting China's relatively poor score on both of these indicators.

[10] The results from the FGLS estimation are also quite comparable to those we obtain using the predictions from the GEE estimation. The GEE predictions indicate China's total outbound equity investment would be $1.8 trillion (16 per cent of GDP) upon full liberalization and substantially better governance, compared with a fitted value of $0.7 trillion for 2015 (7 per cent of GDP). We interpret this as additional equity outflow of $1.1 trillion (10 per cent of GDP) due to liberalization. The GEE predictions indicate China's total outbound debt investment would be $2.3 trillion (20 per cent of GDP) upon full liberalization and substantially better governance, compared with a fitted value of $0.2 trillion for 2015 (2 per cent of GDP). We interpret this as additional debt outflow of $2.0 trillion (18 per cent of GDP) due to liberalization. In total, the GEE model predicts additional portfolio outflows of $3.1 trillion (28 per cent of GDP) at the upper bound, which is in line with the FGLS results shown in **Table 2** and **Table 3**. For the sake of brevity, we do not present the GEE estimation and prediction results here, but they are available from the authors upon request.

Table 3: China's international equity assets by destination

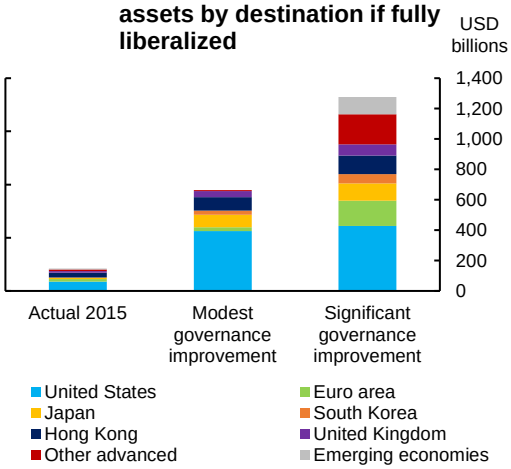
	Actual 2015		Full liberalization and modest improvement in governance		Full liberalization and significant improvement in governance	
	USD billions	% of destination equity market	USD billions	% of destination equity market	USD billions	% of destination equity market
United States	62	0.2	394	1.4	427	1.6
Euro area	16	0.3	25	0.4	179	2.9
Japan	8	0.2	81	1.6	114	2.3
South Korea	2	0.2	28	2.2	60	4.8
Hong Kong	32	1.0	89	2.8	121	3.8
United Kingdom	9	0.3	41	1.2	74	2.1
Australia	3	0.2	3	0.2	35	2.8
Canada	2	0.1	2	0.1	35	1.8
Taiwan	0	2.1	0	0.0	31	367.5
Singapore	1	0.2	0	0.0	33	5.1
Other advanced economies	4	0.2	0	0.0	61	3.2
Advanced economies	**141**	**0.3**	**663**	**1.3**	**1,139**	**2.2**
Emerging markets	**6**	**0.1**	**0**	**0.0**	**115**	**1.6**
Total	**147**	**0.2**	**663**	**1.1**	**1,253**	**2.1**

Table 4: China's international debt assets by destination

	Actual 2015		Full liberalization and modest improvement in governance		Full liberalization and significant improvement in governance	
	USD billions	% of destination debt market	USD billions	% of destination debt market	USD billions	% of destination debt market
United States	50	0.2	338	1.1	384	1.2
Euro area	4	0.0	137	1.2	633	5.6
Japan	2	0.0	141	1.2	187	1.6
South Korea	1	0.1	45	3.2	91	6.4
Hong Kong	26	10.0	44	16.8	90	34.5
United Kingdom	3	0.1	27	1.3	73	3.5
Australia	3	0.2	23	1.8	69	5.3
Canada	1	0.1	17	1.3	63	4.8
Singapore	1	0.7	12	6.4	58	30.1
Other advanced economies	1	0.0	11	0.7	238	15.6
Advanced economies	**93**	**0.1**	**796**	**1.3**	**1,887**	**3.0**
Emerging markets	**2**	**0.1**	**0**	**0.0**	**96**	**4.2**
Total	**95**	**0.1**	**796**	**1.2**	**1,983**	**3.1**

The model predicts that China's asset allocation will be heavily weighted toward advanced economies regardless of the liberalization scenario or the assumptions on governance (**Chart 7** and **Chart 8**). The relatively large size of financial markets in advanced economies is the most important pull factor on China's foreign portfolio investment. In addition, trade relations also favour a greater allocation toward advanced economies, since around three-fifths of China's trade is with these economies. However, distance is the most important gravity variable supporting China's asset allocation to its EME neighbours.

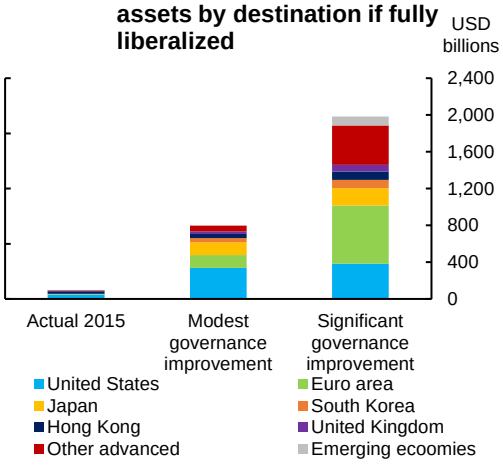
Chart 7: Chinese international equity assets by destination if fully liberalized



Sources: IMF and World Bank via Haver Analytics, Bank of Canada calculations

Last observation: 2015

Chart 8: Chinese international debt assets by destination if fully liberalized



Sources: IMF and World Bank via Haver Analytics, Bank of Canada calculations

Last observation: 2015

Of note, we estimate that between one-quarter and one-half of China's overseas portfolio assets would be allocated to the United States. The European Union (EU) and Japan would also receive a significant share of China's asset allocation. In contrast, Canada and Australia are estimated to receive small amounts, both in terms of levels and as a share of market capitalization.

For advanced economies, the potential increase in Chinese portfolio investment (in levels) is likely to be small relative to market capitalization. The main exceptions are the economies of Taiwan, Hong Kong and Singapore, where additional Chinese investment would be a large share of their markets.[11] This reflects the size of these economies' financial markets, their trade links with mainland China and their proximity to the mainland.

In contrast, EMEs are estimated to receive little, if any, additional Chinese portfolio investment, reflecting the relative importance of financial market size. In fact, EMEs are estimated to receive no additional portfolio investment from China when we assume only a modest improvement in China's governance. Under the assumption of a more significant improvement in China's governance, EMEs are still estimated to receive just US$210 billion, only 7 per cent of predicted Chinese overseas portfolio investment upon liberalization. This is mostly directed to other emerging Asian economies with large trade links to China (i.e., Malaysia, Thailand

[11] While financial centres such as Hong Kong and Singapore are not included in our model, we can apply our coefficients to these economies as locations for Chinese portfolio outflows.

and Indonesia) and EMEs with relatively large financial markets (i.e., Russia, Mexico and Brazil).

Currently, China's distribution is more skewed toward Hong Kong than our model would predict. This reflects the predominant role of Hong Kong in the mainland's existing portfolio outflow programs, which may play a reduced role as China continues to liberalize its capital account. For example, there are Stock Connect programs between the stock exchanges in Shanghai and Shenzhen and the Hong Kong Stock Exchange. Only Hong Kong has this program (for the moment), although other programs allow outflows to be directed to economies other than Hong Kong—for example, a Stock Connect with the United Kingdom is planned for 2018.[12]

Implications of our findings

If China had liberalized its capital account in 2015, our estimates suggest China would have been the fourth-largest holder of foreign portfolio assets in the world (assuming full liberalization and significant improvements in governance), compared with its actual ranking of 21st-largest in 2015.[13] This would have increased the pool of global cross-border portfolio investment by 6 per cent. Moreover, without capital controls, China's holdings of foreign portfolio assets are likely to increase further as its economy and savings grow faster than other major economies. Combined with an increase in China's holdings of offshore direct investment and banking-related assets, China is likely to become a significant provider of capital to the global economy. However, liberalization would also likely entail significant gross inflows of capital for China.

Our results suggest that the liberalization of China's portfolio flows may not prove disruptive to most advanced or emerging economies. A predicted increase in China's overseas asset holdings of US$3 trillion (assuming full liberalization and significant improvements in governance) would have been about 2 per cent global equity and debt market capitalization. In contrast, the annual standard deviation of the growth of global market capitalization is 11 per cent. And while China's additional international portfolio investment is likely to be mostly directed to advanced economies, this investment is also a small share of these economies' market capitalization.

Similarly, EMEs may not receive a large share of China's offshore portfolio allocation (although they may receive inflows indirectly from other financial centres through vehicles such as exchange-traded funds). These economies could, therefore, miss out on some of the benefits of Chinese capital account liberalization, such as an alternative source of portfolio funding. But they also avoid the risks associated with increases in portfolio inflows. Several papers find that portfolio inflows are only beneficial for economies with a sufficiently high level of institutional and financial market development; portfolio inflows are more volatile than direct

[12] See Hatzvi, Meredith and Nixon (2015) for a description of China's portfolio outflow programs.

[13] This excludes Luxembourg.

investment inflows; and (relatedly) debt inflows are riskier than equity inflows.[14] In addition, EMEs may benefit from the liberalization of direct investment and other components of China's capital account. We have observed substantial direct investment by China in several EMEs over the past decade. Our model does not have any complementarity channels through which direct investment could increase portfolio investment flows. If such linkages are important, the results here would likely understate the extent of China's outbound portfolio investment directed to EMEs.

Our results do suggest, however, that the liberalization of Chinese portfolio flows could prove disruptive to economies with large financial markets close to China, namely Hong Kong, Taiwan and Singapore, although some of these flows could be intermediated into other financial markets. However, the potential for disruptive effects is mitigated by China's intention to gradually liberalize its capital account rather than allow a sudden opening.[15] In addition, China is aiming for its capital account to have "managed convertibility" rather be completely open. In this way, China retains macroprudential measures aimed at managing the level of external debt, currency mismatch and short-term speculative flows (Zhou 2015).

While capital account liberalization may not have large disruptive effects on global financial markets, it will likely significantly affect China. An increase in China's overseas portfolio allocation of US$3 trillion represents 19 per cent of China's equity and debt market capitalization. To offset large potential reallocations away from China's domestic financial markets, as well as to mitigate impacts of large gross outflows for China's currency, China would likely liberalize its controls on portfolio inflows as well as outflows. Indeed, our models suggest the stock of global investment in China could increase by about US$2.3 trillion.[16]

There are benefits and costs for China associated with liberalization of capital flows. A more open capital account should lead to a more efficient allocation of capital within China, partly by opening up the Chinese financial sector to competition. This competition may force the Chinese banking system to offer more market-determined deposit rates to customers, giving Chinese residents a higher return on safe assets. In addition, allowing Chinese residents to invest more overseas will give them the opportunity to diversify their assets. In combination with a higher return on safe assets, this will lead to less "search for yield" behaviour, such as real estate speculation or reliance on non-transparent wealth management products.

But there are also costs associated with the liberalization of China's portfolio flows. A large increase in portfolio inflows will have financial stability implications for China, as these flows are relatively volatile. The literature on the sequencing of financial reforms recommends managing these financial stability risks by ensuring the domestic financial system is strong, is

[14] See Agbloyor et al. (2014); Cerutti, Claessens and Puy (2015); Choong et al. (2010); Durham (2004); Eichengreen, Gupta and Masetti (2017); Ghosh and Qureshi (2016); Hoggarth, Jung and Reinhardt (2016); Igan, Kutan and Mirzaei (2016); Pagliari and Hannan (2017); and Prasad, Rajan and Subramanian (2007).

[15] For example, see People's Bank of China (2018).

[16] The model's estimate for gross investment into China should be treated with caution, given China's combination of having large financial markets and little overseas investment. In addition, the economic significance of the inflow capital control variable is low. Nevertheless, the projection for significant increases in investment outflows and inflows is consistent with earlier work by Kruger and Pasricha (2016).

well regulated and can adequately handle risks before exposing it to capital flows (IMF 2012). China's approach (up until 2015) had been somewhat inconsistent with this recommendation; China gradually liberalized its capital account despite vulnerabilities in its financial system, as it was politically possible given the momentum for liberalization within China's government (Ballantyne et al. 2014). However, since late 2016, Chinese authorities have implemented measures aimed at lowering leverage and related vulnerabilities in the financial system, such that further capital account liberalization should now pose less of a risk.

Liberalization could also make navigating the trilemma more challenging for China.[17] China has been trying to have monetary policy independence, an exchange rate that varies only gradually and a slowly opening capital account. These settings can be inconsistent with the trilemma, and a more open capital account could make the trilemma even more problematic in the context of an exchange rate that is allowed to only partially adjust to shocks. For example, if the renminbi can only slowly adjust to any shock that would have caused a freely floating currency to appreciate rapidly, the renminbi can become a one-way bet to appreciate, generating speculative capital inflows and an increase in China's foreign currency reserves (which may prove politically problematic). Conversely, a slow or partial adjustment to a shock that would have caused the renminbi to depreciate implies capital outflows and sales of reserves. Partly for this reason, authorities are aiming to increase two-way renminbi flexibility alongside a gradual opening of the capital account.

6. Conclusion

This paper estimates what China's portfolio asset allocation to various economies would be in a counterfactual scenario where China liberalizes its capital account. We build on analysis of international portfolio allocation determinants as in Forbes (2010) and Bayoumi and Ohnsorge (2013). We find that the increase in China's overseas portfolio allocation is unlikely to prove disruptive to the global financial system. The liberalization of China's portfolio flows could, however, have important implications for its financial stability and how China navigates the trilemma. There is scope for future work to focus on the direction of the other components of China's capital account, with the aim of obtaining a more complete picture of the implications of China's capital account liberalization.

[17] The trilemma is a well-known policy challenge whereby a country can only choose two of the following three options: an independent monetary policy, a fixed exchange rate and an open capital account.

References

Agbloyor, E.K., J.Y. Abor, C.K.D. Adjasi and A. Yawson. 2014. "Private Capital Flows and Economic Growth in Africa: The Role of Domestic Financial Markets." *Journal of International Financial Markets, Institutions & Money* 30: 137–152.

Ballantyne, A., J. Hambur, I. Roberts and M. Wright. 2014. "Financial Reform in Australia and China." Reserve Bank of Australia Research Discussion Paper RDP 2014-10.

Bayoumi, T. and F. Ohnsorge. 2013. "Do Inflows or Outflows Dominate? Global Implications of Capital Account Liberalization." International Monetary Fund Working Paper No. 13/189.

Cerutti, E., S. Claessens and D. Puy. 2015. "Push Factors and Capital Flows to Emerging Markets: Why Knowing Your Lender Matters More Than Fundamentals." International Monetary Fund Working Paper No. 15/267.

Choong, C.K., A.Z. Baharumshah, Z. Yusop and M.S. Habibullah. 2010. "Private Capital Flows, Stock Market and Economic Growth in Developed and Developing Countries: A Comparative Analysis." *Japan and the World Economy* 22 (2): 107–117.

Coeurdacier, N. and H. Rey. 2013. "Home Bias in Open Economy Financial Macroeconomics." *Journal of Economic Literature* 51 (1): 63–115.

Durham, J.B. 2004. "Absorptive Capacity and the Effects of Foreign Direct Investment and Equity Foreign Portfolio Investment on Economic Growth." *European Economic Review* 48 (2): 285–306

Eichengreen, B., P. Gupta and O. Masetti. 2017. "Are Capital Flows Fickle? Increasingly? And Does the Answer Still Depend on Type?" World Bank Policy Research Paper No. 7972.

Fernández, A., M. Klein, A. Rebucci, M. Schindler and M. Uribe. 2015. "Capital Control Measures: A New Dataset." International Monetary Fund Working Paper No. 15/80.

Forbes, K. 2010. "Why Do Foreigners Invest in the United States?" *Journal of International Economics* 80 (1): 3–21.

Ghosh, A.R. and M.S. Qureshi. 2016. "Capital Inflow Surges and Consequences." Asian Development Bank Institute Working Paper Series No. 585.

Guichard, S. 2017. "Findings of Recent Literature on International Capital Flows: Implications and Suggestions for Further Research." Organisation for Economic Co-operation and Development Working Paper No. 1410.

Hatzvi, E., J. Meredith and W. Nixon. 2015. "Chinese Capital Flows and Capital Account Liberalisation." Reserve Bank of Australia *Bulletin*, December quarter.

He, D., L. Cheung, W. Zhang and T. Wu. 2012. "How Would Capital Account Liberalisation Affect China's Capital Flows and the Renminbi Exchange Rate?" Hong Kong Institute for Monetary Research Working Paper No. 09/2012.

Hoggarth, G., C. Jung and D. Reinhardt. 2016. "Capital Inflows – The Good, the Bad and the Bubbly." Bank of England Financial Stability Paper No. 40.

Hooley, J. 2013. “Bringing Down the Great Wall? Global Implications of Capital Account Liberalisation in China.” Bank of England *Quarterly Bulletin* 2013 Q4.

Igan, D., A.M. Kutan and A. Mirzaei. 2016. “Real Effects of Capital Inflows in Emerging Markets.” International Monetary Fund Working Paper No. 16/235.

International Monetary Fund (IMF). 2012. “Liberalizing Capital Flows and Managing Outflows.” March 13.

Koepke, R. 2015. “What Drives Capital Flows to Emerging Markets: A Survey of the Empirical Literature.” Institute of International Finance Working Paper, April 23.

Kruger, M. and G.K. Pasricha. 2016. “What to Expect When China Liberalizes its Capital Account.” Bank of Canada Staff Discussion Paper No. 2016-10.

Lane, P.R. and G.M. Milesi-Ferretti. 2008. “International Investment Patterns.” *The Review of Economics and Statistics* 90 (3): 538–549.

Lowe, P. 2017. “Renminbi Internationalisation.” Remarks to the RMB Global Cities Dialogue Dinner, Sydney, Australia, April 27.

Mayer, T. and S. Zignago. 2011. “Notes on CEPII’s Distance Measures: The GeoDist Database.” Centre d’Études Prospectives et d’Informations Internationales Document de Travail No. 2011-25.

Pagliari, M.S. and S.A. Hannan. 2017. “The Volatility of Capital Flows in Emerging Markets: Measures and Determinants.” International Monetary Fund Working Paper No. 17/41.

People’s Bank of China. 2018. “Q & A by Governor Yi on Monetary Policy Normalization.” Forum at the 2018 Boao Forum for Asia, April 11.

Pesaran, M.H. (2007). “A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence.” *Journal of Applied Econometrics* 22 (2): 265–312.

Portes, R. and H. Rey. 2005. “The Determinants of Cross-Border Equity Flows.” *Journal of International Economics* 65 (2): 269–296.

Prasad, E.S., R.G. Rajan and A. Subramanian. 2007. “Foreign Capital and Economic Growth.” National Bureau of Economic Research Working Paper No. 13619.

Sedik, T.S. and Sun, T. 2012. “Effects of Capital Flow Liberalization – What is the Evidence from Recent Experiences of Emerging Market Economies?” International Monetary Fund Working Paper No. 12/275.

Zhou, X. 2015. “IMFC Statement by ZHOU Xiaochuan, Governor, People’s Bank of China.” Thirty-First Meeting of the International Monetary and Financial Committee, Washington D.C., April 18.

Appendix A: Data descriptions and variable construction

Table A-1: Sources and construction of key variables

Variable	Description	Sources
Bilateral portfolio investment (%)	Stock of source economy's portfolio investment (equity or debt) in a destination economy as a share of the source economy's total portfolio investment. The source economy's total portfolio investment is equal to its domestic financial market size (equity market capitalization or debt outstanding) plus its holding of foreign assets (equity or debt) less its foreign liabilities (equity or debt).	Bilateral investment positions are from the International Monetary Fund (IMF) Coordinated Portfolio Investment Survey database. Domestic market sizes are from the World Bank Global Financial Development (WBGFD) database and national sources.
Size of destination market (%)	Size of the financial market at the destination economy as a share of the world market.	WBGFD database and national sources
Financial market development	Equity market capitalization as a share of gross domestic product (GDP) in equity regressions, and value of bonds outstanding as a share of GDP in debt regressions.	WBGFD database, Bank for International Settlements (BIS) and national sources
Governance	The World Bank publishes a time series for six governance indicators: voice and accountability, political stability, governance effectiveness, regulatory quality, rule of law and control of corruption. We construct a single general measure for governance by taking the first principal component of these six indicators. Note the first principal component explains about 85 per cent of the variation in the six indicators.	World Bank World Governance Indicators database
Capital controls	The data on capital controls are from Fernández et al. (2015). They distinguish between four types of controls: equity, debt, and inflow and outflow restrictions. The restrictions are sorted into three regimes: 0, 0.5 and 1, with 0 representing an economy mostly open to portfolio inflows/outflows.	Fernández et al. (2015) "Capital Control Measures: A New Dataset"
Bilateral trade	Bilateral trade (exports + imports) as a share of source economy’s GDP.	IMF Direction of Trade database
Distance	Population-weighted shortest distance (in kilometres) between major cities, as calculated by Mayer and Zignago (2011).	Centre d’Études Prospectives et d’Informations Internationales (CEPII) GeoDist database

Return differential and return correlation	We compute return differential and return correlations for equity (based on main stock indexes) and debt (based on yields for 10-year bonds) separately. For return differentials, we take the difference in the annual average of monthly returns between the source and destination economies. For return correlations, each annual observation is computed as the correlation of monthly returns in the source and destination economies over the past three years.	National exchange sources via Haver Analytics and Bloomberg
GDP growth, the Volatility Index (VIX), and US 10-year Treasury yield	These variables are included as controls for our estimation. They are converted to the annual frequency using simple averages.	National sources via Haver Analytics and Bloomberg
Advanced economy dummy	A value of 1 is assigned if the destination economy is an advanced economy, 0 otherwise.	IMF classifications

Table A-2: Economies in the final estimation sample

Advanced economies (20)	**Emerging-market economies (19)**
Austria, Belgium, Canada, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, United Kingdom, United States	Argentina, Brazil, Chile, Colombia, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, Nigeria, Peru, Philippines, Poland, Russia, South Africa, Thailand, Turkey

Table A-3: Summary statistics for equity regression variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Bilateral foreign equity asset (% of source country portfolio)	6,588	0.9	5.2	0.0	259.1
Share of destination market in the world	6,588	3.1	7.3	0.0	42.4
Outflow restrictions	6,588	0.3	0.4	0.0	1.0
Inflow restrictions	6,588	0.3	0.4	0.0	1.0
Governance in source	6,588	2.3	1.7	-1.8	4.5
Governance in destination	6,588	1.9	1.9	-2.8	4.5
Distance	6,588	8.5	1.0	5.1	9.9
Bilateral trade (% of source GDP)	6,588	1.7	4.0	0.0	42.0
Market cap to GDP in source	6,588	76.4	48.0	6.3	276.6
Market cap to GDP in destination	6,588	71.3	45.7	6.3	276.6

Equity return differential	6,588	-0.1	1.9	-8.5	9.8
Equity return correlation	6,588	0.6	0.2	-0.3	1.0
Real GDP growth in source	6,588	2.0	3.2	-9.1	11.1
Real GDP growth in destination	6,588	2.5	3.3	-9.1	11.3
VIX	6,588	20.7	7.2	12.8	32.7
US 10-year Treasury yield	6,588	3.4	1.0	1.8	4.8

Table A-4: Summary statistics for debt regression variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Bilateral foreign debt asset (% of source country portfolio)	7,515	1.5	3.9	0.0	48.5
Share of destination market in the world	7,515	3.2	8.3	0.0	45.6
Debt outflow restrictions	7,515	0.3	0.4	0.0	1.0
Debt inflow restrictions	7,515	0.2	0.4	0.0	1.0
Governance in source	7,515	2.4	1.8	-1.8	4.7
Governance in destination	7,515	2.2	1.9	-1.8	4.7
Distance	7,515	8.3	1.0	5.1	9.9
Bilateral trade (% of source GDP)	7,515	1.7	3.9	0.0	45.1
Debt outstanding to GDP in source	7,515	0.9	0.6	0.1	2.6
Debt outstanding to GDP in destination	7,515	0.8	0.5	0.1	2.6
Bond yields differential	4,914	-0.1	3.5	-22.6	22.6
Bond yields correlations	4,914	0.5	0.5	-0.9	1.0
Real GDP growth in source	7,515	1.8	3.3	-9.1	11.1
Real GDP growth in destination	7,515	2.2	3.3	-9.1	11.1
VIX	7,515	20.7	7.2	12.8	32.7

Appendix B: Regression results

Table B-1: Regression results (estimation via feasible generalized least squares)

	Equities				Bonds				
	1	2	3	4*	5	6	7	8	9*
Destination market cap as % of world market cap	0.121	0.126	0.111	0.103	0.092	0.104	0.074	0.106	0.100
	(24.89)***	(24.71)***	(22.14)***	(23.11)***	(21.37)***	(22.89)***	(14.35)***	(19.14)***	(23.71)***
Outflow restriction in source	-0.044	-0.050	-0.197	-0.037	-0.098	-0.139	-0.528	-0.196	-0.133
	(2.84)***	(2.83)***	(12.30)***	(2.47)**	(5.26)***	(7.07)***	(23.30)***	(5.79)***	(6.80)***
Inflow restriction in destination	0.028	0.018	0.012	0.018	-0.011	-0.112	0.012	0.108	-0.035
	(2.04)**	(1.15)	(1.00)	(1.34)	(0.63)	(5.96)***	(1.02)	(2.46)**	(2.11)**
Governance in source	0.168	0.149		0.164	0.250	0.230		0.511	0.189
	(25.34)***	(21.38)***		(25.24)***	(29.75)***	(29.09)***		(33.10)***	(22.74)***
Governance in destination	0.021	0.010		0.028	0.025	0.014		0.041	-0.028
	(3.16)***	(1.33)		(4.69)***	(2.65)***	(1.55)		(3.01)***	(2.98)***
Distance	-0.058	-0.137	-0.003	-0.051	-0.050	-0.429	0.012	-0.173	-0.257
	(17.41)***	(10.34)***	(1.39)	(13.83)***	(13.54)***	(21.63)***	(5.61)***	(21.87)***	(21.37)***
Bilateral trade as % of source GDP	0.136	0.134	0.170	0.141	0.161	0.110	0.158	0.203	0.167
	(17.24)***	(14.33)***	(20.58)***	(18.81)***	(21.18)***	(11.60)***	(22.65)***	(19.07)***	(17.99)***
Market cap as % of GDP in source	-0.001	-0.001	-0.000	-0.001	-0.003	-0.003	-0.000	-0.002	0.010
	(5.75)***	(6.07)***	(5.49)***	(4.43)***	(15.51)***	(17.08)***	(5.20)***	(7.09)***	(11.52)***
Market cap as % of GDP in destination	0.000	0.000	0.000	-0.000	0.000	-0.002	0.001	0.000	0.012
	(2.78)***	(0.08)	(1.83)*	(0.50)	(0.27)	(8.39)***	(3.63)***	(1.04)	(12.72)***
Return differential	-0.002	-0.002	-0.003	-0.002				0.007	
	(1.70)*	(2.02)**	(3.39)***	(1.89)*				(3.04)***	

Return correlation	0.148	0.103	0.145	0.123				0.070	
	(7.63)***	(4.23)***	(7.87)***	(6.34)***				(6.80)***	
Real GDP growth in source	-0.003	0.000	-0.003	-0.002	-0.006	-0.001	-0.007	-0.014	-0.005
	(3.59)***	(0.21)	(3.70)***	(2.86)***	(5.85)***	(0.71)	(7.39)***	(7.00)***	(4.49)***
Real GDP growth in destination	-0.004	-0.002	-0.003	-0.003	-0.004	0.002	0.001	-0.006	-0.005
	(4.35)***	(1.86)*	(4.09)***	(3.35)***	(3.91)***	(1.54)	(1.28)	(3.24)***	(5.74)***
VIX	-0.003	0.064	-0.003	-0.002	-0.003	0.280	-0.002	-0.002	-0.003
	(5.69)***	(8.17)***	(6.90)***	(4.07)***	(7.03)***	(20.18)***	(5.68)***	(3.32)***	(7.44)***
US 10-year Treasury yield	0.004	-0.015	0.007	0.003					
	(0.95)	(1.71)*	(2.03)**	(0.82)					
Dummy for advanced economies	0.097	0.090	0.088	0.067	0.500	0.356	0.547	0.812	0.647
	(3.29)***	(2.92)***	(5.90)***	(2.64)***	(10.91)***	(8.79)***	(24.91)***	(14.39)***	(13.58)***
Year fixed effects	No	Yes	No	No	No	Yes	No	No	No
N	6588	6588	6588	6588	7515	7515	7515	4914	6069

* The value of stock traded to GDP is used as an instrument for equity market capitalization to GDP in the equity regression. The share of private debt to total debt is used as an instrument for total debt outstanding to GDP in the debt regression.

Note: T-stats are shown in parentheses. Statistical significance at the 1%, 5% and 10% levels are denoted by ***, ** and *, respectively.

Table B-2: Regression results (estimation via random effects)

	Equities				Bonds			
	10	11	12	13	14	15	16	17
Destination market cap as % of world market cap	0.162	0.156	0.162	0.162	0.121	0.135	0.139	0.128
	(3.00)***	(2.97)***	(2.98)***	(2.95)***	(3.41)***	(3.90)***	(3.75)***	(3.56)***
Outflow restriction in source	-0.516	-0.586	-0.229	-0.691	-0.341	-0.399	-0.857	-0.647
	(2.19)**	(2.15)**	(1.80)*	(2.94)***	(1.93)*	(2.26)**	(2.61)***	(3.36)***
Inflow restriction in destination	-0.339	-0.379	-0.056	-0.303	-0.013	-0.097	0.159	-0.043
	(1.79)*	(1.74)*	(0.72)	(1.81)*	(0.17)	(1.21)	(0.99)	(0.57)
Governance in source	0.193	0.171	0.217		0.594	0.641	0.782	
	(4.58)***	(3.61)***	(5.15)***		(7.92)***	(7.95)***	(6.68)***	
Governance in destination	-0.097	-0.134	-0.061		0.186	0.181	0.345	
	(1.26)	(1.36)	(1.00)		(2.72)***	(2.62)***	(2.98)***	
Distance	-0.207	-0.223	-0.249	-0.234	-0.614	-0.589	-0.743	-0.931
	(0.99)	(1.05)	(1.28)	(1.10)	(4.39)***	(4.21)***	(4.43)***	(6.61)***
Bilateral trade as % of source GDP	0.212	0.211	0.209	0.212	0.157	0.164	0.144	0.140
	(1.75)*	(1.74)*	(1.73)*	(1.74)*	(2.36)**	(2.43)**	(2.00)**	(2.16)**
Market cap as % of GDP in source	0.002	0.004	-0.000	0.003	-0.011	-0.015	-0.014	-0.009
	(1.13)	(1.34)	(0.34)	(1.43)	(5.57)***	(5.85)***	(4.61)***	(4.78)***
Market cap as % of GDP in destination	0.004	0.006	0.002	0.003	0.003	-0.001	0.005	0.002
	(1.31)	(1.38)	(1.00)	(1.16)	(1.27)	(0.64)	(1.77)*	(0.82)
Equity/debt return differential	0.026	0.023		0.022			-0.008	
	(1.13)	(1.06)		(0.97)			(0.48)	
Equity/debt return correlation	1.169	1.524		1.217			0.404	
	(2.04)**	(1.95)*		(2.15)**			(4.95)***	

Real GDP growth in source	-0.013	-0.005	-0.037	-0.014	-0.019	0.008	-0.051	-0.012
	(1.22)	(0.72)	(1.96)*	(1.32)	(1.34)	(0.48)	(2.31)**	(0.82)
Real GDP growth in destination	0.014	0.022	-0.006	0.013	-0.017	0.011	-0.018	-0.013
	(1.37)	(1.43)	(1.36)	(1.44)	(1.88)*	(1.08)	(1.61)	(1.46)
VIX	-0.018	-0.196	-0.007	-0.019	0.001	0.359	0.006	0.000
	(1.59)	(2.24)**	(1.31)	(1.69)*	(0.58)	(5.28)***	(1.84)*	(0.09)
US 10-year Treasury yield	-0.278	-0.564		-0.279				
	(2.37)**	(2.43)**		(2.38)**				
Dummy for advanced economies	0.388	0.480	0.491	0.026	0.026	0.297	0.073	0.391
	(2.13)**	(2.44)**	(2.82)***	(0.11)	(0.08)	(0.93)	(0.18)	(2.19)**
Constant	1.731	4.988	1.702	2.474	4.969	0.143	5.016	9.183
	(0.98)	(2.96)***	(1.02)	(1.38)	(3.80)***	(0.09)	(3.08)***	(7.01)***
Year fixed effects	No	Yes	No	No	No	Yes	No	No
N	6588	6588	6588	6588	7515	7515	4914	7515
Overall R2	0.15	0.15	0.15	0.15	0.29	0.29	0.30	0.26

Note: T-stats are shown in parentheses. Statistical significance at the 1%, 5% and 10% levels are denoted by ***, ** and *, respectively.

Table B-3: Summary statistics on the residuals by source economy for the equity model
(average percentage-point difference between actual and predicted bilateral equity investment)

	Residuals (actual less predicted values)										Correlation (actual and predicted values)
	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2005–13	
All economies	**0.05**	**0.08**	**0.12**	**0.20**	**0.26**	**0.31**	**0.39**	**0.55**	**0.92**	**0.32**	**0.39**
Advanced economies	**0.21**	**0.21**	**0.23**	**0.34**	**0.40**	**0.47**	**0.58**	**0.81**	**1.33**	**0.51**	**0.46**
Australia	0.03	0.02	0.25	0.30	0.11	0.11	0.26	0.29	0.45	0.20	0.96
Austria	-0.05	-0.13	-0.21	0.04	0.05	0.05	0.18	0.18	0.22	0.04	0.85
Belgium	-0.30	-0.31	-0.32	-0.35	-0.29	-0.36	-0.47	-0.43	-0.38	-0.36	0.76
Canada	-0.10	-0.05	-0.03	0.06	-0.01	-0.01	0.05	0.09	0.20	0.02	0.97
France	0.05	0.05	0.00	0.01	0.07	0.10	0.07	0.15	0.18	0.08	0.81
Germany	-0.09	0.02	-0.12	-0.24	-0.14	-0.12	-0.11	-0.13	-0.10	-0.11	0.85
Greece	-0.42	-0.38	-0.30	-0.07	-0.30	-0.20	-0.03	-0.16	-0.30	-0.24	0.65
Ireland	7.67	7.64	7.53	6.79	10.29	12.27	14.58	28.01	50.97	16.19	0.70
Israel	-0.41	-0.37	-0.27	0.08	0.25	0.22	0.59	0.81	0.79	0.19	0.86
Italy	0.16	0.10	0.11	0.15	0.19	0.24	0.33	0.34	0.38	0.22	0.48
Japan	-0.13	-0.14	-0.07	-0.10	-0.03	-0.03	-0.01	-0.01	-0.07	-0.07	0.95
Korea	-0.32	-0.25	-0.18	-0.13	-0.15	-0.16	-0.18	-0.14	-0.09	-0.18	0.82
Netherlands	0.66	0.50	0.28	0.54	0.57	0.45	0.43	0.46	0.56	0.49	0.78
New Zealand	6.66	6.50	6.80	8.62	8.52	12.38	8.42	9.02	8.46	8.38	0.41
Norway	0.34	0.31	0.45	0.79	0.94	0.74	0.95	0.96	0.99	0.72	0.96
Portugal	0.13	0.33	0.45	1.12	0.66	0.94	1.57	0.16	0.16	0.61	0.69
Spain	-0.68	-0.54	-0.57	-0.72	-0.66	-0.54	-0.66	-0.56	-0.43	-0.59	0.41
United Kingdom	0.27	0.26	0.31	0.47	0.21	0.23	0.27	0.36	0.35	0.30	0.96
United States	0.10	0.12	0.17	0.10	0.18	0.18	0.18	0.17	0.20	0.15	0.90

Emerging-market economies	**-0.31**	**-0.23**	**-0.13**	**-0.11**	**-0.04**	**-0.06**	**-0.04**	**-0.02**	**-0.02**	**-0.11**	**0.40**
Argentina	0.59	0.60	0.77	0.64	0.74	0.59	0.80	1.02	0.91	0.74	0.90
Brazil	0.02	0.04	0.10	0.05	0.03	0.03	0.05	0.04	0.07	0.05	0.74
Chile	-0.35	-0.16	-0.11	0.01	0.00	-0.08	-0.04	-0.04	-0.03	-0.09	0.87
Colombia	-1.83	-1.38	-1.16	-1.44	-0.67	-1.01	-0.89	-1.27	-0.13	-1.09	0.81
Hungary	-0.92	-0.79	-0.63	-0.43	-0.22	-0.01	-0.15	-0.21	-0.10	-0.38	0.65
India	-0.67	-0.63	-0.42	-0.51	-0.41	-0.43	-0.50	-0.49	-0.55	-0.51	0.67
Indonesia	-1.42	-1.22	-1.05	-1.06	-0.92	-1.00	-1.02	-1.22	-1.28	-1.13	-0.01
Malaysia	-0.89	-0.82	-0.66	-0.51	-0.42	-0.47	-0.43	-0.40	-0.36	-0.55	0.62
Mexico	-2.66	-2.50	-2.45	-2.54	-2.53	-2.65	-2.76	-2.95	-2.98	-2.67	0.71
Philippines	-3.37	-3.03	-2.42	-2.40	-2.09	-1.99	-1.99	-2.05	-2.23	-2.40	0.65
Poland	-0.66	-0.59	-0.50	-0.62	-0.57	-0.63	-0.73	-0.74	-0.72	-0.64	-0.08
Russia	0.29	0.32	0.37	0.34	0.30	0.34	0.36	0.31	0.28	0.32	0.25
South Africa	0.10	0.05	0.07	0.16	0.24	0.32	0.32	0.39	0.38	0.23	0.35
Thailand	-0.88	-0.67	-0.48	-0.52	-0.39	-0.43	-0.44	-0.45	-0.44	-0.52	0.40
Turkey	-1.21	-1.21	-1.05	-1.06	-0.97	-0.93	-0.98	-0.98	-1.05	-1.05	0.64

Note: Residuals are calculated as the actual bilateral investment (as a % of source country's total portfolio) minus the predicted values from our preferred equity model (specification 1 in **Table B-1**). This table reports the average residual across available bilateral pairings for each source economy and key aggregates. The correlation is calculated between the predicted and actual values for each source economy and key aggregates.

Table B-4: Summary statistics on the residuals by source economy for the debt model
(average percentage-point difference between actual and predicted bilateral debt investment)

	Residuals (actual less predicted values)										Correlation (actual and predicted values)
	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2005–13	
All economies	**0.51**	**0.72**	**0.69**	**0.58**	**0.97**	**0.66**	**0.59**	**0.62**	**0.64**	**0.66**	**0.53**
Advanced economies	0.71	0.97	0.94	0.80	1.29	0.88	0.80	0.83	0.87	0.90	0.59
Australia	0.62	1.08	0.86	-0.08	0.58	0.67	0.40	0.23	0.23	0.51	0.80
Austria	1.25	1.74	1.50	1.39	1.55	1.43	1.44	1.41	1.80	1.50	0.81
Belgium	0.42	0.59	0.58	0.52	0.69	0.48	0.28	0.31	0.38	0.47	0.78
Canada	-0.74	-0.67	-0.62	-0.67	-0.65	-0.59	-0.59	-0.56	-0.52	-0.62	0.94
Czech Republic	-0.26	-0.28	-0.29	-0.57	-0.50	-0.65	-0.79	-0.83	-0.89	-0.56	0.57
Denmark	-0.38	-0.41	-0.41	-0.40	-0.23	-0.16	-0.25	-0.16	-0.23	-0.29	0.75
Finland	2.83	3.83	3.41	2.85	4.36	5.62	6.31	7.48	7.36	4.89	0.33
France	0.60	0.86	0.83	0.71	1.02	0.95	0.78	0.74	0.76	0.81	0.65
Germany	0.60	1.08	1.01	0.84	1.05	1.00	0.90	1.02	0.92	0.94	0.62
Greece	1.21	1.73	1.57	0.36	0.53	0.10	-0.05	-0.06	0.10	0.61	0.48
Ireland	6.57	7.87	8.36	8.21	8.59	6.84	6.41	5.82	5.83	7.17	0.94
Israel	-0.21	-0.20	-0.20	-0.31	-0.26	-0.32	-0.39	-0.35	-0.22	-0.27	0.93
Italy	0.44	0.55	0.50	0.43	0.59	0.32	0.37	0.32	0.31	0.43	0.66
Japan	0.03	0.01	0.10	0.16	0.14	0.23	0.18	0.12	0.12	0.12	0.93
Korea	-0.36	-0.25	-0.35	-0.35	-0.33	-0.35	-0.41	-0.36	-0.35	-0.35	0.74
Netherlands	1.25	1.56	1.79	1.74	2.74	2.58	2.47	2.99	3.34	2.27	0.78
Norway	1.10	1.44	1.51	1.71	1.23	1.28	1.50	1.38	1.39	1.39	0.86
Portugal	1.44	1.45	1.43	1.37	2.14	1.08	0.52	0.45	0.45	1.15	0.46

Spain	2.81	3.62	2.72	1.39	2.42	1.02	0.63	0.18	0.24	1.67	0.41
Sweden	-0.30	-0.59	-0.54	-0.21	11.54	-0.70	-0.80	-0.84	-0.64	0.77	0.27
United Kingdom	1.48	2.08	2.15	2.56	3.02	1.83	1.65	1.51	1.21	1.94	0.87
United States	-0.19	-0.17	-0.14	-0.17	-0.06	-0.06	-0.07	-0.09	-0.08	-0.11	0.44
Emerging-market economies	-0.11	-0.08	-0.11	-0.11	-0.05	-0.02	-0.06	-0.06	-0.07	-0.07	0.45
Argentina	0.52	0.46	0.46	0.49	0.67	0.74	0.59	0.60	0.69	0.58	0.84
Brazil	-0.12	-0.06	-0.07	-0.14	-0.12	-0.05	-0.11	-0.10	-0.07	-0.09	0.46
Colombia	0.48	0.74	0.77	0.77	0.47	0.45	0.36	0.34	0.45	0.54	0.91
Hungary	-1.53	-1.38	-1.44	-1.44	-1.27	-1.41	-1.42	-1.41	-1.46	-1.42	0.59
Indonesia	-0.10	-0.22	-0.20	-0.08	-0.09	-0.03	0.09	-0.02	0.21	-0.05	0.25
Malaysia	-1.29	-1.17	-1.06	-0.90	-0.75	-0.75	-0.70	-0.65	-0.66	-0.88	0.37
Mexico	-0.91	-0.91	-0.88	-0.89	-0.76	0.26	0.13	0.23	0.11	-0.40	0.83
Philippines	0.16	0.68	0.24	-0.08	0.27	-0.04	-0.10	0.04	-0.37	0.09	0.73
Poland	-0.96	-0.67	-0.93	-1.16	-0.87	-1.36	-1.48	-1.46	-1.47	-1.15	0.65
Russia	1.24	0.87	0.62	0.61	0.55	0.59	0.59	0.58	0.48	0.68	0.43
South Africa	-0.82	-0.79	-0.85	-0.71	-0.69	-0.63	-0.28	-0.17	-0.18	-0.57	0.65
Thailand	-0.40	-0.21	0.05	0.03	0.25	0.17	0.00	-0.04	-0.05	-0.02	0.12
Turkey	-0.36	-0.25	-0.34	-0.32	-0.28	-0.19	-0.21	-0.30	-0.29	-0.28	0.25

Note: Residuals are calculated as the actual bilateral investment (as a % of source country's total portfolio) minus the predicted values from our preferred debt model (specification 4 in **Table B-1**). This table reports the average residual across available bilateral pairings for each source economy and key aggregates. The correlation is calculated between the predicted and actual values for each source economy and key aggregates.