

Cross-Border Capital Flows into Real Estate

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Working Paper

This study investigates the factors that determine the volume of cross-border capital flows into direct real estate markets. In particular, we seek to establish whether existing institutional and regulatory barriers are negatively associated with the average level of cross-border real estate flows into and out of a set of 25 countries. We do not find evidence for cross-border institutional or regulatory arbitrage on the real estate market. Except credit and financial market development, hardly any other institutional and legal barriers impact significantly on the level of real estate inflows. However, the presence of institutional and legal barriers in the domestic country can hinder real estate outflows. Domestic investors are highly dependent on the domestic financial market and on debt financing from the capital markets in general. More transparent credit information serves as a catalyst of cross-border real estate investment activity. Finally, both foreign and domestic inflows are positively linked to property returns in the same year but the volume of foreign flows is generally found to be more reactive to return shocks.

Keywords: Real Estate Investment, Cross-border flows, Panel data analysis, VAR models

JEL Classifications: F14, O19, R12, C31.

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Introduction

Cross-border capital flows into property are marked by sharp differences among countries.

Empirical studies have observed that global institutional real estate investments are focused on a relatively small set of countries, particularly in developed countries such as the United States, the United Kingdom or Japan and within these countries on large cities such as New York, London and Tokyo (Lizieri and Pain, 2013). This remarkable geographic concentration of investments is puzzling and seems at odds with the diversification benefits postulated by modern portfolio theory and the core tenets of neoclassical economics. Absent any distorting factors and cyclical swings, each country should receive capital flows commensurate with the size of its respective economy or, more accurately, the total size of its investible real estate market. This distribution of international flows is sometimes referred to as the 'neutral' or 'naïve' allocation. Observed capital flows deviate from this naïve equilibrium considerably not only in the short run but tend to persist for a very long time. One of the possible explanations for the long-term aberration from expected values are institutional barriers encompassing a broad range of economic, legal and institutional risks. This study sets out to empirically test for the existence and significance of these barriers using a unique dataset that combines two international databases of real estate flows held by the property service providers DTZ and RCA with a large number of institutional, economic and property market indicators from a variety of sources. The assembled panel dataset of 25 countries in Europe and Asia allows us to examine the dynamics of flows in greater detail by disaggregating them into domestic and foreign inflows into and outflows out of each country to find out whether changes in flows are mainly driven by contemporaneous and past property returns or by institutional and macroeconomic barriers. Based on differences in the relationship between returns and investment volumes, we can then draw conclusions on behavioural and information differences between domestic and foreign investors and their average propensity to engage in herding and short-term return-chasing behaviour. Moreover, the differences in the explanatory power of institutional, legal and economic barriers for inflows and outflows reveal some important conclusions about the drivers of cross-border capital.

The panel data analysis shows little evidence for cross-border institutional or regulatory arbitrage on the real estate market as has been recently found for bank flows (see Houston et al. 2012). Except for credit and financial market development, institutional and legal barriers do not appear to have a significant impact on real estate inflows. Indeed, we can show that more transparent credit information can enhance both inflows and outflows serving as a catalyst of real estate investment activity. However, unlike foreign investors, domestic investors investing at home do not seem to be concerned with the credit depth of information what can be seen as an evidence for the presence of information asymmetries for foreign investors in the credit markets and its impact on lowering cross-border flows. The finding that domestic inflows increase significantly in countries with higher financial market flexibility suggests that domestic investors are highly dependent on the domestic financial market and on debt financing from the capital markets in general.

The second part of the analysis shows in a vector-autoregressive framework with contemporaneous and lagged values that both foreign and domestic flows are positively

linked to property returns in the same year. This means that both domestic and foreign investors are able to predict returns reasonably well and respond quickly to changes in property returns, usually within the same year. An impulse response analysis indicates that a one-unit positive return shock has a larger positive impact on the volume of foreign flows attracted into a country than it has for investment flows from domestic investors.

Determinants of Cross-Border Real Estate Flows

International or cross-border property investment has experienced a remarkable surge over the last decade. While this trend is not a singular phenomenon and is in fact mirrored by other asset classes such as equities and bonds as well as international trade patterns and foreign direct investments (FDI), it is notable that direct property as an inherently localised and immobile asset class should be affected by this development to the same degree as the more liquid economic activities. In this section, we will discuss some stylised facts on the property market specific conditions that helped bring about the observed increasing flows into real estate at a global scale before presenting a simple model of expected cross-border flows that guides our empirical analysis.

Why are cross-border flows into property a relatively recent phenomenon?

We offer four explanations for the increase in global real estate funds into real estate, i.e. availability of suitable investment vehicles, technological advances, internationalisation of the real estate industry and increasing advantages for large investors of capital. Figure 1 reveals that both domestic and foreign investments have grown strongly in Asian economies – and most remarkably in China - in recent years despite the onset of the global financial crisis while domestic and foreign inflows exhibit a more cyclical pattern in Europe. Moreover, foreign inflows in Europe follow tightly the path in domestic flows, while this development is not observed in Asia. A possible explanation for the general trend towards an internationalisation of real estate investments is the concomitant expansion of indirect property investment. Particularly, the investment strategies of ‘core’ non-listed real estate funds entails domestic or foreign investment into developed economies whereas the less risk-averse ‘opportunity’ funds also allocate some capital to developing and emerging markets in search of higher returns (Fuerst and Matysiak, 2013; Baum, 2009). Thus, the emergence of new investment vehicles has arguably helped catalyse international property investment in that it managed to overcome some of the problems that are characteristic of this asset class such as low liquidity, strong heterogeneity of individual assets and lumpiness of the asset.

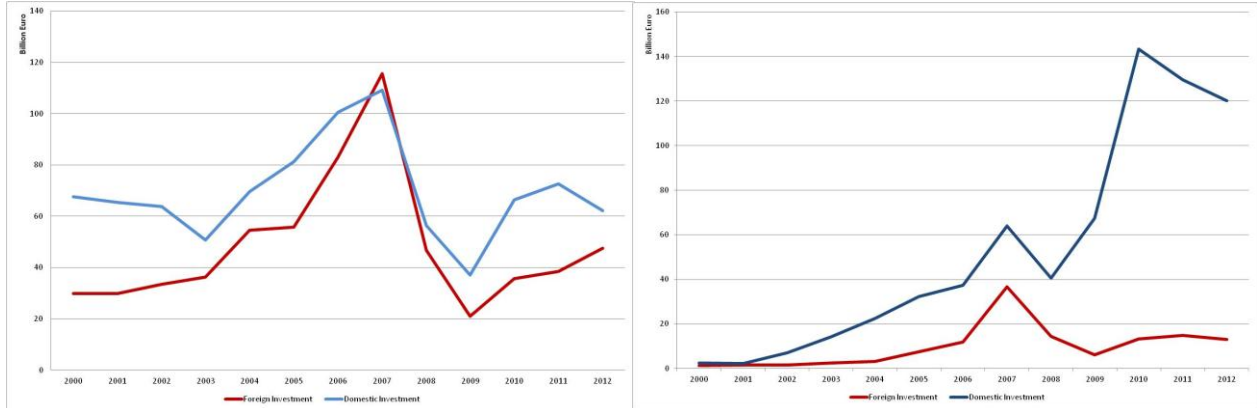


Figure 1: Domestic and foreign capital flows into direct real estate investments in €billion for Europe (left) and Asia (right) from 2000 to 2012.

Currency hedging, however, is expensive and difficult to achieve which means that real estate investment vehicles are rarely fully hedged (Lizieri, Worzala and Johnson, 1998). In practice, this problem leaves investors exposed to considerable currency risk. Other perceived difficulties, including the dangers of operating from a distance with no local representation, increases the attraction of investing internationally through liquid securitised vehicles and non-listed funds, but remain barriers to international exposure by asset managers.

Advances in transportation and communication technology are a further factor that has enabled greater mobility of capital flows although spatial proximity still matters for portfolio choice, savings and investment, and can have a great influence on investors' decisions and returns (Stulz, 2005).

It is a key characteristic of the real estate asset that it requires large-scale equity and debt capital as well as extensive financial and technical expertise to finance and produce institutional-grade buildings. These scale and know-how requirements are the main bottleneck for emerging and developing markets. Entrepreneurship and specialised education are required along with access to foreign, and at a later stage increasingly domestic, debt and equity capital. If actual and perceived barriers to investment influence investor behaviour, then large and more advanced economies will dominate cross-border capital flows into real estate and slow down economic convergence between developed and less developed economies. It is in the context of this broader debate on global economic development that we should be concerned to understand the barriers to cross-border real estate investment, for the benefit of investors seeking diversification and return, and for the benefit of governments seeking to promote domestic economic development.

Finally, some barriers to investment affect not only foreign but domestic investors as well. For example, a lack of transparency or uncertainty regarding financing opportunities tends to

impede domestic investment. We therefore expect lower capital flows, both from domestic and foreign sources, in countries that score low on measures of transparency and other institutional factors.

The effects of market imperfections and barriers on capital flows into real estate

To demonstrate how the effects described in the preceding section shape the distribution of cross-border capital real estate flows, we adopt a simplified version of the model of equity flows by Griffin et al (2004). Following Stulz (1981), we view barriers to cross-border investments as akin to a tax on the returns on these investments. As a starting point, let's consider a world with only two property markets which we call domestic (D) and foreign (F) for convenience. For simplicity and to enable diversification benefits, we assume that the returns of these markets are uncorrelated. Investors are also said to have homogenous expectations, tastes and levels of risk aversion. The volume of investment in foreign real estate assets (I_F^D) is then:

$$I_F^D = \frac{\vartheta_F - \varphi^F}{\sigma_F^2} \frac{W^D}{P_F} \quad (1)$$

where ϑ_F and σ_F^2 are the returns and volatilities of the foreign market respectively and φ^F represents the cost incurred by investors from the domestic market when they invest in the foreign market. As such, this parameter represents all economic, legal, cultural and informational barriers which erode the profits made by investors from abroad relative to resident investors. Since profit-eroding barriers may exist even for domestic investors in the domestic market, a more precise definition of φ^F is that it is the difference between the barriers faced domestically by domestic investors and the barriers faced by domestic investors when investing abroad. Finally, w^D and P_F represent the net wealth of domestic investors and the price of foreign real estate assets respectively. The presence of φ^F in the investment demand equation means that investors will be biased in favour of their home markets where they can achieve superior risk-adjusted returns. This was shown empirically to be the case for the real estate market, for example by Eichholtz et al (1998).

Following again Brennan and Cao (1997) and Griffin et al (2004), we ignore currency effects in this analysis although future work may benefit from the inclusion of this risk factor. The respective equilibrium levels for the domestic and foreign investors are then determined by

$$I_F^D = S_F \omega + \frac{\varphi^F}{\sigma_F^2} [\omega - 1] \omega \frac{W^{FD}}{P_F} \quad (2)$$

$$I_F^F = S_F (1 - \omega) + \frac{\varphi^D}{\sigma_F^2} \omega [1 - \omega] \omega \frac{W^{FD}}{P_F} \quad (3)$$

Here, S_F is the foreign stock of available institutional real estate assets, ω is the ratio of domestic wealth to total wealth and w^{FD} represents the added wealth of foreign and domestic investors. We can now see that domestic investors have a lower equilibrium

allocation to foreign real estate due to the barriers φ^F which by definition entails that foreign investors must have a higher allocation in their home market for the shares to add up to 1. If the prices of foreign real estate rise, this will in turn increase the returns and the wealth of foreign investors disproportionately more than the wealth of domestic investors since the former have a higher allocation in that market than the latter.

However, there is also an argument to the contrary. Given that institutional real estate investments typically require large amounts of equity and/or debt capital, large foreign investment companies may be able to raise capital at a lower cost compared to domestic investors, giving them a competitive advantage even in the presence of barriers. While larger companies clearly have these advantages both in the domestic and foreign markets, it is mainly abroad that they are able to reap diversification benefits and, in some cases, superior returns. Because of their global reach, larger companies may also have lower cost of obtaining information and market intelligence and have superior expertise in evaluating investment opportunities as well as structuring the investment. This proposition is, at least partially, supported by empirical evidence from the real estate market (Eichholtz, Gugler and Kok, 2011). Taking this factor into account, the modified equation then reads:

$$I_F^D = S_F \omega + \frac{\varphi^F - \tau^D}{\sigma_F^2} [\omega - 1] \omega \frac{W^{FD}}{P_F} \quad (4)$$

where τ^D represents the economies of scales available to large global investors but not to smaller domestic investors. Using this formula, we can now demonstrate how expected capital flows change with the values of these parameters. For the base case, let's assume that market prices P_F and P_D are identical and that wealth distributions W^D and W^F are symmetric. The first observation is that a price increase in the foreign markets will cause domestic investors to hold a lower proportion of foreign assets in their portfolio. More interestingly, however, a doubling of the cumulative barriers to investment φ^F , for example through a deterioration in market transparency or the introduction of a tax on income from foreign-owned real estate, will result in reducing the allocation of domestic investors to the foreign real estate market by 50%. By contrast, an increase of the economies of scale parameter τ^D , for example through technological progress in market data collection and transmission, will have the opposite effect, i.e. domestic investors will seek to increase their share of foreign real estate assets in their portfolio.

Three propositions arise from this simple model that are testable with our empirical dataset:

Proposition 1: Barriers to investment reduce the expected returns of foreign investors. The higher the barriers, the greater the reduction in flows that would otherwise be expected if capital flows were only driven by returns. Once barriers are lowered, i.e. transparency and institutions are strengthened in a particular country, there will be a marked increase in cross-border and domestic capital flows. For example, we expect to see this pattern in a number of emerging Asian economies.

Proposition 2: Countries with above-average returns will attract a higher share of capital flows. Also, any increase or decrease in returns, should be followed by a corresponding reaction from capital flows, both from domestic and foreign investors.

Proposition 3: Expectations of investors are assumed to be adaptive and hence tend to follow past and contemporaneous returns. Foreign investors who typically cannot rely on extensive first-hand market experience as well as local and institutional knowledge to put the reported market performance numbers in perspective, are more prone to engaging in adaptive return-chasing behaviour than domestic investors.

Empirical framework

Our empirical strategy is twofold. In the first part, we broadly examine the relationship between institutional, regulatory and macroeconomic barriers and real estate investment flows. In the second part, we narrow down the analysis to the dynamic relationship between flows and property returns to test for evidence of return-chasing behaviour in domestic and foreign investors as outlined by the theoretical model in the previous section.

For the first part of the analysis, we conduct panel OLS regression using both time and country-fixed effects.

The model is given as:

$$REflow_{i,t} = \alpha + \beta_1 Barriers_{i,t} + \beta_2 Return_{i,t} + \beta_3 Msize_{i,t} + \beta_4 Econ_{i,t} + \varphi_i + \mu_t + \varepsilon_{i,t} \quad (5)$$

where i and t indicate respectively the country and year, with $i = 1, \dots, 25$ and $t = 2007, \dots, 2012$. The dependent variable $REflow$ is defined as the log-value of domestic real estate capital inflows to country i , foreign real estate capital inflows to country i or real estate capital outflows from country i in year t . The independent variables include several risk measures associated with institutional and legal barriers collected in the vector $Barriers$, as well as returns ($Return$), market size ($Msize$) and economic environment ($Econ$). In addition, we include country-fixed effects φ_i and time-fixed effects μ_t as indicated by coefficient F-tests. We use heteroskedasticity-robust standard errors in computing p -values. Following our *Proposition 1*, we expect that the barriers will have a significant and negative impact on the volume of capital inflows into direct real estate markets and a significant positive impact on the volume of outflows from the country associated with crowding out of investment.

Proceeding to the second part of the analysis, we investigate the dynamic relationship between returns and capital flows into real estate using an unrestricted VAR. Since our data frequency is annual, it appears plausible that a response of flows to a change in returns may

occur within the same year, we also estimate the VARs with contemporaneous variables included. This system then takes the form:

$$\text{Return} = C(1)*\text{Return}(-1) + C(2)*\text{Return}(-2) + C(3)*\text{Domestic} + C(4)*\text{Domestic}(-1) + C(5)*\text{Domestic}(-2) + C(6)*\text{Foreign} + C(7)*\text{Foreign}(-1) + C(8)*\text{Foreign}(-2) + C(9) + \varepsilon \quad (6)$$

$$\text{Domestic} = C(10)*\text{Return} + C(11)*\text{Return}(-1) + C(12)*\text{Return}(-2) + C(13)*\text{Domestic}(-1) + C(14)*\text{Domestic}(-2) + C(15)*\text{Foreign} + C(16)*\text{Foreign}(-1) + C(17)*\text{Foreign}(-2) + C(18) + \varepsilon \quad (7)$$

$$\text{Foreign} = C(19)*\text{Return} + C(20)*\text{Return}(-1) + C(21)*\text{Return}(-2) + C(22)*\text{Domestic} + C(23)*\text{Domestic}(-1) + C(24)*\text{Domestic}(-2) + C(25)*\text{Foreign}(-1) + C(26)*\text{Foreign}(-2) + C(27) + \varepsilon \quad (8)$$

The purpose of this model is to estimate the relationship between returns and domestic/foreign capital flows. Following our theoretical considerations, we expect that the coefficients for domestic flows C(10-12) and the coefficients for foreign flows C(19-21) are positive and significant (*Proposition 2*). Furthermore, we expect that foreign capital flows react more strongly to changes in returns than domestic flows (*Proposition 3*). As a robustness check, we conduct an impulse response analysis that also illustrates the responses of variables to unit shocks in their lagged variables and in the other two variables.

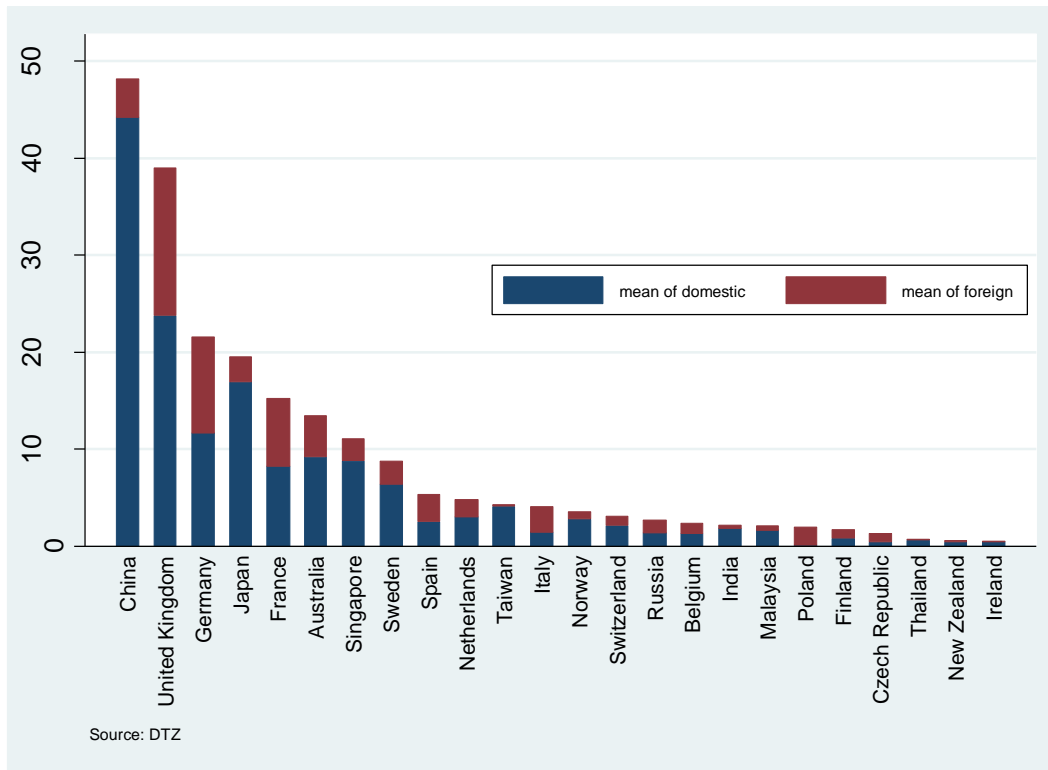


Figure 2: Domestic and foreign real estate investment inflows (in billion USD), average values from 2007 to 2012

Data

Flows

Our dataset consists of a panel of annual series for 25 countries from 2007 to 2012 and a longer time series for the return and flow variables (2000-12). As dependent variables, we use domestic and foreign real estate capital inflows provided by DTZ. In addition to analysing inflows, we also account for the impact of institutional, legal and economic barriers on crowding out real estate investment by looking at capital outflows, data for which has been taken from Real Capital Analytics (RCA). Figure 2 shows the average domestic and foreign inflows to each country between 2007 and 2012. China and the UK attract the bulk of cross-border investment in this sample followed by Germany and Japan. The total volume of investments for these countries ranges from 20 to 48 billion US dollar per annum. In the majority of the countries, average domestic investment represents a higher share of total real estate investment than foreign investment. China stands out as domestic investors have invested in the country about 43 billion US dollar on average from 2007 to 2012.

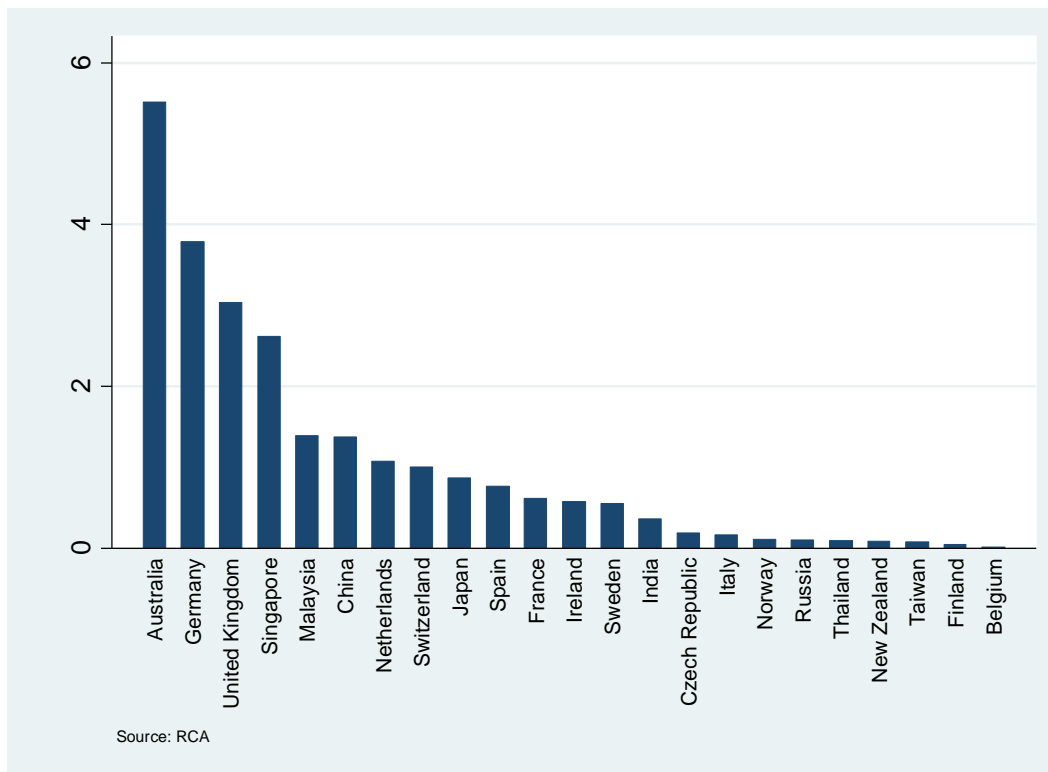


Figure 3: Real estate investment outflows (in billion USD), average values from 2007 to 2012

Figure 3 shows that among the 21 countries for which data is available the highest real estate capital outflows have been observed in Australia amounting annually for about 5.5 billion US dollar on average between 2007 and 2012. Germany, United Kingdom and Singapore follow with outflows ranging between 2.5 and 3.5 billion USD annually. Other important real estate capital exporters are France, Australia, Singapore and Sweden. As shown in Figure 4, in the aftermath of the global financial crisis domestic investment into China has dramatically increased. For the majority of the countries except for China and Russia foreign investment is still trending downwards and there are not yet signs of a recovery (see Figures A1-A4 in the Appendix). Interestingly it is however that the decreasing foreign investment seems to be offset by domestic investment in some of the countries – China, Norway, Malaysia, Singapore, Sweden and Taiwan, so that we can observe an increase in domestic capital flows, reaching even higher values than what has been observed just before the crisis emerged. Outflows have decreased in the aftermath of the financial crisis and have not recovered in the majority of countries.

Institutional, legal and economic barriers

To identify the most important investment barriers, firstly, we collect a wide range of variables characterising the institutional, legal and economic realms from a three different sources – the World Heritage Foundation (WHF), the World Bank (WB) and the World

Economic Forum (WEF). The indicators in our database include property rights, freedom from corruption, fiscal freedom, government spending, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, financial freedom, voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, institutions' quality, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication, innovation, the number of listed companies, credit depth of information, current account-to-GDP ratio, savings-to-GDP ratio, credit-to-GDP ratio, population and GDP. The majority of these variables are components of composed indices, such as the Index of Economic Freedom from the WHF and the Global Competitiveness Index from the WEF. Due to the high correlation among the majority of the variables however, one solution would be the use of a principal component analysis and factors as explanatory variables instead of the individual indicators. Since factors derived from principle components analysis are difficult to interpret, however, we prefer to select those indicators which have the lowest correlation instead of using the factors. The set of barriers is chosen based on two criteria. First, we select those institutional and legal indicators which are most directly related to real estate. Second, we account for different types of barriers which are not directly related to each other by selecting those with the lowest correlations. The selected indicators are summarised in Table 1. Definitions for each variable used in our analysis from the respective sources are presented in the Appendix. Our main set of explanatory variable includes sub-indices of the Index of Economic Freedom from the WHF such as property rights freedom, fiscal freedom, government spending, labour freedom and investment freedom. An increase in property rights is relevant for domestic and foreign investors to the extent that it increases their confidence to undertake entrepreneurial activity, knowing that their wealth such as income, savings, and property is safe from unfair expropriation. (World Heritage Foundation, 2013) Fiscal freedom measures the tax burden imposed by government accounting for direct taxes and overall taxes. Government spending considers the level of government expenditures, including consumption and transfers, as a percentage of GDP. The labour freedom accounts for aspects of the legal and regulatory framework of a country's labour market. In general, the greater the degree of labour freedom, the lower is the rate of unemployment in an economy. (World Heritage Foundation, 2013) Investment freedom accounts for restrictions of foreign investment, restrictions on land ownership, sectoral investment restrictions, capital controls, foreign exchange controls, etc.

We complement these variables by including a measure of financial market development, macroeconomic environment and market size from the WEF's Global Competitiveness Indicators. The index for financial market development measures the degree of development of the financial market by accounting for the availability and affordability of financial services, financing through local equity market, ease of access to loans, venture capital availability, trustworthiness and confidence, soundness of banks, regulation of securities exchanges and legal rights. (World Economic Forum, 2013) The index includes the following macroeconomic indicators – government budget balance, gross national savings, inflation, government debt, country credit rating. (World Economic Forum, 2013) The market size is

an index which consists to 75% of the size of the domestic economy measured by GDP and net exports and to 25% of the size of the foreign economies.

Additionally, as a highly capital-intensive investment asset, real estate flows would be affected by the availability of credit, thus, we include an index for the credit depth of information in each country which measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries.

Table 1: Sources for the institutional, regulatory and macroeconomic barriers

Barriers	Index	Source
Property rights	Index of Economic Freedom	World Heritage Foundation
Fiscal freedom	Index of Economic Freedom	World Heritage Foundation
Government spending	Index of Economic Freedom	World Heritage Foundation
Labour freedom	Index of Economic Freedom	World Heritage Foundation
Investment freedom	Index of Economic Freedom	World Heritage Foundation
Credit depth of information	World Development Indicators	World Bank
Macroeconomic environment	Global Competitiveness Index	World Economic Forum
Financial market development	Global Competitiveness Index	World Economic Forum
Market size	Global Competitiveness Index	World Economic Forum
Global competitiveness index	Global Competitiveness Index	World Economic Forum
Real estate transparency	Global Real Estate Transparency Index	Jones Lang LaSalle

The indices reported in Table 1 measure the institutional, regulatory and macroeconomic barriers that may be relevant for investors. It is important to note that the only index that is specific to the real estate market is the Jones Lang LaSalle transparency index. The index addresses unique factors affecting real estate transparency across the globe, such as real estate performance, availability of listed vehicles, the regulatory and legal environment for real estate businesses, market fundamentals affecting the real estate market, and real estate transaction costs. The index is compiled from a survey of the global business network of Jones Lang LaSalle and LaSalle Investment Management. The survey has been conducted since 1999, and is updated every two years. The higher the value of the index is, the lower is the transparency of the respective real estate market.

Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Foreign inflows (billion USD)	138	2.8	5	0	31
Domestic inflows (billion USD)	138	6.6	12	0	86
Outflows (billion USD)*	109	1	3	0	25
Outflows (billion USD)**	186	2	8	0	89

Property returns (%)	144	5	9	-34	30
Credit depth of information (index)	138	5	1	3	6
Real estate market transparency (index)	144	2	1	1	4
Property rights (index)	144	72	21	20	95
Fiscal freedom (index)	144	65	13	33	91
Government spending (index)	144	53	25	4	95
Labour freedom (index)	144	67	16	40	99
Investment freedom (index)	144	66	20	20	95
Global competitiveness (index)	144	5	0	4	6
Macroeconomic environment (index)	144	5	1	4	7
Financial market development (index)	144	5	1	3	6
Market size (index)	144	5	1	4	7

Note: * Data is from RCA including all the countries in the sample determined by the DTZ data except Belgium, Czech Republic, Finland and New Zealand. **Data for outflows comes from RCA. The full dataset comprises 50 countries. However, it contains a lot of missing observations what explains the relatively low number of observations. For the sake of comparison across inflows and outflows, we report two summary statistics for the same sample of countries as the inflows. As robustness checks we also account for the whole sample of countries available from RCA.

Table 2 shows the summary statistics of all variables including the mean, standard deviation from the mean and the minimum and maximum value. On average across the 25 countries from 2007 to 2012, total real estate capital inflows were around 9.4 billion US dollar with two-thirds of the capital coming from domestic investors. Domestic inflows achieved a maximum value of 86 billion US dollar which is almost three times more than the maximum value for foreign inflows (31 billion US dollar). However, when we exclude China from the sample due to the extraordinary high domestic investment in the aftermath of the crisis, the maximum value of domestic inflows drops to 41 billion US dollar, the mean decreases to 5 billion US dollar and the variation is halved. Moreover, the variation in foreign flows is twice as large as those in domestic flows. The larger variability of foreign inflows may be reflective of the 'lumpiness' large-scale real estate deals, particularly large portfolio purchases by global investors. It may also be reflective of a more short-term investment horizon of foreign investors compared to domestic investors. With respect to the outflows, we observe an average value based on a sample of 21 countries in the sample amounting for 1 billion US dollar per year. The lower value is due to the fact that this figure accounts for average investment flows across only 21 countries whereas inflows account probably to a much larger sample of countries including United States and other large foreign investor countries. Respectively, outflows show much lower volatility than inflows. Property returns vary strongly across the countries ranging from a minimum value of -34% to a maximum value of 30%, with an average return across the 25 countries from 2007 to 2012 of 5% and a standard deviation of 9%. Regarding the legal, institutional and economic barriers, the indices of fiscal freedom and global competitiveness show the lowest volatilities across the 25 countries throughout the estimation period. In turn, the highest variability has been observed for government spending. For this institutional barrier we also observe the lowest mean in comparison to the other barriers. Countries seem to have relatively high government

spending but score well in other institutional and legal barriers with little variation.

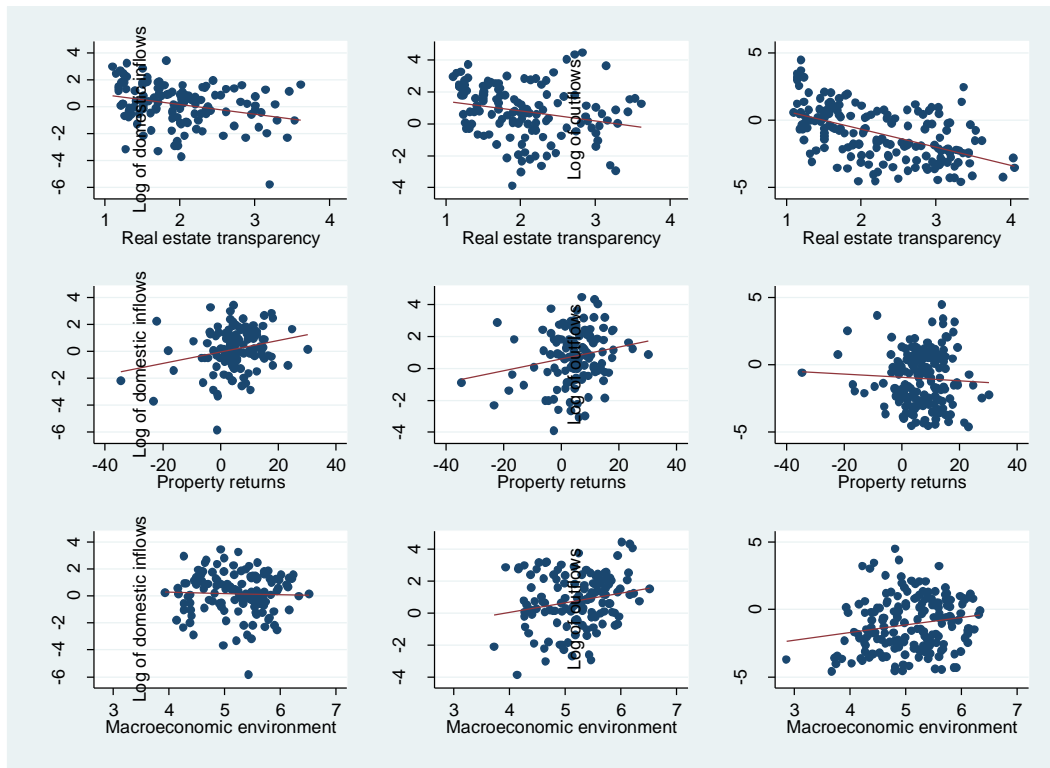


Figure 4: Scatter plots of real estate flows and different explanatory variables

Note: Each dot represents a value in a particular year for a particular country. Property returns are given in percentages.

Figure 4 plots domestic inflows, foreign inflows and outflows against the index of real estate market transparency, property returns and the index of macroeconomic environment respectively. For both inflows and outflows the fitted values of the observations show a negative relationship with the transparency index, which takes higher values for less transparent countries. Domestic investors from countries with good macroeconomic environment will increase both, investment with and outside of their country. However, the state of the macroeconomy does not seem to be a driving force in attracting foreign investment. Thus, transparency and good macroeconomic environment can be seen as enhancing cross-border investment flows and not push or pull investment towards one or another direction. In turn, high property returns seem to pull investment into the country and low returns push investment outside of it what is in line with theoretical models.

Finally, in addition to the investment risk and barrier indicators, we include a measure of investors' return expectations by using annual IPD all-property total returns. The IPD database covers the majority of countries in our database¹. However, there is a range of

¹ Countries in our dataset that are covered by IPD are Australia, Belgium, Czech Republic, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Spain, Sweden, United Kingdom.

countries for which we infer total returns based mainly on GDP growth data to estimate capital growth plus some simplifying assumptions about the development of income returns that we derive from known values for similar countries in the IPD database². As noted earlier, we do not consider currency effects and therefore all our returns are based on local currencies.

Results

The panel results for foreign inflows, domestic inflows and outflows are presented in Table 3, 4 and 5 respectively. Each table contains four different model specifications varying the set of institutional and legal barriers due to the multicollinearity problems that would arise if these barriers were jointly included in one single regression equation. A few variables remain, however, the same throughout all specifications in order to control for the macroeconomic environment, return expectations, credit constraints and loan accessibility, and market size. The first specification includes the majority of the above mentioned barriers but not accounting for property rights, the transparency index and the competitiveness index, as these variables show a high correlation with the majority of the other factors. In the second specification property rights are added to the variables from the first specification but due to high their correlation of over 50% with financial market development and investment freedom, the latter have been dropped from the regression equation. The third specification replaces all institutional barriers from the second specification by the index of real estate market transparency which is a composite index and is already accounting for institutional and legal barriers related to real estate. The fourth specification replaces the individual barriers by a composite index of global competitiveness which takes into account such barriers. In this model, the variables for market size and macroeconomic environment have also been dropped as they are already contained in this index.

Foreign inflows

Table 3 shows the four different model specifications for the effect of institutional, regulatory and economic barriers on foreign capital inflows. As we have pointed above our sample is composed only of 25 countries in Europe and Asia which are often the most preferred investment destinations. Explaining the determinants of flows by looking at such a small sample of countries is not immune against the sample selection bias. Table 3 shows that the selected institutional and legal indicators do not affect foreign real estate capital inflows significantly. The only variable which is significantly positive related to foreign flows is the index of credit depth of information, which can be seen as a measure of the transparency on the credit market. The easier it is for a lender to obtain credit information, the lower the uncertainty about the borrowers' credit rating and the better the pricing of the default risk.

² These countries are IPD countries for which the series is incomplete for early years of the 2000-2012 series as well as the complete series of the following countries: China, Hungary, Hong Kong, India, Malaysia, Russia, Singapore, Taiwan, Thailand

However, other barriers such as property rights or financial market development do not seem to be a burden for foreign investment between 2007 and 2012. Even the degree of legal restrictions on foreign investment seems not be important for the level of foreign investment flows. The insignificance of the barriers may be explained by the “economies of scale” available to large global investors, as we have mentioned in the Introduction. It means, given that institutional real estate investments typically require large amounts of equity and/or debt capital, large global players may be able to raise capital at a lower cost compared to domestic investors, giving them a competitive advantage even in the presence of barriers. Moreover, foreign investors are not driven by returns either. If time-fixed effects were not included in the regressions, returns would become significant. However, as coefficient F-tests suggest, time-fixed effects should be included and we see that they capture the variations in the foreign inflows better than returns. Specification (3) shows the effect of real estate market transparency on investment flows. We can see that even high real estate market transparency does not attract significantly more foreign real estate capital. Overall, foreign investors seem to be only concerned with the transparency on the credit market but even not with property returns or macroeconomic environment. In other words, improving credit market transparency appears to have a stronger positive impact on cross-border flows than an increase in returns or lowering other institutional and legal barriers directly or indirectly related to real estate.

Table 3: Institutional, legal and economic barriers and real estate foreign capital inflows

	(1) foreign inflows	(2) foreign inflows	(3) foreign inflows	(4) foreign inflows
Credit depth of information	1.044*** (0.309)	0.995*** (0.277)	1.102*** (0.293)	0.965*** (0.271)
Property returns	0.00620 (0.0156)	0.00561 (0.0126)	0.0108 (0.0157)	0.000538 (0.0122)
Market size	-2.654 (1.651)	-2.560 (1.592)	-1.675 (1.328)	
Macroeconomic environment	0.0319 (0.307)	-0.0877 (0.301)	0.00892 (0.255)	
Fiscal freedom	-0.0124 (0.0440)	-0.00162 (0.0309)		
Government freedom	0.0131 (0.0196)	0.0194 (0.0208)		
Labour freedom	0.0129 (0.0245)	0.00933 (0.0234)		
Investment freedom	0.0170 (0.0280)			
Financial development	0.0227 (0.298)			
Property rights		-0.0514 (0.0360)		
Real estate transparency			-2.065 (1.378)	
Global competitiveness				-1.761 (1.584)
Constant	7.606 (7.883)	12.15 (8.230)	8.821 (6.562)	5.402 (7.467)

<i>Observations</i>	124	124	124	124
<i>R-squared</i>	0.392	0.403	0.413	0.390
<i>Number of countries</i>	23	23	23	23

Note: The dependent variable is the natural logarithm of foreign real estate capital inflows. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Domestic inflows

Table 4 shows the results for the domestic real estate capital inflows. We can see that institutional and legal barriers do not have strong impact on domestic investment either. The only barrier that seems to affect domestic investment is financial market development. Domestic inflows increase significantly in countries with higher financial market flexibility suggesting that domestic investors are highly dependent on the domestic financial market and on foreign funding from the capital markets in general. Furthermore, domestic inflows increase in those countries with a more preferable macroeconomic environment in terms of a balanced government budget, high gross national savings, low inflation, low government debt and a high country credit rating. However, unlike foreign investors, domestic investors do not seem to be concerned with the credit depth of information what can be seen as an evidence for the presence of information asymmetries for foreign investors on the credit markets and its impact on lowering cross-border flows.³ What domestic investors seem also to be interested in is the transparency of the real estate market. As, however, the rest of the institutional and legal barriers are not included in this model specification, it may be the case that the transparency index captures effects associated with the degree of financial market development instead. Therefore, we run an additional regression (specification (5)) including the index of financial development along with the transparency index. The results confirm our assumption that the significance of the transparency index may capture financial market frictions as the index becomes insignificant and the index for financial development instead turns significant. Another interesting finding is that the market size is significantly negative in two out of four specifications. The larger the domestic country is in terms of GDP and net exports the lower the domestic inflows will be. This variable may be seen as controlling for the large players in the real estate industry such as the UK, Germany, etc. suggesting that they are exporting real estate capital abroad rather than investing in their home countries. This is not surprising as most global companies are based in those countries. However, it also means that global domestic investors look for investment opportunities abroad rather than in their home countries. Finally, we see that domestic investors in the 23 countries of the sample are highly driven by returns. The higher the returns the more the domestic inflows in real estate are.

Table 4: Institutional, legal and economic barriers and real estate domestic capital inflows

³ However, one should be careful to compare the results for domestic inflows directly with those for foreign inflows, as the number of foreign countries is expected to be considerably larger than that for the domestic investors (here: 23 countries).

	(1)	(2)	(3)	(4)	(5)
	domestic inflows	domestic inflows	domestic inflows	domestic inflows	domestic inflows
Credit depth of information	0.0231 (0.344)	0.0523 (0.322)	0.254 (0.330)	-0.283 (0.586)	0.0744 (0.317)
Property returns	0.0293*** (0.00847)	0.0156 (0.00933)	0.0200** (0.00899)	0.0152 (0.0106)	0.0301*** (0.00828)
Market size	-3.805* (1.869)	-3.671 (2.236)	-2.615 (1.716)		-3.255* (1.640)
Macroeconomic environment	0.782*** (0.252)	1.420*** (0.371)	1.285*** (0.334)		0.720*** (0.218)
Fiscal freedom	-0.0188 (0.0369)	0.0265 (0.0450)			
Government freedom	-0.0112 (0.0127)	-0.00202 (0.0125)			
Labour freedom	0.0185 (0.0297)	0.0161 (0.0309)			
Investment freedom	0.0187 (0.0196)				
Financial development	1.173** (0.428)				1.006*** (0.310)
Property rights		-0.00300 (0.0246)			
Real estate transparency			-2.465** (1.153)		-0.718 (0.974)
Global competitiveness				2.576 (2.216)	
Constant	9.268 (9.013)	9.411 (11.74)	11.60 (10.45)	-10.69 (10.15)	9.655 (8.994)
<i>Observations</i>	<i>130</i>	<i>130</i>	<i>130</i>	<i>130</i>	<i>130</i>
<i>R-squared</i>	<i>0.524</i>	<i>0.386</i>	<i>0.444</i>	<i>0.226</i>	<i>0.509</i>
<i>Number of countries</i>	<i>23</i>	<i>23</i>	<i>23</i>	<i>23</i>	<i>23</i>

Note: The dependent variable is the natural logarithm of domestic real estate capital inflows. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Outflows

Table 5 shows the results for the real estate capital outflows. These results could be compared to the results for the domestic inflows, as we have the same domestic countries but one should do this with caution because the source of the outflow data is different from that of the inflows. We see that domestic investors decide whether to invest abroad by looking at the situation in their home countries. One important finding is that both domestic inflows and outflows are positively driven by a good macroeconomic environment and financial market development. Indeed, if the domestic market has a more favourable macroeconomic environment and high financial market development investors would not only invest in their home countries but also in the rest of the world. This finding shows the strong dependence of domestic investors on the domestic credit market not only when they invest within the country but also abroad. Moreover, the fact that good credit depth of information

significantly increases both foreign inflows and domestic outflows points to its role as a catalyst of cross-border real estate investment activity. The finding that other institutional indicators, such as labour freedom and property rights have a positive impact on outflows rather than decrease them can mean that countries with well-established institutional and legal framework will export more real estate capital than countries with high entry barriers. In another estimation accounting for about as twice as many countries, we observe that more fiscal freedom in terms of lower taxes and low government spending also significantly retains real estate capital in the domestic country. Instead, we see that more investment freedom and hence less restrictions on foreign and domestic flows will lead to less outflows from the domestic country. It means that e.g. abolishing capital controls and foreign exchange controls will not cause investment to flow abroad but instead retain it within the country. Although real estate market transparency is not significantly increasing real estate inflows, there is a positive relationship between real estate capital outflows and transparency. However, there is the risk of a reverse causality meaning that countries that export more capital are in general more transparent. Overall, it seems that in order to enhance cross-border real estate investment activity, good macroeconomic environment, a well-developed financial market and a more transparent credit market are crucial.

Table 5: Institutional, legal and economic barriers and real estate capital outflows

	(1) outflows*	(2) outflows*	(3) outflows*	(4) outflows*	(5) outflows*
Credit depth of information	0.110 (0.680)	0.0596 (0.771)	1.076** (0.437)	0.752* (0.426)	1.108** (0.427)
Property returns	0.00680 (0.0106)	-0.00798 (0.0106)	-0.000575 (0.0120)	-0.0107 (0.0133)	0.00837 (0.0138)
Market size	0.254 (2.931)	-0.256 (2.810)	1.999 (2.858)		1.571 (2.957)
Macroeconomic environment	0.133 (0.510)	1.600** (0.642)	0.795** (0.362)		0.315 (0.383)
Fiscal freedom	-0.0524 (0.0325)	-0.0441 (0.0514)			
Government freedom	-0.00460 (0.0324)	-0.0328 (0.0329)			
Labour freedom	0.0519** (0.0242)	0.0492** (0.0216)			
Investment freedom	-0.0666*** (0.0214)				
Financial development	1.382*** (0.260)				0.754*** (0.261)
Property rights		0.0589* (0.0333)			
Real estate transparency			-4.314*** (0.915)		-3.074** (1.185)
Global competitiveness				1.904 (2.393)	
Constant	-5.493 (14.63)	-10.47 (14.37)	-10.56 (12.68)	-13.12 (11.74)	-12.59 (13.39)
<i>Observations</i>	<i>104</i>	<i>104</i>	<i>104</i>	<i>104</i>	<i>104</i>

<i>R-squared</i>	0.511	0.370	0.434	0.249	0.452
<i>Number of countries</i>	22	22	22	22	22

Note: The dependent variable is the natural logarithm of real estate capital outflows. (*) As the data source for the outflows differs from those of inflows, we restrict the sample to include only those countries, for which inflow data is available. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Robustness Checks

We conduct several robustness checks in order to assess the stability of above results. Firstly, due to the extraordinary high domestic inflows in China which may be triggered by institutional changes regarding incentives of domestic investors investing at home, we exclude China from our sample and rerun the estimation. The results are presented in Tables A2 to A4 in the Appendix. There are little differences regarding results for foreign inflows and outflows. Indeed, when China is excluded, foreign inflows turn to respond significantly negative to increases in the Global Competitiveness Index in the domestic country. This may be viewed as a sign that foreign investors seek additional opportunities by going into less competitive markets. Regarding the domestic outflows, there are a few changes in the significance of the coefficients as the exclusion of China would mostly affect the results for the domestic inflows. Most notably, the real estate transparency index turns insignificant. So that a clear conclusion about the importance of transparency for domestic inflows cannot be drawn. The insignificance of the transparency index together with the significance of other institutional barriers can mean that domestic investors probably know the real estate market better and do not see it as an investment constraint. The results for the outflows remain the similar. Secondly, we run regressions excluding the year 2007 when the crisis emerged but the results stay robust. We conduct additional regressions by excluding significant variables to see whether the results will remain similar but could not find any significant changes in the results. Overall, the selected variables in above specifications do not show high correlation among each other and the signs of the coefficients remain robust throughout different variations of the models. There are only a few changes in the significance for some of the variables as discussed above.

Inflows and Returns

In the next step, we estimate the VAR models as outlined above. Model 1 in Table 6 reports the coefficients of the return equation for all countries. Past returns are found to be a strong predictor of current returns but no evidence of a link between past flows (both domestic and foreign) and subsequent returns is found. This is perhaps surprising as we would expect that, *ceteris paribus*, an increase in flows forces up prices and forces down subsequent returns. However, we do not include major demand and supply rivers in the real estate market in this simple estimation. Given the difficulty of predicting returns, the goodness of fit is not very

high, as expected ($R^2=0.28$). By contrast, the VAR estimations of domestic and foreign flows have a much better goodness of fit. Again, lagged values of the respective past flows are found to be the strongest drivers of current flows in both equations. Interestingly, we find at least some weak evidence that foreign flows are positively linked to past returns (with a one-year lag) while no such link is found for domestic flows. This could be taken as initial evidence that foreign capital flows are more return-driven than domestic flows as hypothesised above. A separate estimation by continents reveals largely the same pattern but both domestic and foreign flows are found to be driven by past returns in Europe whereas no significant link between flows and returns is found in Asia/Pacific. Splitting the sample into two periods (2000-6 and 2007-12) shows that returns are weakly significant as a predictor of foreign flows in the more recent period.

Table 6: Vector autoregression estimates of returns and flows

	All countries			Asia/Pacific			Europe		
	(1)	(2)	(3)	(4)	(5)	(6)	(4)	(5)	(6)
	Return	Domestic	Foreign	Return	Domestic	Foreign	Return	Domestic	Foreign
Return(-1)	0.573*** [9.54]	-0.011 [-0.35]	0.035* [1.80]	0.446*** [4.90]	-0.054 [-1.15]	0.018 [1.37]	0.780*** [10.06]	0.122*** [3.09]	0.080** [1.97]
Return(-2)	-0.202*** [-3.48]	-0.017 [-0.56]	-0.030 [-1.62]	-0.081 [-0.89]	0.007 [0.14]	0.002 [0.16]	-0.421*** [-5.91]	-0.139*** [-3.83]	-0.074** [-1.99]
Domestic(-1)	0.035 [0.28]	1.277*** [19.3]	0.013 [0.31]	0.055 [0.31]	1.361*** [15.31]	0.050** [1.98]	0.164 [0.72]	0.903*** [7.88]	0.101 [0.85]
Domestic(-2)	-0.053 [-0.36]	-0.42*** [-5.57]	0.051 [1.09]	-0.070 [-0.32]	-0.65*** [-6.03]	-0.024 [-0.79]	-0.107 [-0.48]	0.102 [0.91]	0.131 [1.14]
Foreign(-1)	-0.376* [-1.73]	-0.35*** [-3.13]	0.63*** [9.18]	-1.279* [-1.85]	-0.450 [-1.28]	0.25*** [2.51]	-0.417* [-1.83]	-0.141 [-1.21]	0.521*** [4.38]
Foreign(-2)	0.111 [0.48]	0.38*** [3.15]	0.069 [0.92]	-0.518 [-0.73]	1.277*** [3.53]	0.113 [1.09]	0.247 [1.09]	-0.086 [-0.74]	-0.073 [-0.62]
C	6.095	1.144	0.466	8.912	1.380	0.406	4.674	0.902	0.778
Observations	275	275	275	121	121	121	154	154	154
R-squared	0.278	0.818	0.593	0.230	0.820	0.240	0.437	0.876	0.644
Countries	25	25	25	11	11	11	14	14	14

	Pre-financial crisis (2000-6)			Financial crisis (2007-12)		
	(7)	(8)	(9)	(10)	(11)	(12)
	Return	Domestic	Foreign	Return	Domestic	Foreign
Return(-1)	0.696*** [8.40]	0.017 [0.61]	-0.004 [-0.24]	0.367*** [4.64]	-0.030 [-0.61]	0.051* [1.71]
Return(-2)	-0.20*** [-2.32]	-0.037 [-1.20]	-0.001 [-0.03]	-0.181** [-2.62]	-0.001 [-0.01]	-0.0411 [-1.57]
Domestic(-1)	0.125 [0.40]	0.772*** [7.01]	-0.131* [-1.84]	0.090 [0.67]	1.341*** [15.64]	0.012 [0.25]
Domestic(-2)	-0.203 [-0.63]	0.146 [1.29]	0.152** [2.01]	-0.097 [-0.61]	-0.544*** [-5.35]	0.035 [0.58]

Return	0.562***	9.45	0.432***	4.71	0.722***	9.24	0.692	8.27	0.353	4.51
Return(-2)	-0.186***	-3.27	-0.085	-0.95	-0.355***	-4.85	-0.196	-2.18	-0.164	-2.41
Domestic	0.230*	1.78	0.137	0.72	0.476**	2.12	0.278	0.90	0.236	1.68
Domestic(-1)	-0.263	-1.28	-0.193	-0.63	-0.266	-0.92	-0.102	-0.24	-0.231	-1.02
Domestic(-2)	0.026	0.17	0.049	0.20	-0.156	-0.73	-0.230	-0.70	0.015	0.09
Foreign	0.376*	1.78	1.218*	1.82	0.001	0.00	-0.097	-0.20	0.426	1.80
Foreign(-1)	-0.534**	-2.00	-1.525***	-2.14	-0.350	-1.34	-0.110	-0.17	-0.483	-1.70
Foreign(-2)	-0.003	-0.01	-0.832	-1.13	0.287	1.30	0.288	0.49	-0.049	-0.20
C	5.657	7.02	8.228***	5.31	4.244***	5.43	7.191	6.19	4.189	4.11
<i>R-squared</i>	<i>0.31</i>		<i>0.26</i>		<i>0.47</i>		<i>0.41</i>		<i>0.23</i>	
DOMESTIC EQUATION										
Return	0.051*	1.78	0.033	0.72	0.063**	2.12	0.025	0.90	0.083	1.68
Return(-2)	-0.066**	-2.05	-0.088*	-1.81	0.019	0.53	0.004	0.14	-0.095	-1.94
Return(-2)	0.015	0.56	0.007	0.16	-0.063**	-2.21	-0.032	-1.17	0.041	1.00
Domestic(-1)	1.266***	21.70	1.304***	15.14	0.825***	10.25	0.877	9.18	1.325	17.03
Domestic(-2)	-0.464***	-6.80	-0.622***	-6.03	0.021	0.27	0.027	0.28	-0.559	-6.05
Foreign	0.729***	8.14	1.081***	3.39	0.668***	11.71	0.813	6.69	0.656	5.00
Foreign(-1)	-0.800***	-6.86	-0.681	-1.93	-0.462***	-5.26	-0.440	-2.39	-0.819	-5.25
Foreign(-2)	0.327***	3.04	1.172***	3.38	-0.052	-0.65	-0.226	-1.31	0.403	2.82
C	0.493	1.20	0.645	0.76	0.086	0.28	0.066	0.16	0.698	1.09
<i>R-squared</i>	<i>0.86</i>		<i>0.84</i>		<i>0.94</i>		<i>0.93</i>		<i>0.84</i>	
FOREIGN EQUATION										
Return	0.031*	1.78	0.024*	1.82	0.001	0.01	-0.004	-0.20	0.053*	1.80
Return(-1)	0.020	1.00	0.012	0.89	-0.009	-0.23	-0.008	-0.40	0.039	1.33
Return(-2)	-0.019	-1.14	0.004	0.28	0.027	0.90	0.011	0.64	-0.031	-1.29
Domestic	0.273***	8.14	0.086***	3.39	0.727***	11.71	0.342***	6.69	0.230***	5.00
Domestic(-1)	-0.337***	-6.05	-0.068	-1.63	-0.556***	-5.55	-0.396***	-5.45	-0.300***	-3.92
Domestic(-2)	0.171***	3.87	0.033	1.00	0.057	0.70	0.102	1.61	0.165**	2.76
Foreign(-1)	0.746***	11.92	0.322***	3.34	0.623***	7.28	0.763***	7.66	0.677***	8.12
Foreign(-2)	-0.039	-0.59	0.015	0.15	-0.011	-0.13	0.286***	2.60	-0.053	-0.61
C	-0.038	-0.15	0.076	0.32	0.121	0.37	0.153	0.59	0.038	0.10
<i>R-squared</i>	<i>0.68</i>		<i>0.34</i>		<i>0.82</i>		<i>0.88</i>		<i>0.58</i>	

Note: The estimates in this table are based on unrestricted VARs and include contemporaneous and lagged variables. To preserve degrees of freedom, only two lags of each variable are included but longer lags were tested and are available upon request. T statistics are presented in brackets and *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Finally, we conduct an impulse response analysis with Cholesky one standard deviation innovations to illustrate our results (Figure 5). All three variables, returns, domestic flows and foreign flows exhibit a high degree of persistency for a number of years and are generally more responsive to their own past values than they are to any of the other two variables. Domestic and foreign flows are strongly linked. The graphs suggest that overall foreign flows are more responsive to return shocks than domestic investors.

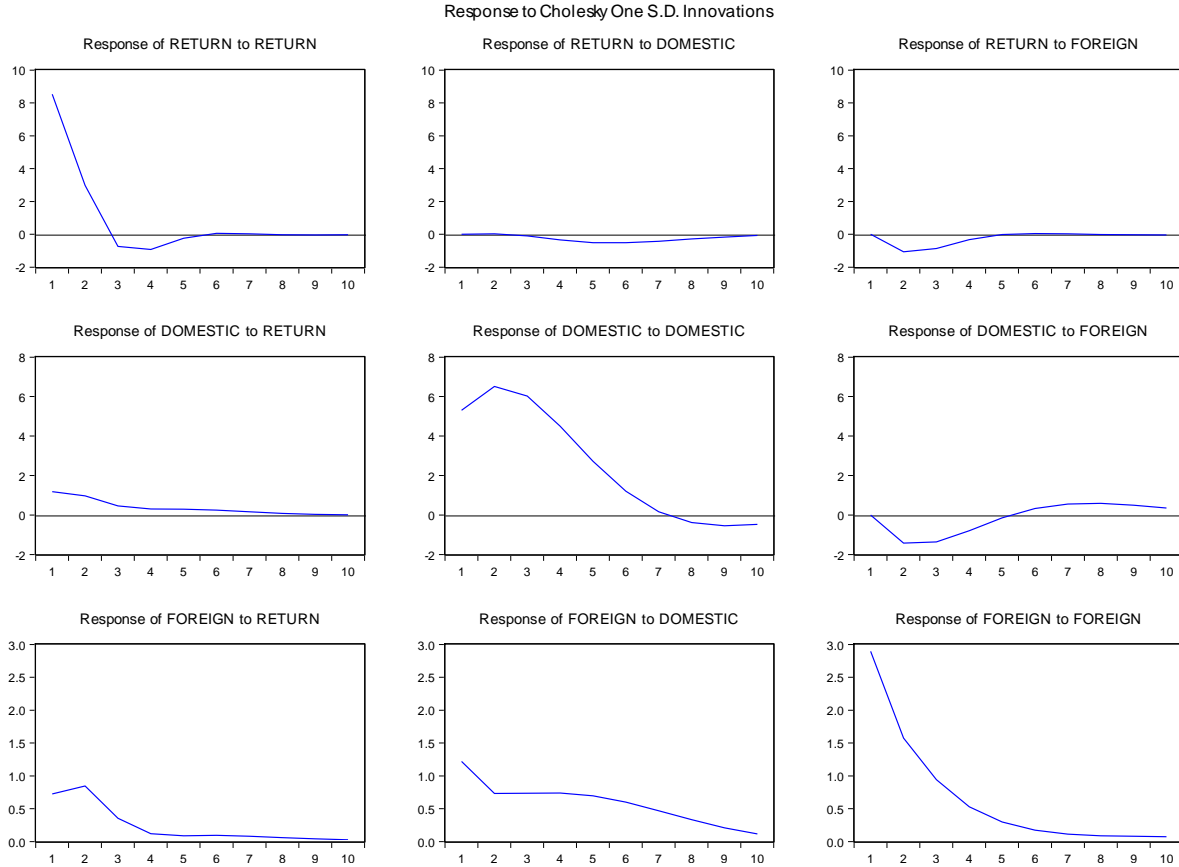


Figure 5: Impulse response graphs of returns, domestic flows and foreign flows.

Note: The graphs in this figure show the results of impulse response functions for average total property returns and capital flows from domestic and foreign investors respectively. The impulse estimation is conducted based on the VAR reported in Table 8.

Conclusions

This study investigated the drivers of cross-border capital flows into direct real estate markets. Based on earlier theoretical work on capital flows into equity markets, we formulate three propositions relating to international real estate investments. These propositions are then empirically investigated in a two-part analysis. The first part enquired whether existing legal, political and socio-economic barriers are negatively associated with the average level of cross-border real estate flows into a set of 25 countries and found empirical evidence that this is the case. The second part of the analysis examined the dynamics of flows in more detail by disaggregating domestic and foreign investment flows and testing for evidence of return-chasing behaviour in both series in a VAR framework. Cross-border investment appears to react more strongly to past returns than domestic investment which is in line with our expectations. However, there is at least some evidence that both cross-border and domestic investment react to contemporaneous returns.

The empirical findings presented in this report are limited in a number of important ways. Firstly, we only consider a limited set of countries (25 out of roughly 200 countries) and continents (Europe and Asia). The inclusion of other countries and continents, notably North and South American countries, may alter the picture dramatically. Furthermore, we have to rely on crude estimates of return data for many countries which may distort the findings. Future work should also seek to model the formation of investor expectations better to detect evidence of contagion or herding behaviour based on adaptive or forward-looking behaviour of investors. This study did not study in detail the recursive relationship between flows and returns but the data for doing so, which also requires more information on market fundamentals in each country, is available for future research,

Overall, our findings confirm that factors related with the macroeconomic environment and credit and financial market development are more important for explaining cross-border flows than property returns both across countries in our dataset and over time in the 2000-2012 study period. We find little evidence of either domestic and foreign investors being better informed about the market or better able to predict year-to-year changes in returns but this finding requires more careful consideration in future research. We do not find evidence for cross-border institutional or regulatory arbitrage on the real estate market as has been found for bank flows (see Houston et al. 2012). Except for credit and financial market development, other institutional and legal barriers do not seem to have a significant impact on real estate inflows. Indeed, we can show that more transparent credit information can enhance both inflows and outflows, thereby serving as a catalyst of real estate investment activity. However, unlike foreign investors, domestic investors investing at home do not seem to be concerned with the credit depth of information what can be seen as an evidence for the presence of information asymmetries for foreign investors on the credit markets and its impact on lowering cross-border flows. The finding that domestic inflows increase significantly in countries with higher financial market flexibility suggests that domestic investors are highly dependent on the domestic financial market and on debt financing from the capital markets in general.

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Appendix

Definition of indicators:

Property rights

The index measures the likelihood that private wealth will be expropriated by looking at the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts. A high value of the index is associated with more secure property rights. An increase in property rights is relevant for domestic and foreign investors to the extent that it increases their confidence to undertake entrepreneurial activity, knowing that their wealth such as income, savings, and property is safe from unfair expropriation. (World Heritage Foundation, 2013)

Fiscal freedom

Fiscal freedom measures the tax burden imposed by government accounting for direct taxes and overall taxes (direct and indirect taxes), such as payroll taxes, sales taxes, excise taxes, tariffs, the value-added tax (VAT). The index is composed of three quantitative factors: the top marginal tax rate on individual income, the top marginal tax rate on corporate income, and the total tax burden as a percentage of GDP. The higher the tax rates are, the lower the overall private-sector activity. (World Heritage Foundation, 2013)

Government spending

Government spending considers the level of government expenditures, including consumption and transfers, as a percentage of GDP. “Excessive government spending runs a great risk of crowding out private economic activity. A government’s insulation from market discipline often leads to bureaucracy, lower productivity, inefficiency, and mounting debt that imposes an even greater burden on future generations.” Therefore, countries with low expenditures score high. (World Heritage Foundation, 2013)

Investment freedom

Investment freedom accounts for restrictions of foreign investment, restrictions on land ownership, sectoral investment restrictions, capital controls, foreign exchange controls, etc. The higher the index is, the freer the country is economically, and there would be less constraints on the flow of investment capital, both internally and across the country’s borders. (World Heritage Foundation, 2013)

Labour freedom

The labour freedom accounts for aspects of the legal and regulatory framework of a country’s labour market, such as the ratio of minimum wage to the average value added per worker, hindrance to hiring additional workers, rigidity of hours, difficulty of firing redundant employees, legally mandated notice period, and mandatory severance pay. Low labour

market freedom is associated with rigid labour regulations result often in a mismatch of labour supply and demand. In general, the greater the degree of labour freedom, the lower is the rate of unemployment in an economy. (World Heritage Foundation, 2013)

Financial market development

The index measures the degree of development of the financial market by accounting for the availability and affordability of financial services, financing through local equity market, ease of access to loans, venture capital availability, trustworthiness and confidence, soundness of banks, regulation of securities exchanges and legal rights. (World Economic Forum, 2013)

Macroeconomic environment

The index includes the following macroeconomic indicators – government budget balance, gross national savings, inflation, government debt, country credit rating. (World Economic Forum, 2013)

Market size

The market size is an index which consists to 75% of the size of the domestic economy and to 25% of the size of the foreign economies. The size of the domestic market is constructed by taking the natural log of the sum of the gross domestic product plus the total value of imports of goods and services, minus the total value of exports of goods and services. The size of the foreign market is estimated as the natural log of the total value of exports of goods and services. All variables are valued at purchased power parity (PPP). (World Economic Forum, 2013)

Global competitiveness index

The global competitiveness index measures the microeconomic and macroeconomic foundations of national competitiveness. “Competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country also associated with the rates of return obtained by investments in an economy.” The GCI includes 12 pillars of competitiveness: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation. (World Economic Forum, 2013)

Credit depth of information

The credit depth of information is an index which measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit

registries. The higher the index is, the better the availability of credit information which in turn will facilitate lending decisions. (World Bank, 2013)

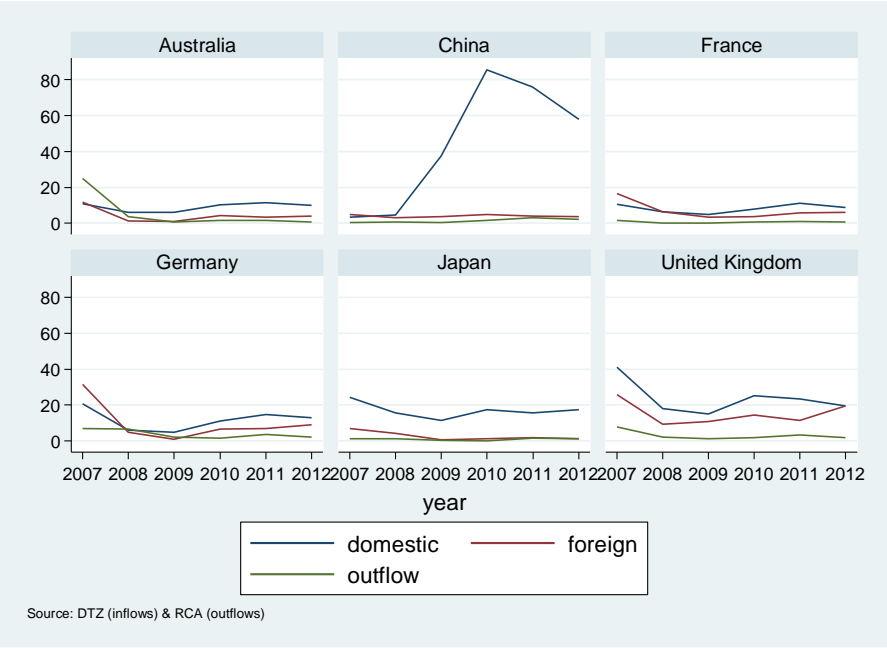


Figure A1: Domestic and foreign real estate capital inflows, and capital outflows (in billion USD)

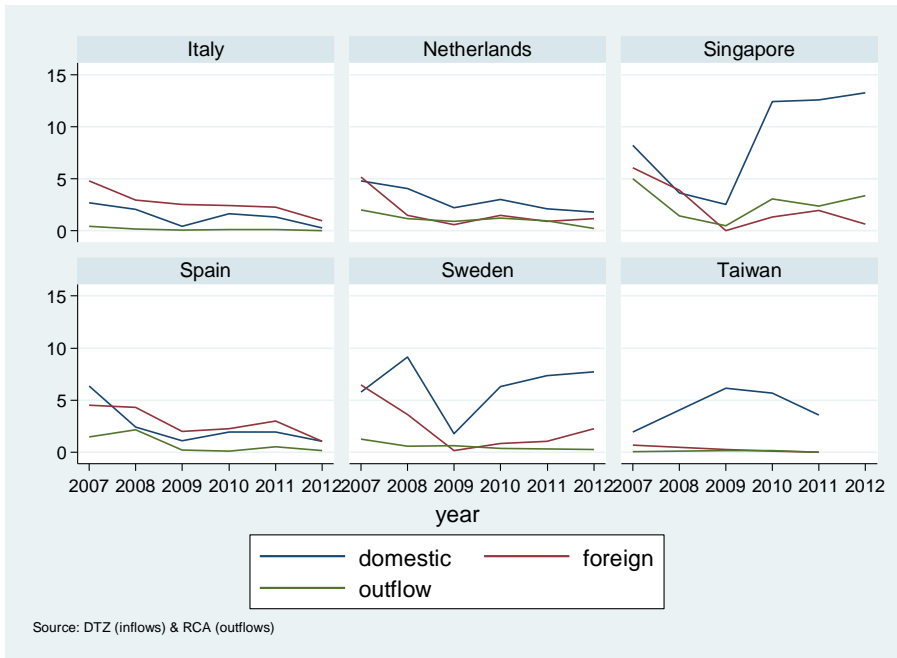


Figure A2: Domestic and foreign real estate capital inflows, and capital outflows (in billion USD)

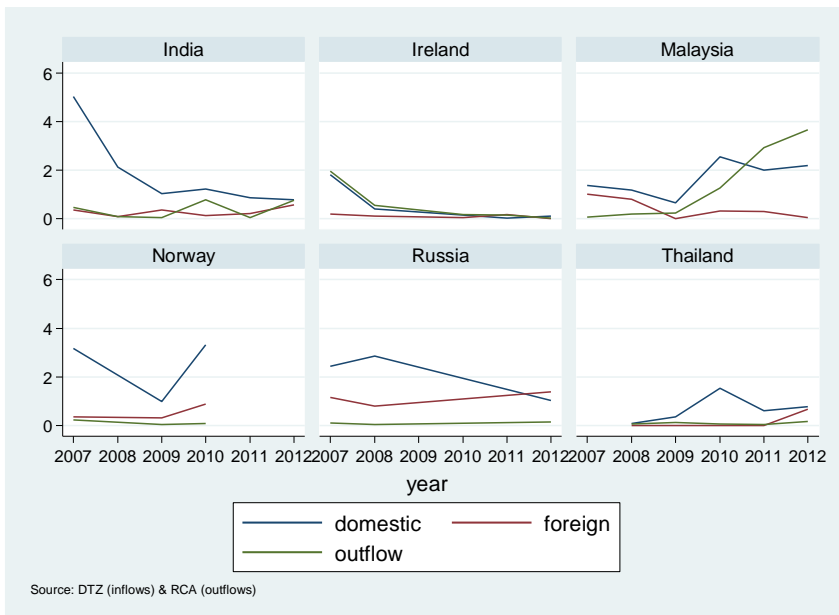


Figure A3: Domestic and foreign real estate capital inflows, and capital outflows (in billion USD)

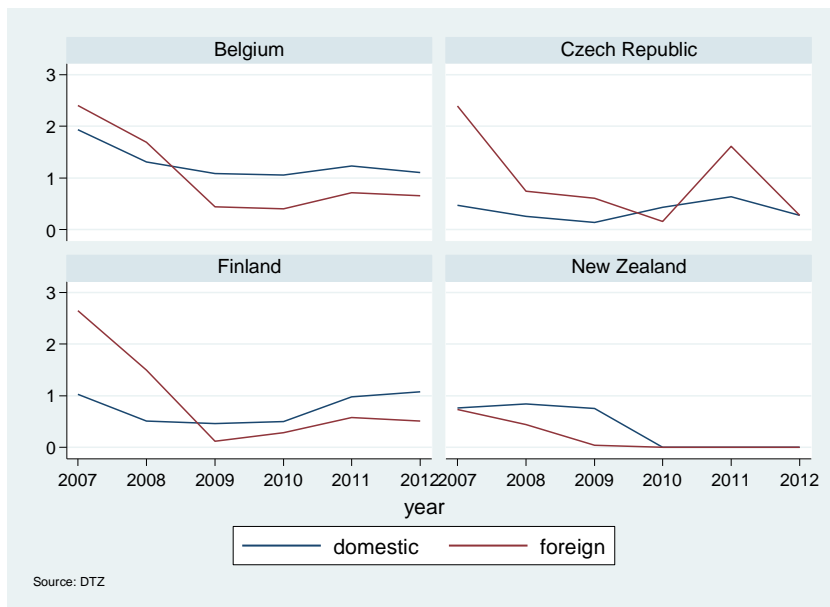


Figure A4: Domestic and foreign real estate capital inflows (in billion USD)

Table A1: Institutional, legal and economic barriers and real estate capital outflows (extended country sample)

	(1) outflows	(2) outflows	(3) outflows	(4) outflows
Credit depth of information	0.637 (0.826)	0.547 (0.896)	1.345** (0.644)	1.258 (0.761)
Property returns	0.00185 (0.0126)	-0.00926 (0.0118)	-0.000603 (0.0106)	-0.0128 (0.0128)
Market size	1.978 (2.858)	1.838 (2.704)	2.908 (2.454)	
Macroeconomic environment	0.657 (0.470)	1.766*** (0.602)	0.767** (0.376)	
Fiscal freedom	-0.0814** (0.0333)	-0.0732 (0.0471)		
Government freedom	-0.0438** (0.0211)	-0.0574** (0.0256)		
Labour freedom	0.0188 (0.0285)	0.0186 (0.0276)		
Investment freedom	-0.0462*** (0.0168)			
Financial development	1.436*** (0.298)			
Property rights		0.0608* (0.0310)		
Real estate transparency			-3.029*** (0.974)	
Global competitiveness				1.685 (1.674)
Constant	-14.99	-18.96	-18.86	-14.75**

	(16.50)	(15.80)	(12.83)	(7.067)
Observations	169	169	167	169
R-squared	0.404	0.302	0.303	0.165
Number of countries	41	41	39	41

Note: The dependent variable is the natural logarithm of real estate capital outflows. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A2: Institutional, legal and economic barriers and real estate foreign capital inflows (excluding China)

	(1) foreign inflows*	(2) foreign inflows*	(3) foreign inflows*	(4) foreign inflows*
Credit depth of information	1.122*** (0.304)	0.983*** (0.275)	1.072*** (0.336)	1.214*** (0.240)
Property returns	0.00346 (0.0151)	0.00628 (0.0132)	0.0115 (0.0167)	0.00113 (0.0124)
Market size	-1.625 (1.876)	-1.651 (1.673)	-1.042 (1.610)	
Macroeconomic environment	0.131 (0.314)	-0.144 (0.296)	0.0408 (0.303)	
Fiscal freedom	-0.0213 (0.0455)	-0.0120 (0.0302)		
Government freedom	0.0167 (0.0202)	0.0203 (0.0213)		
Labour freedom	0.0183 (0.0241)	0.0105 (0.0222)		
Investment freedom	0.0265 (0.0314)			
Financial development	-0.339 (0.315)			
Property rights		-0.0496 (0.0359)		
Real estate transparency			-3.068 (2.619)	
Global competitiveness				-3.119* (1.690)
Constant	2.503 (9.297)	8.175 (8.541)	7.334 (9.245)	11.04 (8.115)
Observations	118	118	118	118
R-squared	0.410	0.413	0.427	0.425
Number of countries	22	22	22	22

Note: The dependent variable is the natural logarithm of real estate foreign capital inflows. This sample does not include China. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A3: Institutional, legal and economic barriers and real estate domestic capital inflows (excluding China)

	(1)	(2)	(3)	(4)
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	domestic inflows	domestic inflows	domestic inflows	domestic inflows
Credit depth of information	0.174 (0.347)	0.122 (0.326)	0.154 (0.333)	0.105 (0.518)
Property returns	0.0250** (0.00903)	0.0186** (0.00893)	0.0204** (0.00912)	0.0151 (0.0103)
Market size	-2.686 (2.048)	-2.289 (2.295)	-1.541 (1.945)	
Macroeconomic environment	0.985*** (0.200)	1.248*** (0.316)	1.216*** (0.318)	
Fiscal freedom	-0.0336 (0.0278)	-0.00275 (0.0282)		
Government freedom	-0.00665 (0.0113)	-0.000597 (0.0129)		
Labour freedom	0.0294 (0.0221)	0.0269 (0.0216)		
Investment freedom	0.0361* (0.0195)			
Financial development	0.595 (0.422)			
Property rights		0.00199 (0.0265)		
Real estate transparency			-0.692 (1.705)	
Global competitiveness				0.486 (2.081)
Constant	3.251 (9.151)	3.408 (12.40)	2.878 (11.75)	-2.064 (9.865)
Observations	124	124	124	124
R-squared	0.518	0.439	0.420	0.242
Number of countries	22	22	22	22

Note: The dependent variable is the natural logarithm of real estate domestic capital inflows. This sample does not include China. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A4: Institutional, legal and economic barriers and real estate capital outflows (excluding China)

	(1) outflows	(2) outflows	(3) outflows	(4) outflows
Credit depth of information	-0.0319 (0.755)	0.320 (0.800)	1.003** (0.446)	1.132*** (0.377)
Property returns	0.00548 (0.0108)	-0.00356 (0.0113)	0.00147 (0.0125)	-0.00948 (0.0123)
Market size	1.387 (3.591)	1.976 (3.076)	3.096 (3.168)	
Macroeconomic environment	0.298 (0.505)	1.227** (0.560)	0.801** (0.335)	
Fiscal freedom	-0.0555 (0.0359)	-0.0838* (0.0407)		
Government freedom	-0.00841 (0.0336)	-0.0226 (0.0345)		
Labour freedom	0.0497** (0.0221)	0.0529** (0.0207)		

Investment freedom	-0.0664** (0.0234)			
Financial development	1.170** (0.415)			
Property rights		0.0718* (0.0365)		
Real estate transparency			-4.582** (1.973)	
Global competitiveness				-0.301 (2.477)
Constant	-9.765 (16.74)	-20.68 (16.03)	-15.46 (13.47)	-3.725 (12.26)
Observations	98	98	98	98
R-squared	0.504	0.447	0.432	0.278
Number of countries	21	21	21	21

Note: The dependent variable is the natural logarithm of real estate capital outflows. This sample does not include China. The estimations are based on fixed effects (FE) panel OLS regressions including both time-fixed and country-fixed effects. The time-fixed effects and country-specific effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A5: Institutional, legal and economic barriers and real estate foreign capital inflows

	(1) foreign inflows	(2) foreign inflows	(3) foreign inflows	(4) foreign inflows
Credit depth of information	0.0402 (0.184)	0.0906 (0.182)	-0.0537 (0.141)	0.352** (0.173)
Property returns	0.0132 (0.0172)	0.000586 (0.0164)	0.00575 (0.0142)	0.0262 (0.0238)
Market size	1.779*** (0.197)	1.755*** (0.187)	1.548*** (0.136)	
Macroeconomic environment	1.028*** (0.243)	1.041*** (0.230)	0.342** (0.154)	
Fiscal freedom	0.0307** (0.0150)	0.0269* (0.0142)		
Government freedom	-0.0380*** (0.00950)	-0.0427*** (0.0104)		
Labour freedom	0.0179** (0.00803)	0.0230*** (0.00829)		
Investment freedom	0.0252*** (0.00872)			
Financial development	0.0560 (0.174)			
Property rights		0.0153** (0.00691)		
Real estate transparency			-1.502*** (0.212)	
Global competitiveness				0.691*** (0.250)
Constant	-17.05*** (2.409)	-16.09*** (2.256)	-5.222*** (1.383)	-4.389** (1.782)
<i>Observations</i>	124	124	124	124
<i>R-squared</i>	0.600	0.572	0.625	0.172

Note: The estimations are based on pooled OLS panel regressions including time-fixed effects. The time-fixed effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A6: Institutional, legal and economic barriers and real estate domestic capital inflows

	(1)	(2)	(3)	(4)	(5)
	domestic inflows	domestic inflows	domestic inflows	domestic inflows	domestic inflows
Credit depth of information	-0.277** (0.116)	-0.190 (0.140)	-0.213 (0.132)	0.183 (0.159)	-0.319*** (0.110)
Property returns	0.0146 (0.0115)	0.0163 (0.0126)	0.00828 (0.0122)	0.0647*** (0.0196)	0.0103 (0.00971)
Market size	2.240*** (0.147)	2.303*** (0.186)	1.870*** (0.138)		2.094*** (0.131)
Macroeconomic environment	1.026*** (0.225)	1.349*** (0.201)	1.053*** (0.184)		0.717*** (0.173)
Fiscal freedom	-0.00400 (0.00897)	-0.00127 (0.00830)			
Government freedom	-0.0102* (0.00611)	-0.00590 (0.00665)			
Labour freedom	0.0271*** (0.00568)	0.0317*** (0.00538)			
Investment freedom	0.0141** (0.00567)				
Financial development	1.161*** (0.182)				1.069*** (0.187)
Property rights		0.0428*** (0.00536)			
Real estate transparency			-1.466*** (0.153)		-0.878*** (0.187)
Global competitiveness				2.140*** (0.259)	
Constant	-22.67*** (1.871)	-22.08*** (1.857)	-10.01*** (1.432)	-11.42*** (1.690)	-15.62*** (1.615)
<i>Observations</i>	130	130	130	130	130
<i>R-squared</i>	0.757	0.725	0.650	0.346	0.747

Note: The estimations are based on pooled OLS panel regressions including time-fixed effects. The time-fixed effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table A7: Institutional, legal and economic barriers and real estate outflows

	(1)	(2)	(3)	(4)	(5)
	outflows	outflows	outflows	outflows	outflows
Credit depth of information	0.274* (0.148)	0.331* (0.171)	0.455** (0.206)	0.349* (0.178)	0.339* (0.181)
Property returns	-0.0128 (0.0146)	-0.0240* (0.0134)	-0.0250* (0.0141)	0.000981 (0.0139)	-0.0201 (0.0142)
Market size	1.495*** (0.179)	1.567*** (0.206)	0.946*** (0.162)		1.151*** (0.177)
Macroeconomic environment	1.259***	1.516***	1.181***		0.916***

	(0.243)	(0.236)	(0.185)		(0.185)
Fiscal freedom	0.0394**	0.0410**			
	(0.0186)	(0.0189)			
Government freedom	-0.0161	-0.0149			
	(0.0106)	(0.0113)			
Labour freedom	0.0207**	0.0245***			
	(0.00932)	(0.00892)			
Investment freedom	0.0253***				
	(0.00682)				
Financial development	0.895***				0.891***
	(0.190)				(0.220)
Property rights		0.0406***			
		(0.00731)			
Real estate transparency			-1.121***		-0.731***
			(0.178)		(0.198)
Global competitiveness				1.733***	
				(0.242)	
Constant	-25.10***	-24.09***	-10.80***	-10.57***	-15.36***
	(2.274)	(2.168)	(2.001)	(1.522)	(2.171)
<i>Observations</i>	104	104	104	104	104
<i>R-squared</i>	0.651	0.624	0.507	0.355	0.592

Note: The estimations are based on pooled OLS panel regressions including time-fixed effects. The time-fixed effects are included in the regressions but not reported. p-values are computed using heteroskedasticity-robust standard errors clustered for recipient countries and are presented in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.