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Institutional quality and cross-border asset trade: are banks less worried about diversification abroad?

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Institutional quality and cross-border asset trade: are banks less worried about diversification abroad?

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Abstract
We build a model of cross-border asset trade where countries' institutional quality impacts on the expected returns of the assets, and investors' sensitivity to quality varies with their financial stress condition. Changes in "perceived quality" influence the portfolio allocation decisions and the patterns of international financial flows over time. We run econometric estimations for cross-border bank flows from advanced to emerging economies, over the period 2005-2014. We find that deteriorating conditions in financial markets, before the crisis, lead to higher demand for institutional quality. A strong regulatory environment is perceived as a protection against adverse future losses, and countries with goods institutions are less exposed to capital retrenchment. In the aftermath of the crisis, the liquidity easing in advanced economies drives down concerns for EMEs' developments, boosting flows and challenging EMEs' ability to use capital controls to mitigate unbridled flows.
Keywords**:** Asset trade, distance, quality**,** international financial flows, emerging markets, economic integration

JEL Classification**:** F12, F3, F4 G1, O5

Introduction

Academics and policy makers are deeply concerned with understanding the "new normal" that settled in international financial markets after the disruption of the 2007-08 global crisis. The "financial deglobalization" (Forbes 2014) mostly driven by the great cross-border bank deleveraging and capital flow retrenchment in advanced countries (Cerutti and Claessens 2016) brought about a new environment featuring a moderate recovery of cross-border flows, although at levels well below the pre-crisis peaks, and a significant heterogeneity across countries and various types of assets (Mc Quade and Schmitz 2017). In this new scenario, capital flows to emerging economies appear large and volatile, raising concerns about the financial stability of these countries, at risk of excessive credit creation and price bubbles (Ahmed and Zlate 2014, Aizenman and Binici 2016, Aizenman *et al.* 2016).

A vast literature has spawned since the global crisis, focusing on the drivers of international financial flows to emerging economies. At the heart of the current debate is the question whether the domestic market developments (*i.e.*, pull factors) or the global/contagion determinants (*i.e.*, push factors) trigger international capital flows. In their seminal papers, Calvo *et al.* (1993) and Fernandez-Arias (1996) first raise the issue that the surge in capital flows to Latin American economies in the early Nineties is due to the slowdown of the US economy, with its particularly low interest rates, rather than the improved local macroeconomic conditions. In this case, countries are at risk of sudden stops and capital reversals, once the favorable external circumstances disappear. On a different standpoint, Ghosh and Ostry (1993) uphold the role of local markets developments as the most important drivers of capital flows for a large group of emerging economies. Indeed, in the later years, capital flows to emerging economies remain sustained, despite the simultaneous acceleration in the US growth, and the focus shifts to country-specific structural characteristics, *i.e.* market structure, institutional settings, policy reforms, etc., as drivers of the international capital flows and financial markets integration (World Bank 1997). The recent crisis, with its extraordinary global reach and heterogeneity of effects has called back the attention to the "pull-vs-push" framework. Milesi-Ferretti and Tille (2011) show that a risk shock, most pronounced in banking flows, is the driver of the retrenchment in international capital flows. Yet, they find that

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the extent of the effect is largely heterogeneous and dependent on the recipient countries' specific conditions. Fratzscher (2012) shows that uncertainty and volatility are overall the main drivers of capital flows during the crisis, while domestic factors related to macroeconomic, institutional and political conditions matter more in the non-crisis period. Forbes and Warnock (2012) find that global risk is significantly associated with extreme capital-flow episodes and contagion with stops and retrenchments, whereas country-specific macroeconomic developments are generally less important. Giannetti and Laeven (2012) analyze the home bias in the US syndicated loan market and find a flight-home effect largely dependent on lenders' wealth, quite independent from the borrower's quality. Lo Duca (2012) uses data for daily equity flows to emerging markets and finds that international investors pay more attention to regional developments in periods of high market tensions, although, in periods of extreme tensions, regional developments play only a marginal role and extreme volatility and risk aversion are the drivers of flows. Hannan (2017) finds that the significance and sensitivity of flows to home and foreign determinants differs between normal times and times of high and low capital flows.

In the contributions above, the typical empirical strategy is the estimation of a benchmark specification with distinct vectors for pull and push factors. This is tested with reference to different episodes, in order to gauge the role played by the drivers of capital flows over the specific periods; alternatively, it is used to explain the differences in capital flows between the pre and the post-crisis period.[2] These empirical contributions recognize unambiguously the role played by the global crisis in the rebound of market segmentation. Fratzscher (2012) employs a factor model that includes a dummy for a financial-crisis interaction term, thus allowing for a change in the factor loadings during crises; Giannetti and Laeven (2012) use financial shock dummies for interaction terms to gauge differences in the effect of such shocks to the lender and the borrower. Lo Duca (2012), uses a model with time-varying coefficients generated endogenously to explain the change in significance of pull and push drivers.

Overall, it is widely agreed upon that the deterioration of the liquidity conditions in international financial markets has interfered with the prolonged globalization process, brought about by improved market conditions, institutional environment, sound policies. Indeed, market integration cannot be thought as being independent from the global liquidity conditions, since structural and cyclical factors interact in determining international capital flows (Buch and Goldberg, 2015).

With this paper we contribute to the literature by addressing the issue of what drives financial flows to emerging economies from a theoretical standpoint, letting pull and push factors enter explicitly in a model of portfolio choice. We derive demand for foreign assets in which external conditions and country-specific developments *interact* in shaping the patterns of international financial flows. To the best of our knowledge, no papers in the literature have investigated so far the *interaction* of pull and push determinants in the way we do.

From a theoretical perspective, two distinct research issues in the international finance literature are relevant for our analysis. On one side, distance and market segmentation arising from transaction costs, due to the information disadvantage in cross-border asset trade (Martin and Rey 2004; Buch 2005). In this case, the institutional/economic characteristics of recipient countries are the source of the home bias in international investors' portfolios. On the other side, contagion and spillover effects in financial markets trigger systemic stability during episodes of crisis (Kaminski and Reinhart 2000, Allen and Gale 2000, Van Rijckeghem and Weder 2003, Calvo *et al*. 2008). In this case, the deterioration of the lenders' balance sheets can trigger a *flight to safety*, that is, a capital retrenchment. The analytical setups for the two research issues differ: what is investigated in the former, *i.e.*, market segmentation, is exogenous in the latter, *i.e.*, the state of liquidity in financial markets, and *vice-versa* (Buch and Goldberg, 2015).

The motivation of our paper is the reformulation of a concept of distance useful for explaining the patterns of international capital flows through time, where market integration is the outcome of the behavioral response of foreign investors to local market developments, and this response, in turn, depends on their own or the global

[2] For instance, Fratzscher (2012), Hannan (2017), and Giannetti and Leaven (2012) focus on crises periods, Forbes and Warnock (2012) distinguish four different episodes related to surge, sudden stop, capital retrenchment and capital flights, respectively; Milesi-Ferretti and Tille (2011) and Mc Quade and Schmitz (2017) compare the levels of capital flows prior to the onset of the crisis to the post-crisis period.

stress conditions. This is, after all, the feature Fratszche (2012) and Giannetti and Laeven (2012) want to capture with dummies for crisis-interaction terms.

With this paper we contribute to the literature by addressing the above issue from a theoretical perspective. We have two main innovations. First, we introduce institutional quality as the relevant pull factor in a theoretical model of asset trade. Quality acts as a portfolio shifter, in that higher-quality assets gain higher portfolio shares. Second, we assume that quality matters, but not always in the same way, and this introduces the push factor in terms of the investor's behavioral response to quality. Rising market tensions worsen the information disadvantage of investors and increase the demand for safer institutional quality. This amplifies the portfolio shift, and impacts on international capital flows and the degree of market integration.

We build on the theoretical setup developed in Martin and Rey (2004), MR hereafter, where asset holdings of risk-averse agents result from the optimal choice of present and future consumption levels, and the presence of international transaction costs and imperfectly competitive financial markets determine size effects, as in gravity models of international trade, and a portfolio allocation with home bias. Our innovation with respect to their framework is in the representation of market segmentation. We keep the imperfect competition setting, but depart from the typical iceberg-type transaction costs, given in terms of a constant fraction of the dividend foregone due, for instance, to bank commissions.[3] Instead, we focus on the information disadvantage of international investors due to limited information in international financial markets, and the "perceived quality" difference in traded asset as the source of market segmentation. Indeed, "perceived quality" is at the basis of a broader concept of distance in a financial framework, as explained below.

We consider quality in terms of an indicator defined at the country level that captures the soundness of its economic/institutional environment. The institutional framework in which a given investment project is realized matters: the uncertainty regarding the enforceability of contracts (litigations and settlement of business disputes), the political risk, investor protection or, more generally, the regulatory quality of the host country (*i.e.*, pull factors) are particularly relevant in portfolio decisions, since they impact on the "effective" realized inflows from shares of traded assets. Additional costs may or may not arise, and investors deal with an issue of limited information. A stronger institutional environment makes policy commitments more credible, reducing the possibility of adverse outcomes, thus signaling safer investment opportunities. Ultimately, the way these information problems are approached may vary substantially: in periods of mounting tensions in financial markets, investors' information disadvantage is likely to increase, raising their sensitivity to country-specific developments. This is a well-built result of the empirical literature (e.g. Giannetti and Laeven, 2012, Lo Duca, 2012).

To account for these features, we develop a model with a quality-based-differentiation of assets. The focus on quality in international financial flows is not new in the empirical literature. Alfaro *et al.* (2008) show that the high institutional quality in developed countries can largely explain the Lucas paradox, that is, why capital does not flow from rich to poor countries; Papaioannou (2009) builds an index for institutional quality to show that capital flows "uphill", not "downhill". Quality is amongst the pull factors always considered in the empirical analysis of drivers of international capital flows.

We model the quality-based differentiation of assets in analogy to the one for varieties exploited in the literature on international trade in goods, where quality is a utility shifter and consumers from countries with different income have different intensity of quality preference.[4] We adapt that reasoning to trade in financial markets, where investors face limited information problems and the possibility of unforecastable future losses (monitoring, liquidation). In these circumstances, higher levels of institutional quality in a given country signal

[3] We could of course include transaction costs of the type considered in MR, but this would act just as in MR. Other contributions look at the geographical distance (km or traffic calls), but we do not consider them explicitly, since technology developments have made these kind of costs in cross-border asset trade almost negligible.

[4] See, for instance, Hummels and Klenow (2005), and Hallak (2006 and 2010) and Crinò and Epifani (2012), where consumers have a preference for higher quality goods,. Countries that export high-quality varieties gain larger markets shares in high-income countries.

safer investment opportunities. Yet, quality matters, but not always in the same way. Worsening conditions in global financial markets make investors more reluctant to uncertain outcomes, and more responsive to institutional quality changes. Overall, "perceived quality" acts as a portfolio shifter: the higher the "perceived quality" of any asset, the larger its portfolio share, other things equal. As a result, countries with stronger institutional environments turn out to be less exposed to capital retrenchments, a *leit-motiv* of the recent empirical literature. Increase in perceived quality differences between any two countries implies increase in their "distance" ; in other words, reduced market integration. .

The paper is organized as follows. In Section 2 we develop a theoretical model for international asset trade, from which we derive the individual asset demand functions and the total value of asset flows from country *A* to country *B*. In Section 3 we perform the econometric analysis by running estimations for cross-border bank flows from advanced to emerging economies, over the period 2005-2014. We look at the changes occurred between the old and the new "normal" in international financial markets, and address the issue of the heterogeneity among groups of countries, in terms of the importance of the home and host country size, market returns and "perceived quality". We test for structural breaks and run several robustness checks using alternative indexes of institutional quality for the recipient countries and of the financial pressure conditions in the source countries. In Section 4 we discuss the empirical results and the implications of the "new normal" in cross-border flows to emerging economies, with a view to explain the changes in banks' diversification strategies, and to gauge the role of different pull drivers, such as the stringency of the regulatory legislation of emerging economies. and Section 5 concludes.

2. The theoretical model

We use the MR imperfect competition framework and consider two countries *A* and *B*, populated by n_A and n_B households endowed with y_A and y_B units of the traded good (the numéraire), respectively. Wealth is used for first-period consumption and to ensure second-period consumption by investing in risky projects, directly or through the stock market. In the second period, there are *L* exogenously given and equally probable states of nature, and different contingent projects that promise the payment of a contractual dividend in only one state of nature, that is, only if that state of nature occurs. Since different projects/assets are imperfectly correlated, holding a diversified portfolio allows reducing risk, although not completely, given that projects/assets are not available for all states of the world. Therefore, two-period consumption is zero when no asset pays a dividend. Let z_{hA} and z_{hB} denote the risky projects developed by any household h_A and h_B in each country, and Z_A and Z_B the corresponding sets. The overall risky projects/assets developed in each country are $m_A = \sum_{hA} z_{hA}$ and $m_B = \sum_{hB} z_{hB}$ (M_A and M_B denote the corresponding sets), with $\left(m_A + m_B\right) < L$. As standard, the cost function of any investment project has positive first and second derivatives, $f(z_{hA})' > 0$ and $f(z_{hA})'' > 0$, for country *A*, and analogously for country *B*. Households of country *A* sell a portion α_{hA}^k, $k \in Z_{hA}$, of their own assets/projects, retain the remaining $1-\alpha_{hA}^k$, and buy shares of projects developed by others s_{hA}^i, $i \in M_A$ and s_{hA}^j, $j \in M_B$. Similarly for households of country *B*.

On the above setting, we introduce the quality-based differentiation of assets as the relevant source of market segmentation, thus abstracting from the standard iceberg-type transaction costs used in MR.[5] We assume that households attach quality levels to the different projects/assets, and that the prospective return from any asset is given by the contractual/nominal dividend adjusted for the "perceived" quality of that asset. That is to say, although the specific state of nature occurs, additional costs may arise that reduce the effective realized dividend; the "perceived quality" of any asset captures the investor's confidence over the realization of the contractual dividend, and depends on investors' behavioral response to quality. Hence, quality matters, but not always in the same way.

To simplify, we restrict our analysis to the definition of a quality index at the country level, so that all projects/assets of a given country feature the same quality q_A and q_B, respectively for country *A* and *B*. Based on the above considerations, the expected future income from any contingent project/asset depends on the (equal) probability that a specific state of nature occurs, the *perceived* quality of the asset and the contractual dividend.

[5] Their inclusion would not alter significantly our analysis.

The consideration of quality allows to give a representation of market segmentation, *i.e.*, a situation where the issuer is required to pay a premium only because it belongs to a specific jurisdiction, independently from his own risk profile.
The optimal choice for the representative agent of country *A* is obtained by solving the following two-period standard maximization program (preferences are symmetric in country *B*):

$$(1) \qquad EU_{hA} = \frac{c_{1hA}^{1-1/\sigma}}{1-1/\sigma} + \beta E\left(\frac{c_{2hA}^{\ 1-1/\sigma}}{1-1/\sigma}\right)$$

Where σ>0 is the constant elasticity of substitution of CRRA functions. Second period consumption derives only from "prospective" dividends, that is:

$$(2) \qquad \begin{aligned} & c_{2hA} = \hat{d}_{hA}^{i} s_{hA}^{i}, \ \ if\ i \in M_A, i \notin Z_{hA} \text{ occurs} \\ & c_{2hA} = \hat{d}_{hA}^{j} s_{hA}^{j}, \ \ if\ \ j \in M_B \text{ occurs} \\ & c_{2hA} = \hat{d}_{hA}^{k}\left(1-\alpha_{hA}^{k}\right), \ \ if\ k \in Z_A \text{ occurs}, \quad c_{2hA} = 0 \text{ otherwise} \end{aligned}$$

Where:

$$(3) \quad \hat{d}_{hA}^{i} \equiv Q_{hA}^{A}\left(\Omega_{hA}, q_A\right) d^{i}, \quad (4) \quad \hat{d}_{hA}^{j} \equiv Q_{hA}^{B}\left(\Omega_{hA}, q_B\right) d^{j}, \quad (5) \quad \hat{d}_{hA}^{k} \equiv Q_{hA}^{A}\left(\Omega_{hA}, q_A\right) d^{k}$$

Denote the "prospective" dividends once quality is accounted for. In the above, nominal/contractual dividends d^{i}, d^{j} and d^{k} are "adjusted" for the quality level, as "perceived" by the agent h_A, according to the functions $Q_{hA}^{A}(.)$ and $Q_{hA}^{B}(.)$, respectively. These functions map the characteristics of agent h_A, defined in Ω_{hA}, and the level of the quality indexes, q_A and q_B, respectively, into "perceived quality". Empirically, variables related to the financial stress condition of agent h_A, or the global volatility in financial markets can represent the characteristics of agent h_A.
With no loss of generality, we assume the following explicit functions:[6]

$$(6) \quad Q_{hA}^{A} = q_A^{\Omega_{hA}} \quad \text{and} \quad (7) \quad Q_{hA}^{B} = q_B^{\Omega_{hA}} \quad .$$

In the above representation, $Q_{hA}^{A}(.)$ and $Q_{hA}^{B}(.)$ act as shifters attached to the contractual dividends accruing from assets of country *A* and *B*, respectively. This shifters depend on the quality level of the projects/assets defined by the quality index q_A and q_B and the sensitivity of investors to quality. Taking into account eq. (2), the maximization program in eq. (1) reads:

$$(8) \quad \frac{c_{1hA}^{1-1/\sigma}}{1-1/\sigma} + \beta\left\{\sum_{\substack{i\in M_A \\ i\notin Z_{hA}}} \frac{1}{L}\left(\hat{d}_{hA}^{i} s_{ha}^{i}\right)^{1-1/\sigma} + \sum_{j\in M_B} \frac{1}{L}\left(\hat{d}_{hA}^{j} s_{ha}^{j}\right)^{1-1/\sigma} + \sum_{k\in Z_{hA}} \frac{1}{L}\left(\hat{d}_{hA}^{k}\left(1-\alpha_{ha}^{k}\right)\right)^{1-1/\sigma}\right\} / 1-1/\sigma$$

where the term in brackets is an individual's expected return from the *L* contingent assets. Agent h_A maximizes eq. (8) subject to the following budget constraint:

[6] The exponential form provides an analytically tractable way to represent investors' sensitivity to the quality index. An analogous formulation is in Hallak (2006 and 2010) and Crinò and Epifani (2012) for the intensity of quality preference in trade in goods.

(9) $$c_{1hA} + f\left(z_{hA}\right) + \sum_{\substack{i \in M_A \\ i \notin Z_{hA}}} p^i s^i_{hA} + \sum_{j \in M_B} p^j s^j_{hA} = y_A + \sum_{k \in Z_{hA}} p^k_{hA} \alpha^k_{hA}$$

Where p^i, p^j and p^k are the prices of assets *i, j, k*, respectively. In the left-hand side are expenditures for first-period consumption, c_{1hA}, investment on project z_{hA} and the purchase of shares of country *A* and *B*; in the right–hand side are the initial endowment y_{hA} and income generated from the sale of the portion α^k_{ha} of each project $k \in Z_A$ the household has developed. Assuming that all agents within the same country are identical and projects symmetric, first order conditions lead to the following demands for shares, for an individual of nationality *A* (hereafter notations for identity of agents is omitted):[7]

(10) $$s^A_A = \bar{\beta}^\sigma \left(\hat{d}^A_A\right)^{\sigma-1} {p_A}^{-\sigma} c_{1A},$$ (11) $$s^B_A = \bar{\beta}^\sigma \left(\hat{d}^B_A\right)^{\sigma-1} {p_B}^{-\sigma} c_{1A}, \quad \text{with } \bar{\beta} = \beta / L$$

Where s^A_A and s^B_A are the demands of an individual of nationality *A* for the shares of country *A* and country *B*, $\hat{d}^A_A$ and $\hat{d}^B_A$ the prospective dividend, p_A and p_B the prices of the projects/assets developed in country *A* and *B*. The above functions state that the demands of an individual of nationality *A* are increasing in the first-period consumption and the prospective dividend, and decreasing in the price of the asset. The FOCs lead to the following supply of own shares: [8]

(12) $$\alpha_A = 1 - \delta {p_A}^{-\sigma} \bar{\beta}^\sigma \left(\hat{d}^A_A\right)^{\sigma-1} c_{1A}, \quad \delta \equiv \left(\frac{\sigma}{\sigma - 1}\right)^\sigma > 1.$$

As in MR, given the imperfect competition setting, each agent exploits an ex-post monopoly power on the projects he has developed, given the initial fixed cost. The extent of the monopoly power is related to the elasticity of substitution between any two assets, *i.e.*, the coefficient of relative risk aversion σ.

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[7] From the FOCs: (*i*) $U'\left(c_{1A}\right) = \lambda p_1$ and (*ii*) $U'\left(s^A_A\right) = \lambda p_A$. By substituting $p_1 = 1$ in (*i*) we get $\lambda = c_{1A}^{-1/\sigma}$. Substituting this value into (*ii*) we get eq. (10) and eq. (11).

[8] In fact we have: $U'\left(\alpha_A\right) = \lambda\left(p'_A \alpha_A + p_A\right)$ where $p_A = \bar{\beta} \alpha_A^{-1/\sigma} c_{1A}^{1/\sigma}$ is the inverse demand function faced by the asset seller, obtained from eq. (10). The supply of shares is thus increasing in the price and decreasing in the prospective dividends. Analogously for an individual of nationality *B*.

The form of the demands above are similar to those in MR, but for the presence of the quality-adjusted dividends. By substitution of eqs. (3), (4) and (5) into the demand functions s_A^A and s_A^B, taking into account eqs. (6) and (7) we get demands for assets of country *A* and country *B* from agents of country *A*:[9]

(13) $s_A^A = \bar{A}\left(q_A\right)^{\Omega_A(\sigma-1)}\left(R_A\right)^{\sigma} c_{1A}$

(14) $s_A^B = \bar{B}\left(q_B\right)^{\Omega_A(\sigma-1)}\left(R_B\right)^{\sigma} c_{1A}$

where $R_A \equiv \frac{d_A}{p_A}$ and $R_B \equiv \frac{d_B}{p_B}$ are the market returns on equities (yields) in the two countries and $\bar{A} = \beta^{\sigma} / d_A$, $\bar{B} = \beta^{\sigma} / d_B$ positive constants.

Equations (13) and (14) show that the demand for shares of country *A* and *B* is a function of the market return, R_A and R_B, respectively, and the degree of confidence placed by households over that information. This, in turn, depends on "objective" factors, i.e., the institutional quality indexes q_A and q_B, and the investors' state of confidence. Thus, equations (13) and (14) disentangle two driving factors in the heterogeneity of financial flows: local market characteristics, *i.e.*, the quality indexes of the issuer and the investor's financial stress conditions.

The implications of introducing the quality dimension in asset trade, as we do in this paper, can be understood by looking at relative demand for shares of an individual in country *A*. Using eq. (13) and (14), we get:

(15) $\frac{s_A^A}{s_A^B} = \frac{\bar{A}}{\bar{B}}\left(\frac{q_A}{q_B}\right)^{\Omega_A(\sigma-1)}\left(\frac{R_A}{R_B}\right)^{\sigma}$.

According to eq. (15), if assets of country *A* and *B* have same quality, the relative return $\frac{R_A}{R_B}$ is enough to explain the portfolio choice of an investor in country A, *coeteris paribus*; differently, shares do not enter symmetrically in the portfolio, and "perceived quality" acts as a shifter. For given relative returns and risk appetite σ, an increase in the quality ratio $\frac{q_A}{q_B}$ determines an increase in relative demand for shares of country *A*. This effect is stronger the more the global liquidity conditions are critical, that is, the larger Ω_A. Therefore, the "global liquidity effect", captured in Ω_A, acts as an amplifier of the market segmentation induced by differences in the institutional characteristics of the countries ($\frac{q_A}{q_B}$). Hence the push and pull factors interact in the determination of the portfolio allocation.

We can derive, as standard, the prices of the assets of each country, from the equilibrium condition in the respective stock market.[10] We get the following aggregate demand in country A:

[9] Analogously for the demand and supply functions from individuals of country B:

(10') $s_B^B = \bar{\beta}^{\sigma}\left(\hat{d}_B^B\right)^{\sigma-1} {p_B}^{-\sigma} c_{1B}$, (11') $s_B^A = \bar{\beta}^{\sigma}\left(\hat{d}_B^A\right)^{\sigma-1} {p_A}^{-\sigma} c_{1B}$, (12') $\alpha_B = 1 - \delta {p_B}^{-\sigma}\bar{\beta}^{\sigma}\left(\hat{d}_B^B\right)^{\sigma-1} c_{1B}$.

(16) $\alpha_A = p_A^{-\sigma} d^{\sigma-1} \bar{\beta}^{\sigma} \left[(n_A - 1)(q_A)^{\Omega_A^A(\sigma-1)} c_{1A} + n_B (q_A)^{\Omega_B^A(\sigma-1)} c_{1B} \right]$

Given the imperfect competition setting, there is a size effect as in MR, *i.e.*, aggregate demand is increasing in the market dimension (n_A and n_B), but now the investors' perceived quality matters. Solving for the price of asset *A* we get:

(17) $p_A = \bar{\beta} d^{1-1/\sigma} \left[(n_A - 1 + \delta) q_A^{\Omega_A^A} c_{1A} + n_B q_A^{\Omega_B^A} c_{1B} \right]^{1/\sigma}$.

The equation above shows, again, that a market size effect operates through demand, as in MR, but it is not independent from perceived quality. Assets of countries with higher quality q_A command higher market prices p_A ; moreover worsening conditions in financial markets, as captured by larger Ω_A, amplify the effect. It follows that the institutional quality gap between countries is reflected in differences in market capitalization, that is, in market segmentation arising from information disadvantage. Besides, the price differential increases with the increase in market tensions. In the spirit of this paper, the deterioration of institutional quality triggers costly monitoring (interpretable as bankruptcy and liquidation) and the perception of such costs increases with the worsening of the global conditions. These results are in line with the major theme of the empirical literature, that during the global crisis countries with weaker institutional characteristics, suffered greater capital retrenchment, and a more pronounced fall in the market capitalization.

We address this issue empirically, by running estimations for cross-border financial flows from advanced to emerging economies using the theoretical model developed above. Hence, we write the total value of asset flows from *A* (advanced country) to *B* (developing country) as the value of the demands by n_A agents for the shares s_A^B of the $n_B p_B z_B$ projects of country *B* :

(18) $F_A^B = n_A s_A^B n_B p_B z_B$

Taking the logarithm of this expression and using eq. (11) gives:

(19) $\ln F_A^B = \ln(n_B p_B z_B) + \ln(n_A c_{1A}) + (\sigma - 1)\Omega_A^B \ln q_B + \sigma \ln R_B + \ln\left(\frac{\bar{\beta}^{\sigma}}{d}\right)$

where: $n_B p_B z_B$ = country *B* financial wealth

$n_A c_{1A}$ = country *A* real income,

q_A = quality index defined in (0,1),

$R_B \equiv \frac{d_B}{p_B}$ = return on equities/yield of market *B*,

$\frac{\bar{\beta}^{\sigma}}{d}$ = constant.

3. What drives cross-border bank flows from advanced to emerging economies? An empirical assessment

3.1 Methodology and data

This section illustrates the strategy we follow for the empirical analysis. We estimate the empirical counterpart of equation (19) for cross-border bank flows from advanced to emerging economies, using quarterly data for the

[10] This is obtained by substituting eqs. (10) and (11') into the equilibrium condition between supply and aggregate demand (from all individuals of country *A* and country *B*), that is: $\alpha_A = (n_A - 1) s_A^A + n_B s_B^A$.

decade spanning from the beginning of 2005 to the end of 2014. Recent literature has emphasized the importance of focusing on gross rather than net flows, as a primary transmission channel of financial instability (Obstfeld 2012), given the remarkable increase in gross external assets and liabilities (Lane and Milesi-Ferretti 2001, 2007).

We suggest that the financial crisis may have modified radically the way investors approach the markets, a fact which is amply documented in the empirical literature, and we run estimates for both the whole period and the two sub-periods, *i.e*., the pre-crisis and post-crisis. The pre-crisis period spans from 2005q1 to 2008q2, while the post-crisis from 2009q3 to 2014q4, as suggested in Ahmed and Zlate, 2014. The presence of a structural break corresponding to the acute phase of the crisis is discussed in Section 3.3.1 below.

Table A.1 of Appendix A presents data sources and definition of variables. We estimate the panel model using a random effects estimator with country-specific fixed effects for 9 advanced countries and 28 emerging economies (The list is reported in Table A.2) and a time dummy. Summary statistics are reported in Table A.3. Robustness checks are reported in Appendix B, where we show results for panel-data models using feasible generalized least square (FGLS) regressions. In this case, the assumption is AR(1) autocorrelation within panels, and that the coefficient of the AR(1) process is specific to each panel. We control for potential multicollinearity among regressors. Bilateral correlations are not very high, including between the global volatility index and the country-specific macroeconomic and financial variables. As in Herrmann and Mihaljek (2013), we suggest that the presence of non-stationarity in some series is not to be considered a main concern as for large N (252) and small T (either 14 for the first period or 22 for the second period), as in our case, the cross-section dimension dominates, and the possibility of non-stationarity can be ignored. Table C in Appendix presents the panel unit root test of Im *et al.* (2003) for stationarity.

The first empirical question is the choice of the variable that best represents the quality of assets of the emerging economies, q_B. We refer to the World Bank's Worldwide Governance Indicators (WGI) and take the "regulatory quality" related to the "Investment Profile" as a benchmark index for institutional quality. It provides "a measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components". The index is built on indicators of Viability/Expropriation, Profits Repatriation, and Payment Delays, and "captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development" . Nevertheless, we performed robustness checks to control how other broad-based indices of institutional quality behave as a measure of the impact of the institutional quality on international capital inflows, drawing from the WGI.

We then need to make explicit the function Ω_A that measures investors' sensitivity to quality (see eq. 14). We assume that higher volatility in global financial markets makes investors in advanced economies more responsive to the regulatory quality of emerging markets. Rising tensions in financial markets determine an increase in the information disadvantage of investors, and the increase in the demand for high quality assets. We take the level of the VIX (Chicago Board Volatility Index) as the relevant measure of financial stress conditions of the source country, and posit:

(20) $\Omega_A = \omega \ln VIX$,

This states that investors' sensitivity to quality is a function of the global volatility index. The expected sign for the coefficient ω is positive. In further robustness-check regressions (section 3.2), we use nonperforming loans of banks' to account for the deterioration of banks' balance sheets, as an alternative to the VIX in eq. (20), and the source country risk premium.

We use the following econometric model (all variables are in logarithms):

(21) $$\left(F_{ijt}\right) = a \quad + \alpha * gdp_{it} + \beta * gdp_{jt} + \lambda * vix_{it} * q_{jt} + \sigma * stockreturn_{jt} + \varphi_i + \varphi_j + + \varphi_t + \varepsilon_{ijt.}$$

Where:

F_{ijt} is the increase in the stock of foreign claims on destination country *j* (recipient) by the origin country *i* (source), at time *t*,

gdp_{it} is the real GDP of the source country *i*, at time *t*,

gdp_{jt} is the nominal GDP of the recipient country *j*, at time *t* and is a proxy for the financial wealth of the emerging economy,

vix_{it} is the Chicago Board Option Exchange Volatility Index,

q_{jt} is the index of regulatory quality of country *j*, at time *t*

$stockreturn_{jt}$ the stock markets price index of the country *j*, at time *t*, as a proxy for the "average returns on assets" .

The coefficient of the interaction term is obtained by substituting eq. (20) into eq. (19) of the theoretical model, and then redefining the term as:

(22) $\lambda \equiv (\sigma - 1)\omega$.

All the estimations include fixed-effects for the source country (φ_i) and recipient country (φ_j), to account for time-invariant country characteristics. We also include a general time fixed effect (φ_t). [11]

The logarithmic form allows a direct interpretation of the coefficients of the estimation in terms of elasticities.

3.2 Core results

Table 1 presents the results for the full sample of recipient countries, for the whole sample period (column 1), but excluding the acute phase of the crisis to avoid biased estimates, and for the pre- and post-crisis periods (columns 2 and 3).

The results point to the role of market size: higher financial wealth of the recipient economy, proxied by *nominal gdp* of the recipient country leads to higher flows. In particular, a 10% increase in the financial wealth of the emerging economies increases capital inflows by about 5%. Analogous results are obtained in MR (2004). The coefficient on *real gdp* of the source country is positive and significant. As to this variable, results found in other contributions of the literature are controversial. For instance, Hermann and Mihaljek (2013), and Papaioannou (2009), find a negative coefficient associated to GDP of the source country, and argue that this may reflect the tendency of larger countries to diversify less. Differently, Jeanneau and Micu (2002) find a positive effect of the GDP of advanced economies on international bank lending to Latin America and Asian countries.

Turning to the coefficient of the interaction term λ, , it measures the impact of the VIX on the portfolio adjustments to quality changes, and therefore it reflects the impact of the global stability conditions on the demand for institutional quality. If global instability affects quality demand, as assumed in the theoretical model, then its predicted sign is positive. The result of the regressions confirm this assumption, delivering a positive and significant value for λ in the whole period.

As to the coefficient of the stock market return σ, it is positive, as expected, and significant for all estimates. We find that a 10% increase in the stock returns index of emerging economies is associated with a roughly proportional increase (around 11%) in cross-border flows.

In Table D.1 (Appendix D), we include a euro crisis dummy, which is statistically significant and has a negative sign for the whole sample of recipient countries and for Asian countries. This implies that, conditional on all other factors in our empirical model, the retrenchment in capital flows was even sharper from euro area Member States, while the other coefficients remain largely unaltered by the inclusion of this dummy. Our results are in line with Mc Quade and Schmitz (2017) who find that the decline of cross-border flows related to debt instruments in 2013-2014 compared to 2005-2006 was higher for euro area countries. As they suggest, this

[11] Our empirical specification is tightly pinned down by theory, and therefore in this benchmark specification we do not include additional controls. Indeed, when the true data generating process (DGP) – that is the true specification- is not precisely known, estimated interaction terms could spuriously capture other features of the data, since this may occur (See e.g. Balli and Sørensen, 2013). Methodologically, we follow Hallak (2010), among others, that estimate export functions derived analytically from a quality preference representation of utility, analogue to the one we adopt here. However, to make our results more robust we run several additional regressions for variants of the baseline specification, to account for the possibility of spurious results (See Section 3 and Appendix D).

result points to a partial reversal of the strong boost to flows provided by the introduction of the euro (Lane, 2013).

Table 1. Determinants of cross-border flows to emerging economies

	Whole period	Pre-crisis	Post-crisis
	(1)	(2)	(3)
Financial wealth (recipient)	0.5833***	0.8329***	0.4549***
Real GDP (source)	0.2458**	0.0664	0.3528***
VIX*regulatory_quality (recipient)	0.2159**	0.4371***	0.1492
Stock Market Index (recipient)	1.0639***	1.1446***	0.4595*
Waldchi2	327.92	155.81	116.72
Rho	0.020	0.037	0.014
Observations	7528	2880	4648
R-squared	0.047	0.061	0.029
R-squared(within)	0.034	0.027	0.010
R-squared(between)	0.223	0.275	0.204
Groups	236	236	235

Notes: All models include fixed effects of recipient and source country, and the time fixed effect. The estimation excludes the acute phase of the crisis, from 2008q3 to 2009q2. All variables are in logs. * Significant at 10% level, **Significant at 5% level, *** Significant at 1% level.

When the two sub-periods are considered, it is evident that the crisis determines a structural break. In particular, the coefficient associated to the real GDP of the source country is not significant in the pre-crisis period and turns highly significant in the post-crisis period, and five times larger; the coefficients of the variables related to characteristics of the recipient country, that is, the average return in the stock market (Stock Market Index) and the financial wealth are smaller in the post-crisis period. Looking at λ, the estimated coefficient of the interaction term *VIX*quality* is large and highly significant in the pre-crisis period and becomes smaller and not significant in the post-crisis period, although it preserves the expected sign.

Our result suggest that after the acute phase of the crisis a new financial environment has settled, in which the factors more directly related to emerging economies, *i.e.*, the financial wealth (proxied by nominal GDP) and stock market return, lose the central role played in the "old normal".

In order to highlight the different drivers of cross-border bank flows across regions, we split our sample in three macro-areas, Asia, Latin America (LA) and Emerging Europe (EE), and run again the regressions. Tables 2 shows the results.

The estimates highlight the noticeable heterogeneity among the regions.

With reference to the whole-period samples, the estimated coefficients have expected signs for all regions; moreover, they are all significant for Asia, whereas for LA and EE only the coefficients of *Financial wealth* and *Stock Market Index* are significant. In particular, the regressions show that a 10% increase in the Financial wealth of the recipient country increases capital inflows by about 5% in Asia and Latin America, and by about 7.5% in Emerging Europe (EE). The sensitivity of capital flows to market returns is very high for Asia and EE regions, more than twice the value obtained for LA countries. It is interesting to notice that the coefficient of the

Real GDP of the recipient country is not significant, but for Asia. As to the interaction term, it has the expected positive sign in the whole sample period, but EE. In the distinct sub periods We find that the size of the recipient country loses significance, but for EE, where in any case the coefficient drops sharply. The interaction term is positive and significant before the crisis only in Asia and LA.

Table 2. Determinants of cross border flows to Asia, Latin America, Asia and Emerging Europe

	Latin America			Asia			Emerging Europe		
	Whole period	Pre-crisis	Post-crisis	Whole period	Pre-crisis	Post-crisis	Whole period	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Financial wealth (recipient)	0.5078**	0.7692***	0.2021	0.4679**	0.6021**	0.1711	0.7450***	1.0040***	0.5018***
Real GDP (source)	0.1718	-0.0693	0.3328	0.5706**	0.3572	0.7224***	0.0495	-0.0408	0.0838
VIX*reg_quality (recipient)	0.1627	0.3410*	0.2144	1.0704**	1.6449**	0.8586	-0.4427	0.1158	-0.613
Stock Market Index (recipient)	0.8246**	1.0494	0.2829	2.9130***	2.6937**	1.7872*	2.2688***	1.2604*	1.8297***
Waldchi2	80.12	41.65	39.02	101.57	48.06	44.67	226.69	125.65	46.15
Rho	0.016	0.029	0.008	0.029	0.021	0.026	0.000	0.020	0.000
Observations	2040	790	1250	2325	873	1452	3163	1217	1946
R-squared	0.040	0.059	0.031	0.048	0.061	0.037	0.067	0.104	0.023
R-squared(within)	0.035	0.025	0.025	0.036	0.015	0.018	0.051	0.047	0.006
R-squared(between)	0.139	0.260	0.111	0.204	0.360	0.214	0.432	0.437	0.221
Groups	62	62	62	72	72	72	102	102	101

Notes: All models include fixed effects of recipient and source country, and the time fixed effect.
The estimation excludes the acute phase of the crisis, from 2008q3 to 2009q2. All variables are in logs.
* Significant at 10% level, **Significant at 5% level, *** Significant at 1% level.

3.3 Sensitivity analysis

3.3.1. Structural break tests

On the basis of the results above and consistent with our model, we assume that a distinction between two sub-periods is inevitable in the empirical strategy.

We test for the presence of a structural break and evaluate whether the sensitivities to explanatory variables have changed from before to after the crisis. This is done by introducing interaction terms of the explanatory variables with a post-crisis dummy variable. Table 3 shows the results for the whole sample of countries and for the three distinct regions. The first four rows of Table 3 reproduce the results of the baseline model for the entire period. The following rows represent the corrections to the baseline coefficients, in the post-crisis period. The analysis by regions allows to assess whether the changes over time in the sensitivity of capital flows to their main determinants differs across regions. As for the changes over time, we confirm the results that have been highlighted in Section 3.2.

First, the structural break test clearly confirms that the recipient country macroeconomic and financial conditions reduce their effect on flows in the post-crisis period. Particularly, the coefficient of Financial wealth decreases in the post-crisis period, as the sign of the interaction terms *Post-crisis*Financial wealth (recipient)*is negative and significant for the pooled sample of countries, and each region, but Asia. Similarly, the sign of the coefficient on *Post-crisis*Stock Market Index (recipient)*is negative, and also significant for the whole sample and for Latin America. In other words, the economic integration can explain why the market return is and remains the prominent factor driving investors' decisions, and this importance does not change significantly.

Table 3 Structural break tests for the determinants of cross-border bank flows

	Whole sample	Latin America	Asia	Emerging Europe
	(1)	(2)	(3)	(4)
Financial wealth (recipient)	0.93***	0.85***	0.74***	1.15***
Real GDP (source)	0.09	0.12	0.33	-0.05
VIX*regulatory_quality (recipient)	0.32***	0.32**	1.03*	0.05
Stock Market Index (recipient)	1.97***	1.97**	2.06***	2.74***
Post-crisis	10.10***	20.46***	5.07	7.15
Post-crisis*Financial wealth (recipient)	-0.52***	-0.78**	-0.34	-0.70***
Post-crisis*Real GDP (source)	0.28*	0.100	0.460	0.170
Post-crisis*VIX*regulatory_quality (recipient)	-0.100	-0.030	-0.720	-0.740
Post-crisis*Stock Market Index (recipient)	-1.48***	-1.79*	-1.110	-0.600
Post-crisis*time	-0.05*	-0.11*	-0.090	-0.010
R-squared	0.056	0.058	0.044	0.081
R-squared_adj	0.055	0.052	0.039	0.077
Observations	7528	2040	2325	3163

Notes: Fixed effects are included. The Chow test is performed using the Stata command Chowreg (type3). We used the following functional form for dummy variables:

(3) Y = X + Post-crisis + Post-crisis*X

Where:

Post-crisis = Dummy variable (0,1), takes (0) in first period, and (1) in second period.

Post*X = Cross product of each Xi times Post-crisis

* Significant at 10% level, **Significant at 5% level, *** Significant at 1% level

Second, we confirm that in the "new normal" the explanatory power of the source country macroeconomic conditions (slightly) increases. The coefficient of the interaction term *Post-crisis*Real GDP (source)* is positive, though significant only for the whole sample of emerging economies.

Third, the Chow test supports the previous finding that the impact of the "perceived quality" weakens after the crisis, as highlighted in the previous Table 1 and Table 2. We explore in more detail this feature running a Chow test with VIX and quality considered as separate regressors (Table D.2 of Appendix D). The results allow disentangling the developments of the institutional quality and the global uncertainty on cross-border banking flows. We find that the coefficient on the interaction term *Post-crisis*quality* is negative and not significant, pointing to a slight reduction in the role of institutional quality in enhancing flows, while the interaction term *Post-crisis*VIX* is positive and significant, highlighting a noticeable moderation of the VIX in driving capital withdrawals. In other words, the structural break test confirm that in the "new normal" the global volatility has a milder impact on capital withdrawals compared to what happened in the first period of our analysis.

3.3.2. Further robustness checks: alternative measures of institutional quality and uncertainty in the recipient country

In this section we present a set of robustness checks. First, we control for alternative measures of financial pressure of the source countries, using the banks' nonperforming loans (as a percentage of total loans) instead of the VIX. Second, we look at alternative measures of institutional quality. Then, we control for financial uncertainty in alternative to institutional uncertainty in emerging economies.

Table 4 Cross border flows: Baseline model but with non-performing loans (NPL) of source country instead of VIX

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)
Financial wealth (recipient)	0.8049***	0.4415***	0.8017***	0.4577***
Real GDP (source)	0.3071*	0.3564***	0.4878***	0.3578***
NPL(source) *regulatory_quality (recipient)	1.7236***	0.0756		
Stock Market Index (recipient)	1.1460***	0.4238*	1.0644***	0.4799*
NPL(source)			-1.0485***	-0.0347
Regulatory quality (recipient)			1.0164**	0.5227
Waldchi2	177.121	114.079	171.748	118.05
Rho	0.035	0.015	0.00	0.00
Observations	2800	4648	2800	4648
R-squared	0.069	0.028	0.067	0.029
R-squared(within)	0.033	0.011	0.035	0.010
R-squared(between)	0.292	0.191	0.266	0.206
Groups	236	235	236	235

***, **, * indicate significance at the 1%, 5%, 10% level.

Columns (1) and (2) are the regressions of the baseline model with *NPL(source)*regulatory_quality* as the pull-push interaction term. The positive coefficients validate the basic assumption of the paper, that is, mounting financial pressure in the source country, in this case due to deteriorated balance sheets, increases the demand for a safe institutional environment, and the effect is highly significant in the pre-crisis period. Columns (3) and (4) disentangle the effects, showing that the increase of nonperforming loans in advanced countries reduces cross-border flows to emerging economies, and higher institutional quality of the recipient country enhances flows. The coefficients are significant in the pre-crisis estimates.

In Table 5 we run regressions with alternative governance indicators, such as Voice and accountability, Rule of law, Political stability/Abs. of violence, Government effectiveness, Control of corruption (WDI governance indicators). Results are not different from the baseline model with regulatory quality. Particularly, we find that in the post-crisis period the coefficient associated with the interaction term *Vix*quality* lowers or even turns negative.[12]

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[12] In Appendix D.3 we report the regressions where we disentangle the variables of the interaction term, to gauge the impact of the distinct variable on flows. The effects of the indexes are in line with those obtained with the regulatory quality index, in the baseline model.

Table 5 – Results for the baseline model with alternative indexes of quality

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial wealth (recipient)	0.8411***	0.3615***	0.7858***	0.4656***	0.8356***	0.4336***	0.8097***	0.4421***	0.8397***	0.4445***
Real GDP (source)	0.0662	0.3529***	0.0657	0.3522***	0.0728	0.3523***	0.0677	0.3526***	0.0728	0.3543***
Stock Market Index (recipient)	1.0522**	0.1788	1.0463***	0.5829*	1.2082***	0.4102	1.4036***	0.4617*	1.4395***	0.5326*
VIX*Voice and acc. (recipient)	0.6170***	-0.3335**								
VIX*Rule of law (recipient)			0.5357***	0.1637						
VIX*Political Stability (recipient)					1.0698**	-0.0544				
VIX*Government effect. (recipient)							0.4410***	0.1146		
VIX*Control of corruption (recipient)									0.6652***	0.2474*
Waldchi2	154.098	124.988	162.437	117.427	147.550	113.077	151.405	114.932	167.419	118.917
Rho	0.039	0.012	0.034	0.015	0.040	0.016	0.040	0.015	0.036	0.015
Observations	2880	4648	2880	4648	2880	4648	2880	4648	2880	4648
R-squared	0.060	0.030	0.063	0.029	0.058	0.028	0.060	0.028	0.065	0.029
R-squared(within)	0.028	0.010	0.026	0.011	0.027	0.011	0.027	0.011	0.029	0.011
R-squared(between)	0.262	0.218	0.295	0.201	0.256	0.189	0.258	0.198	0.284	0.197
Groups	236	235	236	235	236	235	236	235	236	235

***, **, * indicate significance at the 1%, 5%, 10% level.

We use alternative variables to capture the emerging economies' financial uncertainty other than institutional risk. Table 6 present the results of the regressions that considers the recipient country risk premium, measured as the difference between the short-term lending rate and the money market rate. Column (1) presents the results of our baseline model with the interaction term of this variable for the source and the recipient countries. In column (2) we take the risk of emerging markets and the risk of advanced countries separately. The estimations show that financial uncertainty in emerging economies matters, only in the pre-crisis period, when banks in advanced economies are themselves under financial pressure. In unreported regressions we also considered the short-term foreign debt – international financial liabilities due within one year- as an indicator of macroeconomic instability. Results confirm our main findings of a negligible role of financial stress in emerging economies in explaining changes in banks' cross-border claims.

Table 6. Cross border flows: Adding alternative variables related to uncertainty in emerging markets

Pre-crisis and Post-crisis

Whole sample of recipient countries

	Pre-crisis		Post-crisis	
	(1)	(2)	(1)	(2)
Financial wealth (recipient)	0.8035***	0.7005***	0.4052***	0.4151***
Real GDP (source)	0.0909	0.1887	0.4652***	0.5075***
Risk_premium (source) *risk_premium (recipient)	-0.0227*		-0.0103	
Stock Market Index (recipient)	0.9328*	0.9904*	1.2978**	1.2393*
Risk_premium (source)		-0.3758*		-0.2892**
Risk_premium (recipient)		0.0035		-0.0265
Waldchi2	57.08	56.945	66.089	73.434
Rho	0.034	0.033	0	0
Observations	1330	1330	1769	1769
R-squared	0.0482	0.0484	0.0362	0.0400527
R-squared(within)	0.0229	0.0217	0.0252	0.0257811
R-squared(between)	0.226	0.2338	0.0829	0.1029442
Groups	110	110	107	107

Notes:

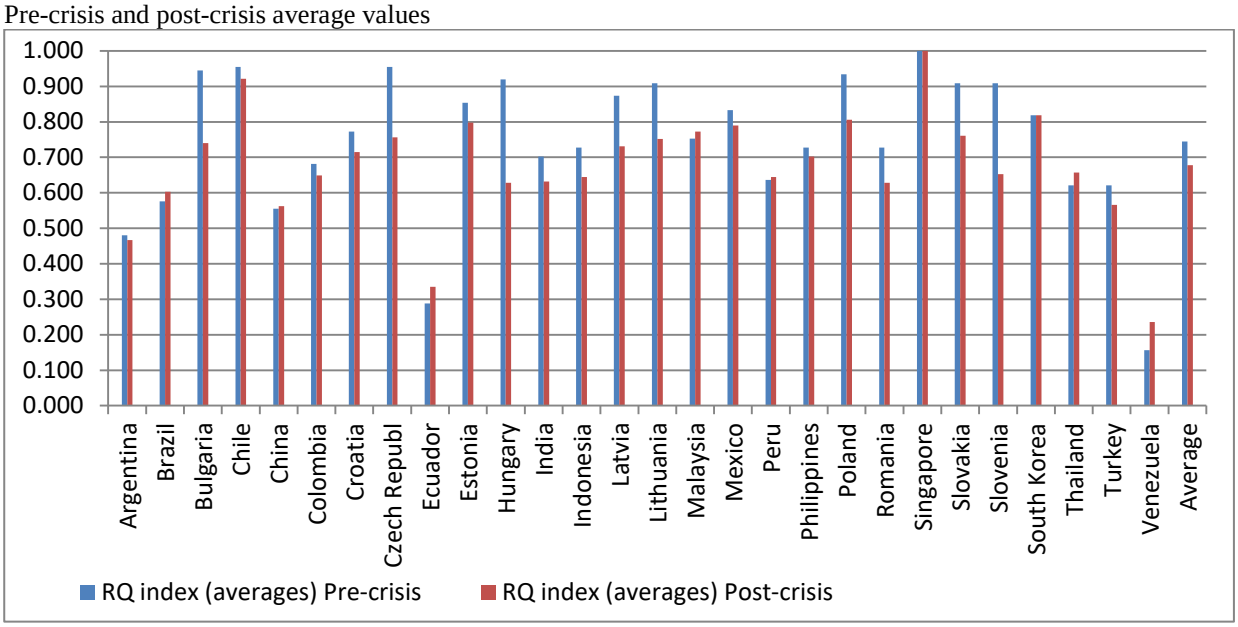
***, **, * indicate significance at the 1%, 5%, 10% level.

4. The old and the new normal in cross-border flows to emerging economies. Are banks less worried about "distance"?

The econometric analysis validates the theoretical model, pointing to the significance of the variables considered, although at a different extent in the pre-crisis and post-crisis periods (Table 1), and a high degree of heterogeneity across groups of countries (Table 2). We find a marked reduction in the coefficient of *gdpj*, that indicates financial wealth of recipient countries is a less important driver after the crisis, and a relevant increase in the coefficient of *realgdpi* that implies larger source countries tend to diversify more. In addition, the sensitivity to stock returns of emerging economies reduces drastically, but for EE. Finally, the estimations show that the demand for institutional quality increases significantly with global market tensions in the pre-crisis period, but this is less so after the crisis. We impute this fact to the reduced importance of global instability in driving banks' behaviour after the crisis.

We investigate further this feature. Figure 1 below shows, for each emerging economy, the average values of the regulatory quality index over the Pre-crisis (blue bar) and Post crisis (red bar) periods.

Figure 1. Regulatory quality index
Pre-crisis and post-crisis average values



Source: World Bank's Global Governance Indicators

Figure 1 shows that there is a high heterogeneity across countries, since the average quality index ranges from a minimum of 0.15 (pre) and 0.23 (post), for Venezuela, to a maximum of 1, for Singapore. With our theoretical framework in mind, it is worth pointing out that, when the discount factor applied to nominal dividends is unity, as in the case of Singapore, nominal and quality-adjusted dividends coincide. Notice that, in such a case, with perfect institutional quality, investors' decisions are driven completely by nominal dividends. On the opposite side, when the quality index is particularly low - as in the cases of Venezuela and Ecuador - the difference between nominal and quality adjusted returns is particularly high, hence economic distance acquires a prominent role. This makes clear that, *coeteris paribus*, the higher the value of the institutional quality index, the more markets are integrated. Figure 1 shows also that institutional quality is generally lower in the post-crisis period than in the pre-crisis period.[13] This is obviously a part of the story since, what matters for cross-border asset trade and international financial flows is the way investors react to the quality changes. That is, we introduce a "psychological driver" in the analysis, by considering not just the "raw" value of the quality index but its perceived value, in order to capture to what extent the institutional setting in the destination country is crucial/important for banks (investors).

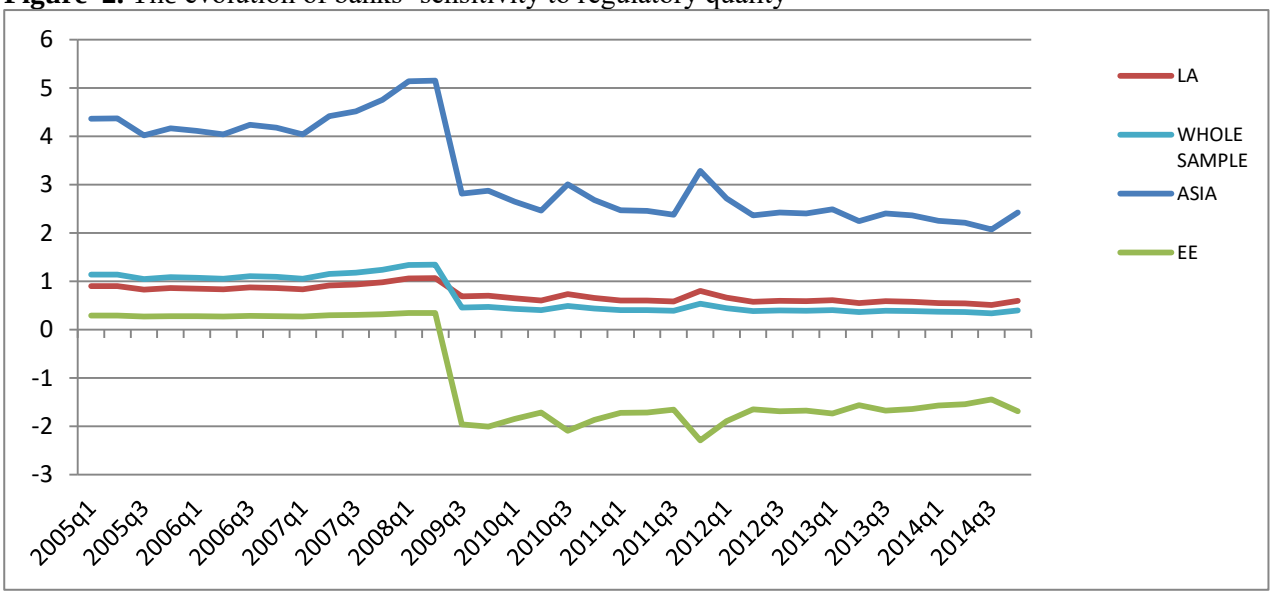
We show in Figure 2 the evolution of banks' sensitivity to regulatory quality, *i.e*., the reaction function to the quality index. In terms of our estimated equation this is represented by the term $\hat{\lambda} * VIX$ (see eq. 21). Empirically, $\hat{\lambda} * VIX$ measures the impact on cross-border flows (in per cent) of a 1% change in regulatory quality.

Financial flows result very reactive to regulatory quality changes in the pre-crisis period, with a peak in the last quarters before the crisis exploded, whereas in the post-crisis "normal" they respond less. Looking at the whole sample, the reaction function ranges always above 1% in the pre-crisis period, whereas in the post-crisis period the sensitivity is strongly reduced, with values around 0.5%. In the spirit of our model, where the demand for institutional quality increases with tensions in global financial markets, the lower sensitivity in the post-crisis period implies a change in the way banks of advanced economies approach foreign markets. In the new environment banks have modified their diversification strategies, and the global volatility has a milder impact

[13] Only in the two countries with substantially lower than average institutional quality –namely Ecuador and Venezuela- the evolution over time is opposite to this general pattern, since the average quality index increases in the post-crisis period compared to the pre-crisis period.

on their aversion to uncertainty. Hence, banks pay less attention to the institutional environment of the local markets with respect to the pre-crisis period. This behavior indicates a rebound of confidence.

Figure 2. The evolution of banks' sensitivity to regulatory quality



Note: *The sensitivity to regulatory quality,* $\hat{\lambda} * VIX$ *, is calculated on the basis of the pre- and post-crisis estimated values of* λ*, reported in Table 1 and Table 2.* The acute phase of the crisis is excluded.

Yet, Figure 2 points to a high degree of heterogeneity among the three regions considered. In fact, $\hat{\lambda}$ is region-specific, whereas the VIX index is identical. Then, investors react differently to institutional changes, with portfolio reallocations due to quality differences definitely more pronounced in the case of claims of Asian countries, that show the highest values of the sensitivity to regulatory quality. On the other side, in EE countries regulatory quality is not significant in the post-crisis period, thus confirming the differences of this region largely emphasized in the literature, due to the strong linkages of its banking sector to the core EU countries, and the agreements, such as the Vienna Initiative put in place in response to the crisis (Cetorelli and Goldberg, 2011). The demand for a safe institutional framework is not a driver of flows to these countries.

One explanation for the different explanatory power of the *VIX-quality* coefficient can be the change of the drivers of the flows, emphasized in Mc Quade and Schmitz (2017). The authors argue that the unconventional monetary policies implemented by central banks, since the crisis, made the VIX considerably lower in the post-crisis period, and thus less significant in shaping the patterns of flows. In the "new normal", new factors, such as the differences in regulatory legislation between countries and the monetary policy stance, override the drivers of cross-border flows before the crisis.

In order to gauge the role of advanced economies' monetary policies on banks' behavior, we run a regression of our base-line model, where we use the short-term lending rate of the source country, instead of the VIX.[14]

Table 7, columns (1) and (2) show that the sign of the interaction term *lending rate (source) *regulatory quality (recipient)* is positive and significant, both in the pre-crisis and post-crisis period, thus confirming that the demand for institutional quality increases with higher interest rates in the source country, *i.e.*, with more stringent monetary policy conditions. The results implies that rising financial pressure in the home market lead to higher demand for institutional quality in the emerging economy. On the other side, in times of lower interest rates due to more accommodative monetary policies, the importance of institutional quality as a protection against adverse future outcomes is less compelling, and banks increase more easily their holdings of asset from emerging economies. This finding is consistent with the assumption of a rebound of confidence, probably driven by the liquidity easing in the advanced economies, a result emphasized in other contributions (Ahmed and Zlate,

[14] We follow Mc Quade and Schmitz (2017) that use short-term interest rates to find evidence on the role of more accommodative monetary policies.

2014). In the "new normal", monetary policy and the liquidity ease in the source country drive portfolio decisions of the banks in advanced countries.
Columns (3) and (4) disentangle the effects of the pull and push factors, and point to the significance of the liquidity conditions of the source country on financial flows in the post-crisis estimates, with a positive sign for the coefficient on quality, significant in the pre-crisis period, in line with the arguments above.

Table 7. Cross border flows: baseline model but with liquidity conditions of the source country (lending rate) instead of VIX

Pre-crisis and Post-crisis

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)
Financial wealth (recipient)	0.8183***	0.3915***	0.8162***	0.3798***
Real GDP (source)	0.0647	0.5523***	0.0441	0.5820***
Stock Market Index (recipient)	0.8299*	0.5298*	0.8335*	0.4982*
lending rate (source)*regulatory quality (recipient)	0.1820**	0.3931***		
lending rate (source)			-0.2119	-0.3117**
Regulatory quality (recipient)			0.7755*	0.4762
Waldchi2	92.717	97.773	90.12	94.403
Rho	0.04	0.018	0.043	0.02
Observations	2193	3575	2193	3575
R-squared	0.052	0.032	0.051	0.031
R-squared(within)	0.014	0.012	0.014	0.012
R-squared(between)	0.275	0.224	0.267	0.209
Groups	182	181	182	181

Whole sample of recipient countries

Notes:

***, **, * indicate significance at the 1%, 5%, 10% level.

Recent studies (e.g. Houston el al., 2012, Ongena et al., 2013; Bremus and Fratzscher, 2014; Ichiu and Lambert, 2016) have highlighted the role of less stringent regulatory legislations in international financial flows. There is evidence that countries have adopted more stringent macro an micro-prudential regulations, also in response to the great volatility, in order to increase the resilience of their financial systems to external shocks. Indeed, the results of the literature of the impact of tighter regulatory frameworks are not unambiguous. There is evidence that tighter regulation moderates international flows (Milesi-Ferretti and Tille, 2011), but also that more stringent capital regulatory requirements in the source countries encourage cross-border flows (Bremus and Fratzscher, 2014, Mc Quade and Schmitz, 2014)
We run further regressions of our model, adding the indexes of bank and supervisory restrictions developed by Barth *et al.* (2013) and the macroprudential index developed by Cerutti *et al.* (2015). Table 8 presents the results.[15]
Overall, we find mixed results for the regulatory indexes, with the coefficients not statistically significant; thus we get no compelling evidence of lower inflows associated with more stringent capital regulations in the recipient countries.
To gauge more insights on this issue, we run further regressions using the interaction term with the lending rates (source countries) and the regulatory indexes (recipient countries), on the presumption that the liquidity conditions in the home market affect bank's response to the regulatory legislation in emerging markets..
The results are reproduced in Table 9. At a glance, the noticeable feature is the difference between the pre-crisis and the post-crisis estimates, with the coefficients of the interaction term that are all negative and larger in magnitude after the crisis, and highly significant for all, but the macro-prudential index. This implies that when the liquidity conditions in the source country are considered, we find that more stringent regulatory

[15] In unreported regressions we include indexes of institutional quality. The results are largely unaffected.

requirements reduce significantly cross-border flows, In other words, strong liquidity pressure in the advanced economies, as captured by high lending rates, makes banks more responsive to the regulatory legislation in emerging countries.

Table 8 Cross-border flows: Adding capital and banking regulation indexes in the recipient country

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial wealth (recipient)	0.2777	0.2567***	0.8019***	0.4577***	0.8353***	0.4416***	0.2933	0.2580***	0.7547***	0.4207***
Real GDP (source)	-0.0579	0.2917**	0.0651	0.3442**	0.0523	0.3524***	-0.0569	0.2920**	0.0812	0.4006***
Stock Market Index (recipient)	0.4119	0.3935	1.1468***	0.3835	1.3954***	0.4257*	0.4295	0.3801	1.3199***	1.5427***
Overall capital stringency (rec.)	0.3006	0.2701								
Overall restrictions on banking activity (rec.)			-0.3555	-0.1455						
Financial statement transparency (rec.)					2.1509**	-0.8138				
Capital regulation (rec.)							0.3426	0.2552		
Macroprudential index (rec.)									0.017	0.2962
Waldchi2	48.451	53.889	146.213	108.669	142.124	112.521	47.872	53.212	94.342	117.191
Rho	0.05	0.012	0.032	0.02	0.04	0.019	0.052	0.012	0.039	0.015
Observations	1082	3504	2682	4285	2682	4412	1082	3504	2330	4140
R-squared	0.049	0.017	0.060	0.030	0.061	0.029	0.048	0.017	0.045	0.031
R-squared(within)	0.028	0.009	0.027	0.012	0.024	0.013	0.028	0.009	0.025	0.016
R-squared(between)	0.145	0.081	0.262	0.179	0.251	0.169	0.140	0.079	0.179	0.178
Groups	122	215	236	234	236	235	122	215	194	211

Whole sample of recipient countries

Notes:

***, **, * indicate significance at the 1%, 5%, 10% level.

One reason behind this finding can be that advanced economies have increased their capital requirements, in response to mounting tensions in their markets, when their lending rates are high. (Mc Quade and Schmitz, 2017). And this has encouraged portfolios' shifts in favor of assets from countries with less stringent legislations. Our result is thus consistent with the "regulatory arbitrage" assumption, and the "race to the bottom" effect discussed in the literature.

Table 9. Cross border flows: baseline model but with capital and banking regulation indexes of the recipient country instead of regulatory quality

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial wealth (recipient)	0.3606	0.1809*	0.7837***	0.3879***	0.7953***	0.3553***	0.3901	0.1784*	0.7188***	0.3671***
Real GDP (source)	-0.105	0.5343***	0.085	0.5973***	0.0369	0.6135***	-0.0942	0.5570***	0.0655	0.5848***
Stock Market Index (recipient)	0.1519	0.42	0.7470*	0.4121	0.9363**	0.4366	0.1987	0.4361	0.8434*	1.7192***
lending rate (source)*overall capital stringency (rec.)	0.0601	-0.1412**								
lending rate (source)*overall restrictions on banking activity (rec.)			-0.036	-0.1529***						
lending rate (source)*financial stat. transparency (rec.)					-0.0148	-0.1939***				
lending rate (source)*capital regulation (rec.)							0.0305	-0.1380***		
lending rate (source)*macroprudential index (rec.)									-0.038	-0.1061
Waldchi2	30.52	51.313	95.686	98.523	84.892	102.356	29.921	54.999	55.242	98.383
Rho	0.068	0.014	0.03	0.022	0.037	0.022	0.066	0.013	0.049	0.021
Observations	818	2702	2041	3300	2041	3400	818	2702	1784	3174
R-squared	0.041	0.021	0.054	0.035	0.050	0.035	0.041	0.022	0.037	0.035
R-squared(within)	0.028	0.011	0.016	0.015	0.014	0.016	0.027	0.012	0.016	0.020
R-squared(between)	0.085	0.112	0.266	0.194	0.234	0.179	0.085	0.123	0.168	0.178
Groups	94	167	182	180	182	181	94	167	150	163

Conclusions

We address the issue of what drives financial flows to emerging economies in a model with a quality-based differentiation of assets. We focus on countries' institutional quality and its impact on the expected returns from the assets, and further consider the spillover effects from the country of origin to the country of destination, building on the idea that quality matters, but not always with the same intensity. Quality acts as a portfolio shifter, and its impact on the portfolio allocation decisions depend on developments in investors' markets. Our theoretical model is capable of encompassing the key drivers emphasized in the empirical literature: size effects, host country conditions, spillovers from the home country/global instability, and can be used to address empirically the issue of evolution through time of international financial flows

We run estimations for cross-border bank flows from advanced to emerging economies over the period 2005-2014. We find evidence that size matters, and that the sensitivity of bank flows to regulatory quality is influenced by the global volatility conditions before the crisis, and by the liquidity pressure in the home countries, after the crisis. Overall, economies with a strong institutional environment are less likely to

experience a sharp capital reversal. In the post-crisis period, we find evidence of a demand for less stringent regulatory frameworks in periods of liquidity tightening in advanced economies. This is in line with the "regulatory arbitrage" assumption found in the literature. Our results point to a noticeable degree of heterogeneity across groups of countries, with a rise in the importance of the size (Real GDP) of the source country, and a reduced role of the recipient country conditions (nominal GDP and market return) for all group of countries, but Emerging Europe. The peculiarities of this region can be explained by the higher degree of integration of the banking system with the core EU countries and the Vienna Initiative, in response to the crisis, as largely documented in the literature. Finally, in the "new normal", the ease of liquidity in advanced economies override global volatility as driver of investors' behavior: the monetary policy stance of advanced countries contributes significantly to the patterns of international lending to emerging economies, making banks more ready to exploit diversification opportunities in emerging markets.

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Appendix A

Table A.1 Variables description and sources

Variable	Description	Source
Flows	It measures the change in reporting banks' exposures of country i to different countries (j), in millions of US dollars. Reporting banks' exposures to different countries: Consolidated foreign claims on a ultimate risk basis (assets) in country i vis-à-vis all sectors in emerging country j, in millions of US dollars. Reporting banks' exposures of country i to different countries (j).	Bank for international Settlements - Consolidated Banking Statistics
Nominal GDP, country j	Nominal GDP at current prices, country j, Millions US$, quarterly	Datastream/Reuters
Real GDP, country i	GDP at constant prices 2010, country i, Millions of US$, quarterly	Global Economic Monitor database, World Bank
Vix	Chicago Board Options Volatility Index (Quarterly average from daily data)	Datastream/Reuters
Stock_market index, country j	Stock Markets Index, q1_2010=100, quarterly	Global Economic Monitor database, World Bank
Regulatory quality, country j	Among the individual variables used to construct this measure in the Worldwide Governance Indicators, we choose Investment Profile. Investment Profile is a measure of the factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: Contract Viability/Expropriation, Profits	Worldwide Governance Indicator, Political Risk Services International Country Risk , World Bank

	Repatriation, and Payment Delays	
Overall capital stringency	Whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined. (Higher values indicate greater stringency.)	Barth et al, 2013
Overall restrictions on banking activity	Sum of Securities activities + Insurance Activities + Real Estate Activities Securities activities :The extent to which banks may engage in underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry. Insurance activities: The extent to which banks may engage in insurance underwriting and selling. Real Estate Activities: The extent to which banks may engage in real estate investment, development and management. (Higher values indicate greater stringency.)	Barth et al, 2013
Financial statement transparency	The transparency of bank financial statements practices. (Higher values indicate better transparency.)	Barth et al, 2013
Capital regulation	Sum of Overall Capital Stringency + Initial Capital Stringency Overall capital stringency: Whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined. Initial Capital Stringency: Whether certain funds may be used to initially capitalize a bank and whether they are officially.	Barth et al, 2013

	(Higher values indicate greater stringency.)	
Macroprudential index	Sum of the scores on 12 policy instruments: General Countercyclical Capital Buffer/Requirement (CTC); Leverage Ratio for banks (LEV); Time-Varying/Dynamic Loan-Loss Provisioning (DP); Loan-to-Value Ratio (LTV); Debt-to-Income Ratio (DTI); Limits on Domestic Currency Loans (CG); Limits on Foreign Currency Loans (FC); Reserve Requirement Ratios (RR); and Levy/Tax on Financial Institutions (TAX); Capital Surcharges on SIFIs (SIFI); Limits on Interbank Exposures (INTER); and Concentration Limits (CONC). (Higher values indicate greater stringency.)	Cerutti et al., 2015
Lending rate	Lending Rate is the other depository corporations rate that usually meets the short- and medium-term financing needs of the private sector.	IMF, Datastream
Money market rate	Weighted average rate on loans determined in the interbank credit auction market	IMF, Datastream
Non performing loans	It is often used as a proxy for asset quality and is intended to identify problems with asset quality in the loan portfolio	Datastream
Rule of Law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Worldwide Governance Indicators (WGI) World Bank
Government Effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	Worldwide Governance Indicators (WGI) World Bank
Voice and Accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom	Worldwide Governance Indicators (WGI) World Bank

	of association, and a free media.	
Political Stability and Absence of Violence/Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism	Worldwide Governance Indicators (WGI) World Bank
Control of corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	Worldwide Governance Indicators (WGI) World Bank

Table A2 List of countries

Lender countries (9)	Borrower countries (28)
France	*Emerging Europe (12)*
Germany	Bulgaria
Italy	Croatia
Japan	Czech Republ
Netherlands	Estonia
Spain	Hungary
Switzerland	Latvia
United Kingdom	Lithuania
United States	Poland
	Romania
	Slovakia
	Slovenia
	Turkey
	Emerging Asia (8)
	China
	India
	Indonesia
	Malaysia
	Philippines
	Singapore
	South Korea
	Thailand
	Latin America (8)
	Argentina
	Brazil
	Chile
	Colombia
	Ecuador
	Mexico
	Peru
	Venezuela

Table A.3 . Summary statistics of the main variables

	Obs	Mean	Std. Dev.	Min	Max
Vix	9072	17.82	6.83	11.15	45.45
Real GDP, country i	9072	964391	1060086	126307	4100000
Consolidated foreign claims	8290	10872	22162	-89	221189
Flows	8028	307	2148	-30519	39601
Nominal GDP, country j	9063	1507079	3457010	21152	19900000
Stock_market index, country j	8685	126	188	23	3076
Regulatory quality, country j	9072	0.705	0.183	0.136	1

Note: Regulatory quality ranges from 0 to 1.
Variables "Consolidated foreign claims", "Flows" and "Nominal GDP, country j" are in Millions of US dollars.
The variable "Real GDP, country i" is in Millions of US dollars (base year=2010) while for "Stock Market Index" q1_2010=100.

Appendix B

Table B.1 Determinants of cross-border flows to emerging economies
As Table 1 in the text, but panel-data models are estimated using feasible generalized least squares (FGLS).

	Whole period	Pre-crisis	Post-crisis
	(1)	(2)	(3)
Financial wealth (recipient)	0.5612***	0.7901***	0.3971***
Real GDP (source)	0.1668**	-0.0153	0.2420**
VIX*regulatory_quality (recipient)	0.2524***	0.4289***	0.1492
Stock Market Index (recipient)	1.0211***	0.9344***	0.4819*
Waldchi2	365.53	219.73	135.38
Observations	7528	2880	4648
Groups	236	236	235

Notes:
Cross-sectional time-series FGLS regression;
Coefficients: generalized least squares;
Panels: As for the autocorrelation within panels, the assumption is AR(1) autocorrelation and that the coefficient of the AR(1) process is specific to each panel.
All models include fixed effects of recipient and source country, and the time fixed effect.
The estimation excludes the acute phase of the crisis, from 2008q3 to 2009q2. All variables are in logs.
* Significant at 10% level, **Significant at 5% level, *** Significant at 1% level.

Appendix C. Testing for stationarity

We test whether our variables contains a unit root for our sample of countries' bilateral ties. Here we resort to the Im, Peasaran and Shin (2003) unit-root test because, compared to other available unit-root tests for panel data, it allows each panel to have different autoregressive parameter (ρ_{ij}). The null hypothesis is that all panels

have a unit root (H_o: $\rho_{ij} = 0$ for all i,j). The alternative hypothesis is that the fraction of panels that are stationary is nonzero. This allows some (but not all) of the panels to possess unit roots under the alternative hypothesis. Moreover, the IPS (2003) test does not require strongly balanced dataset, thought there cannot be gaps within individual time series.

Table 4 reports the values of the *t- bar*$_{NT}$ statistics and its significant level based of the exact critical values for the different samples. We follow the procedure suggested by IPS (2003) to mitigate the impact of cross-sectional dependence. Hence the tests are performed computing and subtracting the cross-sectional averages from the series.

The test confirms the non-stationarity of the panels of the main explanatory variables, for both periods. A different result is found for the global uncertainty indicator (VIX) interacted with the quality of the recipient country during the post-crisis period. Here, because *t- bar*$_{NT}$ is less than even its 1% critical value, we strongly reject the null hypothesis that all series contain a unit root in favor of the alternative that some panels are stationary.

Table C.1 Results for the Im-Pesaran-Shin (2003) unit-root test

T- bar$_{NT}$ statistics and its significant level

	Pre-crisis	**Post-crisis**
Flows	-6.0710§^	-6.0710§^
Financial wealth (recipient)	-1.1746	-1.1699
Real GDP (source)	-1.2414	-1.5862
VIX*regulatory quality (recipient)	0.4440	-2.0544***
Stock Market Index (recipient)	-1.2125^	-1.3836

Notes: */**/*** the statistics is lower than the critical values at the 1%, 5%, 10%, respectively.
^ Fixed-N exact critical values not available
§ the value of the test refers to the entire period. Variables are in logs.

We also performed the same tests specifying a lag structure up to 4 lags, the inclusion of time trend. Results are not qualitatively different from the one presented in Table 4 and are available upon request.

As in Herrmann and Mihaljek (2013), we suggest that the presence of non-stationarity in some series is not to be considered a main concern as for large N (252) and small T (either 14 for the first period or 22 for the second period), as in our case, the cross-section dimension dominates, and the possibility of non-stationarity can be ignored.

Appendix D

Table D.1 Cross border flows: Baseline model, including euro debt crisis dummy

	Whole sample	Latin America	Asia	Emerging Europe
	(1)	(2)	(3)	(4)
Financial wealth (recipient)	0.5827***	0.5073**	0.4484***	0.7442***
Real GDP (source)	0.2027*	0.1922	0.4267**	0.0422
VIX*regulatory_quality (recipient)	0.2224**	0.1605	1.1508***	-0.4529
Stock Market Index (recipient)	1.0343***	0.8309**	2.8073***	2.2620***
Euro debt crisis	-0.4950**	0.2364	-1.7731***	-0.0849
Waldchi2	339.52	80.46	139.81	226.73
Rho	0.017	0.016	0.003	0.000
Observations	7528	2040	2325	3163
R-squared	0.048	0.040	0.058	0.067
R-squared(within)	0.035	0.035	0.040	0.051
R-squared(between)	0.234	0.137	0.284	0.432
Groups	236	62	72	102

As Equation (1) in Table 1 and in Table 2 but with Euro debt crisis dummy

Table D.2 Structural break tests - Disentangling Vix from institutional quality

	Whole sample	Latin America	Asia	Emerging Europe
	(1)	(2)	(3)	(4)
Financial wealth (recipient)	0.92***	0.85***	0.71***	1.14***
Real GDP (source)	0.12	0.12	0.36	-0.04
Stock Market Index (recipient)	1.90***	1.99**	1.83**	2.75***
Regulatory quality (recipient)	0.84***	0.89**	2.79*	-0.25
VIX	-2.69***	0.16	-5.85***	-1.82*
Post-crisis	3.13	18.94**	-3.05	-0.78
Post-crisis*Financial wealth (recipient)	-0.50***	-0.77**	-0.39	-0.68***
Post-crisis*Real GDP (source)	0.250	0.110	0.430	0.150
Post-crisis*Stock Market Index (recipient)	-1.39***	-1.75*	-1.14	-0.47

Post-crisis*regulatory quality (recipient)	-0.090	0.070	-2.350	-1.700
Post-crisis*VIX	2.84***	0.160	4.81**	2.72**
Post-crisis*time	-0.17***	-0.080	-0.42***	-0.070
R-squared	0.058	0.058	0.051	0.083
R-squared_adj	0.056	0.051	0.045	0.079
Observations	7528	2040	2325	3163

Notes: Fixed effects are included. The Chow test is performed using the Stata command Chowreg (type3).
We used the following functional form for dummy variables:
(3) Y = X + Post-crisis + Post-crisis*X
Where:
Post-crisis = Dummy variable (0,1), takes (0) in first period, and (1) in second period.
Post*X = Cross product of each Xi times Post-crisis
* Significant at 10% level, **Significant at 5% level, *** Significant at 1% level

Table D.3 Alternative measures of institutional quality, Pre-crisis period and Post-crisis period

Whole sample of recipient countries

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial wealth (recipient)	0.7916***	0.4585***	0.7958***	0.3507***	0.7509***	0.4718***	0.7907***	0.4351***	0.7708***	0.4431***
Real GDP (source)	0.09	0.3152**	0.0899	0.3130**	0.0885	0.3157**	0.0932	0.3150**	0.0904	0.3153**
Stock Market Index (recipient)	0.9558**	0.4812*	0.8771**	0.1109	0.8705**	0.6405**	1.0660***	0.4074	1.1919***	0.4732*
VIX	-3.5241***	0.0531	-3.5543***	0.0219	-3.5242***	0.0709	-3.4639***	0.0501	-3.4743***	0.0567
Regulatory quality (rec.)	1.0571***	0.5305								
Voice and accountability (rec.)			1.4262**	-1.1212**						
Rule of law (rec.)					1.3115***	0.5781*				
Political stability/Abs. of violence (rec.)							1.9963*	-0.1263		
Government effectiveness (rec.)									0.9897**	0.3655
Control of corruption (rec.)										
Euro debt crisis		-0.2863		-0.3007		-0.2781		-0.2826		-0.2831
Waldchi2	182.31	121.28	179.94	131.30	188.43	122.55	172.25	116.84	177.44	118.93
Rho	0.037	0.012	0.039	0.010	0.034	0.013	0.041	0.014	0.040	0.013

Observations	2880	4648	2880	4648	2880	4648	2880	4648	2880	4648
R-squared	0.069	0.029	0.068	0.031	0.071	0.030	0.066	0.028	0.068	0.029
R-squared(within)	0.036	0.010	0.036	0.010	0.035	0.011	0.036	0.011	0.036	0.011
R-squared(between)	0.276	0.210	0.266	0.226	0.296	0.206	0.256	0.193	0.262	0.202
Groups	236	235	236	235	236	235	236	235	236	235

***, **, * indicate significance at the 1%, 5%, 10% level.

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