

Financial flows, macro-prudential policies, capital restrictions and institutions: what do gravity equations tell us?¹

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ABSTRACT

This paper analyzes the impact on financial flows of institutional factors promoting financial integration such as European integration or trying to tame them such as capital control or macro-prudential policies. We use a detailed database of bilateral financial assets and construct gravity models, for foreign direct investment, portfolio flows and other investments. Capital control policies have limited and disparate effects, being particularly effective through restrictions on inward flows for destination countries. The impacts of macro-prudential measures are complex, with macro-prudential measures in the origin country financial sector having a positive impact on outward capital flows and macro-prudential measures in destination countries having a negative impact on inward capital flows. European integration has played a positive role on financial flows. We also emphasize the benefits of cooperation between the origin and destination countries, both for capital control and macro-prudential measures.

Keywords: Gravity Equation, International Financial Assets and Flows, Macro-Prudential Measures, Restrictions to Financial Flows, European Integration

JEL classification: F38, G15

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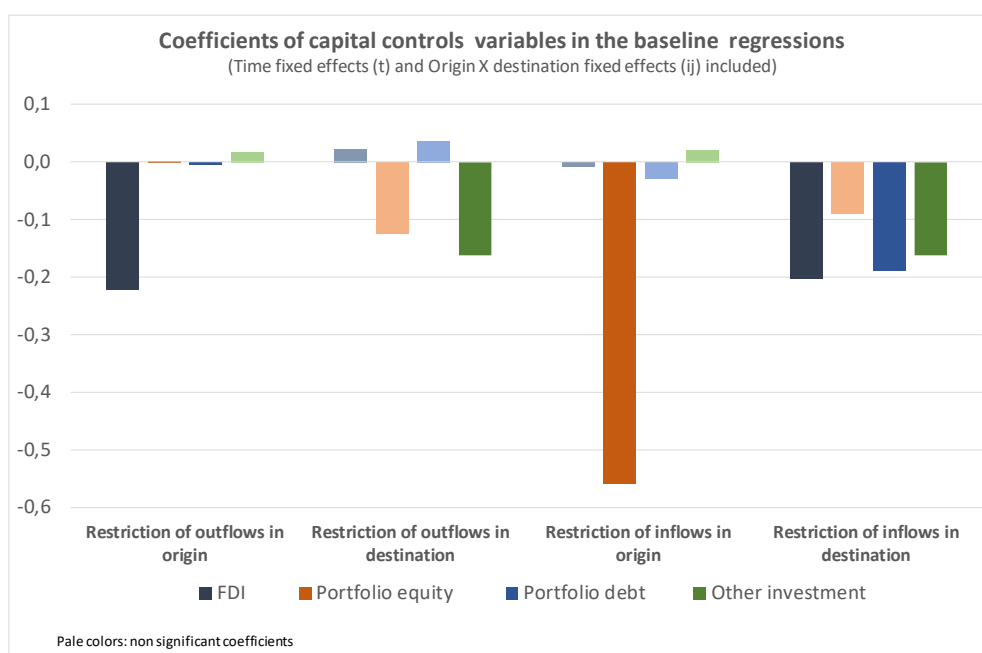
NON-TECHNICAL SUMMARY

The development of financial integration has been one major feature of globalisation, leading to an increase over the long term of the volume of global gross capital flows in all their dimensions (foreign direct investment, portfolio flows, other investments). This development was accompanied by enhanced volatility, leading to major disruptions in emerging but also advanced countries. This raised many policy issues around the management of capital flows, which took a new turn following the global financial crisis and its aftermaths for the euro area, as well as the massive withdrawal of capital flows from emerging countries following the COVID-19 crisis.

Over the last decades, policy initiatives regarding capital flow management went both in the direction of promoting financial integration and of taming financial flows. Regarding financial integration, one of the most prominent projects was the European Union (EU) and the creation of the euro area, which led to a large liberalization of financial flows. On the other side, capital controls tended to increase since the global financial crisis across all income groups of countries and macro-prudential measures, which may impact capital flows directly or indirectly, were set up and implemented in emerging and advanced economies.

Using three different sets of regressions based on gravity equations with financial assets/flows, depending on sets of fixed effects used, it is found that standard determinants of gravity equations are significant and with expected signs. Capital control policies have limited and disparate effects, being particularly effective through restrictions on inward flows for destination countries for FDI, portfolio debt and other investments (see graph). The impacts of macro-prudential measures are complex, with macro-prudential measures in the origin country financial sector having a positive impact on outward capital flows and macro-prudential measures in destination countries having a negative impact on inward capital flows. European integration, whether in European Union or Euro Area, has played a positive role on financial assets. In the most complete set of fixed effects, we emphasize the benefits of cooperation between the origin and destination countries, both for capital control and macro-prudential measures. In particular, restriction of outflows in origin combined to restriction of inflows in destination have a negative impact on FDI and on other investments.

In a period when the IMF is reflecting on its views regarding the use of the tools available to different types of countries (Basu et al, 2020; Adrian et al. 2020), this paper offers both an assessment of the effectiveness of each policy tool and also of the benefits of international cooperation between origin and destination countries (Ghosh et al. 2014). In particular, the preemptive effectiveness of capital controls on inflows seems to be comforted.



Flux de capitaux, politique macroprudentielle et contrôle des capitaux : que nous disent les équations de gravité ?

RÉSUMÉ

Ce papier analyse l'impact sur les flux de capitaux des facteurs institutionnels comme l'intégration européenne ou essayant de limiter ces flux comme les contrôles de capitaux ou les politiques macroprudentielles. Nous utilisons une base de données détaillée de flux bilatéraux de capitaux et construisons un modèle de gravité, pour les IDE, les investissements de portefeuille et les autres investissements. Les politiques de contrôle des capitaux ont des effets limités et inégaux, avec une efficacité particulière pour les contrôles des flux entrants dans les pays de destination pour les IDE, les flux de dette et les autres investissements. L'impact des mesures macroprudentielles est plus complexe avec un impact positif sur les flux sortants des mesures dans les pays d'origine visant le secteur financier, tandis que les mesures dans le pays de destination ont un impact négatif sur les flux entrants. L'intégration européenne, que ce soit l'Union européenne ou la zone euro, ont joué un rôle positif sur les flux financiers. Nous soulignons également les bénéfices de la coopération entre pays d'origine et de destination, à la fois pour les contrôles de capitaux et les mesures macroprudentielles. En particulier, les restrictions sur les flux sortants dans le pays d'origine et les flux entrants dans le pays de destination ont un impact négatif sur les IDE et les autres investissements.

Mots-clés : équation de gravité, flux de capitaux, mesures macro-prudentielles, contrôle des capitaux, intégration européenne.

Les Documents de travail reflètent les idées personnelles de leurs auteurs et n'expriment pas nécessairement la position de la Banque de France. Ils sont disponibles sur publications.banque-france.fr

I. Introduction

The development of financial integration has been one major feature of globalisation, leading to an increase over the long term of the volume of global gross capital flows in all their dimensions (foreign direct investment, portfolio flows, other investments). This development was accompanied by enhanced volatility, leading to major disruptions in emerging but also advanced countries. This raised many policy issues around the management of capital flows, which took a new turn following the global financial crisis and its aftermaths for the euro area, as well as the massive withdrawal of capital flows from emerging countries following the COVID-19 crisis.

Over the last decades, policy initiatives regarding capital flow management went both in the direction of promoting financial integration and of taming financial flows. Regarding financial integration, one of the most prominent projects was the European Union (EU) and the creation of the euro area, which led to a large liberalization of financial flows. On the other side, capital controls tended to increase since the global financial crisis across all income groups of countries (Fernandez et al., 2015) and macro-prudential measures, which may impact capital flows directly or indirectly, were set up and implemented in emerging and advanced economies.

In the European Union, capital controls have been dismantled in the 1980s and early 1990s, while financial regulation convergence and the creation of the euro area led to financial flows across EU countries way higher than other advanced economies (Lane 2006, Lane 2009, Lane et Milesi-Ferretti 2008). The volume of capital flows across the euro area has tripled from 2001 to 2007, beyond the increase observed in other countries, and reached a gross amount of 40% of GDP at its peak in 2007 (Christiansen, 2014). Yet, the global financial crisis and its aftermath in Europe led to a sudden stop on cross border credit flows, which have been slowly recovering afterwards (see, among others, Diaz del Hoyo et al., 2017). The question of the overall impact of the European Union project on financial integration should hence be examined, in particular with regard to the nature of the capital flows involved, which changed substantially after the Global Financial Crisis.

Regarding capital controls, a rich literature has studied their effectiveness, their potential deflection effects to other countries or other assets types and their impact on macroeconomic variables. Results on the effectiveness of capital controls are mixed, with some studies emphasizing a significant impact on the volume of capital flows, but depending on country-specific characteristics, not always lasting in the long run and not for all asset types or direction of flows (cf., among others, Binici et al., 2010 and Boero et al., 2018 at the global level, Ostry et al.,

2011, De Gregorio et al., 2000, for Chile and Magud et al., 2014 for a literature review). Macro-prudential measures and their impact on capital flows is a newer field and empirical studies are not as rich (see section 2). On emerging and advanced economies, Beirne and Friedrich (2017) find that macro-prudential measures are effective in managing cross-border bank flows, especially in a context of higher regulatory quality and a higher credit-to-deposit ratio. Fendoğlu, (2017) finds a significant impact of borrower-based tools, measures with a domestic focus, and domestic reserve requirements on major emerging economies. Filiz Unsal (2013), in a DSGE framework, shows that macro-prudential policy can complement monetary policy in case of capital inflows.

This paper addresses both institutional measures promoting financial integration and measures aiming to tame capital flows, both capital controls and macro-prudential measures, and for all categories of flows, whether FDI, portfolio investments or other investments. This all-encompassing approach is made possible by a novel database of bilateral financial flows and assets developed by the European Commission for 220 countries from 2000 to 2015. More specifically, we aim to measure the impact of these developments on bilateral financial assets using a ‘gravity’ model. While ‘gravity’ models have been extensively used to study trade flows, the originality of this approach lies in the use of this methodology on financial assets and on a large-scale dataset. Portes and Rey (2005) already used cross-border portfolio equity flows between 14 countries, over 1989-1996, to demonstrate that ‘gravity’ model is a reliable tool explaining international transactions of financial assets. On cross-border bank flows, an IMF working paper, Ghosh and al. (2014) also implements a gravity model. ‘Gravity’ models explain financial transactions at least as well as trade in goods. There are indeed strong empirical evidences that distance has an impact on international asset flows, and the informational frictions are one of the powerful factors shaping the distribution of asset flows at the international level. Macro-prudential measures are taken from the database built by Cerutti, Claessens and Laeven (on the subject, see for example Cerutti et al. (2015)) and restrictions to capital flows come from the database built in Fernández et al. (2016). The period under study is particularly interesting as it encompasses an international financial expansion (2000-07), an international financial crisis with the reversal of capital flows (2007-09) and the return to a new normal. We do not deal with the specific problematic of sudden stops, but more generally with the structural and policy determinants of bilateral capital flows.

Three different sets of regressions are implemented, depending on sets of fixed effects used, to control for global effects and for characteristics of countries of origin and destination. Standard determinants of gravity equations are found significant and with expected signs. Capital control policies have limited and disparate effects, being particularly effective through restrictions on

inward flows for destination countries for FDI, portfolio debt and other investments. The impacts of macro-prudential measures are complex, with macro-prudential measures in the origin country financial sector having a positive impact on outward capital flows (on this, see for example Avdjiev et al. (2017) that states that “the tightening of macro-prudential policy measures, often intended to constrain domestic credit, can give rise to potentially sizable expansionary international spillovers”) and macro-prudential measures in destination countries having a negative impact on inward capital flows, these two effects being consistent with financial institutions trying to escape regulatory constraints as long as the costs involved by these exceed the ones of investing abroad. European integration, whether in European Union or euro area, has played a positive role on financial flows. In the most complete set of fixed effects, we emphasize the benefits of cooperation between the origin and destination countries, both for capital control and macro-prudential measures. In particular, restriction of outflows in origin combined to restriction of inflows in destination have a negative impact on FDIs and on other investments.

Section 2 reviews the literature on our main themes of interest; section 3 presents the databases and econometric strategy; section 4 presents the econometric results from three sets of gravity equations. The last section concludes.

II. Literature review

a. European integration

The creation and subsequent deepening of the European Union (EU) and the Economic and Monetary Union (EMU) aimed to stimulate integration between the economies of member States.

Various approaches are applied to investigate the effects of integration and single currency area. A lion's share of the literature is mainly focused on measuring the possible outcomes on trade of goods (Rose (2000), Rose and Wincoop (2001), Persson (2001), Glick and Rose (2002), Head et al. (2010), Mayer et al. (2018)).

De Santis and Gerard (2006) using the International Monetary Fund (IMF) database of global portfolio holdings over the 1997 to 2001 period provide an evidence that EMU enhances international portfolio reallocation among union members by allowing an access to the equity and bonds markets. However, other largest economies do not experience financial integration to the same extent.

Hobza and Zeugner (2014) develop a database of bilateral financial stocks and flows that covers the period 2001-2015 focusing on euro area countries and their main world partners. The

authors study the importance of financial ties between countries and adjustments of account imbalances demonstrating that financial links may play a crucial role in transmitting shocks.

Mayer et al. (2018) provide a counterfactual research calculating possible welfare losses of undoing the EU. Authors apply modern versions of gravity models in order to quantify effects on trade. The ex-post approach proved its applicability to estimate the multidimensional nature of the integration inside the EU area. There are large differences across countries, with small open economies gaining the most.

Kalemi-Ozcan et al. (2009) aim to study the strengthening of the EU and the EMU from different angles. This study observes different perspectives of the EU and the EMU integration. Authors develop three possible ways to deepen this integration. A dataset on bilateral banking linkages among twenty developed countries in past thirty years is used to prove that elimination of currency risk is the primary reason to the tightening of cross-country linkages. Secondly, the authors examine the impact of legislative convergence among European countries. Countries that quickly adopt the Directives of the Financial Services Action Plan (FSAP) have higher amounts of cross-border banking activities. However, legislative harmonization of financial services cannot explain the total effect of financial integration. Finally, the authors test the hypothesis investigated by many papers to analyze how much international trade spurs the integrational processes between countries. Authors prove that despite the strong correlation between financial and good flows, trade in goods does not fully explain financial integration.

b. Capital controls

Capital controls have been studied for their effectiveness to control financial flows volume, their potential deflection effects to other countries or other assets types and their impact on macroeconomic variables. Results on the effectiveness of capital controls are mixed, with some studies emphasizing a significant impact on the volume of capital flows (Boero et al., 2019; Nispi Landi and Schiavone, 2018; Binici et al., 2010), while others do not (Frost et al., 2020; Magud et al., 2018; Habermeier et al., 2011).

Boero et al. (2019) find that capital controls are effective for some countries in the short run (Chile and Taiwan), but have no lasting effects. Nispi Landi and Schiavone (2018) find that controls significantly reduce capital flows both in advanced and emerging economies, although in EMEs this effectiveness is driven mostly by FDI and portfolio investments, while in advanced economies it is driven by other investments. Binici et al. (2010) find that both debt and equity controls can substantially reduce outflows, with little effect on capital inflows.

Indeed, capital controls' effectiveness may be related to external conditions, such as global liquidity (Pasricha et al., 2018) or to country-specific characteristics, such as the elasticity of short-term capital flows to total capital flows or the level of short-term capital flows when the controls are put in place for (Magud et al., 2014). This vindicates the very demanding strategy in terms of fixed effects we use in this paper.

An IMF working paper, Ghosh et al. (2014), performs an exercise quite similar to the one of the present article. They use bilateral cross-border bank flows and combine data on financial flows with capital controls and prudential measures. Their conclusions are similar to the ones of the present articles: capital restrictions at either end can significantly influence the volume of cross-border bank flows, with restrictions at both ends associated with a larger reduction in flows, concluding to potential scope for policy coordination. They also find evidence of cross-border spillovers whereby inflow restrictions imposed by countries are associated with larger flows to other countries. Still, the present article goes several steps further. First, financial flows, coming from an updated version of Hobza and Zeugner (2014) are not limited to cross-border bank flows, which represent a sizeable, but not complete fraction of international financial flows. Second, to better control for potential multilateral resistance terms and explore further the impact of coordination between measures in origin and destination countries, other sets of panel regressions are performed, using country of origin interacted with time, and country of destination interacted with time fixed effects.

c. Macro-prudential measures

After the global financial crisis, both emerging and developed countries prioritized incorporation of macro-prudential policy (MPP) instruments in their policies. Many countries complemented macroeconomic tools by MPP or capital flow measures to use them on a systematic basis. The aim is to mitigate systemic risks in the financial market and maintain economic agents, particularly banks, resilient to shocks.

We expand our dataset by incorporating additional variables of MPP and capital flow measures. However, the list of MPP instruments is long and most regulations are implemented nationally.

Earlier studies conducted by Montiel and Reinhart (1999), La Porta et al. (2002), Buch (2003), Mian (2006), Sengupta (2007), Lin et al. (2011), or Pang et al. (2010) focus on global banking regulations, determining their effects on capital market flows.

Later studies by Fernandez et al. (2015), Cerutti et al. (2016), or Vandebussche et al. (2015) contribute to the extension of datasets for macro-prudential and capital flows policies impact measurement. Table 1 gives a view of some existing datasets on policy actions.

Table 1. Comparison of datasets on policy actions.

	Fernandez et al. (2015)	Cerutti et al. (2015)	Cerutti et al. (2016)	Vandebussche et al. (2015)	Pasricha et al. (2018)	Forbes et al. (2015)
Direction of flow	inflows and outflows	inflows and outflows	inflows and outflows	inflows	inflows and outflows	inflows and outflows
Number of countries	100	119	64	16	16	60
Period of coverage	1995-2013	2000-2013	2000-2014	2000-2010	2001-2012	2009-2011
Categorization	capital flow measures: 10 categories of assets	12 MPP instruments	5 types of MPP instruments: capital buffers, interbank exposure limits, concentration limits, loan to value ratio limits, and reserve requirements	29 categories of MPP, 5 groups: capital measures, provisioning measures, liquidity measures, loan eligibility requirements, other quantitative restrictions	782 capital control actions	capital-flow management measures: prudential and non-prudential
Frequency of observation	yearly	yearly	quarterly	quarterly	yearly	weekly

Cerutti et al. (2016) implement a dataset that measures the intensity of usage: interbank exposure limits, capital buffers, concentration limits, reserve requirements and loan to value ratio limits. There are nine prudential tools at the final stage due to the specification of capital buffers into: real estate credit specific capital buffers, general capital requirements, consumer credit specific capital buffers and other specific capital buffers.

Vandenbussche et al. (2015) measure five groups of MPP policies: provisional, capital and liquidity measures, loan eligibility requirements and other quantitative restrictions over the period between 2000 and 2010.

The latest studies focus on the spillover effect of MPP policies on foreign capital flows. Beirne and Friedrich (2017) prove that both types of spillovers can be of positive or negative nature. The authors fill a gap to study negative externalities. Eight MPP indices in a sample of 139 countries (emerging, developing and advanced) over the period 1999-2009 are studied. There is an evidence that asset classes within countries are affected to varying degrees. Geographical spillovers have an impact on a small number of countries.

Buch and Goldberg (2017) in cooperation with researchers from 15 central banks and 2 international organizations published comprehensive research of cross-border prudential policy spillovers using detailed micro-banking data. The main finding is a spillover effect across borders through bank lending, which might be positive or negative. The intensity of spillovers depends on the particular macro-prudential instruments applied, the bank's balance sheet conditions and its international business model. Spillovers frequently occur for countries interlinked through international banking. These findings are not systematically different between advanced and emerging economies.

Aizenman, Chinn and Ito (2017) highlight the fact that financial globalization has made open emerging markets more sensitive to the external environment. Authors aim to investigate to what extent MPPs link central and peripheral economies. The main focus of research is the policy of interest rates: if expansionary MPPs are implemented by emerging economies, it leads to enhanced monetary independence, especially with regard to current account deficit, and minimum required level of international reserves.

Pasricha et al. (2018) use a database in 16 emerging markets of 782 capital control action or policy changes over the period 2001-2012. The research complements existing findings by studying capital control actions and investigating the effectiveness of MPPs in accordance with the monetary policy trilemma as well as spillover effects of MPPs in pre- and post- financial crisis periods. The main conclusion is that emerging economies faced certain constraints in policy choice in 2000s due to the impossible trinity. Thus, the priority was given to exchange rate stability, which weakened autonomy of monetary policy. The policy of net inflow tightening implemented by developed economies in 2000s and 2010s significantly affected other States.

Compared to these three sets of determinants (European integration, capital controls and macro-prudential measures), the goal of the present paper is to take all these effects into account, controlling for other factors with different sets of fixed effects.

III. Databases used, stylized facts and econometric strategy

Financial assets are taken from an updated version of Hobza and Zeugner (2014), which builds a database of bilateral financial flows and stocks. Most regressions shown in the next part are based on bilateral stocks (as done for example in Kalemli-Ozcan et al. (2009)), but the same analysis may be implemented for flows.

Table 2. Descriptive statistics on the capital flows database.

Origin country group	Destin country group	Number of flows	Sum of ln(direct investment)	Sum of ln(portfolio equity)	Sum of ln(portfolio debt)	Sum of ln(other investment)
Developed	Developed	11013	57598.3	61639.4	71225.6	58543.4
Developed	Emerging	8718	39368.9	29294.4	34135.6	30062.3
Developed	Other	9979	13964.3	4861.5	8631.3	8838.3
Emerging	Developed	10935	19013.5	13060.5	19305.8	40360.9
Emerging	Emerging	6262	11236.8	2694.5	4703.1	6818.9
Emerging	Other	6630	5011.0	471.0	526.1	1194.8
Other	Developed	13986	2485.5	1676.7	2951.4	18667.1
Other	Emerging	4510	2932.2	579.0	922.5	1917.2
Other	Other	12281	2545.8	457.5	503.9	630.6

Note: Developed countries are: AUS, AUT, BEL, CAN, CHE, CYP, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, IRL, ISL, ITA, JPN, KOR, LUX, LVA, MLT, NLD, NOR, NZL, PRT, SWE, USA.

Emerging countries are: ARE, ARG, BGR, BIH, BRA, CHL, CHN, COL, CZE, EGY, HKG, HRV, HUN, IDN, IND, IRN, ISR, KWT, LTU, MEX, MYS, PHL, POL, QAT, ROU, RUS, SAU, SGP, SVK, SVN, THA, TUR, TWN, UKR, URY, ZAF.

Other countries correspond to less advanced countries, which are not classified as "developed" or "emerging".

This database contains yearly bilateral financial investment positions between OECD, EU, emerging and offshore countries (stocks and flows) from 2001 to 2015. Information on cross border positions are obtained through a large variety of data sources (Eurostat, BIS, IMF, OECD). The main sources are: (a) OECD for Direct Investment; (b) IMF for Portfolio Investment and (c) BIS for Other Investment. Through a series of steps, missing values are imputed by using either proxies from alternative data sources (Eurostat) or back and forward growth rates matching. For this part a sample of 220 countries are used, while the final dataset consists of around 80 countries, due to merges with other datasets with a lower country coverage. When bilateral financial flows

are missing, intended as net acquisitions of assets, they are estimated based on the change of cross border positions of one year to another, correcting for valuation effects.

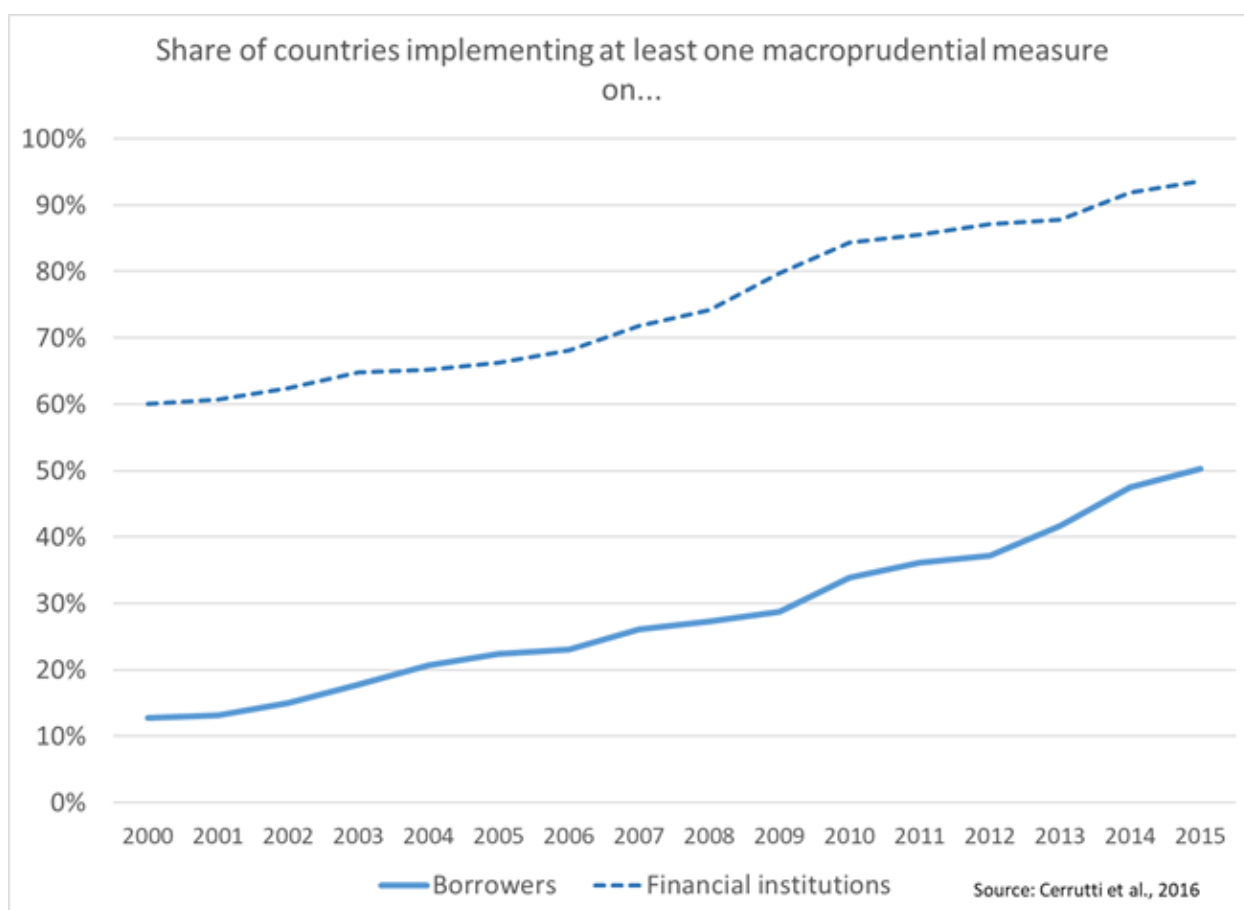
In the baseline regressions of our paper, we use financial international positions for which we have a more comprehensive database, but for other investments, for which we use financial flows. Indeed, other investments are of a different nature, being more volatile and short-term and less affected by valuation effects. Robustness tests are carried out with financial flows for all types of flows but for other investment, for which international positions are used). Descriptive statistics on the capital flows database are presented in table 2.

Most macroeconomic variables are taken from the IMF WEO. Macro-prudential measures are taken from the database built by Cerutti, Claessens and Laeven (on the subject, see for example Cerutti et al. (2015)) and restrictions to capital flows come from the database built in Fernández et al. (2016).

The macro-prudential data used in Cerutti et al. (2015) come from a comprehensive IMF survey, called Global Macro-prudential Policy Instruments (GMPI)—carried out by the IMF's Monetary and Capital Department during 2013-2014. The survey was conducted by IMF staff and responses were received directly from country authorities. The GMPI survey is very detailed and covers 18 different instruments, of which authors focus on 12 specific 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); Levy/Tax on Financial Institutions (TAX); Capital Surcharges on SIFIs (SIFI); Limits on Interbank Exposures (INTER); and Concentration Limits (CONC). Authors create an overall macro-prudential index (MPI) which is just the simple sum of the scores on all 12 policies, which is the indicator used in the regressions hereafter. A country is qualified as implementing severe/high macro-prudential standards if the MPI index is in the range [8;10] (in a scale that goes up to 10) and low standards if this index is in the range [0;2].

Regarding stylized facts on macro-prudential policies, there has been a constant increase over the period under study of their use. Measures regarding financial institutions are more frequent than measures targeting borrowers. They are more often used by emerging than advanced countries (Cerutti et al., 2016).

Graph 1

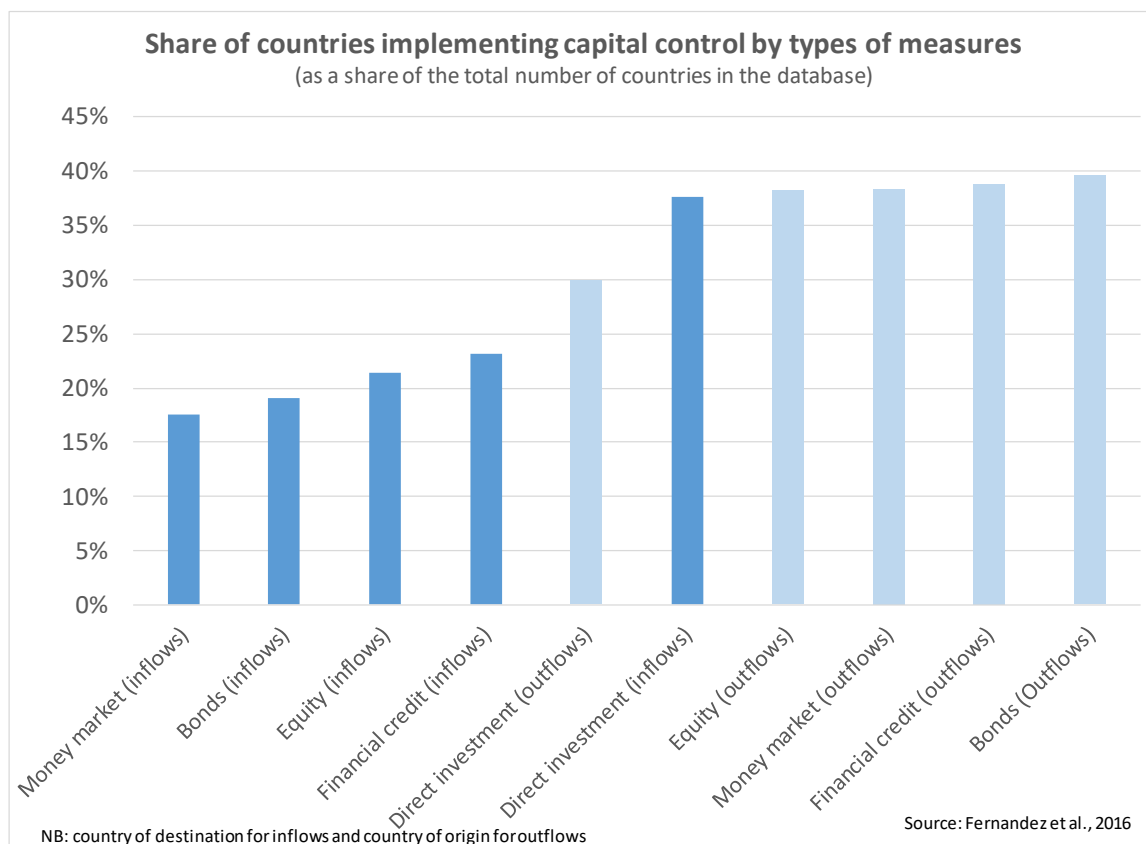


Fernández et al. (2016) builds a dataset of capital control restrictions on both inflows and outflows of ten categories of assets for 100 countries from 1995. They use the narrative description in the AREAER (Annual Report on Exchange Arrangements and Exchange Restrictions) from the IMF to determine whether there are restrictions on international transactions, with a 1 representing the presence of a restriction and a 0 representing no restriction¹.

Regarding stylized facts about capital flows, countries are implementing more measures on outflows (light blue) than on inflows (dark blue). For outflows, they target equally each type of flows, but FDI, which are more spared. On the contrary, for inflows, they target mostly FDI. Low income countries tend to use more capital controls than others (Fernandez et al., 2016).

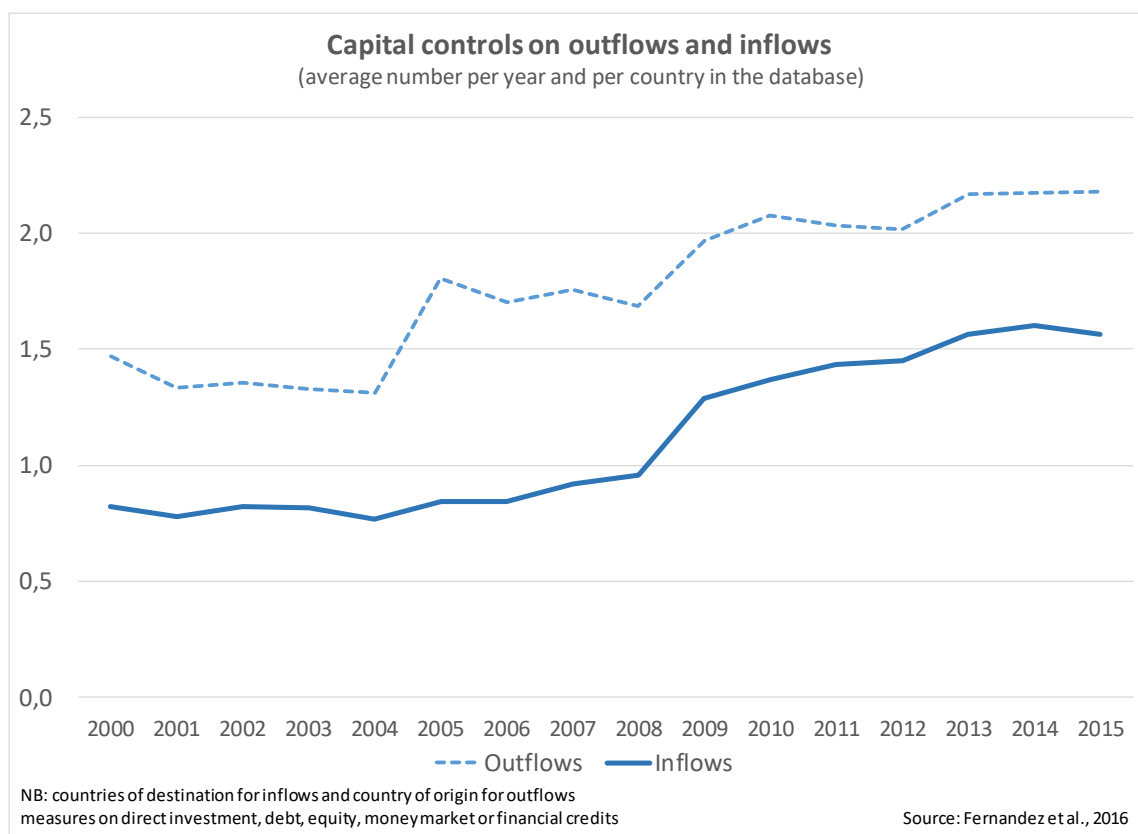
¹ For portfolio debt, we sum money market and bond restrictions; for other investment, we use the financial credit indicator in Fernández et al. (2016).

Graph 2



Overall, capital controls have increased over the period, with a marked jump after the Great Financial Crisis.

Graph 3



Several strategies of panel regressions may be envisaged depending on fixed effects used. We use a similar methodological progression in the implementation of fixed effects as in Mayer et al. (2018)².

Bilateral capital flows/positions are first determined by pull and push factors, as well as by the overall proximity between the two countries (geographical, cultural, historical proximity). These factors can be captured explicitly by GDP, distance or cultural dummies or by a set of fixed effects.

The first one, which is quite standard while rather minimalist, includes country of origin (i), country of destination (j) and time fixed effects. This specification enables to check the sign, significance and magnitude of most factors, which have a dyadic (ij), country of origin*time (it) or country or destination*time (jt) dimension, or a mix of them. It will be used to check the

² Still, unlike Mayer et al. (2018), we are not able to include pairs of countries for which there is no financial flows since we are not able to distinguish between missing and null values.

relevance of our gravity model approach, but given its minimal set of fixed effects it will not be our preferred specification.

$$k_{ijt} = \alpha_1 y_{it} + \alpha_2 y_{jt} + \alpha_3 RegQual + \beta Prox_{ij} + \gamma EU_{ijt} + \delta_1 CC_{it} + \delta_2 CC_{jt} + \delta_3 CC_{it} \times CC_{jt} + \theta_1 MP_{it} + \theta_2 MP_{jt} + \theta_3 MP_{it} \times MP_{jt} + FE_t + FE_i + FE_j + \varepsilon_{ijt} \quad (1)$$

k is our financial investment position. y is the log of GDP, as a measure of push or pull factors and of the country economic size or cyclical position. *RegQual* is a World Bank indicator of quality of regulation, which has been found to be a significant determinant of financial flows (cf. among others Dellis et al. , 2017). *Prox* is a vector of variables representing the proximity of the two countries, including the log of distance, dummies for former colony and common official language. *EU* is a vector of variables representing European union relationships: member of the EU or of the euro area. *CC* is a vector of capital controls restrictions (inflows and outflows) from Fernández et al. (2016). *MP* is a vector of dummies for macro-prudential measures (on borrowers or on the financial sector) from Cerutti et al. (2015). We test the direct impact of capital controls and macro-prudential measures as well as the interaction between these measures in the origin and destination countries, as we may have an enhanced impact if two countries cooperate or take measures going in the same direction. Yet, we do not test the interaction between capital controls and macro-prudential, which pertains to a different problematic (complementarity/substitutability) and for which our estimation framework is not appropriate. *FE* are time, country of destination and country of origins fixed effects.

The second specification includes dyadic (ij) and time (t) fixed effects, as done in Kalemli-Ozcan et al. (2009). The first group of fixed effects encompasses all structural factors that depend only on the relation between origin and destination countries, such as distance, common language, former relation as a colony..., while the time fixed effects capture global factors. Allowing to test most relevant indicators while having a demanding set of fixed effects, it will be our preferred specification.

$$k_{ijt} = \alpha_1 y_{it} + \alpha_2 y_{jt} + \alpha_3 RegQual + \gamma EU_{ijt} + \delta_1 CC_{it} + \delta_2 CC_{jt} + \delta_3 CC_{it} \times CC_{jt} + \theta_1 MP_{it} + \theta_2 MP_{jt} + \theta_3 MP_{it} \times MP_{jt} + FE_t + FE_{ij} + \varepsilon_{ijt} \quad (2)$$

The third specification is the most demanding, including dyadic (ij), country of origin*time (it) and country of destination*time (jt) dimensions. The inclusion of these fixed effects enables to capture the multilateral resistance terms (MRT), as explained for example by Mayer et al. (2018). The MRT captures the general equilibrium effect associated with the barriers to exchanges

that each country faces with all its partners. In its essence, what matters in explaining bilateral exchanges are relative bilateral barriers, and an omission of the MRT may lead to bias estimates of the relevant elasticities. This specification, which does not allow to estimate the coefficient of most of our interest variables, will be used for robustness test of our interaction variables.

$$k_{ijt} = \gamma EU_{ijt} + \delta_3 CC_{it} \times CC_{jt} + \theta_3 MP_{it} \times MP_{jt} + FE_{ij} + FE_{it} + FE_{jt} + \varepsilon_{ijt} \quad (3)$$

As *it* and *jt* fixed effects absorb the impact of capital controls or macro-prudential measures in a single country, we can only test the impact of their interaction when taken both in the origin and destination countries.

In the three sets of regressions, macro-prudential measures and capital restrictions are introduced with a lag of one year, because these measures may be taken throughout the year and hence have little influence on financial stocks in the contemporary year if taken at end-year, and to diminish endogeneity issues, coming in particular from reverse causality. This being said, reverse causality should be a limited problem in a bilateral flows estimate: an increase in one given bilateral flow may not entail a surge in total capital inflows for a country leading it to implement capital inflows controls measures. Moreover, if there is still some reverse causality, the sign of capital restrictions should be positive since more financial flows should induce more severe capital restrictions. If a negative and significant coefficient is found (which will be often the case), it will confirm the expected channel: more severe capital restrictions should tame financial movements. As a robustness test, we implement 2SLS estimates with Central bank independence index as instruments.

IV. Econometric results from the three sets of gravity equations

Results for estimates of equation (1), (2) and (3) are presented for FDI, portfolio equity, portfolio debt and other investments respectively in table A-1, table 2 and table A-2 .

Regarding control variables, they range from the largest set in table A-1 to only EU and Euro Area membership in table A-2, as fixed effects absorb most variables in this estimate. Specific gravity variables (country-pair invariants) in table A-1 have the expected sign and are significant: distance is significantly negative, while the statute as a former colony and a common official language are in all cases significant and have a positive impact on the flows/positions of the different types of capital. This comforts our modelling choice and vindicates the gravity approach.

In table 2, GDP of origin and destination countries are positive and significant, reflecting the role of economy size and cyclical fluctuations in attracting or generating capital flows. Regulatory quality, though a qualitative variable, is significant and positive, reflecting the importance of institutions in attracting capital flows.

European integration, whether in the European Union or the Euro area, has played an overall positive role on financial integration. As country pair dummies are introduced, the EU or Euro area membership dummies reflect the impact on new entrants of these memberships³. The EU membership is positive and significant for all types of capital flows, reflecting a boost to capital market integration when a country-pair or one member of a country-pair enters the EU, the other member being already inside. The EA membership, in addition to the EU membership, has a positive impact mostly on portfolio debt positions, as it first led to a convergence in euro area debt markets (see for example Ehrmann et al., 2007) before the episode of crisis of sovereign debt in the periphery of the EA over 2010-2013.

³ New entrants were numerous over the estimation period, with the EU enlargement to the Eastern countries and the EA enlargement to Malta, Cyprus, the Baltic States, Slovenia and Slovakia, allowing an accurate estimate of the coefficients.

Table 2. Regressions based on time (t) and couple of origin and destination countries (ij) fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FDI	FDI	Portfolio equity	Portfolio equity	Portfolio debt	Portfolio debt	Other investment	Other investment
Control variables								
$\ln(\text{GDP}_{\text{origin}})$	0.541*** (0.127)	0.555*** (0.128)	1.060*** (0.112)	1.056*** (0.111)	0.462*** (0.100)	0.444*** (0.0997)	0.514*** (0.0780)	0.531*** (0.0780)
$\ln(\text{GDP}_{\text{destination}})$	0.308*** (0.119)	0.330*** (0.120)	0.808*** (0.0983)	0.786*** (0.0978)	0.788*** (0.0907)	0.768*** (0.0913)	0.764*** (0.0854)	0.769*** (0.0858)
Regulatory quality _{destination}	0.237* (0.127)	0.229* (0.127)	0.260** (0.110)	0.271** (0.110)	0.575*** (0.105)	0.583*** (0.105)	0.208* (0.109)	0.202* (0.109)
EU membership _{origin&destination}	0.401*** (0.120)	0.403*** (0.120)	0.237* (0.136)	0.241* (0.136)	0.191** (0.0950)	0.204** (0.0953)	0.181** (0.0832)	0.171** (0.0837)
Euro area membership _{origin&destination}	0.137 (0.256)	0.117 (0.256)	0.151 (0.158)	0.148 (0.159)	0.262* (0.146)	0.257* (0.147)	0.217 (0.165)	0.202 (0.166)
Capital controls								
Restriction of outflows in origin _{t-1}	-0.222*** (0.0688)	-0.220** (0.0856)	0.000666 (0.0776)	-0.0166 (0.0874)	-0.00376 (0.0382)	-0.0339 (0.0452)	0.0173 (0.0608)	0.0690 (0.0649)
Restriction of outflows in destination _{t-1}	0.0218 (0.0775)	0.0236 (0.0976)	-0.125 (0.0800)	-0.113 (0.0877)	0.0359 (0.0355)	0.0192 (0.0398)	-0.161*** (0.0516)	-0.198*** (0.0587)
Restriction of inflows in origin _{t-1}	-0.00755 (0.0695)	0.0510 (0.0870)	-0.558*** (0.144)	-0.608*** (0.164)	-0.0277 (0.0638)	-0.00600 (0.0734)	0.0202 (0.0730)	0.00557 (0.0842)
Restriction of inflows in destination _{t-1}	-0.203*** (0.0750)	-0.142 (0.0905)	-0.0895 (0.115)	-0.153 (0.124)	-0.188*** (0.0523)	-0.182*** (0.0573)	-0.162*** (0.0496)	-0.148** (0.0622)
Restriction of inflows in origin * restriction of inflows in destination _{t-1}		-0.0980 (0.122)		0.108 (0.322)		-0.167 (0.106)		0.273 (0.184)
Restriction of inflows in origin * restriction of outflows in destination _{t-1}		-0.0626 (0.120)		0.199 (0.268)		0.0433 (0.0752)		-0.308** (0.124)
Restriction of outflows in origin * restriction of inflows in destination _{t-1}		-0.0761 (0.133)		0.276 (0.230)		0.0717 (0.0657)		-0.0861 (0.151)

Restriction of outflows in origin * restriction of outflows in destination $t-1$		0.0607 (0.129)		-0.138 (0.185)		0.00485 (0.0545)		0.155 (0.105)
Macro-prudential measures								
Macro-prudential measures on borrowers in origin $t-1$	0.0582 (0.0527)	-0.0632 (0.0760)	0.189*** (0.0369)	0.0871* (0.0512)	0.0588 (0.0382)	0.0104 (0.0561)	0.0558 (0.0365)	0.0497 (0.0539)
Macro-prudential measures on financial sector in origin $t-1$	0.0262 (0.0293)	0.0654 (0.0412)	0.129*** (0.0284)	0.133*** (0.0381)	0.104*** (0.0272)	0.0866** (0.0368)	0.0298 (0.0262)	0.0759** (0.0342)
Macro-prudential measures on borrowers in destination $t-1$	0.0918** (0.0461)	0.0276 (0.0593)	0.0634 (0.0420)	0.112 (0.0699)	0.0128 (0.0358)	-0.0856 (0.0522)	-0.0324 (0.0336)	0.0353 (0.0492)
Macro-prudential measures on financial sector in destination $t-1$	-0.0549* (0.0313)	-0.0302 (0.0406)	0.0122 (0.0262)	-0.0198 (0.0384)	0.0257 (0.0269)	0.0197 (0.0354)	-0.0603** (0.0266)	-0.0334 (0.0363)
Macro-prudential measures on borrowers in origin * on borrowers in destination $t-1$		0.0731* (0.0425)		0.0122 (0.0401)		0.0173 (0.0372)		0.0301 (0.0352)
Macro-prudential measures on borrowers in origin * on financial sector in destination $t-1$		0.0420* (0.0235)		0.0518** (0.0225)		0.0214 (0.0224)		-0.00572 (0.0240)
Macro-prudential measures on financial sector in origin * on borrowers in destination $t-1$		0.0119 (0.0230)		-0.0310 (0.0266)		0.0508** (0.0237)		-0.0445** (0.0204)
Macro-prudential measures on financial sector in origin * on financial sector in destination $t-1$		-0.0291** (0.0136)		0.00404 (0.0154)		-0.00400 (0.0157)		-0.0137 (0.0148)
# observations	26,942	26,942	23,166	23,166	25,697	25,697	19,557	19,557
R ²	0.872	0.872	0.915	0.916	0.901	0.901	0.847	0.848
RMSE	1.324	1.323	1.106	1.105	1.148	1.148	1.397	1.396

Time fixed effects (t) and Origin X destination fixed effects (ij) included. Constant included but not reported. Robust standards errors. Origin X destination clustering * p<0.10, ** p<0.05, *** p<0.01

Regarding capital controls, some have a negative and significant impact, but in line with the literature, it is not a general case. Restrictions in inward flows for destination countries are the most effective in limiting capital flows, with a negative and significant coefficient on FDI, portfolio debt and other investments. FDI are also sensitive to controls on outward flows in origin countries. Restrictions on inflows in origin also have a negative impact on portfolio equity: they appear to limit the availability of capital to be invested abroad particularly for equity. This limited impact of capital controls is echoing the mixed results for their effectiveness on the volume of flows in the literature, some finding significant impact (Boero et al., 2019; Nispi Landi and Schiavone, 2018; Binici et al., 2010), while others do not (Frost et al., 2020; Magud et al., 2018; Habermeier et al., 2011). Indeed, their effectiveness may be related to external conditions (Pasricha et al., 2018) or to country-specific characteristics (Magud et al., 2014). In this setting, the very complete sets of fixed effects, absorbing both external conditions and country-specific characteristics, and the use of bilateral flows/positions is hence essential to assess the actual effectiveness of capital controls.

The impact of these restrictions is also assessed taking into account their intensity jointly in origin and destination countries. Some of these interactions have an additional impact relative to the sum of the impact of both measures, which is already taken directly into account, reflecting the benefits of cooperation/coordination in the management of capital flows. Other investments are impacted by the combination of restriction of inflows in origin and restriction of outflows in destination. Other cooperation effects appear in other specifications (table A-1 and A-3) specification.

Regarding macro-prudential measures, results are more nuanced, with positive or negative impacts on capital flows. This later finding is consistent with Beirne and Friedrich (2017) or Buch and Goldberg (2017) who show that different types of spillovers can occur, of positive and negative nature.

Macro-prudential measures in the origin country tend to have a positive impact on outward capital flows, of all types for restriction on the financial sector. Indeed, this could be interpreted as follows: as investment opportunities tend to be restricted at home, investors turn to foreign opportunities (see for example Avdjiev et al. (2017), that shows that “A tightening of local-currency reserve requirements in either the home or the destination country is also associated with an increase in international bank lending”). See also Bank for International Settlements (2016) that underlines that “when macro-prudential instruments that operate locally are used, they seem to

encourage banks to increase lending in other jurisdictions, possibly by rebalancing their lending portfolio in view of the changes in the relative price of lending among them”), which would need to be evidenced on more granular data. In destination countries, macro-prudential measures tend to have rather a negative impact on inward capital flows, as investment opportunities are reduced. This is particularly the case for measures on the financial sector for all types of capital flows (table 2 and 3). The interaction of measures in the origin and destination countries have in some cases an additional impact to the one of both measures taken separately, reflecting the benefits of cooperation/coordination. Macro-prudential measures on borrowers in origin combined with measures on financial sector in destination tend to have a positive impact on capital positions/flows, but for other investments: investors in the origin country, especially financial institutions, tend to divert their investment to other countries, except to the banking system (making the bulk of other investment), which is also constrained. Other investment appear to be curbed down by a combination of macro-prudential measures on financial sector in origin and on borrowers in destination.

Complementary specifications (available on demand) go further in detail with macro-prudential measures targeted at lenders, by splitting measures related to reserve requirements ratios on the one hand and foreign currency loans, and measures on concentration limits, time varying/dynamic loan-loss provisioning, countercyclical capital buffer/requirement, limits on interbank exposures and levy/tax on financial institutions. The first sub-group of macro-prudential measures tend to diminish outflows of portfolio debt due to restriction on banks that also hit foreign activities, whereas the second group favors outflows.

Robustness tests are presented in annex. First, we implement in table A-2 specification (3) which includes multilateral resistance terms. Dummies absorb most of our variables of interest, leaving mainly interaction terms. Regarding European integration variables, they are positive and significant for portfolio investments, with country-year dummies absorbing its effect for other types of flows. Regarding capital controls interaction, restriction of outflows in origin combined to restriction of inflows in destination have a negative impact on FDI. As in specification (2), other investments are impacted by the combination of restriction of inflows in origin and restriction of outflows in destination. Regarding interaction of macro-prudential variables, joint measures in origin and destination countries have positive effects on capital flows, such as macro-prudential measures on borrowers in origin combined with measures on financial sector in destination for portfolio equity, as in specification (2).

We also implement robustness tests on our main specification (2) with contemporary or two-year lag capital controls and macro-prudential measures instead of one year lag, excluding offshore centers, with the indicator of flows instead of international position (or the reverse for other investments), without EU and EA controls, without top/bottom 1% of capital flows and instrumenting capital controls (table A.3-6 for each type of capital flows). Regarding control variables, results appear to be robust, except for regulatory quality in the FDI flows estimate and for EU or EA membership, which may turn out to be significant when they were not or the reverse. Regarding restrictions on capital flows, results are very robust, with some additional results turning significant, in particular when considering capital flows (restriction of outflows in destination has a significant negative impact on FDI flows for example). Regarding macro-prudential measures, they appear less robust, although the main results commented remain significant in most cases and some additional coefficients appear significant, comforting the idea that restrictions in origin country tend to foster capital flows to other countries.

We finally implement instrumentation with two-stage least squares (2SLS) estimates to take into account endogeneity, even if this is not a major concern in the baseline specification: first, reverse causality from one specific bilateral flow to capital control measures is limited, as policy makers may react only if this flow is of macroeconomic significance, unlike reverse causality from total inward or outward flows to or from a country. In table A-7 and A-7 bis, we use several instruments in 2SLS estimates: 1) central bank independence, as a more independent central bank may be more prone to implement capital controls; 2) government political orientation (in the spirit of Ghosh et al., 2014), as a left-wing government may be more prone to take actions that may harm the wealthiest part of the population; 3) Legislative Index of Electoral Competitiveness and Executive Index of Electoral Competitiveness, as electoral competitiveness may make it more difficult to implement capital controls measures that would be unpopular⁴. Although these instruments are relevant and contribute to explain well the first stage of our 2SLS estimates, they reflect the overall favorable context for capital controls but are not helpful to give the timing of the implementation of the capital controls and hence the estimates lack precision. We have to implement the regressions capital control type per capital control type. The results confirm that the capital controls we found significant remain so (but for restriction of outflows in origin on FDIs) but do not exhibit significant results for other capital control types.

⁴ Central bank independence index is taken from Bodea and Hicks, 2015; government political orientation and electoral competitiveness are taken from Beck and al., 2000. Other instruments such as lagged exchange rate volatility have been tested and enabled to turn some additional capital controls' coefficients significant (in particular for the "other investment" category), but the exogeneity of this instrument may be more debatable than the ones that have been kept in the end.

V. Conclusions and way forward

Using three different sets of regressions based on gravity equations with financial assets/flows, depending on sets of fixed effects used, it is found that standard determinants of gravity equations are significant and with expected signs. Capital control policies have limited and disparate effects, being particularly effective through restrictions on inward flows for destination countries for FDI, portfolio debt and other investments. The impacts of macro-prudential measures are complex, with macro-prudential measures in the origin country financial sector having a positive impact on outward capital flows and macro-prudential measures in destination countries having a negative impact on inward capital flows. European integration, whether in European Union or Euro Area, has played a positive role on financial assets. In the most complete set of fixed effects, we emphasize the benefits of cooperation between the origin and destination countries, both for capital control and macro-prudential measures. In particular, restriction of outflows in origin combined to restriction of inflows in destination have a negative impact on FDI and on other investments.

In a period when the IMF is reflecting on its views regarding the use of the tools available to different types of countries (Basu et al, 2020; Adrian et al. 2020), this paper offers both an assessment of the effectiveness of each policy tool and also of the benefits of international cooperation between origin and destination countries. In particular, the preemptive effectiveness of capital controls on inflows seems to be comforted.

In this setting, global factors are taken into account through fixed effects. Yet, one avenue of research could be to use the fixed effects at the country level to explore their relationship with global factors such as risk appetite, global liquidity or US monetary policy. Through precisely estimated country-time specific factors, we could provide interesting insights into the role of global factors and the differentiated reactions of countries to global shocks, according for example to the safe haven or flight to quality effects which would appear.

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Table A-1. Regressions based on time (t), country of origin (i) and country of destination (j) fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FDI	FDI	Portfolio equity	Portfolio equity	Portfolio debt	Portfolio debt	Other investment	Other investment
Control variables								
$\ln(\text{GDP}_{\text{origin}})$	0.422*** (0.135)	0.432*** (0.136)	1.020*** (0.121)	0.992*** (0.120)	0.568*** (0.103)	0.532*** (0.103)	0.339*** (0.0896)	0.346*** (0.0893)
$\ln(\text{GDP}_{\text{destination}})$	0.122 (0.126)	0.135 (0.127)	0.870*** (0.116)	0.839*** (0.116)	0.939*** (0.106)	0.914*** (0.106)	0.615*** (0.106)	0.630*** (0.107)
Regulatory quality _{destination}	0.328** (0.143)	0.343** (0.143)	0.162 (0.119)	0.173 (0.118)	0.561*** (0.117)	0.568*** (0.117)	0.183 (0.124)	0.172 (0.125)
Distance	-1.379*** (0.0598)	-1.376*** (0.0603)	-1.029*** (0.0494)	-1.019*** (0.0501)	-0.980*** (0.0459)	-0.978*** (0.0462)	-1.125*** (0.0563)	-1.121*** (0.0564)
Ex-colony	0.949*** (0.191)	0.939*** (0.191)	0.551*** (0.179)	0.544*** (0.179)	0.286** (0.140)	0.291** (0.142)	0.814*** (0.150)	0.806*** (0.149)
Common language	1.080*** (0.153)	1.074*** (0.153)	0.652*** (0.119)	0.648*** (0.120)	0.444*** (0.114)	0.443*** (0.114)	0.411*** (0.127)	0.405*** (0.127)
EU membership _{origin&destination}	0.0588 (0.156)	0.0638 (0.155)	0.118 (0.120)	0.106 (0.120)	0.767*** (0.111)	0.759*** (0.110)	0.398*** (0.124)	0.401*** (0.124)
Euro area membership _{origin&destination}	0.290 (0.196)	0.286 (0.195)	0.296** (0.122)	0.298** (0.122)	0.984*** (0.120)	0.970*** (0.120)	0.102 (0.169)	0.115 (0.168)
Capital controls								
Restriction of outflows in origin _{t-1}	-0.229*** (0.0812)	-0.179* (0.105)	0.0475 (0.0829)	0.0935 (0.0977)	-0.0149 (0.0417)	-0.0495 (0.0535)	0.00749 (0.0720)	0.0158 (0.0789)
Restriction of outflows in destination _{t-1}	-0.0211 (0.0819)	0.00886 (0.0985)	-0.000934 (0.0855)	-0.0231 (0.101)	0.0753* (0.0402)	0.0338 (0.0488)	-0.122** (0.0607)	-0.0721 (0.0721)
Restriction of inflows in origin _{t-1}	0.0160 (0.0779)	0.0649 (0.0980)	-0.625*** (0.152)	-0.717*** (0.165)	0.0341 (0.0646)	0.0113 (0.0760)	0.0224 (0.0862)	0.0917 (0.0975)
Restriction of inflows in destination _{t-1}	-0.191** (0.0812)	-0.118 (0.0944)	-0.0792 (0.128)	-0.0675 (0.142)	-0.121** (0.0612)	-0.121* (0.0679)	-0.0294 (0.0598)	-0.0140 (0.0733)

Restriction of inflows in origin * restriction of inflows in destination $t-1$	0.0251 (0.145)		0.207 (0.446)		-0.0115 (0.121)		0.0981 (0.195)	
Restriction of inflows in origin * restriction of outflows in destination $t-1$	-0.183 (0.159)		0.207 (0.354)		0.0676 (0.0951)		-0.104 (0.154)	
Restriction of outflows in origin * restriction of inflows in destination $t-1$	-0.256 (0.171)		-0.270 (0.323)		0.0279 (0.0895)		-0.297* (0.165)	
Restriction of outflows in origin * restriction of outflows in destination $t-1$	0.124 (0.185)		-0.0503 (0.269)		0.0318 (0.0783)		0.0290 (0.130)	
Macro-prudential measures								
Macro-prudential measures on borrowers in origin $t-1$	0.0741 (0.0576)	-0.132 (0.0829)	0.229*** (0.0404)	0.0768 (0.0598)	0.0663 (0.0406)	0.0125 (0.0601)	0.0930** (0.0434)	0.0753 (0.0633)
Macro-prudential measures on financial sector in origin $t-1$	0.0791** (0.0341)	0.0780* (0.0466)	0.145*** (0.0327)	0.120*** (0.0439)	0.111*** (0.0311)	0.115*** (0.0390)	0.0507* (0.0306)	0.0255 (0.0381)
Macro-prudential measures on borrowers in destination $t-1$	0.0917* (0.0513)	0.0691 (0.0787)	0.0698 (0.0439)	0.0508 (0.0711)	0.0253 (0.0388)	-0.0749 (0.0605)	-0.0115 (0.0402)	-0.0341 (0.0615)
Macro-prudential measures on financial sector in destination $t-1$	-0.109*** (0.0350)	-0.160*** (0.0495)	-0.0153 (0.0291)	-0.0761* (0.0431)	0.0204 (0.0292)	0.0351 (0.0393)	-0.0745** (0.0304)	-0.0966** (0.0397)
Macro-prudential measures on borrowers in origin * on borrowers in destination $t-1$		0.00983 (0.0521)		0.0206 (0.0460)		0.0618 (0.0436)		0.0714 (0.0455)
Macro-prudential measures on borrowers in origin * on financial sector in destination $t-1$		0.105*** (0.0303)		0.0760*** (0.0242)		0.0111 (0.0242)		-0.0140 (0.0252)
Macro-prudential measures on financial sector in origin * on borrowers in destination $t-1$		0.00897 (0.0324)		0.00605 (0.0327)		0.0368 (0.0296)		-0.00782 (0.0261)
Macro-prudential measures on financial sector in origin * on financial sector in destination $t-1$		-0.00568 (0.0189)		0.0130 (0.0173)		-0.0143 (0.0165)		0.0174 (0.0153)
# observations	27,005	27,005	23,265	23,265	25,765	25,765	19,714	19,714
R ²	0.606	0.607	0.781	0.782	0.764	0.764	0.668	0.669
RMSE	2.206	2.203	1.702	1.700	1.689	1.688	1.917	1.917

Time fixed effects, destination fixed effects and origin fixed effects included. Constant included but not reported. Robust standards errors. Origin X destination clustering.

* p<0.10, ** p<0.05, *** p<0.01

Table A-2. Regressions based on couple of origin and destination countries (ij), and country of origin*time (it) and country of destination (jt) fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FDI	FDI	Portfolio equity	Portfolio equity	Portfolio debt	Portfolio debt	Other investment	Other investment
Control variables								
EU membership _{origin&destination}	0.167 (0.210)	0.177 (0.210)	-0.0657 (0.197)	-0.0521 (0.195)	0.444** (0.182)	0.433** (0.183)	0.196 (0.155)	0.188 (0.156)
Euro area membership _{origin&destination}	-0.155 (0.294)	-0.170 (0.294)	0.530** (0.241)	0.511** (0.240)	0.282 (0.221)	0.265 (0.222)	-0.190 (0.208)	-0.192 (0.209)
Capital controls								
Restriction of inflows in origin * restriction of inflows in destination _{t-1}		-0.0870 (0.129)		-0.555* (0.311)		-0.0944 (0.104)		0.452** (0.182)
Restriction of inflows in origin * restriction of outflows in destination _{t-1}		0.0492 (0.120)		0.00569 (0.232)		0.00715 (0.0702)		-0.332*** (0.122)
Restriction of outflows in origin * restriction of inflows in destination _{t-1}		-0.302** (0.136)		0.337 (0.206)		0.0787 (0.0640)		-0.199 (0.147)
Restriction of outflows in origin * restriction of outflows in destination _{t-1}		0.146 (0.132)		-0.192 (0.173)		0.0412 (0.0520)		0.140 (0.103)
Macro-prudential measures								
Macro-prudential measures on borrowers in origin * on borrowers in destination _{t-1}		0.0203 (0.0487)		-0.0175 (0.0338)		0.0245 (0.0334)		0.0315 (0.0374)
Macro-prudential measures on borrowers in origin * on financial sector in destination _{t-1}		0.0225 (0.0245)		0.0376* (0.0201)		0.0280 (0.0215)		-0.0230 (0.0237)
Macro-prudential measures on financial sector in origin * on borrowers in destination _{t-1}		0.0492* (0.0272)		-0.00729 (0.0243)		0.0348* (0.0199)		-0.0392* (0.0219)
Macro-prudential measures on financial sector in origin * on financial sector in destination _{t-1}		0.00950 (0.0167)		0.0273* (0.0141)		-0.0142 (0.0143)		-0.0162 (0.0157)
# observations	26,838	26,838	23,043	23,043	25,654	25,654	19,411	19,411
R ²	0.891	0.892	0.942	0.942	0.924	0.924	0.883	0.884
RMSE	1.284	1.284	0.966	0.965	1.051	1.051	1.328	1.327

Origin X destination fixed effects (ij), Origin X time fixed effects (it) and destination X time fixed effects (jt) included. Constant included but not reported. Robust standards errors. Origin X destination clustering * p<0.10, ** p<0.05, *** p<0.01

Table A-3: Robustness: FDI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline	Contemporary capital controls and macroprud. measures	Lag 2 capital controls and macroprud. measures	Excluding offshore centers	FDI flows	Without EU EA controls	Without top/bottom 1% cap. flows
$\ln(\text{GDP}_{\text{origin}})$	0.555*** (0.128)	0.571*** (0.121)	0.550*** (0.135)	0.587*** (0.125)	0.557*** (0.0735)	0.554*** (0.128)	0.686*** (0.115)
$\ln(\text{GDP}_{\text{destination}})$	0.330*** (0.120)	0.333*** (0.112)	0.331** (0.129)	0.476*** (0.123)	0.561*** (0.0889)	0.327*** (0.121)	0.496*** (0.0886)
Regulatory quality _{destination}	0.229* (0.127)	0.257** (0.115)	0.223 (0.136)	0.0619 (0.145)	-0.419*** (0.0977)	0.219* (0.128)	0.0810 (0.110)
EU membership _{origin&destination}	0.403*** (0.120)	0.455*** (0.119)	0.381*** (0.122)	0.432*** (0.146)	0.194** (0.0856)		0.450*** (0.117)
Euro area membership _{origin&destination}	0.117 (0.256)	0.148 (0.256)	0.118 (0.255)	-0.358 (0.264)	0.224 (0.153)		0.319 (0.210)
Restriction of outflows in origin	-0.220** (0.0856)	-0.186** (0.0888)	-0.313*** (0.0907)	-0.172* (0.0902)	-0.115* (0.0668)	-0.247*** (0.0866)	-0.215*** (0.0797)
Restriction of outflows in destination	0.0236 (0.0976)	0.0423 (0.0960)	-0.0332 (0.108)	0.200* (0.108)	-0.257*** (0.0680)	-0.00121 (0.0985)	0.000586 (0.0838)
Restriction of inflows in origin	0.0510 (0.0870)	0.0563 (0.0892)	0.0827 (0.0897)	0.0312 (0.0894)	-0.0174 (0.0694)	0.0449 (0.0873)	0.0269 (0.0747)
Restriction of inflows in destination	-0.142 (0.0905)	-0.0948 (0.0793)	-0.172 (0.108)	-0.0823 (0.0925)	-0.0179 (0.0680)	-0.149* (0.0903)	-0.161** (0.0691)
Restriction of inflows in origin * restriction of inflows in destination	-0.0980 (0.122)	-0.184 (0.120)	-0.0511 (0.131)	-0.00836 (0.119)	0.0131 (0.103)	-0.108 (0.121)	-0.0046 (0.105)
Restriction of inflows in origin * restriction of outflows in destination	-0.0626 (0.120)	-0.0122 (0.117)	-0.0823 (0.128)	-0.0481 (0.122)	-0.0521 (0.104)	-0.0548 (0.120)	-0.0647 (0.113)
Restriction of outflows in origin * restriction of inflows in destination	-0.0761 (0.133)	-0.0337 (0.135)	-0.0923 (0.135)	-0.0564 (0.128)	0.0543 (0.103)	-0.0637 (0.133)	-0.0716 (0.120)
Restriction of outflows in origin * restriction of outflows in destination	0.0607	-0.0050	0.0947	-0.0600	0.0077	0.0723	0.0622

of outflows in destination	(0.129)	(0.123)	(0.138)	(0.133)	(0.110)	(0.129)	(0.124)
Macro-prudential measures on borrowers in origin	-0.0632 (0.0760)	-0.0549 (0.0713)	-0.0407 (0.0806)	0.0367 (0.0983)	0.109** (0.0515)	-0.0642 (0.0759)	-0.0608 (0.0570)
Macro-prudential measures on financial sector in origin	0.0654 (0.0412)	0.0732** (0.0371)	0.0277 (0.0446)	0.0691 (0.0438)	0.0315 (0.0281)	0.0710* (0.0410)	0.0866** (0.0349)
Macro-prudential measures on borrowers in destination	0.0276 (0.0593)	0.0728 (0.0562)	0.000157 (0.0660)	0.112 (0.0690)	0.0770 (0.0493)	0.0265 (0.0591)	0.0558 (0.0526)
Macro-prudential measures on financial sector in destination	-0.0302 (0.0406)	-0.00377 (0.0374)	-0.0499 (0.0440)	0.000660 (0.0425)	0.0552* (0.0295)	-0.0241 (0.0406)	-0.0157 (0.0349)
Macro-prudential measures on borrowers in origin * on borrowers in destination	0.0731* (0.0425)	0.0695* (0.0408)	0.0540 (0.0504)	0.0549 (0.0567)	0.00318 (0.0346)	0.0731* (0.0426)	0.0542 (0.0366)
Macro-prudential measures on borrowers in origin * on financial sector in destination	0.0420* (0.0235)	0.0398* (0.0204)	0.0365 (0.0282)	0.0212 (0.0290)	-0.0241 (0.0187)	0.0402* (0.0235)	0.0394* (0.0213)
Macro-prudential measures on financial sector in origin * on borrowers in destination	0.0119 (0.0230)	0.00571 (0.0205)	0.0161 (0.0293)	0.0129 (0.0291)	-0.00170 (0.0198)	0.0103 (0.0230)	0.00356 (0.0203)
Macro-prudential measures on financial sector in origin * on financial sector in destination	-0.0291** (0.0136)	-0.0234** (0.0115)	-0.0303* (0.0157)	-0.0182 (0.0142)	-0.00755 (0.00959)	-0.0321** (0.0136)	-0.0316** (0.0123)
N	26,942	29,448	24,675	18,226	23,126	26,942	26,457
R2	0.872	0.871	0.874	0.895	0.805	0.872	0.897
RMSE	1.323	1.324	1.316	1.154	1.400	1.324	1.132

Constant included but not reported. Robust standards errors. Origin X destination clustering

* p<0.10, ** p<0.05, *** p<0.01

Table A-4: Robustness: Portfolio equity

	(1) Baseline	(2) Contemporary capital controls and macroprud. measures	(3) Lag 2 capital controls and macroprud. measures	(4) Excluding offshore centers	(5) Portfolio equity flows	(6) Without EU EA controls	(7) Without top/bottom 1% cap. flows
$\ln(\text{GDP}_{\text{origin}})$	1.056*** (0.111)	1.046*** (0.107)	1.071*** (0.118)	1.105*** (0.135)	0.881*** (0.111)	1.065*** (0.112)	1.080*** (0.109)
$\ln(\text{GDP}_{\text{destination}})$	0.786*** (0.0978)	0.805*** (0.0947)	0.753*** (0.104)	0.853*** (0.123)	0.833*** (0.107)	0.782*** (0.0979)	0.784*** (0.0966)
Regulatory quality _{destination}	0.271** (0.110)	0.284*** (0.107)	0.246** (0.112)	0.323** (0.144)	0.306** (0.141)	0.263** (0.111)	0.265** (0.109)
EU membership _{origin&destination}	0.241* (0.136)	0.224* (0.135)	0.203 (0.144)	0.390** (0.182)	-0.0509 (0.144)		0.256* (0.136)
Euro area membership _{origin&destination}	0.148 (0.159)	0.166 (0.164)	0.106 (0.153)	-0.253 (0.561)	0.423** (0.179)		0.147 (0.158)
Restriction of outflows in origin	-0.0166 (0.0874)	0.103 (0.0952)	-0.0759 (0.0830)	0.0115 (0.116)	-0.0295 (0.101)	-0.0352 (0.0870)	-0.0460 (0.0829)
Restriction of outflows in destination	-0.113 (0.0877)	0.0139 (0.0880)	-0.156* (0.0806)	-0.0232 (0.109)	-0.141 (0.101)	-0.126 (0.0884)	-0.106 (0.0874)
Restriction of inflows in origin	-0.608*** (0.164)	-0.526*** (0.168)	-0.640*** (0.161)	-0.748*** (0.202)	-0.427** (0.182)	-0.621*** (0.164)	-0.603*** (0.163)
Restriction of inflows in destination	-0.153 (0.124)	-0.0487 (0.130)	-0.128 (0.120)	-0.127 (0.162)	-0.0494 (0.147)	-0.177 (0.123)	-0.151 (0.124)
Restriction of inflows in origin * restriction of inflows in destination	0.108 (0.322)	0.265 (0.341)	0.0585 (0.327)	0.323 (0.352)	0.0997 (0.387)	0.141 (0.322)	0.0654 (0.325)
Restriction of inflows in origin * restriction of outflows in destination	0.199 (0.268)	-0.0128 (0.274)	0.0629 (0.260)	0.251 (0.316)	0.151 (0.297)	0.190 (0.269)	0.203 (0.271)
Restriction of outflows in origin * restriction	0.276	0.160	0.122	0.168	0.404	0.277	0.276

of inflows in destination	(0.230)	(0.225)	(0.215)	(0.269)	(0.294)	(0.229)	(0.232)
Restriction of outflows in origin * restriction of outflows in destination	-0.138 (0.185)	-0.0715 (0.180)	-0.0728 (0.184)	-0.379* (0.222)	-0.441* (0.249)	-0.111 (0.185)	-0.127 (0.184)
Macro-prudential measures on borrowers in origin	0.0871* (0.0512)	0.0830* (0.0498)	0.129** (0.0564)	-0.00800 (0.0710)	0.0851 (0.0763)	0.0926* (0.0512)	0.0763 (0.0503)
Macro-prudential measures on financial sector in origin	0.133*** (0.0381)	0.122*** (0.0376)	0.146*** (0.0397)	0.239*** (0.0525)	0.0609 (0.0484)	0.137*** (0.0381)	0.138*** (0.0377)
Macro-prudential measures on borrowers in destination	0.112 (0.0699)	0.142* (0.0756)	0.133** (0.0661)	0.132 (0.106)	0.0155 (0.0658)	0.114 (0.0697)	0.0604 (0.0513)
Macro-prudential measures on financial sector in destination	-0.0198 (0.0384)	-0.0514 (0.0372)	0.0163 (0.0397)	0.00840 (0.0585)	0.0496 (0.0442)	-0.0159 (0.0386)	-0.00931 (0.0346)
Macro-prudential measures on borrowers in origin * on borrowers in destination	0.0122 (0.0401)	0.0161 (0.0383)	0.00729 (0.0463)	0.0431 (0.0599)	-0.0251 (0.0536)	0.0113 (0.0400)	0.0135 (0.0377)
Macro-prudential measures on borrowers in origin * on financial sector in destination	0.0518** (0.0225)	0.0448** (0.0207)	0.0593** (0.0256)	0.0863*** (0.0319)	0.0457 (0.0286)	0.0501** (0.0225)	0.0567** (0.0225)
Macro-prudential measures on financial sector in origin * on borrowers in destination	-0.0310 (0.0266)	-0.0335 (0.0261)	-0.0295 (0.0299)	-0.0399 (0.0395)	-0.0290 (0.0285)	-0.0324 (0.0266)	-0.0116 (0.0228)
Macro-prudential measures on financial sector in origin * on financial sector in destination	0.00404 (0.0154)	0.0169 (0.0143)	-0.0148 (0.0173)	-0.000458 (0.0208)	0.00760 (0.0181)	0.00208 (0.0154)	-0.00355 (0.0144)
N	23166	25110	21310	14664	16498	23166	22909
R2	0.916	0.912	0.921	0.908	0.834	0.915	0.917
RMSE	1.105	1.125	1.069	1.153	1.717	1.106	1.071

Constant included but not reported. Robust standards errors. Origin X destination clustering

* p<0.10, ** p<0.05, *** p<0.01

Table A-5: Robustness: Portfolio debt

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline	Contemporary capital controls and macroprud. measures	Lag 2 capital controls and macroprud. measures	Excluding offshore centers	Portfolio debt flows	Without EU EA controls	Without top/bottom 1% cap. flows
$\ln(\text{GDP}_{\text{origin}})$	0.444*** (0.0997)	0.488*** (0.0996)	0.476*** (0.106)	0.449*** (0.123)	0.500*** (0.0970)	0.444*** (0.0995)	0.465*** (0.0986)
$\ln(\text{GDP}_{\text{destination}})$	0.768*** (0.0913)	0.773*** (0.0910)	0.812*** (0.0927)	0.656*** (0.107)	0.957*** (0.127)	0.760*** (0.0914)	0.755*** (0.0908)
Regulatory quality _{destination}	0.583*** (0.105)	0.506*** (0.0981)	0.687*** (0.108)	0.739*** (0.128)	0.450*** (0.143)	0.570*** (0.105)	0.551*** (0.102)
EU membership _{origin&destination}	0.204** (0.0953)	0.153 (0.0960)	0.194** (0.0986)	0.362*** (0.126)	0.0412 (0.101)		0.192** (0.0911)
Euro area membership _{origin&destination}	0.257* (0.147)	0.254* (0.147)	0.277* (0.147)	0.594** (0.296)	0.568*** (0.175)		0.271* (0.146)
Restriction of outflows in origin	-0.0339 (0.0452)	-0.0331 (0.0473)	0.0212 (0.0469)	-0.0363 (0.0605)	-0.0285 (0.0563)	-0.0358 (0.0452)	-0.0353 (0.0447)
Restriction of outflows in destination	0.0192 (0.0398)	-0.0180 (0.0395)	0.0786** (0.0395)	-0.0335 (0.0521)	0.0512 (0.0534)	0.0175 (0.0399)	0.0136 (0.0396)
Restriction of inflows in origin	-0.00600 (0.0734)	-0.0423 (0.0742)	-0.0973 (0.0757)	0.0189 (0.0896)	-0.0143 (0.0790)	-0.0354 (0.0723)	-0.00576 (0.0732)
Restriction of inflows in destination	-0.182*** (0.0573)	-0.173*** (0.0584)	-0.166*** (0.0538)	-0.196*** (0.0723)	-0.179** (0.0722)	-0.206*** (0.0566)	-0.176*** (0.0561)
Restriction of inflows in origin * restriction of inflows in destination	-0.167 (0.106)	-0.112 (0.119)	-0.0249 (0.110)	-0.174 (0.119)	0.0758 (0.113)	-0.165 (0.106)	-0.169 (0.105)
Restriction of inflows in origin * restriction of outflows in destination	0.0433 (0.0752)	0.0720 (0.0756)	0.0411 (0.0799)	0.0594 (0.0833)	-0.147* (0.0805)	0.0495 (0.0752)	0.0347 (0.0730)
Restriction of outflows in origin * restriction	0.0717	0.0824	0.0572	0.0861	-0.0194	0.0772	0.0587

of inflows in destination	(0.0657)	(0.0673)	(0.0628)	(0.0735)	(0.0808)	(0.0658)	(0.0625)
Restriction of outflows in origin * restriction of outflows in destination	0.00485 (0.0545)	-0.0148 (0.0535)	-0.0355 (0.0532)	0.00655 (0.0642)	0.0519 (0.0625)	0.00457 (0.0546)	0.0186 (0.0519)
Macro-prudential measures on borrowers in origin	0.0104 (0.0561)	0.0118 (0.0540)	0.0283 (0.0586)	-0.161** (0.0751)	0.0629 (0.0564)	0.0123 (0.0559)	-0.00336 (0.0553)
Macro-prudential measures on financial sector in origin	0.0866** (0.0368)	0.0662* (0.0342)	0.115*** (0.0399)	0.103** (0.0477)	0.115*** (0.0441)	0.0923** (0.0366)	0.0847** (0.0364)
Macro-prudential measures on borrowers in destination	-0.0856 (0.0522)	-0.0966* (0.0498)	-0.0696 (0.0578)	-0.144** (0.0691)	0.0973 (0.0625)	-0.0857 (0.0522)	-0.0900* (0.0515)
Macro-prudential measures on financial sector in destination	0.0197 (0.0354)	-0.00146 (0.0335)	0.0227 (0.0385)	0.0320 (0.0458)	0.108** (0.0420)	0.0255 (0.0354)	0.0184 (0.0354)
Macro-prudential measures on borrowers in origin * on borrowers in destination	0.0173 (0.0372)	0.00644 (0.0346)	0.0443 (0.0432)	0.0837 (0.0528)	0.0451 (0.0424)	0.0158 (0.0372)	0.0211 (0.0368)
Macro-prudential measures on borrowers in origin * on financial sector in destination	0.0214 (0.0224)	0.0117 (0.0217)	0.0127 (0.0240)	0.0931*** (0.0296)	0.0155 (0.0229)	0.0197 (0.0224)	0.0218 (0.0220)
Macro-prudential measures on financial sector in origin * on borrowers in destination	0.0508** (0.0237)	0.0626*** (0.0225)	0.0346 (0.0268)	0.0512 (0.0313)	-0.0109 (0.0236)	0.0500** (0.0237)	0.0516** (0.0236)
Macro-prudential measures on financial sector in origin * on financial sector in destination	-0.00400 (0.0157)	0.00287 (0.0143)	-0.0139 (0.0173)	-0.0172 (0.0184)	-0.00707 (0.0162)	-0.00629 (0.0156)	-0.00316 (0.0159)
N	25697	28043	23562	16272	18083	25697	25223
R2	0.901	0.896	0.906	0.902	0.799	0.901	0.897
RMSE	1.148	1.173	1.119	1.152	1.720	1.148	1.122

Constant included but not reported. Robust standards errors. Origin X destination clustering

* p<0.10, ** p<0.05, *** p<0.01

Table A-6: Robustness: Other investments

	(1) Baseline	(2) Contemporary capital controls and macroprud. measures	(3) Lag 2 capital controls and macroprud. measures	(4) Excluding offshore centers	(5) Other investments position	(6) Without EU EA controls	(7) Without top/bottom 1% cap. flows
$\ln(\text{GDP}_{\text{origin}})$	0.531*** (0.0780)	0.513*** (0.0768)	0.507*** (0.0834)	0.584*** (0.0914)	0.328*** (0.0712)	0.522*** (0.0780)	0.582*** (0.0764)
$\ln(\text{GDP}_{\text{destination}})$	0.769*** (0.0858)	0.801*** (0.0845)	0.789*** (0.0946)	0.762*** (0.100)	0.535*** (0.0731)	0.766*** (0.0857)	0.773*** (0.0847)
Regulatory quality _{destination}	0.202* (0.109)	0.210** (0.107)	0.207* (0.117)	0.191 (0.134)	0.138 (0.0873)	0.194* (0.109)	0.136 (0.107)
EU membership _{origin&destination}	0.171** (0.0837)	0.202** (0.0827)	0.150* (0.0890)	-0.0259 (0.116)	0.171** (0.0868)		0.212** (0.0831)
Euro area membership _{origin&destination}	0.202 (0.166)	0.266 (0.162)	0.189 (0.166)	0.901** (0.414)	0.306* (0.162)		0.185 (0.164)
Restriction of outflows in origin	0.0690 (0.0649)	0.0620 (0.0705)	0.104 (0.0692)	0.0576 (0.0757)	0.124* (0.0636)	0.0425 (0.0638)	0.0958 (0.0644)
Restriction of outflows in destination	-0.198*** (0.0587)	-0.202*** (0.0578)	-0.207*** (0.0610)	-0.228*** (0.0739)	-0.152*** (0.0475)	-0.198*** (0.0587)	-0.185*** (0.0577)
Restriction of inflows in origin	0.00557 (0.0842)	0.175** (0.0841)	-0.101 (0.0849)	-0.0359 (0.104)	-0.0540 (0.0693)	-0.0229 (0.0839)	0.0314 (0.0825)
Restriction of inflows in destination	-0.148** (0.0622)	-0.242*** (0.0602)	-0.0220 (0.0657)	-0.144* (0.0855)	-0.131*** (0.0442)	-0.143** (0.0621)	-0.161*** (0.0605)
Restriction of inflows in origin * restriction of inflows in destination	0.273 (0.184)	0.0332 (0.182)	0.0337 (0.184)	0.329 (0.212)	0.482*** (0.177)	0.300 (0.184)	0.286 (0.191)
Restriction of inflows in origin * restriction of outflows in destination	-0.308** (0.124)	-0.0766 (0.131)	-0.314** (0.133)	-0.266* (0.156)	-0.257*** (0.0864)	-0.310** (0.124)	-0.322** (0.126)
Restriction of outflows in origin * restriction	-0.0861	-0.115	0.0883	-0.0159	-0.354***	-0.0834	-0.142

of inflows in destination	(0.151)	(0.132)	(0.152)	(0.182)	(0.108)	(0.150)	(0.147)
Restriction of outflows in origin * restriction of outflows in destination	0.155 (0.105)	0.113 (0.101)	0.0508 (0.112)	0.0656 (0.142)	0.171*** (0.0657)	0.156 (0.105)	0.178* (0.104)
Macro-prudential measures on borrowers in origin	0.0497 (0.0539)	0.114** (0.0534)	0.111* (0.0582)	0.0432 (0.0713)	0.0128 (0.0462)	0.0496 (0.0540)	0.0530 (0.0533)
Macro-prudential measures on financial sector in origin	0.0759** (0.0342)	0.0247 (0.0324)	0.0279 (0.0374)	0.0924** (0.0436)	-0.0132 (0.0257)	0.0801** (0.0341)	0.0896*** (0.0339)
Macro-prudential measures on borrowers in destination	0.0353 (0.0492)	0.000681 (0.0489)	0.0985* (0.0550)	0.0346 (0.0616)	0.0288 (0.0452)	0.0327 (0.0492)	0.0455 (0.0492)
Macro-prudential measures on financial sector in destination	-0.0334 (0.0363)	-0.0308 (0.0343)	-0.122*** (0.0379)	0.0447 (0.0484)	-0.0543** (0.0250)	-0.0301 (0.0362)	-0.0300 (0.0364)
Macro-prudential measures on borrowers in origin * on borrowers in destination	0.0301 (0.0352)	0.0188 (0.0332)	0.0300 (0.0413)	-0.00749 (0.0459)	0.0208 (0.0331)	0.0307 (0.0352)	0.0384 (0.0349)
Macro-prudential measures on borrowers in origin * on financial sector in destination	-0.00572 (0.0240)	-0.0203 (0.0221)	-0.0197 (0.0255)	-0.0189 (0.0314)	0.00978 (0.0171)	-0.00688 (0.0240)	-0.0117 (0.0239)
Macro-prudential measures on financial sector in origin * on borrowers in destination	-0.0445** (0.0204)	-0.0275 (0.0182)	-0.0686*** (0.0241)	-0.0371 (0.0259)	0.000438 (0.0189)	-0.0451** (0.0204)	-0.0534*** (0.0203)
Macro-prudential measures on financial sector in origin * on financial sector in destination	-0.0137 (0.0148)	-0.000873 (0.0126)	0.0147 (0.0155)	-0.0224 (0.0189)	0.00172 (0.00907)	-0.0148 (0.0147)	-0.0143 (0.0148)
N	19557	20466	17789	13297	28459	19557	19163
R2	0.848	0.848	0.849	0.848	0.922	0.848	0.835
RMSE	1.396	1.403	1.390	1.428	0.873	1.397	1.372

Constant included but not reported. Robust standards errors. Origin X destination clustering

* p<0.10, ** p<0.05, *** p<0.01

Table A-7: Robustness: Endogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FDI	FDI	FDI	FDI	Portfolio equity	Portfolio equity	Portfolio equity	Portfolio equity
Control variables								
$\ln(\text{GDP}_{\text{origin}})$	0.733*** (0.0725)	0.848*** (0.0724)	0.693*** (0.0441)	0.723*** (0.0956)	1.453*** (0.140)	2.413 (1.844)	1.252*** (0.152)	1.863 (1.698)
$\ln(\text{GDP}_{\text{destination}})$	0.586*** (0.0658)	0.727*** (0.0512)	0.635*** (0.0541)	0.816*** (0.0850)	0.640*** (0.0700)	1.192 (0.766)	0.474*** (0.146)	1.308 (1.266)
Regulatory quality _{destination}	0.0262 (0.112)	0.241** (0.114)	0.0222 (0.0672)	-0.0600 (0.156)	0.905** (0.363)	-2.691 (3.788)	-0.0185 (0.303)	0.0696 (0.355)
EU membership _{origin&destination}	-0.211 (0.134)	0.116 (0.120)	0.376*** (0.0578)	-0.258 (0.211)	0.553 (0.762)	-0.883 (1.702)	-0.356 (0.251)	-0.653 (1.524)
Euro area membership _{origin&destination}	0.679*** (0.221)	0.653*** (0.196)	0.421*** (0.0832)	0.364 (0.280)	-0.253 (0.555)	-0.613 (1.253)	0.160 (0.450)	-1.691 (2.603)
Capital controls								
Restriction of inflows in destination _{t-1}	-3.284*** (0.740)				4.079 (3.262)			
Restriction of outflows in destination _{t-1}		0.428 (0.431)				-29.41 (36.45)		
Restriction of inflows in origin _{t-1}			0.0779 (0.178)				-20.26** (9.095)	
Restriction of outflows in origin _{t-1}				-0.0166 (0.744)				-17.16 (29.65)
Macro-prudential measures								
Macro-prudential measures on borrowers in origin _{t-1}	0.258*** (0.0392)	0.198*** (0.0345)	0.209*** (0.0222)	0.239*** (0.0608)	0.0435 (0.0501)	0.0690 (0.179)	0.371*** (0.130)	-0.394 (1.009)

Macro-prudential measures on financial sector in origin $t-1$	0.216*** (0.0357)	0.0973*** (0.0275)	0.126*** (0.0190)	0.0733 (0.0599)	0.0975** (0.0480)	0.0902 (0.0815)	0.340*** (0.120)	0.802 (1.193)
Macro-prudential measures on borrowers in destination $t-1$	0.249*** (0.0381)	0.186*** (0.0392)	0.156*** (0.0222)	0.175*** (0.0454)	-0.00750 (0.0377)	-0.381 (0.565)	0.173** (0.0771)	0.101 (0.0710)
Macro-prudential measures on financial sector in destination $t-1$	0.0666** (0.0314)	0.00170 (0.0299)	0.0497*** (0.0161)	-0.0221 (0.0409)	-0.160** (0.0808)	1.261 (1.550)	0.0341 (0.0688)	0.0749 (0.0886)
# observations	10,126	9,928	30,246	4,478	7,756	24,488	8,306	24,220

Time fixed effects (t) and Origin X destination fixed effects (ij) included. Constant included but not reported. * p<0.10, ** p<0.05, *** p<0.01

Table A-7 (bis): Robustness: Endogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Portfolio debt	Portfolio debt	Portfolio debt	Portfolio debt	Other investment	Other investment	Other investment	Other investment
Control variables								
$\ln(\text{GDP}_{\text{origin}})$	0.366*** (0.0480)	0.430*** (0.0464)	0.359*** (0.0578)	0.329*** (0.0601)	0.759*** (0.111)	1.095*** (0.191)	0.467*** (0.121)	0.749 (0.586)
$\ln(\text{GDP}_{\text{destination}})$	0.805*** (0.0641)	0.687*** (0.0353)	0.605*** (0.0575)	0.612*** (0.0642)	0.453*** (0.146)	0.0448 (0.262)	0.957*** (0.0853)	-0.0991 (1.576)
Regulatory quality _{destination}	0.136 (0.212)	0.564*** (0.0857)	0.287*** (0.0986)	0.320*** (0.0989)	-0.0204 (0.245)	0.950*** (0.318)	-0.0523 (0.147)	0.334 (0.352)
EU membership _{origin&destination}	-0.105 (0.199)	0.415*** (0.0579)	0.365** (0.144)	0.556*** (0.114)	-0.173 (0.351)	0.388 (0.251)	0.598* (0.328)	0.936 (1.175)
Euro area membership _{origin&destination}	0.522*** (0.0805)	0.463*** (0.0733)	0.0249 (0.133)	0.0248 (0.133)	-0.170 (0.338)	1.601** (0.783)	-0.0202 (0.206)	-0.309 (0.454)
Capital controls								
Restriction of inflows in destination _{t-1}	-2.405** (0.970)				-2.058** (0.964)			
Restriction of outflows in destination _{t-1}		0.0782 (0.230)				-3.059*** (1.185)		
Restriction of inflows in origin _{t-1}			-0.337 (0.247)				1.255 (0.878)	
Restriction of outflows in origin _{t-1}				0.107 (0.196)				5.285 (10.05)
Macro-prudential measures								
Macro-prudential measures on borrowers in origin _{t-1}	0.0762*** (0.0235)	0.0643*** (0.0201)	0.0829** (0.0385)	0.127*** (0.0334)	0.0829 (0.0638)	0.0820 (0.0650)	-0.0682 (0.0441)	0.482 (0.787)

Macro-prudential measures on financial sector in origin $t-1$	0.184*** (0.0206)	0.138*** (0.0150)	0.206*** (0.0501)	0.149*** (0.0362)	-0.100* (0.0549)	-0.0915* (0.0505)	-0.125 (0.128)	-0.146 (0.273)
Macro-prudential measures on borrowers in destination $t-1$	-0.0205 (0.0491)	0.0916*** (0.0277)	0.0796** (0.0329)	0.0793** (0.0329)	-0.105* (0.0616)	-0.0565 (0.0702)	-0.0720 (0.0466)	0.0260 (0.114)
Macro-prudential measures on financial sector in destination $t-1$	0.167*** (0.0440)	0.0657*** (0.0178)	0.0397* (0.0227)	0.0287 (0.0226)	0.345** (0.171)	0.481** (0.193)	-0.0976*** (0.0364)	-0.0723 (0.0936)
# observations	25,064	27,221	11,438	11,302	5,523	5,457	9,139	21,381

Time fixed effects (t) and Origin X destination fixed effects (ij) included. Constant included but not reported. * p<0.10, ** p<0.05, *** p<0.01