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Banks' Foreign Claims in the Aftermath of the 2008 Crisis: Institutional Response, Financial Efficiency, and Integration of Cross-Border Banking in the Euro Area

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Abstract: Beyond financial stability as the European Banking Union's primary objective, the European capital market integration provides an impetus for deepening bank integration and greater financial market efficiency. This article proposes an empirical framework to assess the dynamics of euro area banks' business networking. We use banks' foreign claims across Europe, particularly the euro area, to see how banks react to various macroeconomic signals. Banks' foreign claims are particularly interesting due to their sensitivity. One of the main conclusions is that the euro area has seen a reallocation of capital in the aftermath of the 2008 crisis. The financial picture of Europe is different after the recent financial crisis. Although we observe a re-concentration of capital from the periphery to the core countries, we also observe some signs of recovered confidence within the European banking framework for macro-prudential reasons.

Keywords: capital flows; banking industry; financial regulation

JEL Classification: E5; G1; G2

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1. Introduction and Research Context

This article proposes to look into the European financial industry and its efficiency. It does so through the lens of the banking sector before and after the 2008 Global Financial Crisis. When we consider the question of the European financial market efficiency, we often focus on the idiosyncratic risks. We propose here to complement the specific risk-based analyses with a systematic risk perspective. The latter allows us to notably document the European capital allocations in light of the global crisis extreme event. We also complement the existing literature by considering euro and non-euro area members in our empirical estimations. By looking at the global financial crisis event and the structural nature of the European financial system through its banking system, while considering euro and non-euro area members, the study sheds light on some potential anomalies that may hinder the European financial market efficiency.

This research is inspired by Cerrone's (2018) study investigating the potential effect of a European Deposit Insurance Scheme (EDIS) on banking system stability. In the same vein, we will look at the potential impact of the institutional responses and financial directives put forth in Europe on encouraging intra-European capital flows. Our article also adds a descriptive dimension to Obstfeld's (2013) new policy trilemma. He argues that once financial deepening reaches a certain threshold, the euro area cannot simultaneously have: (1) full cross-border financial integration, (2) financial stability, and (3) national fiscal independence. This is a particularly relevant issue, given the growth in banking and financial globalization and the increased incidence of sudden stops of international capital flows (e.g., Micossi 2013a, 2013b, 2015; Crafts 2014).

The first contribution is to provide some interesting perspectives about the allocation of cross-border capital flows, and in particular banks' foreign claims within the euro area, as a relevant tool to describe what happened during the crisis and what lessons can be drawn from the implementation of the new E.U. rules and institutions. As explained later in more detail (cf. Section 0), the ultimate intention of euro area institutions was to avoid the "doom loop," a vicious circle in which sovereigns are exposed to bank risk, and banks are exposed to sovereign risk (e.g., Baldwin and Giavazzi 2015; Alogoskoufis and Langfield 2018). In doing so, we contribute to the literature linking economic outcomes to institutions by endogenizing policies (e.g., Wyplosz 2015). More specifically, we examine the integration of the euro area banking system engendered within the European banking framework for macro-prudential purposes. The second intended contribution is a methodological one. We highlight the process of re-concentration to the core countries during the crisis, based on an augmented gravity model. Following Bruno's (2005) econometric procedure for approximating (correcting) the bias of the Least Square Dummy Variable (LSDV) estimator for dynamic unbalanced panel data models, we capture the dynamics of cross-border capital flows and examine the dynamics of business networking of euro area banks.

Since the 2008 Global Financial Crisis, governments and various international bodies have been designing scenarios for a new financial framework. From the Dodd-Frank Act to the Basel III to the European Banking Union (EBU), the international financial world has lived through important changes (see Arden 2011; Gruenberg 2012; Vasudev 2014).[1]

EBU aims at avoiding financial fragmentation by promoting regulatory harmonization and furthering financial integration, particularly in the euro area. In the logical sequence, the next assumption is that financial integration should enhance financial stability by pooling risk (e.g., Cerrone 2018; Deslandes et al. 2019). Now equipped with the internal market of goods and services (Geeroms and Karbownik 2014), the fundamental question is whether the E.U. has been fixing its governance issues. Europe is still facing some critical economic challenges, such as refinancing the sovereign debts. For instance, Tabellini (2015) explains that in the case of a sudden stop of capital flows in an economy with a highly leveraged banking system and an eroded tax base, the authorities will likely lack fiscal resources to face the crisis if they are heavily relying on foreign borrowing. Moreover, the euro area's financial industry is not as diversified—given that only 120 banks own 85% of banks' assets (Langfield and Pagano 2016). This may pose a significant systemic risk, which we explore in Section 0.

Financial integration was already happening in the pre-crisis period, but as a consequence of the 2008 crisis, European financial markets are now more fragmented (e.g., Claessens 2017, 2019). An early post-crisis report by EBF (2014, p. 1) stated that:

> "the share of cross-border Euro Area's interbank loans fell from 36% at the start of 2008 to the present 25%; the cross-border loans to businesses in the Euro Area account for just 8% of the total; the same share of cross-border border integration for households loans is below 1%; the cross-border bank holdings of debt securities issued by Euro Area corporates and sovereigns decreased from a level above 30% in 2006 to just 16%; the divergence in the interest rate of loans to businesses is twice as much as that observed before the crisis; the cross-border integration of subsidiaries and branches as a share of total banking assets fell from 18.5% in 2009 to 16.4% in 2013".

Inspired by Obstfeld's (2013) financial trilemma, we want to explore whether the banks from the core countries have re-concentrated to the core countries or re-invested in the periphery countries reassured by the new macro-prudential regulations and the step-wise institutional approach for completion of the EBU. Put differently, we investigate whether the institutional reaction to the crisis is sufficient to halt the financial fragmentation and encourage financial integration.

[1] The roots of the European Banking Union trace back to the 1960s and 1970s (see more in Mourlon-Druol 2016).

The structure of the article is as follows. The next section provides a critical review of the existing body of empirical literature exploring the structural fundamentals and weaknesses of the Economic and Monetary Union (EMU), the rapid transformation of the financial crisis into the euro area sovereign debt crisis, and the institutional reaction to the crisis. The third section examines the relationship between these developments and the intra-European dynamics of banks' foreign claims. The empirical strategy is elaborated in the fourth section, whereas the next section presents the econometric results. The sixth section contains concluding remarks and policy-relevant recommendations.

2. Literature Review

2.1. Before the Crisis

An advanced stage of economic integration requires both a single market for goods and a single market for services or, in other words, both international trade and financial integration. In the European context, the single market for goods started in 1985, and the Single European Act was adopted in 1986. The Lisbon Summit in March 2000 started the conversation about a single market for services, which led to the publication of the Report on the State of the Internal Market for Services in July 2002. The European Commission worked on a proposal for a Directive on services in the Internal Market in January 2004, which was adopted in December 2006 by the European Council and Parliament.[2] However, the Services Directive did not include financial services.

Nevertheless, the European financial integration was deepening in the pre-crisis period by both price-based and quantity-based measures. The single European currency facilitated significant cross-border financial flows. As argued by Lane (2015, p. 1), deep swap markets between the euro and the other major currencies have lowered risks, furthered "by access to Euro system liquidity to euro area banks, which was additionally secured by the ECB collateral policy of treating the sovereign bonds of all member countries as low risk." In terms of the external imbalances, Baldwin and Giavazzi (2015) explain that until 2007, the euro area was perceived positively, or even *very* positively, as shown by the unprecedented reduction of risk premia across euro area countries. The euro area's overall current account was balanced before the 2008 Global Financial Crisis and remained close to balance throughout the crisis. There was minimal net lending from the rest of the world to the euro area countries highlighting that euro-area lending and borrowing activities were mainly intra-EMU, with countries with large current account surpluses (such as Germany) and countries with large deficits (Greece, Ireland, Portugal, and Spain). However, there was a problem with the structural fundamentals: the European monetary policy was handed over to one institution, namely the European Central Bank (ECB), whereas the responsibility for financial regulation remained fragmented.

European integration has increased the efficiency gains and cost savings of banks, especially those extending their presence to Central and Eastern Europe (e.g., Galizzo et al. 2015; Busch et al. 2018; Minviel and Bouheni 2020). Well-functioning financial markets relied on a more diversified investor base, which enriched the informational efficiency of those markets. However, the wave of cross-border integration of European banks was also accompanied by a higher degree of risk exposure (e.g., Lee and Huang 2017).

2.2. From Financial Crisis to Euro Area Sovereign Debt Crisis

The 2008 Global Financial Crisis rapidly developed into a sovereign debt crisis and imposed political challenges to countries' governing institutions. The crisis was unprecedented—both in nature and magnitude—and hit the United States and Europe in roughly similar ways at the beginning (e.g., Borio 2013). Although Americans and Europeans shared the same goal—namely, to restore the banking system's stability—there was a difference in how the U.S. and European policymakers addressed their banking

[2] Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market, OJ L 376, 27 December 2006.

issues. The United States followed a systematic two-dimensional approach. First, weak banks' recapitalization occurred along with stress-testing procedures for restoring financial system stability as early as mid-2009. Second, the U.S. Congress enacted a robust policy response in 2010: the Dodd-Frank Wall Street Reform and Consumer Protection Act. In the meantime, the European Union (E.U.)—although debating about the inception of the EBU—was criticized for its slow response to the crisis (e.g., Quaglia 2013).

For historical reasons, a substantial part of Europe's financial system is based on the universal bank model. In the United States, the financial system comprises various financial actors with a higher presence of 'shadow banking.' As a consequence of this structural difference, it is potentially more challenging for the E.U. to address systemic banking crises (Véron 2008). On the top of this vicious circle, "pervasive banking nationalism–the tendency of governments to protect their national banking champions–and the occasional instance of regulators being captured by banks they were supposed to regulate prevented adequate action by national bank supervisors" (Véron 2016a, 2016b).

Frankel (2015) highlights three sources of the crisis in the euro area: (1) asymmetric shocks and the loss of ability to respond to national economic conditions; (2) fiscal policy, moral hazard and prospects for bailouts, and (3) fragmented responsibility for financial regulation, an argument also advanced by Kudrna and Riekmann (2018). Baldwin and Giavazzi (2015) emphasize that the euro area crisis was not originally a sovereign-debt crisis but the result of a sudden stop in cross-border capital flows.

It is interesting to investigate the cross-border private (bank) lending and borrowing activities to sovereign states in this context. According to Baldwin and Giavazzi (2015, p. 1), "this inter-linkage among core-nation banks and periphery-nations came to be a critical piece of the puzzle as the crisis unfolded." The sudden stop led to a bank debt vortex, also known as the "doom loop." When a bank gets into trouble, the government is often rescued, thereby raising the public debt. In turn, higher indebtedness worsens the quality of sovereign bonds and the quality of bank portfolios. This mechanism was convincingly explained by Farhi and Tirole (Farhi and Tirole 2018, p. 1783):

> "A weakening of financial balance sheets leads to a weakening of the balance sheet of the Sovereign because it prompts bailouts that increase the stock of public debt. At the same time, a weakening of the balance sheet of the Sovereign has direct effects on financial balance sheets because banks hold public debt. The multiplier reflecting the loss in sovereign bond price increases with the extent of home bias."

In 2009, a bank-sovereign vicious circle started to develop. The problems in the country's public finances also become endogenous to problems of the banking sector. Moreover, in a monetary union, the sovereign debt nature changes in a fundamental way when a country joins it. Specifically, its debt is issued in a currency in which the country has no control (De Grauwe 2011). The European banking sector owned US$1200 billion of sovereign debts before the crisis (2007), which increased to US$1720 billion by mid-2013. Amplifying the sheer size of the public debts lies at the core of the national preference effect (Geeroms and Karbownik 2014). The respective national banking sector's exposure to sovereign debts between 2007 and 2013 went from 14% to 18% in Greece, from 26% to 33% in Spain, from 16% to 22% in Italy, from 26% to 33% in Spain, and from 10% to 25% in Ireland. In 2014, the banks from these four countries owned roughly US$700 billion of domestic public debts, twice as much as in 2007. Véron (2014) highlights this toxic combination between the national preference effect and the financial integration in Europe. Focusing on the capital flows, De Haas and Lelyveld (2010) and Navaretti et al. (2010) find that banks support their troubled foreign affiliates through internal capital markets. Furthermore, De Haas and Horen (2013) and De Haas and Lelyveld (2014) demonstrate that foreign banks continued to lend to countries that are geographically close and integrated into the network of domestic co-lenders and to those countries where banks had established relationships.

In a highly leveraged and primarily universal banking system, the euro area crisis became a systemic one (Gros 2015). As highlighted by De Grauwe (2015, p. 1), "the European monetary union lacked a mechanism that could stop divergent economic developments [. . .] which were crystallized in the fact that some countries built up external deficits and other external surpluses". Large European banks were particularly hit by the Global Financial Crisis, medium-sized banks suffered most losses, whereas smaller, retail-oriented banks weathered this calamity relatively well (de Haan and Kakes 2020). The public pressure on E.U. institutions was growing.

2.3. The Institutional Reaction: Policy Reforms in Europe

The euro area crisis made things move forward (Boyer et al. 2012). The group chaired by Jacques de Larosière led to a series of revised directives and new regulations: (1) the Directive on Deposit Guarantee Schemes (1994/19/E.C.) was amended by 2009/14/E.C.;[3] (2) the Capital Requirements Directive (Directive 2006/48/E.C.) was revised to enable member states and/or competent authorities to apply capital requirements on a solo and consolidated basis; (3) the Regulation on Credit Rating Agencies (Regulation (E.C.) No 1060/2009 (O.J. L 302, 17.11.2009)) and (4) the Regulation (E.U.) No 1092/2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board were adopted.

In June 2012, the E.U. leaders agreed that a banking union for the euro area is the next logical step. The primary motivation was to break the vicious circle (the "doom loop") between banks and sovereigns, under which the euro area was at serious risk of break-up during mid-2012. It was agreed that the EBU would consist of two fully operational pillars, the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM). The former places ECB as the central prudential supervisor in the euro area (approximately 6000 banks) and in those non-euro E.U. countries that choose to join the SSM. If a bank fails, then the bank resolution is managed by a Single Resolution Board, which has access to a Single Resolution Fund financed by the banking industry. The banking union applies to countries in the euro area, but E.U. member states that are not in the euro area can also join. Put differently, non-euro area countries cannot become full member states of the two pillars (SSM and SRM) but can enter into a close cooperation agreement.

The Five Presidents' Report on Completing Europe's Economic and Monetary Union called for a European Deposit Insurance to complete the EBU. Without an EDIS, national budgets provide the funding for the national deposit insurance schemes that rely principally on the quality of European-level supervision in the current partial implementation of the EBU. The continuation of national deposit insurance may perpetuate the highly destabilizing bank-sovereign vicious circle in the euro area. In November 2015, the European Commission adopted a legislative proposal to create a European deposit insurance scheme (EDIS), the third pillar of EBU (Meister 2015; Beck et al. 2016; Alessi et al. 2017). As of early 2020, it is still being negotiated among E.U. member states, despite the broad consensus that a resilient European banking union needs an EDIS (e.g., Gros and Schoenmaker 2014; Schoenmaker and Wolff 2015).[4]

The EDIS proposal comes with challenges. Two of them are related to Germany's idiosyncratic situation in two dimensions: (1) the existence of Germany's pillar-based systems of deposit insurance, namely those for German savings and cooperative banks; and (2) the hesitation of the German public to accept further risk-sharing with euro-area neighbours. This is more a political than a legal issue since Germany approved the SRM Regulation of 2014, based on the same legal framework of the Internal Market as the EDIS

[3] Later on, both directives were repealed by the Directive 2014/49/EU of the European Parliament and of the Council of 16 April 2014 on deposit guarantee schemes.

[4] Additionally, three European supervisory authorities were set up. The European Banking Authority (EBA), established on 1 January 2011, aims at contributing to the creation of a European Single Rulebook in banking. The European Securities and Markets Authority is responsible for the functioning of financial markets in the EU. The European Insurance and Occupational Pensions Authority is envisaged to further support the stability of the financial system by protecting policyholders, pension scheme members, and beneficiaries.

would be. The real debate is not abstract—about mutualization or no mutualization in the single currency area—but a practical one about minimizing perverse incentives, moral hazard, and financial stability risks.

3. Banks' Foreign Claims: Indicators of Systemic Risk or Financial Instability?

An important question is whether this step-wise approach for completing EBU will be perceived as a useful tool to reduce the systemic risk and encourage the euro area's financial integration. Although recognizing the positive developments, some authors criticize the complex nature of the new regulatory environment (e.g., McPhilemy 2014). Other authors are more optimistic. For instance, Beck (2017, p. 1) explains that "the bank regulatory framework in the Eurozone seemed to have reached a decisive moment, with the completion of the Comprehensive Assessment and the establishment of the Single Supervisory Mechanism and Single Resolution Mechanism, and the implementation of the Bank Recovery and Resolution Directive." These institutional mechanisms should contribute to the circumvention of the sovereign-bank "doom loop", and preferably, to a reduction of the systemic risk.

The systemic risk is endogenous because it is a positive function of the level of complexity or opacity within the overall market. It captures the risk of collapse of the entire financial system because of its interlinked and interdependent aspects, including short-term credit and counterparty risks. Whether the integration of euro area banks—through a more complex web of banks' foreign claims—reduces the systemic risk or increases the likelihood of financial instability depends on two conflicting channels at work. On the one hand, the modern portfolio theory assumes that the diversification principle holds: as financial markets become more complete, the system becomes more stable (e.g., Wagner and Lau 1971). On the other hand, risks are a necessary accompaniment of the more complex interactions between euro area banks (e.g., Prasch and Warin 2016). Hence, the deeper the financial markets, the less realistic is the diversification principle and the higher the total risk. EBU holds strong potential for encouraging financial integration in Europe, which is likely to reduce the systemic risk (e.g., Asimakopoulos 2018).

Therefore, it is not surprising that banks' foreign claims have been analyzed from both financial stability and financial integration perspectives. Cerutti et al. (2012) treated them as a proxy for rising financial instability leading to a higher systemic risk. A more recent study by Claessens (2019) finds that some degree of fragmentation can enhance financial stability. Using aggregate BIS data, Peek and Rosengren (2000) analyzed the adjustment of foreign banks to the Japanese crisis, and Kaminsky et al. (2003) demonstrated the issue of having a monopolistic lender in the East Asian crisis. In the case of Latin America, Clarke et al. (2005), Rai and Kamil (2010), and McGuire and Tarashev (2008) studied the slowdown in international credit to Emerging Market Economies (EMEs). Other authors have been using foreign direct investment inflows (Warin et al. 2009), equity portfolios, private reserves, and debts (Kubelec and Sà 2012) to capture trends and determinants of other types of cross-border capital flows.

Our central hypothesis is that banks' foreign claims and their changes over time may serve as a proxy for the euro area banking markets. They are particularly interesting in the context of a common currency area with potential sudden stops. Financial integration increases the liquidity-strapped member state risks if a sudden withdrawal of international financial flows (Tabellini 2015). Fragmentation has increased after the eruption of the euro area sovereign debt crisis. However, although being still above the pre-crisis levels, fragmentation has been decreasing since late 2012. The unconventional monetary policy instruments used by the ECB have reduced financial market fragmentation, according to Horvath (2017).

4. Empirical Strategy

The empirical strategy is inspired by Herrero and Pería (2007), analyzing the determinants of the mix of international banks' claims countries receive and their implications for

financial stability. We intend to analyze the pre- and post-crisis dynamics of banks' foreign claims with particular reference to euro area banks and assess whether policy reforms have impacted the post-crisis period. Therefore, banks' foreign claims are our dependent variable. We also use a set of explanatory variables to capture the changing nature of the institutional landscape and macroeconomic environment in Europe.

4.1. The Model

Gravity models have been extensively used to analyze bilateral trade and investment flows since the seminal contributions by Tinbergen ((Tinbergen 1962) *Tinbergen, Jan. 1962. Shaping the World Economy: Suggestions* for an International Economic Policy. New York: Twentieth Century Fund. 1962), Pöyhönen (1963), Linnemann (1966), Leamer and Stern (1971) and Anderson (1979). We expand the application of gravity modelling in investigating the dynamics of bilateral banks' foreign claims. The rationale is that similar explanatory variables shape bank groups' decisions to extend cross-border claims or open an affiliate in a foreign jurisdiction. Gravity models of the behavior of bilateral trade and financial flows have mainly focused on the flows among the members of currency areas.

We perform a gravity-type macroeconomic analysis of the dependent variable's behavior (banks' foreign claims). In empirical terms, the dependent variable is expressed as a logarithm of the outstanding amounts of banks' foreign claims at the end of the year, as provided by the Bank for International Settlements. We classify the explanatory variables into two groups: (1) three variables associated with the Heckscher-Ohlin-Samuelson (H-O-S) model: market size, market similarity, and relative endowments, and (2) three European macroeconomic convergence variables. An intercept dummy variable for euro area membership (*EMU*) is also added to capture whether the euro area members differ from the global pattern. Data sources and definitions of the variables are provided in the Appendix A.

In the spirit of the Heckscher-Ohlin-Samuelson (H-O-S) framework, we investigate to what extent banks' foreign claims are influenced by market size, market similarity, and relative factor endowments (see Helpman 1987). The market size ($G_{ij,t}$) is a measure of the overall economic space, and it is calculated as a natural logarithm of the sum of the host and home countries' GDP (Equation (1)). The higher the size of both economies in the country pair is, the lower the expected bilateral banks' foreign claims are. This hypothesized relationship's validity depends on the domestic financial market's depth and the prevalence of the national preference effect. Market similarity ($S_{ij,t}$) is an index that captures the relative size of the two economies bounded between absolute divergence in size and equality in country size (Equation (2)). A priori, the expected sign is negative, as the banks' foreign claims are more likely to occur among different economies. Relative factor endowments ($R_{ij,t}$) is the difference in factor endowments between two countries (Equation (3)). In empirical terms, the factor endowment is defined by the ratio of gross fixed capital formation to a country's population. The factor endowments variable takes a minimum value of 0, representing equality in relative factor endowments, and a maximum value that approaches 1, the largest possible difference in the relative factor endowment:

$$G_{ij,t} = ln\left(Y_{i,t} + Y_{j,t}\right) \tag{1}$$

$$S_{ij,t} = ln\left(1 - \left(\frac{Y_{i,t}}{Y_{i,t} + Y_j}\right)^2 - \left(\frac{Y_{j,t}}{Y_{i,t} + Y_j}\right)^2\right) \tag{2}$$

$$R_{ij,t} = \left|ln\left(\frac{gcf_{i,t}}{N_{i,t}}\right) - ln\left(\frac{gcf_{j,t}}{N_{j,t}}\right)\right| \tag{3}$$

The three European macroeconomic convergence variables are: $IRDIF_{ij,t}$ is the difference in the real interest rates between country i and j (4), $BGTDIF_{ij,t}$ represents the difference in the government budget surplus or deficit as a percentage of GDP between

the source and host country (5), and $DBTDIF_{ij,t}$ is the difference of the debt-to-GDP ratios within each country pair (6). They take the following forms:

$$IRDIFF_{ij,t} = \mid interest_{i,t} - interest_{j,t} \mid \quad (4)$$

$$BGTDIFF_{ij,t} = \mid budget_{i,t} - budget_{j,t} \mid \quad (5)$$

$$DEBTDIFF_{ij,t} = \mid debt_{i,t} - debt_{j,t} \mid \quad (6)$$

We estimate a gravity-type Equation (7), which consists of H-O-S variables (market size, income similarity and relative factor endowments) and including three proxies for capturing the European convergence (interest rate difference, budget difference, and debt difference):

$$\begin{gathered} \ln(FC_{ij,t}) = \alpha_s + \beta_1 G_{ij,t} + \beta_2 S_{ij,t} + \beta_3 R_{ij,t} + \beta_4 IRDIF_{ij,t} + \beta_5 BGTDIF_{ij,t} \\ +\beta_6 DBTDIF_{ij,t} + \lambda_1 (G\ x\ EMU)_{ij,t} + \lambda_2 (S\ x\ EMU)_{ij,t} + \lambda_3 (R\ x\ EMU)_{ij,t} + \lambda_4 (D\ x\ EMU)_{i,j} + \\ \lambda_5 (IRDIF\ x\ EMU)_{ij,t} + \lambda_6 (BGTDIF\ x\ EMU)_{ij,t} + \lambda_7 (DBTDIF\ x\ EMU)_{ij,t} + \varepsilon_{ij,t} \end{gathered} \quad (7)$$

In order to investigate intra-euro-area developments, we introduce *EMU* as a dummy variable. If both countries in the pair are euro area members, then the dummy variable takes the value of 1. If one of the countries is not a euro area member, or both countries are not euro area members, the dummy variable takes the value of 0. This approach will enable to use these pairs as a de facto control group, an approach that will be reinforced by the interaction variables. We interact this dummy variable with the variables representing market size, market similarity, factor endowments, distance, interest rate, differences in budget deficits, and differences in public debts. This helps us isolate whether being an EMU member matters or not while using the explanatory variables we specified in Equation (7).

Fixed effects, which are denoted as α_s recognize country-specific (symmetric) heterogeneity (i.e., when i = Austria, or j = Austria, then the dummy variable takes a value of 1, and zero otherwise). Therefore, heterogeneity models country-specific participation or investment intensity instead of modeling heterogeneity between source and host countries. The error term ($\varepsilon_{ij,t}$) represents all unobserved bilateral effects.

4.2. Data

Annual data on outstanding banks' foreign claims comes from locational banking statistics compiled by the Bank for International Settlements (BIS). Banks' foreign claims ($A + B + C$) are reported as: (A) cross-border claims, or claims on non-residents booked by either a bank's head office or a foreign affiliate (branch or subsidiary) in a third country; (B) local claims of foreign affiliates denominated in foreign currency, and (C) local claims of foreign affiliates in the local currency of the host country. The amounts are expressed in constant U.S. dollar-equivalent after the impact of methodological changes, exchange rate movements, and inflationary effects have been eliminated.[5]

As presented in Figure 1, the outstanding amounts of foreign claims of banks located in the euro area countries witnessed a strongly declining path between 2007 and 2015. Cross-border positions at the end of 2015 were only 51.5% of the pre-crisis peak at the end of 2007. Claessens and Horen (2015) highlight that this was facilitated by Global Systemically Important Banks' (G-SIBs) tendency to reduce their international assets, going from 44% of their assets being international in 2007 to 35% in 2015. The Global Systemically Important Banks (G-SIBs) list is published annually by the Financial Stability Board, in close consultation with the Basel Committee on Banking Supervision and national authorities. They are determined based on four main criteria: (1) size, (2) cross-jurisdiction activity, (3) complexity, and (4) substitutability.[6]

[5] The reporting banks' positions in currencies other than the US dollar are converted into US dollars, using the exchange rate prevailing on the reporting date (ie end of quarter exchange rates), either by the banks themselves or by their official monetary authorities). These amounts are then expressed in constant 2010 US dollars.

[6] The most recent list of G-SIBs is available at: https://www.fsb.org/wp-content/uploads/P221119-1.pdf.

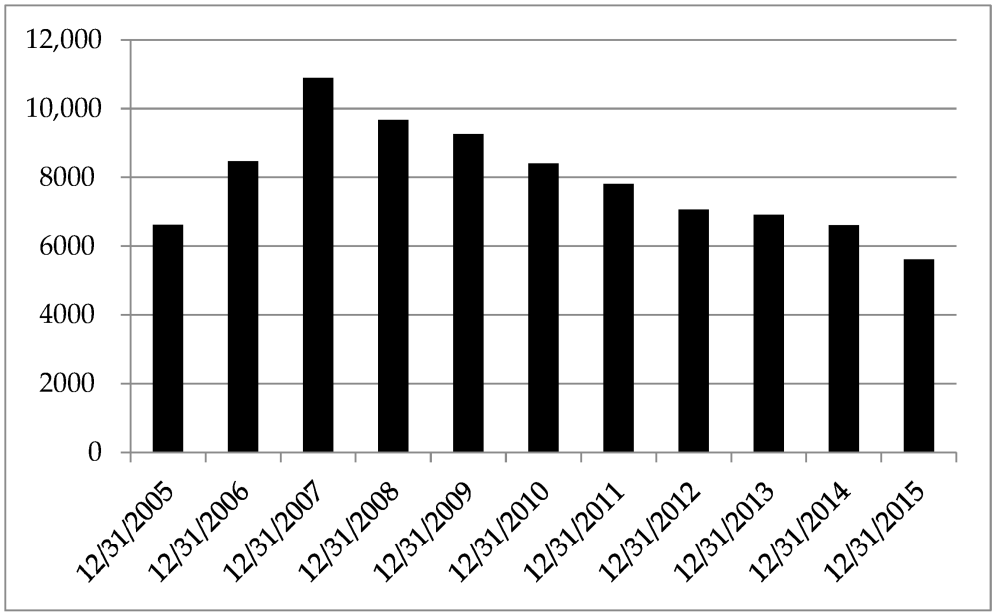

Figure 1. Foreign claims of reporting Euro area banks during the 2005–15 period (outstanding amounts at end-period, in billions of U.S. dollars). Source: Locational banking statistics (LBS_D_PUB), Bank for International Settlements, January 2021.

It is important to note that the empirical literature on banking restructuring and integration has considered different approaches based on potential gains in financial efficiency and/or profitability. They have applied a multicriteria methodology and goal programming—such as consideration of bank performance in terms of credit risk; profitability; productivity; technical, harmony, and scale efficiency—to explain the restructuring process in the banking industry (e.g., Shi et al. 2017; García et al. 2010; Guijarro et al. 2020). This important strand of the literature underscores the considerable potential gains from the mergers and acquisitions in the banking sector regarding financial efficiency.

At the global level, Asian banks have not suffered from the crisis. U.S. banks have worked rapidly on their recapitalization. In Europe, the situation is a bit more contrasted. British and Swiss banks have reduced their international exposures, while euro area banks have restructured and slightly diminished their international exposures.

The dataset contains 552 (=24 × 23) pairs of countries for 11 years (2005–2015), implying 6072 country-pair-year observations.[7] The selection of the period under investigation is driven by the intention to capture developments before, during, and after the Global Financial Crisis September 2008. It reflects a boom-and-bust cycle followed by a strong E.U. institutional response. Due to some missing observations, the panel dataset is unbalanced. This issue is carefully addressed in the econometric analysis by adopting a bias-corrected LDCV estimator.

The summary statistics for the dependent variable and the explanatory variables are provided in Table 1.

[7] The countries under investigation are: AT: Austria; AU: Australia; BE: Belgium; BR: Brazil; CA: Canada; CH: Switzerland; CL: Chile; DE: Germany; DK: Denmark; ES: Spain; FI: Finland; FR: France; GB: United Kingdom; GR: Greece; HK: Hong Kong SAR; IE: Ireland; JP: Japan; KR: South Korea; LU: Luxembourg; MX: Mexico; NL: Netherlands; SE: Sweden; US: United States; ZA: South Africa.

Table 1. Summary Statistics.

Statistics	N	Mean	St. Dev.	Min	Max
GCFReporting 2010	6072	374.2 Bill USD	617.2 Bill USD	8.4 Bill USD	3.3 Trillion USD
GDPReporting 2010	6072	41,540	21,080	6818	110,001
PopulationReporting	6072	52,896,947	71,578,296	466,158	324,418,820
Budget Reporting	3289	−3.4	4.3	−32.1	5.0
RealInterestRatesReporting	6072	3.5	6.8	−4.3	44.6
DebtReporting	3910	73.5	39.8	7.5	216.0
GDPDeflatorReporting	6072	105.0	29.8	69.5	326.0
logOutstandingClaims	2650	4.2	1.4	−0.7	9.5
irdif	6072	5.0	8.4	0	46.3
bgtdif	1716	4.0	4.0	0	32.0
dbtdif	2460	42.2	38.0	0.01	196.0
G	6072	11.3	0.4	9.7	12.1
S	6072	−0.9	0.3	−2.1	−0.7
R	6072	0.7	0.7	0	2.7

All the commands and algorithms are coded in R 3.3.2.

4.3. Selection of the Estimation Technique

We have checked for fixed-effects to select the right set of estimators, both cross-section and time fixed effects. We validated time fixed-effects and checked for contemporaneous correlation. According to Baltagi (2013), cross-sectional dependence is a problem in macro panels with long time series (over 20–30 years), which is not the case here.

We checked for heteroskedasticity as well. We could use the Parks-Kmenta estimator, but it is typically inappropriate for use with medium- and large-scale econometric panels due to at least two reasons. Firstly, this method is unfeasible if the panel's time dimension T is smaller than its cross-sectional dimension N, which is the case here. Secondly, Beck and Katz (1995) show that the Parks-Kmenta method tends to produce unacceptably small standard error estimates. We then checked for the use of different estimators (Beck and Katz 1995; Driscoll and Kraay 1998; Bruno 2005) and focused on Bruno's (2005) protocol. It is a bias-corrected LSDV estimator, developed for short dynamic panels with fixed effects and extended to accommodate unbalanced data. The approximations are obtained by modifying the within operator to accommodate the dynamic selection rule. Monte Carlo evidence strongly supports the corrected LSDV estimator compared to more traditional Generalized Method of Moments (GMM) estimators.

Correcting the LSDV estimator is unbalanced panels is difficult. The solution is partly found in Bruno (2005), where the bias approximations are extended to accommodate unbalanced panels with a strictly exogenous selection rule. As a result, our study estimates a bootstrap variance-covariance matrix for the corrected estimator.

5. Econometric Results

The baseline results from the estimations are presented in Table 2. In the absence of contemporaneous correlation, serial correlation, unit roots and heteroskedasticity, we choose a time-fixed effects model for our unbalanced panel following Bruno's (2005) protocol for a bias-corrected LSDV estimation. The estimations use data for the entire sample (N = 24) from 2005 to 2015. The results presented in columns [1,2] refer to the most parsimonious specifications. Column [1] presents the estimation results using only the three European convergence variables (interest rate difference, the difference in general government budget balance and the debt-to-GDP ratios) within each country pair, regardless of whether the country is a euro area member. The results in columns [3,4] are based on estimations that include an intercept dummy variable for participation in EMU and multiplicative terms of each explanatory variable interacted with the EMU membership dummy variable. The tables with regression results report the coefficient's magnitude with the 95% confidence interval in parentheses.

Table 2. Regression Results.

	Dependent Variable: Outstanding Claims (Log)			
Explanatory Variables	**Convergence (1)**	**H−O−S (2)**	**Euro−Convergence (3)**	**Euro−H−O−S (4)**
irdif	0.218 *** (0.154, 0.283)	−0.094 (−0.215, 0.028)	−0.304 * (−0.549, −0.058)	−0.310 ** (−0.563, −0.058)
bgtdif	−0.007 (−0.058, 0.044)	0.024 (−0.024, 0.072)	−0.056 (−0.146, 0.034)	−0.060 (−0.155, 0.035)
dbtdif	−0.003 (−0.018, 0.012)	−0.019 *(−0.034, −0.005)	−0.024 ** (−0.041, −0.006)	−0.024 ** (−0.043, −0.006)
G		−31.20 *** (−42.0, −20.4)	−30.50 *** (−41.1, −19.8)	−32.100 *** (−45.6, −18.7)
S		−82.30 *** (−118.0, −47.0)	−68.9 *** (−107.0, −30.9)	−72.10 *** (−132.0, −12.4)
R		−2.760 ***(−4.650, −0.863)	−2.160 *** (−4.060, −0.256)	−1.860 (−4.630, 0.907)
irdif:emuPair			0.237 * (−0.018, 0.492)	0.250 * (−0.027, 0.526)
bgtdif:emuPair			0.098 * (−0.011, 0.206)	0.100 * (−0.012, 0.212)
dbtdif:emuPair			0.012 (−0.014, 0.037)	0.013 (−0.013, 0.039)
G:emuPair				1.940 (−7.920, 11.800)
S:emuPair				3.950 (−72.50, 80.40)
R:emuPair				−0.397 (−4.230, 3.440)
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	211	211	211	211
R^2	0.400	0.532	0.560	0.561
Adjusted R^2	0.156	0.335	0.363	0.351
F Statistic	8.390 *** (df = 12; 151)	11.200 *** (df = 15; 148)	10.300 *** (df=18; 145)	8.650 *** (df = 21; 142)

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Time-fixed effects estimations based on a time-series cross-section analysis, with no serial correlation, no contemporaneous correlation, and no heteroscedasticity. All commands are coded in R 3.3.2. using the plm package.

We interpret only the results from the fourth specification (column [4]) of Table 2, which refers to the global sample's general empirical specification during the 2005–2015 period. The estimations display statistically significant and negative coefficients for market size (*G*) and market similarity (*S*) among H-O-S variables. They indicate that a country pair's market size is negatively associated with bilateral outstanding banks' foreign claims. Moreover, dissimilar countries in terms of economic size tend to have a higher value of outstanding banks' foreign claims. The statistically insignificant coefficients for these variables' multiplicative terms with the *EMU* dummy variable indicate that this global pattern is also valid for the euro area.

The coefficients on the interest rate difference (irdif) and difference in the debt-to-GDP ratios (dbtdif) turn out to be statistically significant and negative among the European convergence variables. The higher the difference in the debt-to-GDP ratios, the lower the value of the outstanding banks' foreign claims is. Bank groups from countries with lower levels of public debt are less prone to extend cross-border claims or local claims of their foreign affiliates in a country facing higher levels of public debt. An interesting case is the difference in the real interest rates. The relationship between this variable and the logarithm of outstanding banks' foreign claims displays a statistically significant and negative coefficient (−0.310) for the global sample. In contrast, after considering the statistically significant coefficient on the multiplicative term for EMU members, the implied coefficient for EMU is estimated at −0.06 [=−0.310 + 0.250].

This estimation refers to the turbulent 2005–2015 period, which encompasses a boom and bust cycle followed by a strong E.U. institutional response towards the end of the period. For this reason, we split the period into two sub-periods (2005–2008 and 2009–2015), which roughly correspond to pre-crisis and post-crisis periods. When we compare the results in Table 3 with those for the entire period, we uncover some interesting patterns. Estimations consistently display a negative and statistically significant coefficient for market size across all specifications. The coefficient on the difference in interest rates (*irdiff)* is statistically significant in columns [2,3], but it is negative in the pre-crisis period (2005–2008) and positive in the post-crisis period (2009–2015). In the post-crisis period for the global sample, a smaller interest rate differential between two countries would imply smaller values of outstanding amounts of banks' foreign claims.

Table 3. Regression Results.

	Dependent Variable: Outstanding Claims (Log)			
Explanatory Variables	**Convergence before 2008 (1)**	**H−O−S before 2008 (2)**	**Convergence after 2008 (3)**	**H−O−S after 2008 (4)**
irdif	−0.124 (−0.418, 0.171)	−0.259 * (−0.509, −0.009)	0.161 *** (0.080, 0.243)	−0.023 (−0.226, 0.181)
bgtdif	−0.063 (−0.200, 0.075)	−0.108 * (−0.224, 0.007)	−0.054 (−0.133, 0.026)	−0.012 (−0.105, 0.081)
dbtdif	−0.014 (−0.061, 0.033)	0.014 (−0.024, −0.052)	0.022 * (−0.002, 0.046)	0.008 (−0.020, 0.035)
G		−53.500 *** (−71.6, −36.5)		−23.600 * (−47.900, 0.671)
S		−141.000 ** (−259.0, −21.9)		−41.700(−108.0, 24.100)
R		−5.630 ** (−9.900, −1.370)		−0.854 (−5.050, 3.350)
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	108	108	103	103
R^2	0.229	0.550	0.497	0.537
Adjusted R^2	−0.500	0.075	0.116	0.141
F Statistic	3.270 ** (df = 5; 55)	7.900 *** (df = 8; 52)	6.380 *** (df = 9; 58)	5.320 *** (df = 12; 55)

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Time-fixed effects estimations based on a time-series cross-section analysis, with no serial correlation, no contemporaneous correlation, and no heteroscedasticity. All commands are coded in R 3.3.2. using the plm package.

However, we are more interested in the euro area developments. The estimation results are presented in Table 4. During the pre-crisis period, the market size (*G*) is both statistically and economically significant driving force of banks' foreign claims. The sample average is 11.26, which would correspond to an average market size of a country pair of US$ 181.1 Billion. An increase of the market size by 1% in the pre-crisis period is likely to lead to a US$ 220.1 Million lower value of outstanding amounts of banks' foreign claims. In the post-crisis period, this association is also negative, but the change would result in a US$ 154.1 Million lower value of banks' foreign claims, ceteris paribus.

Table 4. Regression Results.

	Dependent Variable: Outstanding Claims (Log)			
Explanatory Variables	**Euro−Convergence before 2008 (1)**	**Euro−H−O−S before 2008 (2)**	**Euro−Convergence after 2008 (3)**	**Euro−H−O−S after 2008 (4)**
irdif	−0.310 * (0.660, 0.039)	−0.270 (−0.637, 0.097)	−0.227 (−0.654, 0.200)	−0.345 (−0.824, 0.133)
bgtdif	−0.148 (−0.348, 0.053)	−0.118 (−0.326, 0.091)	−0.166 (−0.408, 0.075)	−0.229 (−0.516, 0.058)
dbtdif	0.019 (−0.028, 0.065)	0.013 (−0.034, 0.061)	0.021 (−0.021, 0.064)	0.026 (−0.018, 0.070)
G	−50.30 *** (−69.4, −31.0)	−52.400 *** (−75.8, −29.0)	−23.000 *** (−47.60, 1.68)	−36.700 *** (−70.60, −2.72)
S	−137.00 ** (−256.0, −17.3)	−62.400 (−214.00, 89.10)	−50.500 (−123.00, 21.60)	−106.000 * (−222.0, 8.540)
R	−5.470 ** (−9.770, −1.160)	−2.140 (−8.000, 0.618)	−1.350 (−5.600, 2.900)	−0.281 (−6.650, 6.090)
irdif:emuPair	0.144 (−0.366, 0.655)	0.066 (−0.486, 0.618)	0.202 (−0.226, 0.036)	0.432 (−0.093, 0.958)
bgtdif:emuPair	0.054 (−0.189, 0.296)	0.008 (−0.253, 0.269)	0.175 (−0.077, 0.426)	0.208 (−0.0806, 0.502)
dbtdif:emuPair	−0.060 (−0.156, 0.036)	−0.047 (−0.146, 0.053)	−0.016 (−0.068, 0.036)	−0.011 (−0.065, 0.043)
G:emuPair		0.961 (−8.220, 10.100)		14.800 (−9.120, 38.700)
S:emuPair		−187.000 (−438.0, 64.4)		111.000 (−43.90, 266.00)
R:emuPair		−7.160 (−16.100, 1.770)		1.220 (−8.440, 10.900)
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	108	108	103	103
R^2	0.572	0.599	0.565	0.588
Adjusted R^2	0.066	0.067	0.147	0.143
F Statistic	5.960 *** (df = 11; 49)	4.900 *** (df=14; 46)	4.500 *** (df = 15; 52)	3.890 *** (df = 18; 49)

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Time-fixed effects estimations based on a time-series cross-section analysis, with no serial correlation, no contemporaneous correlation, and no heteroscedasticity. All commands are coded in R 3.3.2. using the plm package.

We observe an overall positive impact of belonging to the EMU, even after the 2008 Global Financial Crisis. However, we also observe a slightly negative impact of the crisis, forcing core countries to repatriate capital within their borders. While we believe that much of our analysis is valid in its own terms, we also believe that meaningful insights can be acquired from melding gravity modelling with recent Network Theory developments.

These results are not as strong as those found in 2009 when Foreign Direct Investment (FDI) was used as a dependent variable (e.g., Warin et al. 2009), but there is a somewhat similar narrative with the banks' foreign claims. Confidence is again on the rise for the

euro area member states in particular. As presented in Table 4, there is also a protection effect created by the euro area.

We also investigated the sensitivity of the estimation results to the removal of outlying observations. When we preserved the values within the interquartile range (IQR), the results were remarkably consistent.

We acknowledge several limitations to our analysis. We use data from the locational banking statistics without specific reference to the international debt securities statistics. Future research could amend the analysis with domestic and international debt issuance. As the primary institutional response to the euro area sovereign debt crisis, the EBU's effect is only partly captured, as it is embedded in the EMU variable. Our follow-up research will take a more explicit treatment of the econometric analysis's institutional response. Another limitation of our empirical work is that the number of observations is not very large concerning the number of variables used, which calls for a future inquiry into a more extended period under investigation to investigate the results' sensitivity.

6. Concluding Remarks

6.1. Research Findings

In this article, we propose to look into the European financial industry and its efficiency through the lens of the banking sector before and after the 2008 Global Financial Crisis. We complement the specific risk-based analyses with a systematic risk perspective. We also complement the existing literature by considering euro and non-euro area members in our empirical estimations. It allows us to shed some light on some potential anomalies that may hinder the European financial market efficiency.

We propose a framework to analyze the dynamics of banks' foreign claims and the Banking Union's potential impacts. The study aims to address the question of whether the announcements about the creation of the Banking Union have helped reassure the banks, and consequently, avoided repatriation to the core countries. A more profound economic convergence among member countries should be associated with less financial divergence in external imbalances and asymmetries.

The estimation results indicate an overall positive impact of the EMU membership, even after the 2008 Global Financial Crisis. However, we also detect a slightly negative impact of the crisis, which contributes to the capital's repatriation in bank groups' home countries. As a future research avenue, we firmly believe that meaningful insights can be acquired from melding gravity modelling with recent Network Theory developments.

The 2008 Global Financial Crisis hit Europe in the same way as the United States. However, the crisis has had a more dramatic impact in Europe due to its institutional architecture. The institutional framework is complex: there is the E.U., which concentrates on decision-making power, and the euro area, which has no decision-making power away from the E.U institutions. This dichotomy is fragile and is the result of the history of European integration. This dichotomy exacerbated the 2008 crisis. In response to pressure from financial markets, Europe will be equipped with new solutions that strengthen the euro area and reduce this dichotomy. Is that enough to protect the euro area from future crises?

6.2. Policy Implications

A balance between EDIS as a "risk-sharing" device and other measures should improve the banks' risk allocation and management. Further steps toward improved regulatory and resolution framework could address remaining concerns about the free movement of capital, higher financial efficiency, and unhindered liquidity within banking groups. As a consequence, financial fragmentation should disappear in favor of financial integration. Indeed, this should trigger some effective action to dismantle the currently massive concentration of home-country sovereign risk in several euro area banks' bond portfolios. A well-integrated financial system would also require measures to: (1) improve the banks' accounting, auditing, and disclosure frameworks to enhance market discipline; (2) foster

further regulatory harmonization, as the SSM has started to promote with its action on so-called options and national discretions; (3) end harmful ring-fencing of capital and liquidity across national borders within the euro area, which favors detrimental geographical fragmentation; (4) introduce a single bank insolvency regime enforced by a European bank insolvency court, mirroring the SRM, and even further on the horizon, and (5) encourage some harmonization of the taxation of banks and banking activities in the euro area.

European policymakers remain optimistic about this new set of rules as it makes a big step towards reducing systemic risk in the euro area. It should eventually break the "doom loop" between banks and their sovereigns, and have positive spillover effects for financial market resiliency, stability, and efficiency. However, although an improvement compared to the pre-2008 era, the Banking Union lacks some elements that would further financial integration. The Banking Union is only a small step towards the single market for financial services. Hence, although the European Banking Union may encourage the networking of euro area banks, it does not go far enough to create institutions that would reduce financial fragmentation. While this new institutional framework represents a significant improvement and an essential step towards Europe's financial integration, there are still important criticisms. Is EBU well designed to increase the integration of the European financial markets? This is another avenue for future research, which merits a separate in-depth investigation.

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Appendix A. Annex—Definition of Variables

Table A1. Definition of variables.

Variable	Definition and Primary Source	Source
Outstanding claims (log)	Logarithm of the outstanding amounts of banks' foreign claims (Cross-border positions, by location of reporting bank and sector of the counterparty), in billions of U.S. dollars Source: Bank for International Settlements, *Locational Banking Statistics*. (https://www.bis.org/statistics/bankstats.htm).	Bank for International Settlements (BIS)
GDP	Gross domestic product, current prices, in U.S. dollars. Values are based upon GDP in national currency converted to U.S. dollars using market exchange rates (yearly average). Source: IMF World Economic Outlook Database, October 2019. https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx	The International Monetary Fund (IMF)
GFCF	Gross fixed capital formation (including Acquisitions less disposals of valuables), at current prices—U.S. $ Source: The International Financial Statistics, IMF, January 2020. https://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B	IMF

Table A1. *Cont.*

Variable	Definition and Primary Source	Source
irdiff	Logarithm of the absolute difference in countries' real interest rate Source: The International Financial Statistics, IMF, January 2020. https://data.imf.org/regular.aspx?key=61545855	IMF
bgtdif	Logarithm of the absolute difference in countries' general government budget balance (expressed in percent of GDP) Source: IMF World Economic Outlook Database, October 2019. https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx	IMF
dbtdif	Logarithm of the absolute difference in countries' public debt (expressed in percent of GDP) Source: Global Debt Database, October 2019. https://www.imf.org/external/datamapper/datasets/GDD/2	IMF
pop	Population (number of inhabitants) Source: IMF World Economic Outlook Database, October 2019. https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx	IMF
emu	If both countries in the pair are euro area members, then the dummy variable takes the value of 1. If one of the countries is not a euro area member, or both countries are not euro area members, the dummy variable takes the value of 0.	European Central Bank

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