

Vighneswara Swamy

## **EUROZONE SOVEREIGN DEBT CRISIS AND ITS IMPACT ON INDIA'S CROSS-BORDER CREDIT MARKET**

### **ABSTRACT**

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This study examines the impact of the Eurozone's sovereign debt crisis on cross-border credit to India, addressing: (i) Causes of subsidized lending, (ii) India's loan demand, (iii) Influence of Eurozone banks' home countries on credit, and (vi) Identification of the banking system responsible for the falloff. Results indicate that a 1% change in India's sovereign debt to GDP ratio is linked to a \$1013m increase in cross-border lending from the Eurozone. A 1% change in the Eurozone's ratio is associated with a \$556m increase in cross-border credit to India. A 1% rise in India's real GDP growth rate is associated with a \$164m increase in cross-border bank financing to India. The results indicate that global banks propagate financial shocks from their country of origin. The implications suggest that the concentration of cross-border credit in advanced economy financial systems puts emerging economies like India at risk of country- or region-specific financial shocks.

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*Keywords: Debt crisis, Eurozone, cross-border credit, credit booms, macroeconomic impact*

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## INTRODUCTION

As the globe was putting policies and procedures in place to bounce back from the global financial crisis, the rapid appearance of the Eurozone debt crisis led developing economies to confront even more significant problems in limiting the severe decrease in their economic growth. Because of the Eurozone's significant global economic influence, the risk of the crisis spreading and having devastating consequences has prompted researchers and international financial institutions to focus on understanding the nature and consequences of the Eurozone debt crisis on developing economies, particularly India. Although the Eurozone crisis has mostly afflicted Europe, the continent's woes have impacted the world's other affluent economies, including the U.S. and Japan. Even though exports to the European Union (E.U.) decreased and foreign direct investment from the E.U. declined, the U.S. economy expanded by 3% in 2010 and 1.7% in 2011. Despite the slowdown in growth in 2011, partially attributable to the consequences of the Eurozone debt crisis, the economy still performed significantly better than in 2009, when it contracted by 3.5%. Moreover, the World Bank cautioned that the impacts of the Eurozone crisis would be felt by both developed and developing countries in the event of a worldwide economic slump.

For emerging markets like China and India, Europe and the Eurozone represent a substantial market. Hence, any slowdown or contraction in the Eurozone inevitably dampens their export growth. While the Eurozone debt crisis presents risks and opportunities for China, as they seek bargain deals during the asset fire sale, it poses significant challenges for India. Because the EU is India's most important commercial partner, the crisis has severely impacted its economy. Perse, a slowdown in the Eurozone<sup>1</sup> and the E.U. significantly adversely impacted India's exports and South Asia.

The external environment for Asia, in general, and India was exacerbated because of the Eurozone crisis and the delayed recovery in the United States. This fragile external environment and slower growth in China and India lowered the growth projections for developing Asia; GDP growth is now forecast at 6.6% in 2012 and 7.1% in 2013 (ADB, 2012). The deceleration of India's growth can be partly attributed to decreased demand for the region's exports, stemming from the sluggish growth in the United States and Eurozone.

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<sup>1</sup> On need to note the difference between European Union and Eurozone. While European Union often called EU consisting of 27 nations of Europe represents the political interests of all of Europe, on the other hand, The Eurozone is a monetary group comprised of 17 states that have adopted the Euro as their common currency. Not all EU nations use the Euro as their currency (for example United Kingdom still has Pound Sterling). Reasonably one can infer that Eurozone is a subset of EU. While Eurozone accounts for 19% of global GDP, EU accounts for 25% of global GDP.

Furthermore, the tightening measures and policy stimulus reversal in China and other countries also contributed to slower economic growth.

The Indian economy faced a slump with the commencement of the Eurozone crisis, dropping from 9.9% in 2010 to 7.4% in 2011. The macroeconomic conditions have deteriorated, budget and trade deficits have risen to 5.8, and 9.9 percent of GDP, respectively, and inflation is expected to reach double digits by 2012. The Indian rupee reached a new low of INR 68.85 per U.S. dollar, placing it among the worst-performing developing market currencies. The rupee's depreciation increased the country's growing budget imbalance and even evoked flashbacks of the current-account crisis of 1991.

The slowing of India's economic development can be ascribed in part to the reduced foreign investment in the country, which is a common trend during times of crisis as investors seek safe havens. The European Union has the highest level of foreign investment in India, making it particularly vulnerable to the flight of investors. This decline in investment contributed to the Indian rupee's devaluation, notably in the second half of 2011, like in Brazil. However, lower domestic demand was the primary cause of India's economic slowdown, with reduced foreign investment playing a secondary role. In addition to foreign investors fleeing to safety in the second half of 2011, India's inability to control inflation discouraged international investment. India's unique dependence on oil imports, which account for around 80% of their crude oil requirements, adds to its vulnerability. While a recovery in Europe could increase demand for foreign investment and exports from India, it may increase global demand and volatility.

The escalation of the Eurozone debt crisis led to a significant decrease in cross-border bank credit to developing markets, including India, during 2011-12. This decline ended a consecutive seven-quarter growth period following the global contraction after the Lehman Brothers collapsed in 2008-09. In addition, the rebound in the first quarter of 2012 occurred surprisingly late in the second quarter. This trend poses severe concerns for policymakers and scholars alike, such as: (i) What triggered the decline in cross-border lending? (ii) Did the demand for credit fall in India? (iii) Did India's sovereign risk increase? (iv) Were the major drivers related to the financial stability of Eurozone banks providing cross-border credit? (v) If true, which of these financial systems was most responsible for the decline? The literature review has identified these research gaps about the effect of the Eurozone crisis on international credit. Further studies are necessary to comprehensively understand the extent of cross-border spillover effects, the transmission mechanisms, the

effects on various credit types, and the policy implications of the crisis for cross-border credit to find answers to the questions above.

This research aims to address the above research questions using a panel regression framework. In order to investigate the reduction of international credit to India resulting from the issues in the Eurozone banking sector, we sourced quarterly data from the Bank for International Settlements' (BIS) International Banking Statistics (IBS data sets) for the period spanning from 2000-Q1 to 2011-Q4. We developed an innovative methodology that accounts for the impact of home-country factors related to the Eurozone banks' health. Our unique approach involves disaggregating the panel regression findings to assess the influence of changes in sovereign debt levels for India and Eurozone countries. Notably, the novelty of this model lies in the inclusion of sovereign debt-related variables of the host nation India and Eurozone banks' home countries. The findings reveal that, while the demand for cross-border lending in India remained constant, the Eurozone crisis undermined the Eurozone banks' ability to provide cross-border credit, resulting in a credit supply reduction.

This paper is arranged in the following manner. Section 2 begins by summarizing the available literature on the subject. Section 3 then presents stylized information concerning the Eurozone crisis and the Eurozone-India connection. Section 4 showcases the data used in this analysis, along with relevant literature reviews. Moving on, Section 5 elaborates on the methodology used to evaluate the home and host country factors involved in cross-border credit. Section 6 covers the analysis's principal results, while Section 7 presents the conclusion and the implications for policy.

## **LITERATURE REVIEW**

The global economy, including the cross-border credit market, has been significantly impacted by the sovereign debt crisis in the Eurozone. Our review focuses on investigating how the crisis has influenced the supply and demand of cross-border credit and identifying the factors that have contributed to these effects.

Acharya et al. (2014) investigated the impact of bank bailouts on the risk of sovereign credit default. The study found that bank bailouts increase the prospect of a government debt default, particularly in countries with weak fiscal positions. Altavilla et al. (2017) investigated the relationship between banking and sovereign risk in the Eurozone. The study found that the two risks are closely linked, with sovereign risk affecting bank lending and banking risk affecting sovereign borrowing costs.

Bottero et al. (2016) investigated the effect of the global financial crisis on Eurozone sovereign spreads. The authors discovered that the crisis significantly influenced sovereign spreads, especially in periphery nations. Blundell-Wignall and Slovik (2012) analyzed the Eurozone debt crisis and its causes, contending that a mix of factors, such as bad fiscal policy and banking practices, caused the crisis.

Buch and Goldberg (2017) investigated the impact of prudential rules on cross-border loans. These effects were determined to be considered by the authors, particularly in nations with weak fiscal conditions. De Haas and Van Horen investigated the conduct of multinational banks during a financial crisis in 2012. The authors discovered that during a crisis, banks limit lending, particularly to nations with weak budgetary conditions.

Gagnon and Karolyi (2006) examined the connection between mutual fund flows and global risk appetite. According to the report, global risk appetite considerably influences mutual fund flows, especially for cross-border funds. The influence of the Eurozone sovereign debt crisis on cross-border bank lending was studied by Kalemli-Ozcan et al. (2013). The authors discovered that the crisis lowered cross-border funding considerably, mainly by banks in core nations to periphery countries.

Laeven and Valencia (2012) investigated the impact of sovereign debt crises on bank lending. The authors observed that during a crisis, bank lending reduces, particularly for banks with high exposure to crisis countries. Suarez and Martínez-Miera (2012) examined the impact of the Eurozone sovereign debt crisis on bank credit supply. According to the authors, the crisis reduced bank credit supply, particularly for banks with weak capital.

The literature suggests that the Eurozone crisis significantly impacted international credit, influencing the supply and demand for international finance and the factors that affect these effects. The review concludes that the Eurozone crisis significantly impacted international credit. However, significant research gaps have been uncovered concerning the crisis's influence on cross-border lending.

The first research gap is how much the Eurozone financial crisis has affected credit availability and risk across borders. According to the review, more study is needed to understand the scope of these impacts and their causes fully. While some studies, such as Bottero et al. (2016) and De Haas and Van Horen (2012), have examined the spillover effects of the crisis on non-crisis countries, more research is needed to understand the extent of these effects and their drivers fully.

The second research gap concerns the pathways via which the Eurozone debt crisis impacts worldwide lending. According to the assessment, more study is needed to

understand how the crisis impacts cross-border loan supply and demand. While some studies, such as those by Kalemli-Ozcan et al. (2013) and Gagnon and Karolyi (2006), have looked at the impact of global banks and portfolio diversification, additional study is needed to properly understand how the crisis affects cross-border loan supply and demand.

The third research gap concerns the effect of the Eurozone debt crisis on various forms of cross-border credit, such as business and government debt markets. The fourth research gap is the need for further study on the Eurozone crisis's policy implications for international lending. While some studies, such as Altavilla et al. (2017) and Buch and Goldberg (2017), have examined cross-border prudential policy spillovers and their importance, more research is needed to understand the effectiveness of different policy responses to the crisis and their impact on cross-border credit supply and demand.

In conclusion, the above literature review has highlighted several research gaps related to the consequences of the Eurozone crisis on cross-border credit. Further research in these areas is needed to fully understand the extent of cross-border spillover effects, the transmission channels, the impact on different types of credit, and the policy implications of the crisis for cross-border credit.

## **EUROZONE SOVEREIGN DEBT CRISIS – STYLIZED FACTS**

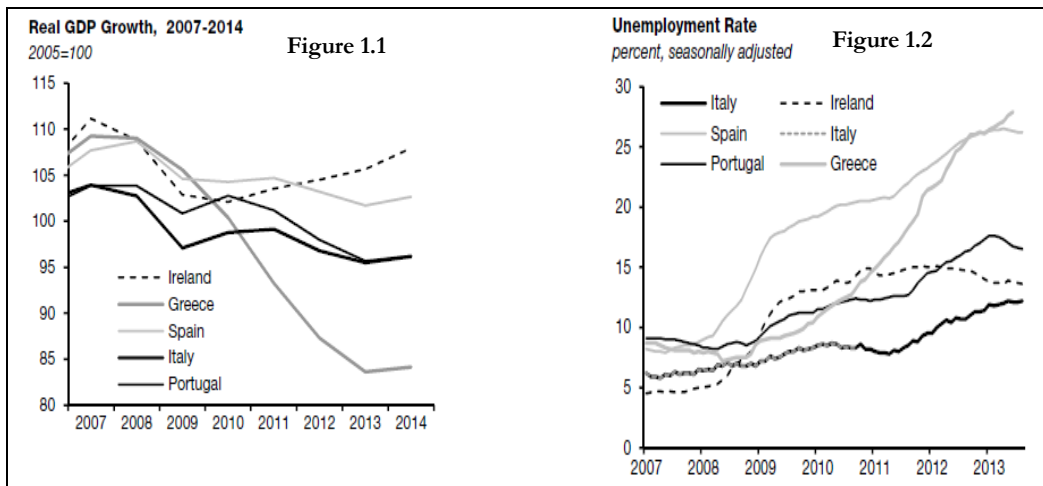
The Eurozone crisis originated from the excessive levels of fiscal deficit and debt. A significant factor contributing to the weak fiscal position was the expenditure on entitlements, primarily caused by an aging population, which was not matched by a proportional rise in revenue. Additionally, fundamental changes are lacking that promote growth, further compounding the issue. This resulted in expanding the public sector, which grew bloated over time.

The Eurozone debt crisis posed significant challenges for its resolution and management, primarily for three reasons. Firstly, several countries faced difficulties funding their sovereign debt due to rating downgrades, leading to rising bond yields. Secondly, Eurozone banks were undercapitalized, owing primarily to sovereign bond losses, and faced liquidity issues, resulting in lending limitations. Finally, weak and negative economic development worsened financial risks, complicating crisis resolution and management efforts even more.

During the initial eight years of the common currency (1999-2007), the Eurozone encountered significant problems related to the reversal of financial imbalances that had accumulated within the region. This was primarily due to the rapid growth experienced by

several countries on the periphery of the region, mainly the PIIGS countries, fueled by substantial credit expansion from creditors in surplus countries within the region's core, such as Austria, Germany, and the Netherlands. Correcting these intra-regional imbalances was complicated, and significant centralized funding was required to occur without the formal default of several governments on the periphery. Consequently, banks and financial markets remained under stress, and the collective performance of the region was relatively sluggish. This led to a prolonged recession, with Greece experiencing a GDP contraction of 25% and record-high unemployment rates (Figure 1), resulting in social unrest and reduced political support for implementing structural reforms. This is where the unfinished business of the region lies.

**Figure 1. Economic growth and unemployment in Eurozone**



Source: IIF Research

Despite improvements being made at both the national and EU level, such as reducing fiscal and external deficits, enhancing competitiveness, stabilizing activity, and strengthening fiscal rules, much work still needs to be done to stimulate growth. Even when growth does return, it may not be enough to reduce unemployment from the current high levels. The expansion of financial support from the ECB and the ESM, along with the advancement of the banking union, will help to increase the volume and flexibility of financial aid, but additional measures are necessary to strengthen the economy.

Until the banking union was fully established and the limitations on debt mutualization, vulnerabilities persisted, leading to financial tensions resurgence. Moreover, the private

sector's ongoing deleveraging could constrain economic recovery, leaving it uncertain and susceptible to changes in financial market sentiment. To address these challenges, it is crucial to continue reducing financial market fragmentation and ensure that companies capable of benefiting from structural reforms receive adequate financing. High unemployment rates, particularly among young people, were a source of concern (as depicted in Figure 1.2), raising questions about the durability of political stability and the potential for output to recover to pre-crisis levels in some nations.

The macroeconomic indices for the Eurozone's PIIGS member nations offer a grim image of their economies during 2012 and 2013. Although their domestic demand remained negative, there were some positive signs of recovery in fixed investment and exports.

The mounting sovereign debt has been a significant cause of concern for the current crises that most Eurozone countries find themselves in. While some amount of debt shall always have to be borne to stimulate economic growth, conversely, the unrelenting over-dependence on borrowings is bound to have awful consequences and weaken the fiscal positions of the government. The PIIGS nations allowed their debt levels to such a high level that it became almost impossible for them to repay their loans, and thus most of them had to approach either the other better-placed Eurozone partners or the IMF for loans to sustain themselves. As an economic slowdown would lead to lower tax revenues, the government's repaying capacity gets hampered invariably.

In 2011, Portugal, Ireland, Italy, and Greece had a central government debt that exceeded 100% of their respective GDPs. It has been the case, particularly for Greece and Italy, since 2008. The very high interest in these countries' government debt had almost triggered a virtual bankruptcy. Such massive and unsustainable sovereign debts resulted in the Eurozone crisis.

Data on the PIIGS nations' current account balances reflect the decline in the competitiveness of most of these economies' exports. The vulnerable current account position would mean dependence on capital flows to sustain the balance of payments position. This, however, under the prevailing conditions, could further aggravate the external debt situations of various economies. All the PIIGS economies (barring Ireland since 2011) have had a negative CAB as a percentage of GDP ever since 2008. In 2012, Greece's current account deficit was 7.4% of GDP, whereas Portugal's deficit was 4.2 percent.

Portugal and Ireland experienced a return to growth, while the recessions in Greece, Italy, and Spain slowed. In the second quarter, Portugal's growth was the highest in the



Eurozone at 1.1%, driven by temporary factors. Meanwhile, renewed export growth in Ireland led to a 0.4% increase in real GDP, marking the first advance after three consecutive quarters of decline caused by falling domestic demand and expiring pharmaceutical patents.

Spanish exports rebounded, resulting in an impressive double-digit year-on-year increase and a minimal 0.1% contraction in quarterly real GDP. Italy's renewed growth in exports slowed the contraction in real GDP to 0.3%, despite a more significant decrease in domestic demand in Q2 than in Q1. However, the prolonged debt crisis in Europe caused global financial markets to become jittery; as a result, capital outflows are decreasing, and the rupee is falling sharply in value.

The Eurozone crisis, with some countries experiencing sovereign fiscal deficits surpassing 100 percent of their GDP, provides valuable lessons to be learned. It is crucial to avoid allowing the fiscal deficit to exceed a specific limit.

## **EUROZONE AND INDIA**

India's economic link with the Eurozone is substantial since the area contributes to around one-fifth of total Indian exports and one-sixth of total Eurozone imports. The Eurozone's diverse range of goods and services, from agriculture to manufacturing and services, play a crucial role in inward and outward foreign direct investment (FDI) flows. In 2012, the United Kingdom, Germany, and the Netherlands contributed around \$9 billion to the total value of India's exports to the European Union, \$26 billion, while India's exports to OECD nations totaled \$46 billion (according to the RBI Monthly Bulletin, June 2012). According to Exim Bank figures, the United Kingdom and the Netherlands received 7 percent and 6 percent of India's total FDI outflows, respectively, in 2012. However, the Eurozone's share of worldwide exports has decreased recently, from 19.2 percent in 2003 to 15.4 percent in 2011.

As a fundamental and longstanding economy, the Eurozone has a significant role in India's integrated trade and financial networks. The Indian economy imports a large percentage of the region's exports and benefits from Eurozone FDI and other types of capital inflows. After Asia, the European Union is India's second-most significant commercial relationship. The three significant export partners were the USA, United Arab Emirates, and China.

India's foreign trade demonstrates the importance of its specific commercial and financial links with Eurozone nations. These nations are essential commercial partners for India and providers of services and investment. Furthermore, India is increasingly

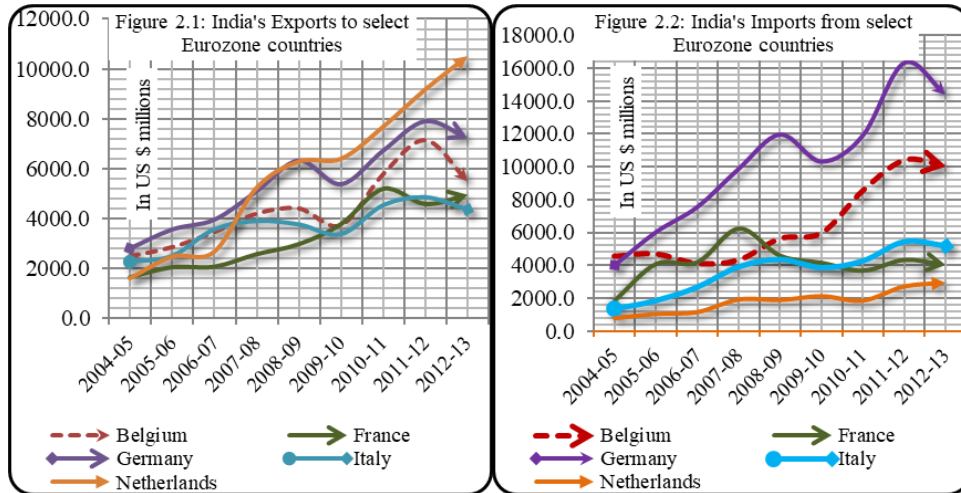
establishing itself as an outward foreign direct investment (FDI) presence in the Eurozone. However, as a result of the Eurozone's economic downturn, India's product exports to the region were \$37.8 billion in 2012, down from \$42.7 billion in 2011. As a result, the Eurozone's proportion of overall Indian exports has fallen from 13.9 to 12.8 percent. In 2008, the Eurozone accounted for a more substantial share of India's exports, at 16 percent.

In 2011-12, India's software services exports to Europe fell to 24 percent of overall software export income., down from 26% in 2009-10. Furthermore, Europe accounts for over one-third of all tourist arrivals in India. As a result, travel receipts were negatively impacted by reduced tourist arrivals from Eurozone countries that were significantly affected. As a result, India's share of the Eurozone trade shrunk from a peak of 1.8 percent of Euro area exports in 2010 to 1.6 percent in 2012 and declined. The volume of exports to E.U. countries, which was 17539 US \$ million, rose to 52574.2 US \$ million in 2011-12 and is now in a declining trend with 50320.3 US \$ million in 2012-13. Similarly, the volume of imports from E.U. countries, which was 18713.0 US \$ million, rose to 58465.1 US \$ million in 2011-12 and is now in a declining trend with 53067.5 US \$ million in 2012-13.

Due to the Eurozone debt crisis, India's exports to Eurozone countries experienced a dramatic downturn in the last two years. Exports to Belgium, France, Germany, and Italy experienced a downward trend from earlier highs (Figure 2.1). During 2012-13, Indian exports declined by 22.98% in Belgium, 8.66% in Germany, and 10.05% in Italy. However, on the contrary, Indian imports did not dip, as imports grew by 3.56% in Belgium, 11.92% in Germany, 6.96% in France, and 4.89% in Italy (Figure 2.2).

The Eurozone crisis shook the global economy in 2010, but India's exports to the region did not fall immediately. This was due in part to the fact that India's main trade partners, Germany and France, were still doing well. However, as the crisis worsened, India's exports to the Eurozone decreased. The crisis began in 2009, when Portugal, Ireland, Greece, and Spain entered recession as a result of large budget deficits. As a result, credit rating agencies downgraded peripheral European sovereigns and banks in 2010, worsening the crisis.

**Figure 2. India's foreign trade with select Eurozone countries**



Source: Eurostat database

European banks have sold assets to reduce their leverage. According to bank polls, the biggest issue is the fragile economic situation rather than funding deficiencies or capital deficits. Despite substantial advances, many banks' market-value-to-book-value ratios signal that their capital buffers may not be strong enough to sustain much risk-taking. To prevent balance-sheet deterioration in the Eurozone and alleviate financial fragmentation, the ECB could provide targeted credit and liquidity support, such as long-term refinancing operations for small and medium-sized enterprises and less-stringent haircuts on collateral or private asset purchases. Table 1 reports the macroeconomic indicators of the Eurozone and India.

EUROZONE SOVEREIGN DEBT CRISIS AND ITS IMPACT ON INDIA'S CROSS-BORDER CREDIT MARKET

**Table 1. Eurozone and India: macroeconomic indicators**

Indicator	Country	2005	2006	2007	2008	2009	2010	2011	2012
Trade in services (% of GDP)	Eurozone	16.11	16.70	17.24	17.67	17.70	18.61	19.06	19.69
	India	11.91	13.48	12.65	15.83	12.69	14.09	13.98	--
Insurance and financial services (% of service imports, BoP)	Eurozone	6.99	7.61	7.79	7.38	7.02	7.33	7.40	7.19
	India	6.78	7.90	9.16	8.98	9.68	10.05	11.45	--
Foreign direct investment, net outflows (% of GDP)	Eurozone	7.42	6.66	8.96	6.75	4.84	4.61	5.38	2.90
	India	0.32	1.48	1.37	1.57	1.18	0.91	0.79	--
Foreign direct investment, net inflows (% of GDP)	Eurozone	4.70	3.52	5.45	3.32	2.14	1.13	2.51	1.51
	India	0.87	2.11	2.04	3.55	2.61	1.55	1.72	--
Bank nonperforming loans to total gross loans (%)	Eurozone	2.25	2.50	2.20	2.90	4.50	5.20	5.60	7.15
	India	5.20	3.30	2.70	2.40	2.40	2.50	2.30	3.00
Automated teller machines (ATMs) (per 100,000 adults)	Eurozone	85.0	85.5	93.7	97.4	96.4	92.5	90.5	--
	India	--	--	3.38	4.26	5.24	7.18	8.90	--
Bank capital to assets ratio (%)	Eurozone	5.85	6.50	6.60	5.90	6.40	6.20	5.55	7.10
	India	6.40	6.60	6.40	7.30	7.00	7.10	7.10	6.90
Commercial bank branches (per 100,000 adults)	Eurozone	34.5	37.4	39.4	39.4	39.5	38.7	38.49	--
	India	8.96	8.93	9.04	9.35	9.63	10.05	10.64	--
Total reserves in months of imports	Eurozone	1.42	1.34	1.33	1.14	1.73	1.93	1.78	2.10
	India	8.52	8.92	11.14	7.71	9.77	7.77	6.31	--
Inflation, consumer prices (annual %)	Eurozone	2.48	2.50	2.37	4.07	0.37	1.54	3.27	2.49
	India	4.25	6.15	6.37	8.35	10.88	11.99	8.86	9.31
Domestic credit provided by banking sector (% of GDP)	Eurozone	127.3	131.2	138.3	142.8	152.5	155.8	153.4	153.4
	India	58.36	60.87	60.81	67.67	70.15	71.84	74.12	76.59
Domestic credit to private sector (% of GDP)	Eurozone	109.3	114.8	121.5	127.0	133.8	133.6	131.6	128.5
	India	39.40	43.22	44.82	48.54	47.30	49.51	49.93	51.49
Trade (% of GDP)	Eurozone	74.54	79.32	81.06	82.55	71.93	80.17	85.72	87.33
	India	41.31	45.30	44.88	52.27	45.48	48.24	54.22	55.36
GDP growth (annual %)	Eurozone	1.72	3.26	3.01	0.39	-4.40	2.03	1.53	-0.57
	India	9.28	9.26	9.80	3.89	8.48	10.55	6.33	3.24
Gross savings (% of GDP)	Eurozone	21.55	22.54	23.19	21.62	19.02	19.45	19.89	20.05
	India	33.66	34.96	36.61	33.86	33.90	34.61	31.43	--

Source: Data sourced from World Bank Data

Note: "--" indicates data not available

In certain nations, record unemployment, low disposable incomes and wealth, and excessive indebtedness impacted household behavior, causing the rebound in private consumption to be delayed. Meanwhile, uncertainties about future growth prospects influenced enterprises' investment decisions. A corporate debt overhang combined with fragile bank balance sheets in the periphery was another source of worry in the October 2013 GFSR. It was believed vital to fortify the currency union with a robust banking union, which included a single supervision and resolution system and a shared budgetary backup for emergency assistance. Nationally, defined medium-term budgetary and structural reform plans and more predictable policies were required. Furthermore, several countries need judicial changes and other steps to expedite lousy debt settlement.

## **DATA**

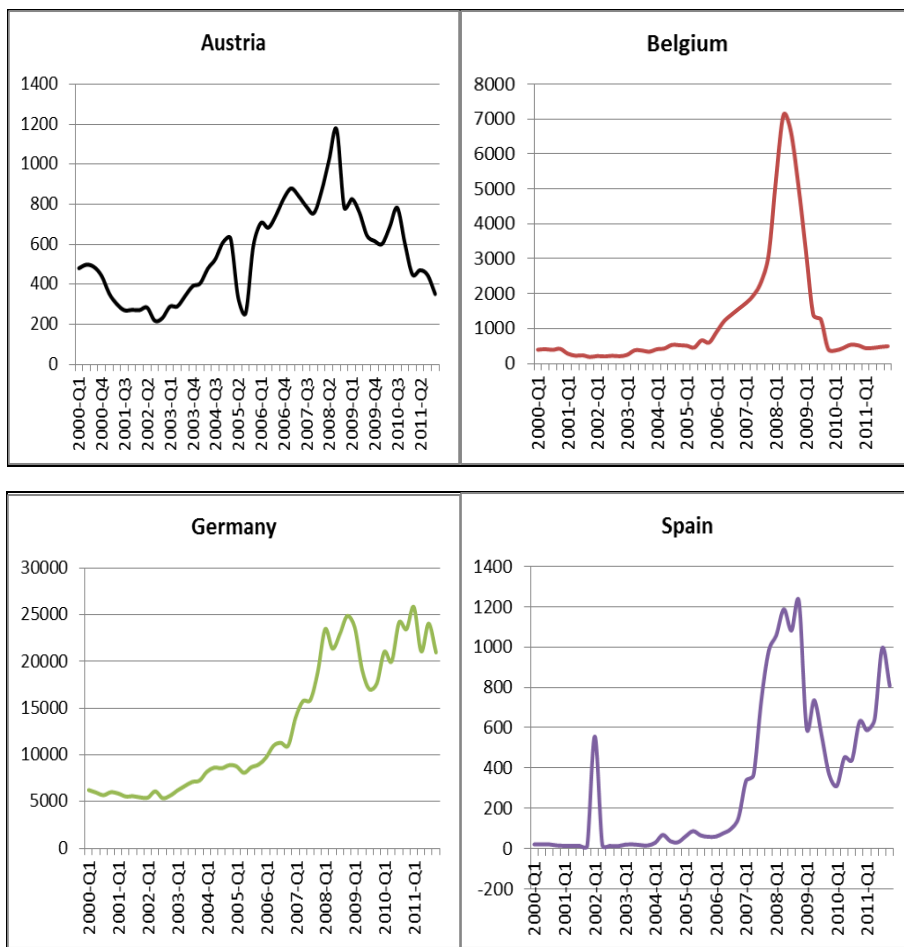
The domestic credit to the private sector was defined as financial resources provided to the private sector by financial corporations, such as loans, purchases of non-equity securities, trade credits, and other accounts receivable, resulting in a claim for recovery. Domestic credit in India has previously shown a growing tendency, demonstrating a constant need for credit in the economy. The data set for the investigation spans the years 2000 to 2013. Data revealed an increasing trend in India's domestic lending to the private sector (as a proportion of GDP), showing that credit demand did not fall dramatically. As a result, the rapid fall in cross-border lending in India necessitated scrutiny.

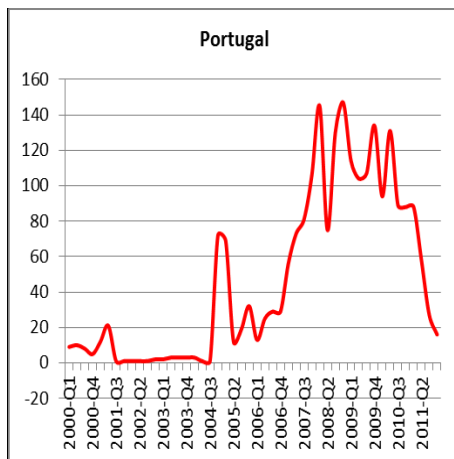
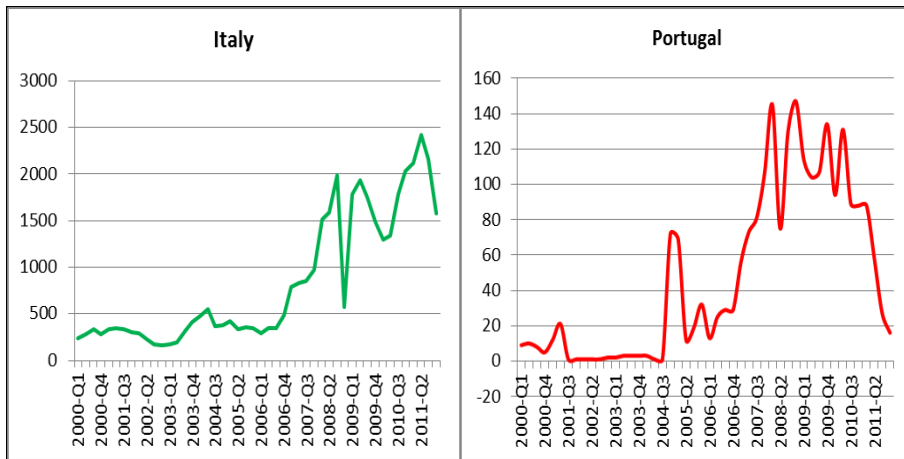
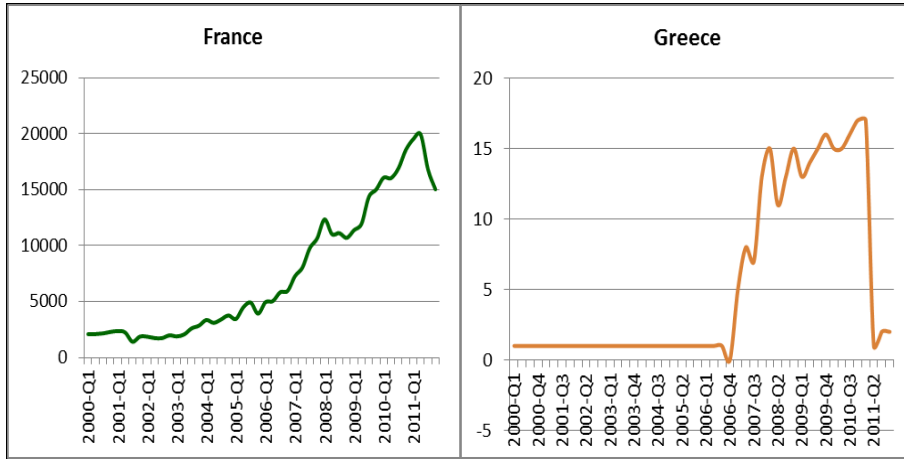
We obtained the data for cross-border banking claims from BIS CBS data sets due to their benefits for the study. Due to their relative advantages, BIS CBS data sets were used by McGuire and Tarashev (2008) to construct the dependent variable in their model, due to which they can study how the health of individual national banking systems affects foreign lending to EMEs. Cetorelli and Goldberg (2011) use data from BIS consolidated banking statistics in their econometric analysis of the transmission channels of global bank shocks in emerging market regions in the crisis that pummeled the global economy from 2007 to 2011. McGuire and von Peter (2009a) and (2009b); Takats (2010); McCauley *et al.* (2010), and Avdjiev (2012) also used the above data sets to analyze cross-border bank credit to EMEs. Accordingly, the data for bank claims across borders (CBBC) in India comes from BIS CBS data.

The quarterly real GDP of India (IGDP) data is obtained from the Federal Reserve Economic Data. The National Stock Exchange (NSE) in India provides data for India's financial market volatility (IVOL). The data for the change in government debt to GDP in

India (CIDGDP) comes from World Development Indicators, whereas the data for the change in government debt to GDP in Eurozone nations (CEUDGDP) comes from the Eurostat database. Figure 3 presents a graphical illustration of the CBCB of Eurozone banking systems in India, and Figure 4 presents a graphic sketch of the change in the sovereign debt of Eurozone countries.

**Figure 3. Cross-border bank claims of Eurozone banking systems on India**

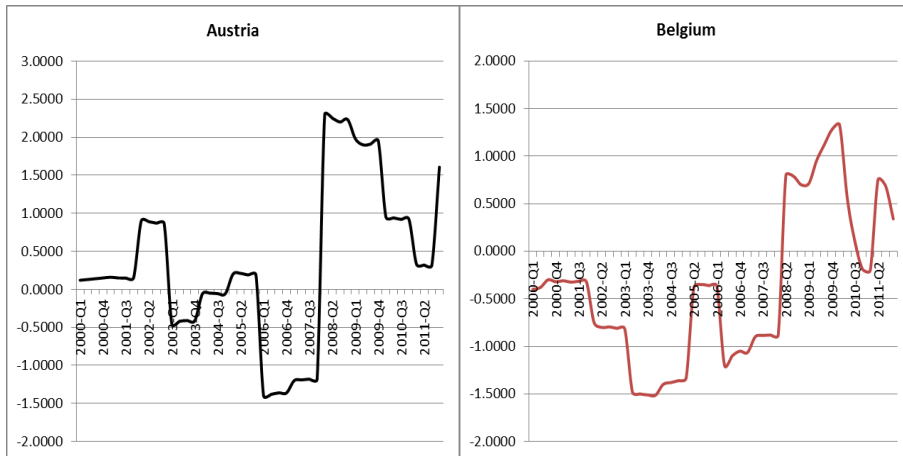




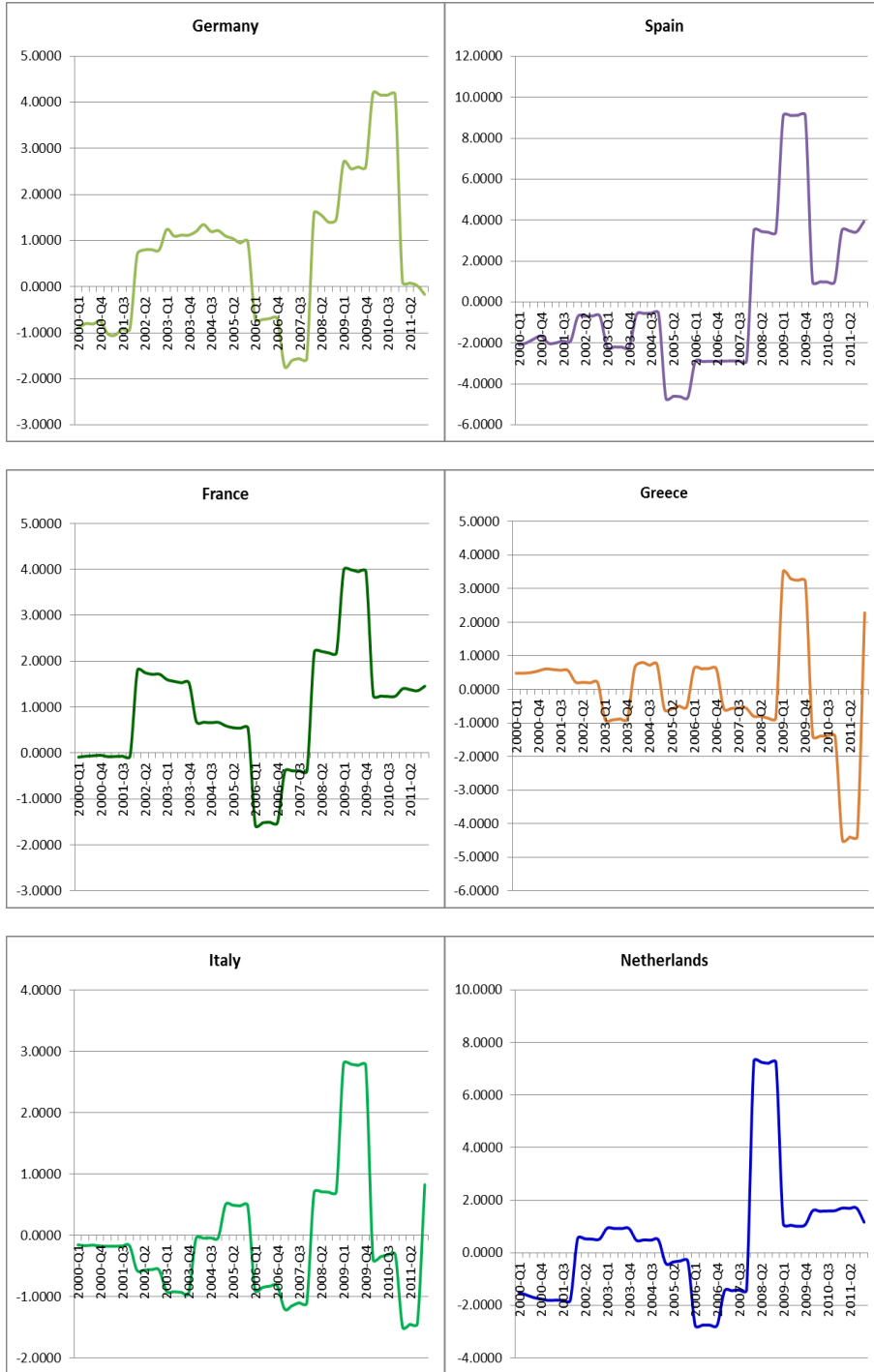
EUROZONE SOVEREIGN DEBT CRISIS AND ITS IMPACT ON INDIA'S CROSS-BORDER CREDIT MARKET

Note: The X-axis denotes the period from 2000-Q1 to 2011-Q4. Y-axis denotes the cross-border claims of Eurozone banks in India in Millions of U.S. dollars. Source: Author's calculations from the data sourced from BIS CBS data sets.

Figure 4. Change in the sovereign debt of Eurozone countries

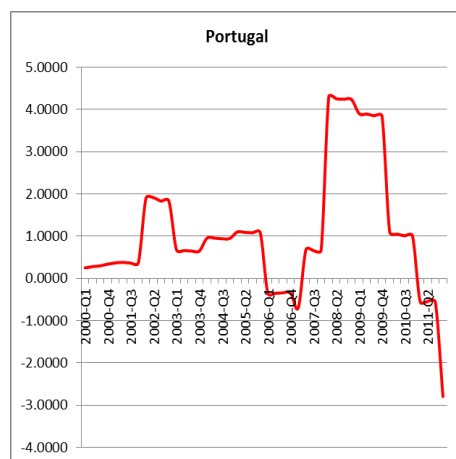






EUROZONE SOVEREIGN DEBT CRISIS AND ITS IMPACT ON INDIA'S CROSS-BORDER CREDIT MARKET

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Note: The X-axis denotes the period from 2000-Q1 to 2011-Q4. Y-axis denotes the percentage change in sovereign debt to GDP over the previous quarter. Source: Author's calculations from the data sourced from the Eurostat database.

Table 2 shows the variables' descriptive statistics. The average CBBC in India was around \$ 3892.53 mn against the maximum of \$ 26609 mn with a standard deviation of \$ 6352.02 mn. The average quarterly IGDP for the sample period was 3.21 against the maximum of 7.89, with a standard deviation of 1.82. IVOL had a mean of 22.35 against the maximum of 40.51, with a standard deviation of 4.69.

**Table 2. Descriptive statistics**

Statistic	CBBC	IGDP	IVOL	CIDGDP	CEUDGDP
Mean	3892.53	3.21	22.35	-0.32	0.35
Median	579.00	3.46	21.13	-0.47	0.18
Maximum	26609.00	7.89	40.51	2.04	12.00
Minimum	0.00	-2.00	17.02	-1.79	-4.70
Std. Dev.	6352.02	1.82	4.69	1.07	2.02
Skewness	1.86	-0.43	1.98	0.77	1.46
Kurtosis	5.44	4.31	7.60	2.82	8.65
Jarque-Bera	356.90	45.06	664.44	43.39	730.34
Observations	432	432	432	432	432

Change in sovereign debt to GDP of India quarterly was with a mean of -0.32 as against a maximum of 2.04 with a standard deviation of 1.07. Similarly, the quarterly change

in sovereign debt to GDP of Eurozone countries was with a mean of 0.35 against the maximum value of 12 and a standard deviation of 2.02.

## METHODS

To estimate the impact of the Eurozone crisis on cross-border credit inflows to India, we consider four explanatory variables: India's quarterly real GDP, the volatility of the Indian financial market, the change in the ratio of sovereign debt to GDP of India, and the change in the ratio of sovereign debt to GDP of Eurozone countries. The addition of variables relating to the sovereign debt of the host nation, India, and the home countries of Eurozone banks, distinguishes this model. Because Eurozone banks hold significant government debt instruments on their balance sheets, the deterioration of their sovereign debt affects their cross-border lending. Popov and van der Linden published their findings in 2013.

The panel methods primer model is expressed as

$$Y_{it} = f(X_{it}, \beta) + \delta_i + \gamma_t + \epsilon_{it} \quad \text{Eq (1)}$$

Assuming a linear conditional mean specification, the specification can be expressed in the following manner;

$$Y_{it} = \alpha + X_{it} \beta + \delta_i + \gamma_t + \epsilon_{it} \quad \text{Eq (2)}$$

In the model,  $Y_{it}$  is the dependent variable, and  $X_{it}$  is a k-dimensional vector of regressors. The error terms,  $\epsilon_{it}$ , are observed for dated periods  $t = 1, 2, \dots, T$  and cross-sectional units  $i = 1, 2, \dots, M$ . The constant in the model is represented by  $\alpha$ , while  $\delta_i$  and  $\gamma_t$  represent cross-section or period-specific effects that can be either random or fixed.

Given the objective to estimate the effect of the Eurozone debt crisis on the cross-border credit flows into India, we formalize the regression setup as below:

$$CBBC_{it} = \alpha + IGDP_t + IVOL_t + CIDGP_t + CEUDGP_{it} + \delta_i + \gamma_t + \epsilon_{it} \quad \text{Eq (3)}$$

where,  $CBBC_{it}$  is the quarterly outstanding cross-border claims on India from the Eurozone country  $i$  at time  $t$ ,  $IGDP_t$  represents the quarterly real GDP of India,  $IVOL_t$  denotes the volatility of the Indian financial market at the time  $t$ ,  $CIDGP_t$  is the quarterly change in the ratio of sovereign debt to the GDP of India, and  $CEUDGP_{it}$  is the quarterly change in Eurozone countries' sovereign debt to GDP ratio.  $\epsilon_{it}$  denotes the error term.

Table 3 summarizes the coefficient estimates from the panel regression. All of the coefficients have the predicted sign. More robust GDP growth in India, the host nation, leads to more cross-border bank lending to its people, but more significant levels of Indian sovereign debt lead to less lending. Higher government debt levels and financial market volatility in India are linked to decreased cross-border bank lending.

**Table 3. Panel regression results**

Variable	Model 1	Model 2
IGDP	164.077 (100.43)	164.077 (130.97)
IVOL	-25.780 (39.83)	-25.780 (54.49)
CIDGDP	-1013.37*** (170.36)	-1013.37*** (222.46)
CEUDGDP	556.99*** (98.28)	556.99*** (118.71)
Intercept	3427.62*** (980.75)	3427.62*** (1327.77)
Adjusted R-squared	0.678	0.678
Observations	432	432

This table reports the regression results of the dependent variable - Cross-border bank claims in India. Model 1 is estimated with Panel Least Squares, and Model 2 is estimated with Panel Generalized Method of Moments. Periods included: 48, Cross-sections included: 9. Coefficients of estimates followed by standard errors in parenthesis are presented. "\*\*\*", "\*\*", and "\*" denote significance levels at 1 percent, 5 percent, and 10 percent, respectively.

The coefficients of CIDGDP and CEUDGDP are statistically and economically significant. One percent change in sovereign debt to the GDP of India is linked with 1013 million U.S. dollars of international lending to India. Similarly, a 1% change in sovereign debt to the GDP of Eurozone countries is associated with 556 million U.S. dollars of cross-border lending to India. One percent rise in India's real GDP growth rate is associated with 164 million U.S. dollars of cross-border lending to India. One point change in the volatility index of Indian financial markets is associated with 25.78 million U.S. dollars of cross-border lending to India.

## RESULTS AND DISCUSSION

The purpose of this section is to provide a broad analysis of different aspects of the methodology and results within their context. Nevertheless, it is crucial to acknowledge that

this approach is constrained because it only offers indirect evidence on the factors in Eurozone countries that influence cross-border bank lending to India instead of direct evidence. The lack of true currency-adjusted statistics on bilateral cross-border flows causes this shortcoming. However, the results' strength depends on the estimates' robustness.

In many empirical studies, endogeneity is a significant issue. Despite this, it seems unlikely that foreign claims substantially impacted changes in India's lending in recent years. The idea that international bank lending was the driving force behind India's growth is also hard to accept. To address this issue, we performed a regression analysis using a one-quarter lag of the IGDP variable. The results showed that all coefficients were still resilient, showing that even if endogeneity exists, it does not substantially impact our conclusions.

The regression approach employed in this research and the explanatory variables chosen are critical for comprehending cross-border bank lending patterns. Cross-border claims are used to net out intra-bank positions, providing a more realistic representation of the level of cross-border lending (Cerutti et al., 2012). As a significant aspect of the credit equation, IGDP (India's GDP) is also utilized to assess the host country's economic fundamentals (Cerutti et al., 2012). According to the traditional credit equation, higher output levels, including significant cross-border loans, necessitate more credit.

The importance of demand factors is also highlighted in this analysis, with quarterly GDP being a crucial variable. As higher output levels require more credit, GDP is a crucial demand factor in determining the extent of cross-border lending. Takats (2010) further supports the importance of demand and supply specifications in credit equations, illustrating their robustness.

In addition to demand factors, market volatility is a significant driver of international bank lending. The variable IVOL, which captures the volatility of financial markets in India, is included in the analysis. Higher volatility suggests that banks are finding it more challenging to raise additional capital, which, in turn, limits the credit supply. Takats (2010) has shown that global home country shock indicators, such as the VIX, can explain a substantial part of the variation of cross-border bank lending, especially during the post-Lehman episode. Similarly, IVOL is a significant contributor to cross-border bank financing in our research.

Overall, the regression framework and the choice of factors used in this analysis are critical for understanding the determining factors of cross-border financing by banks. The findings of this study are consistent with previous research on this topic and highlight the

importance of demand factors, market volatility, and economic fundamentals in determining the extent of cross-border lending.

The model considers changes in India's government debt and Eurozone nations as critical variables. The correlation statistics suggest that as CEUDGDP increases, CBBC increases as well. However, as CIDGDP increases, CBBC decreases. Furthermore, there is no multicollinearity because the estimated variance inflation factors are within the usually acceptable values. We do panel unit root tests because current research demonstrates that panel-based unit root tests have greater power than individual time series unit root testing. To test the robustness of the regression framework, like with any econometric model, try expanding it to include other cross-border bank lending parameters. This model conforms to the goodness of fit requirements as the coefficient of determination is estimated, indicating that almost 68 percent of the data are closest to the line of best fit.

The results are consistent with transnational financial shock propagation via multinational bank balance sheets. It, therefore, adds to the literature that has shown that banks transmit adverse shocks to their capital domestically (Jimenez et al., 2012) and across borders (De Haas and Van Horen, 2012; Popov and Udell, 2012; Schnabl, 2012). The findings indicate a strong relationship between cross-border credit availability and sovereign debt difficulties, demonstrating that the Eurozone sovereign debt crisis has major cross-border consequences for the real economy via the bank-lending channel.

It is crucial to remember that the economic consequences of cross-border bank lending on a given economy are proportional to its share of total bank lending to that industry. For example, in Latin America, foreign banks play a substantial role, but cross-border lending is a relatively less important part of their operations because foreign banks tend to fund most of their lending to the region locally (McCauley *et al.*, 2010). On the other hand, in emerging Asia, cross-border lending represents a much larger part of the operations of foreign banks, but the overall role of foreign banks tends to be small (BIS, 2011). Consequently, changes in cross-border lending to that area typically have a moderate economic impact. Finally, the data imply that the Eurozone crisis had a detrimental impact on cross-border capital flows to India.

## CONCLUSION AND IMPLICATIONS

Cross-border bank loans to India fell precipitously from 2011 to 2012 during the Eurozone financial crisis, capping a seven-quarter rebound. This decline raises questions for researchers and policymakers regarding its causes, including changes in demand for credit,

India's sovereign risk, and the health of Eurozone banks supplying credit. The literature review identifies research gaps on the crisis' impact on cross-border credit and the need for additional research to understand its effects and find answers to these questions thoroughly. This study examines the reasons behind the reduction in cross-border financing to India and discusses related issues. It investigates whether the reduction was caused by a dip in credit demand in India, an increase in India's sovereign risk, or variables connected to the soundness of Eurozone banks that provide cross-border credit using BIS IBS data sets. The study also seeks to determine which financial systems were most responsible for the downturn.

The findings show a substantial link between cross-border credit availability and sovereign debt issues, underscoring the enormous cross-border implications of the Eurozone crisis on the real economy via the bank-lending channel. The regression framework has a good fit, with a coefficient of determination indicating that almost 68 percent of the data is closest to the line of best fit.

The findings are consistent with prior studies on the worldwide transmission of financial shocks via multinational banks' balance sheets, which convey adverse shocks to their capital locally and beyond borders. The findings of this study contribute to the literature on the topic and highlight the significance of understanding the determinants of cross-border financing in the context of economic fundamentals, demand factors, and market volatility. Like any other econometric model, the regression framework might be developed to assess the robustness of cross-border bank lending and incorporate additional factors.

The findings indicate that the deepening debt crisis in the Eurozone was the primary driver of India's dramatic drop in cross-border bank claims. This crisis hindered the ability of Eurozone banks to provide cross-border credit, leading to the decline. Demand for credit in India did not decrease significantly, suggesting that the Eurozone crisis was a significant factor behind the decline.

According to the findings, an increase in India's sovereign risk contributed to a drop in cross-border loans, which was impacted by the Eurozone crisis. The findings highlight the importance of changes in Eurozone sovereign debt in explaining the decline in Indian cross-border bank claims, demonstrating that the condition of Eurozone banks providing cross-border loans to India is an important determinant. The analysis also suggests that the Eurozone financial systems were the primary drivers of the fall since the recent decrease in cross-border bank lending was mainly related to Eurozone banks' poor condition.

Finally, the study provides insights into the relationship between sovereign debt, real GDP growth rate, and international lending. Results show that a 1 percent change in sovereign debt to the GDP of India is associated with 1013 million U.S. dollars of cross-border lending from the Eurozone, while a 1 percent change in sovereign debt to the GDP of the Eurozone is associated with 556 million U.S. dollars of cross-border credit to India. The study also finds that a one percent rise in India's growth rate in real GDP is associated with 164 million U.S. dollars of cross-border bank financing to India.

The study's findings are consistent with many emerging economies' policy worries that multinational banks may spread financial shocks originating in their native nations. As a result, a high cross-border credit concentration originating from a small number of financial systems in advanced economies may expose economies such as India to country or region-specific financial shocks generated by international bank cross-border lending.

This study has far-reaching ramifications for policymakers and researchers. It emphasizes the significance of understanding the drivers of cross-border finance and the Eurozone crisis has had enormous cross-border ramifications for the real economy via the bank-lending channel. According to the analysis, the Eurozone crisis was the fundamental cause of the steep fall in cross-border bank lending to India. This highlights the importance of strengthening the resilience of cross-border lending to avoid such events in the future. The study highlights how changes in sovereign debt within Eurozone nations account for the decline in cross-border bank claims in India. As a result, regulators should keep an eye on the soundness of Eurozone banks that provide cross-border lending to India to avert possible problems.

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