

The Global Financial Crisis

Project Synopsis¹

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Problems that initially emerged in the U.S. subprime market in 2007 quickly spread around the world to generate the most severe and synchronized global financial crisis and recession since the Great Depression. The global ramifications of this crisis were largely unforeseen and have forced a rethinking of international financial linkages. Previous research on the role of these linkages has been hampered by a lack of detailed data. This project produced fourteen new research papers that develop, augment and analyze new data sets on cross-border asset flows and holdings in order to advance our understanding of global aspects of the recent financial crisis. These papers prioritized providing empirical analysis to provide the intellectual underpinnings for policies to better manage and reduce the likelihood of future financial crises. The project also emphasized analysis that bridged the research being done in the fields of corporate finance and international macroeconomics – a nexus at the heart of the causes and effects of this global crisis.

The papers can be broadly grouped into three categories: causes of the crisis (financial integration, capital flows and global imbalances), the spread of the crisis (contagion through banks, investors, and other channels), and policies to reduce country vulnerability in the future (reserve accumulation, capital controls, prudential policies, and changes to the global financial architecture). The following synopsis summarizes the key insights from each paper.

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Financial Integration, Capital Flows and Global Imbalances: Aggravating or Ameliorating Crises?

Financial globalization, international capital flows, and global imbalances increased dramatically before the crisis. These trends can provide substantial benefits—such as facilitating access to capital for profitable investments, allowing greater diversification of risk, and improving market discipline. These trends can also increase risks, however, as countries become more vulnerable to changes in investor sentiment and events in other parts of the world. Several papers in this project reevaluated the implications of increased financial globalization and cross-border capital flows in light of the crisis, evaluating new aspects of cross-border capital flows and how global imbalances and financial integration performed during and after the crisis.

One aspect of global imbalances which received substantial attention—even before the crisis—was the "global saving glut" (GSG) hypothesis. This hypothesis argues that large capital flows from emerging market economies to the United States led to significant declines in long-term interest rates in the United States and other industrial economies. With the benefit of hindsight, it is now clear that these lower interest rates, combined with innovations and deficiencies of the U.S. credit market, contributed to the U.S. housing bubble and to the buildup in financial vulnerabilities that led to the financial crisis. Europeans generally argued that they were not a key player in the saving glut as Europe as a whole had fairly small net capital flows. **Bertaut, DeMarco, Kamin, and Tryon**, however, present a more complete picture of how capital flows contributed to the crisis. They document sizable flows from European investors into U.S. private-label asset-backed securities (ABS), including mortgage-backed securities and other structured investment products. By adding to domestic demand for private-label ABS, substantial foreign acquisitions of these securities contributed to the decline in their spreads over Treasury yields. Through a combination of estimation and model simulation, the authors verify that both GSG inflows into Treasuries and Agencies and European acquisitions of ABS played a significant role in contributing to downward pressures on U.S. interest rates.

Forbes and **Warnock** also examine the factors driving international capital flows, but attempt to understand not only periods of large capital inflows (as occurred under the GSG hypothesis), but also why these capital flows can suddenly reverse. They also take a longer-term perspective by analyzing what they call the international "waves" in capital flows since 1980. The authors develop

a new methodology for identifying episodes of extreme capital flow movements using quarterly data on gross inflows and gross outflows so that they can differentiate activity by foreigners and domestics. They use this approach to document episodes of “surge”, “stop”, “flight”, and “retrenchment” and show that disaggregating capital flows into movements driven by foreigners and domestic yields a fundamentally different understanding of what causes extreme capital flow movements than the previous literature that used measures of net flows. They find that global factors, especially global risk, are the most important determinants of all types of extreme capital flow movements. Contagion, especially through trade and the bilateral exposure of banking systems, is important in determining episodes when foreigners stop investing abroad and domestics retrench and bring money home. Domestic macroeconomic characteristics are generally less important, although changes in domestic economic growth have an influence on flows from foreigners. They find little role for capital controls in reducing capital flow waves. The insights from analyzing the behavior of domestic investors as well as foreigners highlight the importance of global factors in causing crises and capital flow volatility.

If global factors are the most important determinants of capital flows, what happened to capital flows in various countries during the severe global shock from the crisis? **Lane and Milesi-Ferretti** answer this question by providing an in-depth analysis of how global imbalances evolved directly before, during and after the crisis. They show that the period preceding the global financial crisis was characterized by a substantial widening of current account imbalances across the world. Since the onset of the crisis, however, these imbalances contracted to a significant extent. Countries whose precrisis current account balances were in excess of what could be explained by standard economic fundamentals experienced the largest contractions in their external balance. When the authors attempt to explain how these global imbalances adjusted, they find that external adjustment in deficit countries was achieved primarily through demand compression, rather than expenditure switching. They also show that the main channel of financial account adjustment was through changes in other investment flows, and that official external assistance and ECB liquidity cushioned the exit of private capital flows for some countries. The authors speculate on the future path of global imbalances—describing different scenarios under which the reduction in imbalances that occurred during the crisis might only be temporary and further adjustment may be needed.

Gourinchas, Rey, and Truempler consider how these changes in international capital flows, when combined with changes in asset valuations, transferred wealth across countries during the crisis. They construct valuation changes on bilateral external positions in equity, direct investment, and portfolio debt at the height of the crisis and show that these valuation changes were sizable, even when compared to the massive domestic wealth losses brought about by the crisis. Then the authors map which countries benefited and which countries lost on their international exposure from the massive movements in relative asset prices. They find that countries' external portfolios played an important role in transferring gains and losses during the crisis. Countries long equity or direct investment faced losses on their net positions, as risky assets took some of the sharpest valuation falls in the crisis. The United States saw a substantial deterioration in its international investment position with a valuation loss amounting to roughly \$2,200 billion. Other countries with notable valuation losses included Switzerland, the Euro area, and to a lesser extent, China. These countries were “global insurers” in the sense that the deteriorations in their net international asset positions provided wealth transfers to other countries. The authors are also able to link the gains and losses on debt portfolios across countries to their exposure to ABCP conduits and to dollar shortages. This work suggests that financial integration provided one of its theoretical benefits of transferring wealth across countries during the recent crisis—although in some unexpected directions.

Global Contagion: What was the Role of Banks, Investors and Trade?

Although international exposure may have provided some insurance through positive wealth transfers for some countries during the crisis, international exposure also played a more damaging role by causing the crisis to spread quickly from the U.S. housing market to the broader U.S. economy and then around the globe. The world swiftly transitioned from the “global savings glut” state described at the beginning of this synopsis, to a sudden contraction in global liquidity. The next set of papers evaluates the various channels by which the crisis was magnified and contagion occurred. The papers focus on the key role of major financial players, such as banks and investors, and attempts to understand better what drove their behavior during the crisis and how they transmitted the crisis internationally. Papers also consider whether providing liquidity could have stemmed the spread of the crisis, as well as if “real” contagion through channels such as trade and demand played a role in addition to the more apparent financial channels of contagion.

Shocks tend to be magnified and spread more rapidly in the presence of leverage. **Kalemli-Ozcan, Sorensen, and Yesiltas** begin this series of papers on contagion by documenting new stylized facts on bank and firm leverage before the crisis using micro-level data. The authors find that although there was very little buildup in leverage for the average non-financial firm and commercial bank before the crisis, there was a significant increase in the leverage ratios of large commercial banks in the United States and investment banks worldwide during the early 2000s. They also show that off balance-sheet items constitute a large fraction of assets, especially for large commercial banks in the United States, and that the leverage ratio is pro-cyclical for investment and commercial banks in the United States. These results show that excessive risk taking before the crisis was not easily detectable outside of investment banks, because much of the risk involved the quality rather than the amount of assets. They also find that banks in emerging markets with tighter bank regulation and stronger investor protection experienced significantly less deleveraging during the crisis—a result which has important implications for future bank regulatory policy.

Even though commercial banks may not have appeared to have problematic levels of leverage before the crisis, once the crisis began, globally active banks played an important role in spreading shocks internationally. One channel for this linkage is through how these banks manage liquidity across their entire banking organization. **Cetorelli and Goldberg** document that funds regularly flow between parent banks and their affiliates in diverse foreign markets. The authors use the Global Financial Crisis as an opportunity to identify balance sheet shocks to parent banks in the United States. Then they present an econometric evaluation of the features of parent banks and overseas affiliates that influence the allocation of organizational liquidity. For example, they test for the role of a bank's status as an important location in sourcing funding or as a destination for foreign investment activity. They show that distance from the parent organization plays a significant role in this liquidity allocation, where distance is bank-affiliate specific and depends on the ex ante relative importance of such locations as local funding pools and in overall foreign investment strategies. The results show that these flows within banks create an important source of international shock transmission, a form of global interdependence that had previously not been explored in detail.

Banks can not only transmit shocks internationally through their management of liquidity across foreign affiliates, but also through their international lending decisions and interactions through global banking networks. **Hale** argues that global banking networks can be important in overcoming asymmetric information and supporting lending to firms for productive investments. To better understand these links, the author uses network analysis to describe bank relationships in the global banking network. She constructs a novel dataset that builds a bank-level global network from loan-level data on syndicated loans to financial institutions between 1980 and 2009. The network consists of 7,938 banking institutions from 141 countries. She shows that the network became more interconnected and more asymmetric, and therefore potentially more fragile, prior to 2008. Recessions and banking crises tend to have negative effects on the formation of new connections, and these effects are not the same for all countries or all banks. The Global Financial Crisis of 2008-09 followed this pattern and had a large negative impact on the formation of new relationships in the global banking network. The Crisis of 2008-9 made banks very cautious in their lending, meaning that almost no new connections were made, particularly in 2009, which could have longer term effects as economies recover. It will take time to rebuild these networks.

This important role of banks in spreading the crisis through reduced lending had not only the effect of reducing global liquidity, but given the central role of US banks in providing dollars, also created a global shortage of dollar liquidity. In response, the Federal Reserve partnered with other central banks to inject dollars. Empirical studies of the success of these efforts have yielded mixed results, in part because it is difficult to correct for the endogeneity between these injections and events in funding markets. In their paper, **Rose and Spiegel** use a new identification technique to examine the cross-sectional impact of these interventions. The authors explain that the impact of the dollar injections should be greater for countries that have greater exposure to the United States through trade and financial channels, less transparent holdings of dollar assets, and greater illiquidity difficulties. They test these predictions on observed cross-sectional changes in CDS spreads for different countries, using a new proxy to measure the innovations in perceived CDS changes constructed using a novel index of sovereign risk based on Google-search data. They find robust evidence that auctions of dollar assets by foreign central banks disproportionately benefited countries that were more exposed to the United States through either trade linkages or asset exposure. They obtain weaker results for differences in asset transparency or illiquidity, but several of the important announcements concerning the international swap programs

disproportionately benefited countries exhibiting greater asset opaqueness. These results suggest that the dollar liquidity provisions could play some role in reducing contagion caused by banks reducing liquidity across borders.

Banks, however, were not the only financial players through which the crisis spread internationally. As banks sharply restricted liquidity and lending across borders, investors simultaneously reduced their capital flows abroad. **Fratzscher** analyzes a novel dataset of high-frequency mutual fund investment in equity and debt in 50 economies. He uses this data in the context of a factor model to understand better what drove the behavior of investors during and immediately after the crisis. The author finds that common shocks – key crisis events as well as changes to global liquidity and risk – exerted a large effect on capital flows, both during the crisis and in the recovery. These effects were highly heterogeneous across countries, however, with a large part of this heterogeneity explained by differences in the quality of domestic institutions, country risk, and the strength of macroeconomic fundamentals. Comparing and quantifying these effects shows that while common factors ("push" factors) were the main drivers of investor flows during the crisis, country-specific determinants ("pull" factors) have been more dominant during the recovery in 2009 and 2010, especially for emerging markets.

Raddatz and **Schmukler** use the same novel micro-level data on mutual fund investors, but focus on the different roles of fund managers versus the underlying fund investors in transmitting shocks across countries. The authors find that the volatility of mutual fund investments is driven by both the underlying investors and fund managers, through both injections/redemptions into each fund and managerial changes in country weights and cash. Both investors and managers respond to country returns and crises and adjust their investments substantially in response to events such as the Global Financial Crisis. The behavior of both types of actors tends to be procyclical, pulling out of countries during bad times and increasing exposures when conditions improve. Managers actively change country weights over time, although there is significant short-run pass-through from returns to these weights. The results suggest that mutual fund investors can transmit shocks across countries in their portfolio and thereby act as a channel for financial contagion.

Although this series of papers finds a prominent role for investors and banks in causing contagion through financial channels during the Global Financial Crisis, it is also possible that contagion occurred through “real” linkages. For example, many Asian economies that had little exposure to the U.S. subprime and housing markets and that had weaker links with the United States through direct bank and investment links, still suffered severe output contractions in late 2008 and early 2009. **Claessens, Tong, and Wei** test for the roles of contagion through real as well as some financial channels by using accounting data for 7,722 non-financial firms from 42 countries to examine how the 2007-9 crisis affected firm performance. They isolate and compare the effects from changes in external financing conditions, domestic demand, and international trade on firms’ profits, sales and investment using both sectoral benchmarks and firm-specific sensitivities estimated prior to the crisis. The authors find that the crisis had a bigger negative impact on firms with greater sensitivity to demand and trade, particularly in countries more open to trade. Interestingly, financial openness appears to have made limited difference. These results provide evidence that “real” channels of contagion through effects on trade flows and aggregate demand were important in spreading the Global Financial Crisis.

Reducing Country Vulnerability: Capital Controls, Reserves, the IMF, or Something New?

The series of papers documenting how a crisis that begins in one country can rapidly spread around the world through various channels suggests that a top priority for policymakers should be to reduce their vulnerability to external shocks. Over the past few decades, international institutions have relied more and more heavily on large emergency lending packages to stabilize economies during crises. As the scale and scope of these crises grow, however, and the corresponding size of the necessary rescue packages increases, this approach is becoming increasingly costly. Moreover, as larger developed economies may be the next crisis countries, it is unclear that emergency lending on the scale that would be necessary is even available. The recent crisis provides a case study to test which strategies were more effective at supporting countries as the global economy deteriorated and the crisis spread. Papers examined whether the traditional strategy of accumulating reserves, or the increasingly popular approaches of instituting new capital controls and stronger prudential regulations, reduced country vulnerability during the recent crisis. A final paper suggests that current strategies are reaching their limits and it is time for a new structure for country debt to stabilize economies in the future.

Many emerging market countries accumulated massive international reserve portfolios prior to the global financial crisis, partly to provide precautionary self-insurance in the case of a sudden stop in capital inflows and/or contagion. **Dominguez, Hashimoto, and Ito** analyze if these pre-crisis international reserve accumulations, as well as exchange rate and reserve decumulation decisions made during the crisis, can explain cross-country differences in post-crisis economic performance. Many emerging markets saw minimal changes in reserve ratios during the crisis—which some interpreted as showing that the reserves provided little insurance as countries were unable or unwilling to use them after a shock. The authors show, however, the importance of distinguishing between passive valuation changes and active management of the assets in international reserve portfolios in order to fully understand the dynamics of reserves during the crisis. The authors find evidence that reserves served as an important counter-cyclical policy tool for a number of emerging market countries during the crisis. Among countries that depleted their reserves, those that were able to replenish their reserve accumulations by the end of 2009 were also the countries that experienced the largest output recoveries in 2010.

Chamon, Ghosh, Ostry, and Qureshi analyze two other approaches to reducing country vulnerability that have become even more popular after the crisis—adapting prudential policies and/or capital controls in order to reduce financial fragilities resulting from capital inflows. They construct new indices for prudential policies and for financial-sector-specific capital controls for 50 emerging market economies over the period 1995-2008. Their results indicate that both prudential regulations related to currency denomination and capital controls tend to reduce the proportion of foreign currency-denominated loans by the domestic banking sector and to shift the country's external liability structure away from portfolio debt. Other prudential policies, however, appear to be more effective in restraining overall banking system credit booms. Experience from the Global Financial Crisis suggests that countries that had such prudential policies and capital controls in place prior to the crisis fared better in terms of the output decline during the crisis.

Even if the careful use of prudential regulations, capital controls, and reserve accumulation helped support some economies during the recent Global Financial Crisis, these steps are unlikely to be sufficient to protect countries in the future in this era of financial globalization. Additional

policies should be considered. After surveying the modern history of financial crises, **Barkbu**, **Mody**, and **Eichengreen** present a novel proposal for reducing vulnerabilities in the future. They show that emergency lending packages have grown over time, while debt restructuring has become less frequent. Private lenders have an obvious interest in holding out for full payment, while national officials have an interest in pushing into the future a difficult and politically embarrassing restructuring. Recognizing that restructuring is difficult during a crisis, private investors have an incentive to lend at rates that are, in retrospect, too low. This implies that the next crisis has a larger capital outflow, increasing the size of the official financing needed to limit the damage. This cycle leads the authors to ask what can be done to rebalance the management of debt problems toward a better mix of emergency lending and private sector burden sharing. Building on the literature on collective action clauses, they explore the idea of "sovereign cocos": contingent debt securities that automatically reduce payment obligations in the event of debt-sustainability problems. Automating the process of debt restructuring has key advantages: it preserves the integrity of the contract (which avoids the uncertainties involved in triggering CDS); it is predictable; and it can be priced. Although this idea is preliminary and a number of difficult technical issues need to be addressed, it is a novel and promising proposal to address vulnerabilities that contributed to the recent crisis.