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Abstract

This paper examines the new trends in research on capital flows fueled by the 2007-2009 Global Crisis. Previous studies on capital flows focused on current-account imbalances and net capital flows. The Global Crisis changed that. The onset of this crisis was preceded by a dramatic increase in gross financial flows while net capital flows remained mostly subdued. The attention in academia zoomed in on gross inflows and outflows with special attention to cross border banking flows before the crisis erupted and the shift towards corporate bond issuance in its aftermath. The boom and bust in capital flows around the Global Crisis also stimulated a new area of research: capturing the "global factor." This research adopts two different approaches. The traditional literature on the push-pull factors, which before the crisis was mostly focused on monetary policy in the financial center as the "push factor," started to explore what other factors contribute to the comovement of capital flows as well as to amplify the role of monetary policy in the financial center on capital flows to the periphery. This new research focuses on global banks' leverage, risk appetite, and global uncertainty. Since the "global factor" is not known, a second branch of the literature has captured this factor indirectly using dynamic common factors extracted from actual capital flows or movements in asset prices.

Keywords: The Global Crisis, Capital flow cycles, global banks, "push" and "pull" factors, corporate borrowing, global factors, dynamic latent factor models.

JEL Codes: F30, F34, F65

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I. Introduction

Almost 45 years after barriers to capital flows were erected around the world in the aftermath of the Great Depression, the collapse of the Bretton Woods System in 1973 launched a new era of financial globalization. With floating exchange rates, countries can follow independent monetary policies even in the presence of capital mobility. Thus, as currencies started to float in 1973, countries began removing restrictions to capital flows. United States and Germany were the first to eliminate capital controls. Japan, the United Kingdom, and Latin America followed later in the 1970s. The rest of Europe followed suit in the late 1980s by relaxing controls on its path to the monetary union. By the early 1990s East Asia had removed most capital controls. Since then, capital flows have dramatically increased and have played an important role on economic growth, the business cycle, and financial crises.

Naturally, the research on capital flows has surged. One of the areas of research that has flourished the most is that of understanding what triggers boom-bust cycles in international capital flows. With developing countries suffering a variety of currency, banking, and sovereign debt crises in the 1980s and 1990s in the aftermath of capital flow bonanzas, the focus during this early phase of financial globalization was on these countries. One theme of this research is the distinction between global "push" factors and country-specific "pull" factors. The questions most frequently asked are about the role of the financial center. Is monetary policy in the financial center at the core of the volatility of capital flows to the periphery? Does monetary policy in the financial center trigger crises in the periphery? Calvo, Leiderman, and Reinhart (1993, 1996) were the first to emphasize the importance of external push factors in explaining capital flows to emerging economies. They isolated monetary policy in the financial center as one of the main culprits fueling capital flow bonanzas to the emerging periphery. Importantly, the early empirical research on capital flows focused on the behavior of net capital flows or current account imbalances. All this changed with the onset of the Global Crisis in 2007. The focus of attention shifted to advanced economies. Also, since the onset of the Global Crisis was preceded by a dramatic increase in gross financial flows while net capital flows remained mostly subdued, the attention in academia and policy circles zoomed in on gross inflows and outflows with special attention to cross border banking flows.

This paper reviews the new research on capital flows during the last ten years in the aftermath of the Global Crisis. We can divide this research as follows: First, the research focusing on the triggers of the 2007-2009 crisis as well as on the effect of this crisis on capital flows in its aftermath. This research concentrates on the role of global banks in the years preceding the crisis and on the explosion of non-financial corporates' borrowing in international capital markets in its wake Second, the research

examining the role of global and idiosyncratic factors (the traditional "push-pull" factors) in explaining gross capital flows. This research examines the evidence on gross capital flows for a longer episode, with some research going back to the 1980s. Most of this research uses panel regression estimations. Third, the Global Crisis motivated researchers to capture the degree of commonality in capital flows around the world. This research mostly centers on extracting unobserved components from capital flows using dynamic latent factor models. The next three Sections discuss respectively these three areas of research. The last Section provides some reflections.

II. Capital Flows and the Global Crisis

The Global Crisis erupting in August 2007 and the bonanza that preceded the crisis fueled a growing research on the type and size of capital flows at the core of the capital flow boom preceding the crisis, the mechanisms through which these flows created financial fragilities, and the spillovers of the crisis to both advanced and developing countries. The Global Crisis shifted the focus from current-account imbalances to the spectacular evolution and integration of international financial markets captured with gross flows (inflows plus outflows). These flows increased from about 10 percent of world GDP in 1988 to over 30 percent in 2007. One of the earliest papers assessing the role of gross flows on financial fragility in the years predating the Global Crisis is Obstfeld (2012). In this paper, Obstfeld evaluates (theoretically and empirically) the case for focusing on current account imbalances as well as the case for emphasizing gross flows and positions as the source of financial fragility. He describes how gross exposures in the presence of financial distortions can carry risks of financial instability regardless of whether the country has a current-account deficit or surplus: "a country with a gross short-term debt position may be vulnerable to a run, just as banks are, even if that country as a whole holds a large net foreign asset stock." (page 9). Importantly, while Obstfeld emphasizes that the explosive growth of gross positions led to a *balance-sheet* crisis in 2007-2009, he reminds us that large and persistent current account imbalances in a world with incomplete markets can also signal elevated macroeconomic and financial stresses, as the evidence from the 1980s and the 1990s shows.

Borio and Disyatat (2011) study what triggered the easy credit conditions in the United States leading up to the Global Crisis. They examine the evidence supporting two alternative hypotheses: the "Global Savings Glut" and the "Global Banking Glut." According to the "Global Savings Glut" hypothesis (Bernanke, 2009; Krugman, 2009; and Portes, 2009), net capital outflows from emerging market countries with current account surpluses to current account deficit nations (such as the United States) exerted downward pressure on world interest rates, fueled a credit boom and risk-taking in major advanced

economies and sowed the seeds of the global financial crisis. In contrast, the "Global Banking Glut" hypothesis (Borio and Disyatat, 2011; Shin, 2011; and Acharya and Schnabl, 2011) indicates that the spectacular expansion of global gross flows from the late 1990s to 2007 was driven by flows between advanced economies, which ultimately led to a balance-sheet crisis. In an exhaustive empirical analysis, Borio and Disyatat show that current accounts did not play a dominant role in determining financial flows into the U.S. in the run-up to the crisis. They show that gross capital flows into and out of the United States expanded roughly three times faster than net claims. In contrast to the claims of the "Savings Glut" hypothesis that stresses the role of the official sector in emerging economies, Borio and Disyatat show that the bulk of gross inflows into the United States originated in the private sector, with global banks at the heart of these flows. Importantly, they also show that the largest source of capital inflows into United States was Europe, not emerging markets. Europe accounted for around one-half of total inflows in 2007. Of this, more than half came from the United Kingdom, a country running a current-account deficit and roughly one-third from the Eurozone, a region roughly in balance.

Shin, in his Mundell-Fleming Lecture at the IMF Research Conference (2011), provides a theoretical model on the creation of global liquidity centering on the activities of international banks. At the core of this model is the leverage cycle of banks. The paper shows that cross-border banking flows and the fluctuating leverage of global banks are the channels through which permissive financial conditions are transmitted globally. The presentation also provides in-depth evidence on the important role of global banks in the U.S. credit system. Using data from the BIS banking statistics complemented with data from the Federal Reserve's Flow of Funds, Shin shows that at the onset of the crisis the offshore banking sector intermediating in U.S. dollar claims and obligations was of comparable size to the U.S. commercial banking sector. The paper also provides further information about the importance of the assets of the European global banks in the United States using the Federal Reserve's disclosures on the liquidity support given to commercial banks under the Term Auction Facility.[1] This data shows that non-U.S. banks' and U.S. banks' total borrowing from this facility are similar, providing further evidence that non-U.S. global banks were at the center of the U.S. financial fragility in 2008.

Another early contribution to the "Global Banking Glut" literature is Acharya and Schnabl (2010). In this paper, the authors present an impressive exhaustive analysis of the determinants of the large gross capital flows across advanced economies based on the proliferation of asset-backed commercial paper

[1] This facility allowed banks to access liquidity support without forcing banks to face the stigma of borrowing from the Federal Reserve's discount window

(ABCP) conduits.[2] The authors construct a rich database of ABCP conduits that allows them to identify the country of origin and the funding currency of these instruments as well as their importance to U.S. money market funds. To construct this database, they use a variety of sources including conduit rating reports from Moody's Investor Service, Bankscope, Osiris, the Federal Reserve Flow of Funds, and iMoney Net. As shown in the paper, ABCP conduits grew significantly before the financial crisis, becoming the largest short-term debt instrument with more than $1.2 trillion outstanding in January 2007. Sixty percent of those conduits were sponsored by global banks outside the United States. Importantly, in contrast with the hypothesis of the savings glut, the sponsoring commercial banks were based both in current account surplus countries (for example, Germany, Japan, and the Netherlands) and current account deficit countries (for example, the United States and the United Kingdom). Their estimates show that, independent of the sponsor location, most (80 %) ABCP was issued in U.S. dollars. These ABCP conduits were sold to risk-averse investors, such as money market funds, who invested between 10% to 30% of their portfolio in ABCP conduits. Most of the proceeds were used to invest in long-term financial assets of current account deficit countries, such as the United States. As shown by regressions estimates, when negative information about U.S. assets became apparent in August 2007, banks in both surplus and deficit countries experienced difficulties in rolling over ABCP conduits and as a result suffered significant losses.

Bruno and Shin (2015b) contribute to this debate by quantifying the effect of changes in U.S. monetary policy on cross-border bank capital flows. The attention in this paper is focused on the amplifying role of global bank leverage on the monetary transmission mechanism. To capture this amplifying mechanism, Bruno and Shin estimate a VAR with four indicators: the real Fed Funds target rate, the broker dealer leverage, the VIX, and the real U.S. dollar exchange rate. They find that shocks to monetary policy in the United States have economically significant and persistent effect on risk and banks' leverage, explaining up to 30 percent of the variance of risk (captured with the VIX) and up to 20 percent of the variance of global banks' leverage (captured with the broker dealer leverage). In turn, leverage shocks magnify the volatility of monetary policy in the United States and risk over medium horizons (explaining almost 40 percent of the variance of monetary policy and 20 percent of the variance of risk). To capture the international dimension of U.S. monetary policy spillovers, the original VAR is expanded to include total cross-border lending by global banks to other banks using BIS Locational Bank Statistics. This

[2] As explained in Acharya and Schnabl, "These conduits are a form of securitization in which banks use off-balance-sheet vehicles to purchase long-term assets financed with short-term debt. Importantly, in this form of securitization, banks retain the credit risk associated with conduit assets. Hence as long as banks are solvent, conduits are risk-free for outside investors but can generate significant risks for banks. In exchange for bearing these risks, banks have access to low-cost funding via the ABCP market." (page 38)

extension shows that banks' leverage is the essential link that amplifies the effect of expansionary U.S. monetary policy shocks and lower risk into larger cross-border banking flows and local currency appreciation. Overall, their findings indicate that shocks to U.S. monetary policy and global banks' leverage have persistent and economically significant effects on cross-border flows.

The previous studies of the Global Crisis focus their analysis on banking flows across advanced economies. Milesi-Ferretti and Tille (2010) extend their analysis to the various types of capital flows around the time of the crisis and include the experiences of both advanced economies and emerging markets. In particular, they study the behavior of capital flows around the Global Financial Crisis using quarterly data for 75 countries from 2006 to 2009. They find that there is a high degree of heterogeneity in the patterns of capital flows across time, types of flows, and countries. Their estimations indicate that international banking flows—particularly among advanced economies— suffered the most dramatic reversal in the aftermath of the crisis. Their analysis stresses that the main driving force in the reversal of capital flows following the Lehman Brothers' bankruptcy was a "risk shock," with investors taking a more cautious view of investment prospects, but that "pull factors" also mattered. In particular, they show that countries with large holdings of debt and bank positions before the crisis saw a larger contraction of capital inflows during the crisis and in its aftermath. Finally, they conclude that macroeconomic conditions also played a role. For example, there was a larger decline in inflows in countries with downward revisions in the fiscal and growth outlook.

While the research at the onset of the 2007-2009 crisis is mostly focused on the banking flow bonanza preceding the crisis, the post-crisis research is largely centered on the rise of international corporate debt. The post-crisis episode witnesses the retrenchment of global banks as the main providers of international liquidity, the surge of assets managers and other investors, and the explosion of issuance of international debt securities. This phenomenon has been dubbed by Shin (2013) as "The Second Phase of Global Liquidity" and is studied in Adrian, Colla, and Shin (2013), Caballero, Panizza, and Powell (2016), Eichengreen (2016), and Bruno and Shin (2017), among others.

Adrian, Colla, and Shin (2013) are the first to examine this switch from loan to bond issuance. Their focus is on the United States. They ask why the economic downturn following the onset of the U.S. crisis affected the banking sector so differently from bond investors. Is it a demand shock or a supply shock? Aggregate data on loan and bond issuance cannot uncover the driver of this phenomenon because the evolution of credit characteristics may simply reflect changes in the number and characteristics of the firms operating in the market. Thus, the authors use granular data on syndicated loans and bond issues together with information on the listed firms participating in these markets to study the drivers of this

shift. To identify shocks to demand or supply of credit, they examine the behavior of firms that issue loans and/or bonds during the financial crisis. They point that the evidence from these estimations indicates an adverse shock to banks' lending. They find that firms that had access to direct credit through the bond market tapped this market in large amounts. For these firms, the contraction in bank lending was largely offset by issuing bonds. Since the cost of credit increased sharply for both bank and bond loans, they conclude that "the demand curve for bond financing shifted out as a response to the inward shift in the bank credit supply curve" (page 160).

Caballero, Panizza, and Powell (2016) and Bruno and Shin (2017) scrutinize further the borrowing choices of non-financial corporations. They raise several questions. What do firms do with the proceeds of bond issued in international capital markets? Do non-financial corporations issue bonds solely for real investment? Or do they also borrow to increase cash holdings or other liquid assets? If they borrow to increase cash holdings, how do they use them? Are they acting like financial intermediaries, reaching for the yield by depositing these funds in banks or other financial intermediaries at higher interest rates? What is the currency of denomination of the bonds? Both papers use granular data on bond issuance combined with firm level-balance sheet data for non-US firms with special attention to their holdings of liquid financial assets.

Caballero, Panizza, and Powell (2016) focus on the behavior of firms in 18 emerging markets and examine whether capital controls can explain why non-financial corporate firms act like financial intermediaries (reaching for the yield). Their hypothesis is that non-financial firms tend to act like financial intermediaries in countries with capital controls because non-financial corporates have a comparative advantage in arbitraging capital controls that prevent banks from pursuing profitable opportunities. This is because non-financial firms may have ways of escaping these controls as they can issue bonds in offshore financial centers and then bring the proceeds of that issuance into the home country via inter-company loans (which in the balance of payments is normally counted as FDI). Caballero, Panizza, and Powell also examine an alternative hypothesis: Is the explosive increase in non-financial corporate borrowing a response solely due to the retreat of global banks from international capital markets? Their estimates support the hypothesis that capital controls are at the core of the increase in international bond issuance in search for a yield.

Bruno and Shin (2017) focus on the behavior of firms in 20 emerging markets and 27 advanced economies from 2002 to 2014 to answer four questions. First, are there systematic departures from the "pecking order" theory of corporate finance (a firm uses internal funds first and only borrows when such funds are insufficient)? Second, what does the firm do with the proceeds of bonds issued? Are the

proceeds used to finance fixed assets and real economic activity? Or do the proceeds end up as cash on the firms balance sheet? Third, are there systematic differences in the triggers of international bond issuance in emerging and advanced economies? Fourth, what triggers carry trade? Bruno and Shin have three main findings. First, advanced economy's firms' borrowing patterns conform more to a conventional pecking order model of corporate financing decisions whereas those of emerging economies resemble carry-trade like decisions. Second, carry-trade behavior is linked to issuance in dollar-denominated bonds. Third, carry trade increases in times of low volatility of the exchange rate and high interest rate differentials.

The early research on capital flow bonanzas stresses how global banking flow booms fueled vulnerability in advanced economies leading to the 2007-2009 crisis. The new research on international borrowing warns of a new capital flow bonanza in emerging economies, this time with non-financial corporations at its core. It is argued that non-financial corporates are taking advantage of the unprecedented easy global financial conditions following the 2007-2009 crisis by borrowing mostly in dollars and investing in higher yielding domestic assets like bank deposits. As discussed in Eichengreen (2016) and Chui, Fender, and Sushko (2014), this second phase of global liquidity may expose corporations to currency as well as roll-over risks in times of hikes in world interest rates, with fragilities also spreading to local banks as corporates withdraw their deposits from these banks. These risks suggest that this research may soon expand into a more formal model of early warnings of distress. Interestingly, this research also emphasizes that the surge in corporate borrowing is fueled by an increase in capital controls and overall macroprudential regulations introduced in the aftermath of the global crisis. It is believed that banks cannot circumvent these controls while corporates can. Still, this phenomenon of corporate borrowing and carry-trade in the aftermath of the global crisis is not new. Also, it is not necessarily an emerging market phenomenon as emphasized by this empirical literature. One important example is Japan in the 1980s. During that decade, non-financial corporates started to behave as financial surrogates. As explained in Masazumi, Shin, and Takahashi (2009), this behavior was triggered by the gradual implementation of financial deregulation of the banking and corporate sector. Naturally, this example suggests the need to investigate further the effects of the complex phenomenon of financial repression and deregulation in emerging and advanced economies.

III. Gross Capital Flows: Push and Pull Factors

The Global Crisis and the capital flow bonanza that preceded the crisis also stimulated new econometric research on the "push" versus "pull" factors behind capital flow movements. As with the

literature on the triggers of the Global Crisis, the push versus pull factors literature also focuses on gross capital flows. This literature not only pays attention to capital flows around the Global Crisis, but also extends the sample to include (if possible) up to the 1980s, thus providing a better gauge of capital flows in times when the financial center is not in panic and the only crises are in developing countries. Most of this literature relies on unbalanced panel data estimations since the IMF data on capital flows for many countries is only available much later even only starting in the 2000s.[3]

One of the earliest contributions in this area is that of Fostel and Kaminsky (2008). This paper examines the evolution of gross capital inflows captured by gross international primary issuance of bonds, equity, and syndicated loans of Latin American countries since 1980. As in the typical push-pull factor literature, the authors include measures of growth and quality of institutions among the pull factors, and interest rates in the financial center, measures of global liquidity, and risk among the push factors. Using panel estimation, Fostel and Kaminsky find a time-varying pattern in the drivers of capital flows. They find that sound fundamentals matter. For example, Argentina, Brazil, and Chile's superb performance in capital markets during the early 1990s was in large part driven by better fundamentals. However, the upsurge in international lending to Latin America starting in 2003 was mainly driven by the dramatic increase in global liquidity predating the Global Crisis.

Gosh, Kim, Qureshi, and Zalduendo (2014) examine what fuels capital flows to emerging market economies using a sample of 56 countries over the period 1980-2009. In contrast to earlier work (for example, Fernandez Arias, 1996), these authors do not examine the overall behavior of booms and busts in capital flows. Instead, they focus on certain episodes that are denoted as surges (extreme capital flow bonanzas). To identify surges, the authors use two different methodologies: a "threshold" approach that identifies surges as net flows/GDP that fall in the top 30th percentile and a "clustering" statistical approach that classifies net flows/GDP to distinguish between surges, normal flows, and outflows. These two methodologies identify, respectively, 290 and 338 surges, concentrated in the early 1980s, the early 1990s, and the mid-2000s. To examine these identified surges, the authors follow a two-pronged approach. First, they estimate the triggers of surges using a probit model. Next, they estimate the magnitude of the surges (conditional on their occurrence). The probit estimates indicate that surge events are mostly triggered by push factors, such as global market uncertainty (volatility of the S&P 500 index) and commodity price booms. Still, good domestic fundamentals matter. When the authors estimate the magnitude of the surges, they find that the magnitude of the capital flow during a surge varies

[3] See Koepke (2019) for a more extensive survey of the empirical literature on the drivers of capital flows to emerging markets.

considerably (ranging from 4 percent of GDP to about 54 percent of GDP). Thus, the authors also focus on explaining the size of the identified surges using OLS estimations. Interestingly, the push factors cannot explain the magnitude of the capital flows in these events, suggesting, as the authors put it, that "*these factors act largely as gatekeepers*, with capital surging toward EMEs only when the global conditions permit, but once this hurdle is passed, the volume of capital flows is largely independent of push factors and is mostly explained by pull factors, such as external financing needs of the country and exchange rate regimes"[4] (page 267).

In the same vein as Gosh et al. (2014), Forbes and Warnock (2012) also study extreme capital flow movements but extend their analysis to "surges" and "stops" (sharp increases and decreases of gross inflows) as well as "flight" and "retrenchment" (sharp increases and decreases of gross outflows). The first two types of episodes (surges and stops) are driven by foreigners while the last two (flight and retrenchment) are driven by domestic investors. Forbes and Warnock also expand their analysis of capital flows to both emerging and advanced economies, including a total of 58 countries from 1980 to 2009. In contrast to Gosh et al., they identify episodes of extreme capital flow movements using data on gross capital flows that differentiate activity by foreign and domestic investors. Forbes and Warnock identify the extreme events as those year-over-year changes in four-quarter gross capital inflows or outflows that are more than two standard deviations away from the historic mean subject to some minimum duration of the event. They identify 167 surge, 221 stop, 196 flight, and 214 retrenchment episodes. Importantly, the identification method depends crucially on whether net flows or gross flows are used to identify extreme movements. Interestingly, the results in Forbes and Warnock indicate that the identification using gross capital flows yields fundamentally different results than the previous literature that used measures of net flows. For example, identifying an extreme event with net flows during the Global Financial Crisis identifies many surges not because countries increase their borrowing abroad but because in the midst of the Global Crisis, domestic investors are retrenching from foreign markets, selling their foreign assets, and bringing their money home. Forbes and Warnock's analysis indicates that waves of capital flows are primarily associated with global factors. Global risk, which incorporates both risk aversion and economic uncertainty, is the only variable that consistently predicts each type of capital flow episode;

[4] While the authors identify surges in terms of the net flow of capital, in sync with the rest of the post-2007-2009 literature, they also use gross flow data to distinguish between those surges that correspond mainly to changes in external liabilities and those that correspond to changes in assets. The authors show that most surges (in their sample with just emerging-market economies) are driven by an increase in gross inflows rather than by a decline in gross outflows.

with an increase in global risk being associated with more stops and retrenchments, and fewer surges and flights. In contrast to Gosh et al. (2014), Forbes and Warnock find that most domestic factors only have a limited correlation with capital flow volatility.

Bruno and Shin (2015a) focus their analysis on gross banking flows using BIS locational data. Departing from the model in Shin (2011), they present a model of global liquidity built around the operation of international banks, but which now highlights the role of the U.S. dollar in these transactions. As in Shin (2011), the leverage cycle of global banks is at the center of booms and busts in global liquidity. In this paper, the authors also construct a model of cross border bank flows where regional banks borrow in U.S. dollars from global banks to lend to local corporate borrowers. The global banks finance cross-border lending to regional banks by tapping U.S. dollar money market funds in the financial center. The transmission channel in this model is via fluctuations in the effective credit risk faced by banks who lend to local borrowers that have a currency mismatch. When the local currency appreciates vis-à-vis the U.S. dollar, local borrowers' balance sheets become stronger, resulting in lower credit risk and hence expanding bank lending capacity. Thus, in this model, currency appreciation leads to greater risk-taking by banks. This model also allows for links between changes in monetary policy in the financial center, with lower U.S. dollar borrowing rates affecting funding costs and bank leverage. The model is tested using a panel of 46 advanced and emerging economies. As in the rest of the push versus pull literature, the authors also examine the role of fragilities in the domestic economy, such as a decline in growth, an increase in inflation, and high debt/GDP ratios. For the push factors, they also focus on the U.S. interest rate but they now add indicators capturing fragilities in the global banking sector, such as global leverage and equity growth of major global banks. Their findings suggest that the leverage cycle of global banks was the key determinant of global liquidity before 2008.

While not exactly in the same vein as the studies of "push" and "pull" factors, Broner, Didier, Erce, and Schmukler (2013) present important evidence on the role of country-specific factors on gross capital flows. Using a sample of 103 countries over the 1970-2009 period, this paper studies the behavior of international capital flows by foreign and domestic agents over the business cycle and during financial crises. They find that when foreigners invest in a country, domestic agents invest abroad, and vice versa: both gross capital outflow and inflows are procyclical. During expansions, foreigners invest more in the domestic economy and domestic agents invest more abroad. During crises, total gross flows collapse and there is a retrenchment in both inflows by foreigners and outflows by domestic agents. This pattern is similar across countries and types of capital flows. These results contradict most models of capital flows that predict that negative productivity shocks in the domestic economy in the midst of a crisis should

decrease the incentive of foreign investors to bring capital to the domestic economy (procyclical behavior), while the same shock should increase the incentives for domestic investors to invest abroad (countercyclical behavior). These findings open new areas of inquiry. On the theorical side, it is important to examine what type of model may explain this empirical regularity. Are financial frictions at the core of this regularity? What type of frictions? Do shocks affect domestic and foreign agents asymmetrically?[5] On the empirical side, it would be important to control for the effect of global factors. What type of shocks affect the business cycle? The findings in Forbes and Warnock (2012), Gosh et al. (2014), Bruno and Shin (2015a) suggest that global financial shocks are important determinants of capital flows. These shocks may be at the core of fluctuations in financial frictions and affect the responses of capital flows to the business cycle. The joint analysis of push and pull factors may help to untangle the route through which global and country-specific factors affect the business cycle around the world and contribute to the cyclicality of capital flows.

IV. Capturing Global Patterns

The boom and bust in capital flows around the 2007-2009 Global Crisis also motivated a new area of research: capturing the "global factor." Since the global financial cycle is unobservable, a new branch of the literature has captured this factor indirectly using dynamic common factors extracted from actual capital flows or by overall movements in asset prices. One of the earliest papers is this area is Rey (2013). In her Jackson Hole paper, Rey examines capital flows from 1990 to 2012 and documents a positive correlation in capital gross inflows as well as outflows across most of the regions in the world. She finds particularly strong positive correlations between all the major flows into North America and Western Europe. This evidence prompts Rey to examine the characteristics of this global cycle. She examines the correlations between capital flows and the VIX and finds negative correlations between various types of capital flows and the VIX (both globally and for various sub-regions) averaging around -0.23. She then documents that a common factor obtained from a large number of asset prices for various regions of the world shows a relatively high negative correlation with the VIX, suggesting that there is a global financial cycle in capital flows, asset prices and credit growth. Rey also reports a VAR estimation indicating that one of the determinants of the global financial cycle is monetary policy in the center country, which in

[5] Broner, Didier, Erce, and Schmukler suggest that models with asymmetries between domestic and foreign investors may be at the heart of this behavior. For example, if domestic and foreign investors are treated differently when the sovereign defaults, with domestic residents being treated more favorably, foreigners will have incentives to sell domestic assets to domestic residents in secondary markets, leading to a retrenchment when the risk of default rises.

turn affects the leverage of global banks, capital flows, and credit growth in the international financial system. She concludes that whenever capital is freely mobile, the global financial cycle constrains national monetary policies regardless of the exchange rate regime, invalidating the "trilemma," which postulates that in a world of free capital mobility, independent monetary policies are feasible if and only if exchange rates are floating.

Naturally, this provoking conclusion that "*cross-border flows and leverage of global institutions transmit monetary conditions globally, even under floating exchange-rate regimes"* has stimulated further research in this area. Cerutti, Claessens, and Puy (2017) explore the role of global factors using data on gross capital inflows across 34 emerging markets for the period 2001-2013. In the spirit of the literature on global factors, the authors examine whether aggregate inflows to EMs co-move using dynamic latent factor models. They not only examine whether total flows co-move together around the world and regionally, but also study the co-movement across different types of capital flows. They find that while total capital flows are explained in part by a global factor and by regional factors, the effects of these factors across countries are quite heterogenous. Importantly, Cerutti, Claessens, and Puy find that comovement is more pronounced for portfolio and bank flows. They also find that the sensitivity to common dynamics varies significantly across borrower countries and is influenced by financial market characteristics, such as liquidity in the recipient country and composition of the foreign investor bases, rather than country-specific macroeconomic or institutional fundamentals In particular, they find that the countries most affected by push factors are those countries relying more on international funds, such as mutual funds and ETFs, and global banks.

In 2003, the IMF Balance of Payments data on capital flows started providing information not only about types of instruments but also about types of borrowers. While this database only includes 14 years, it includes the bonanza preceding the Global Crisis and the retrenchment in its aftermath, and it can help us to understand not only the behavior of banking, bond, and equity flows, but also the behavior of banks, corporations, and sovereigns. Cerutti and Hong (2018) use this disaggregation to examine the behavior of borrowers in 43 advanced and emerging economies. To examine the behavior across borrowers and instruments, they decompose each capital inflow series into a global factor, borrower-type sub-factors, and a country-specific component. Their estimations indicate that gross capital flows do not move in tandem across countries regardless of borrower characteristics: different borrowing sectors have different sensitivities to the global financial cycle. For example, advanced economy corporates borrowing before the crisis shows a complementary behavior with both an increase in their borrowing through both debt securities and loans. This changed in the aftermath of the crisis. Advanced economy corporates

started borrowing more through debt securities which replaced international bank loans. Emerging market corporates, on the other hand, have shown both an increase in bond and loan financing. The authors suggest that the heterogeneity across borrowers may explain why capital flows do not respond strongly to the global cycle.

Cerutti, Claessens, and Rose (2017) intensively scrutinize the extent of the comovement of capital flows using a variety of methods and variables to capture the global factor. Using an unbalanced panel of 85 countries, they examine capital flows from 1990 to 2015. The estimations are not limited to total gross inflows and outflows, they also include different types of flows. Cerutti et al. estimate the global factor using observable indicators (such as the VIX and the interest rate in the financial center) and unobservable indicators extracted from capital flows using dynamic factor models. In total they estimate about 600 regressions using different combinations of observable variables from different financial centers for both panels of countries and individual countries. They find that on average the R^2 from all these regressions is at most about 0.25, indicating that the global factor can only explain a small fraction of the variance of capital flows.

Overall, this relatively new strand of the literature suggests that while there is a global cycle, the effects of global factors are time-varying and seem to affect more strongly North America and Western Europe. While the emphasis on the role of the global and idiosyncratic factors is somewhat different, the findings of the traditional research on push and pull factors point to similar results. All these studies cover at most capital flows starting in the 1990s or they use unbalanced panels because earlier IMF BOP database on capital flows does not have complete country coverage. Is this because most of the findings indicate that Western Europe seems to respond more strongly to the global factor? What triggers this coordination? Is it because of the elimination of controls and deregulation across Western European countries in their path to the monetary union? Did this process of financial liberalization amplify the effects of the easy monetary policy of the early 2000s? It is important to examine whether a variety of shocks can amplify and coordinate financial cycles. Unfortunately, these data limitations prevent us from studying the most systemic episode of crises (and the boom-bust cycle that triggered those crises) since the restart of financial globalization following the collapse of the Bretton Woods System. This is the episode of capital flow bonanzas starting in the 1970s that culminated with defaults in Africa, Asia, Eastern European countries, Latin America, and the Middle East in what it became to be known as the "Debt Crisis."[6]

[6] Preliminary work by Kaminsky, Medina, and Wang (2019) constructs a new database on capital flows starting in 1973 in the aftermath of the collapse of the Bretton Woods System. This novel database captures gross inflows by

V. Reflections

The studies on the causes of the 2007-2009 Global Crisis have uncovered new empirical regularities predating the crisis as well as new models to explain these regularities. The "global banking glut" literature brought to attention the major role of European global banks in the explosive round trip of cross border capital flows that ended with the U.S. subprime crisis. An important contribution of this literature is the construction of very rich and detailed databases from a variety of sources (including the BIS, Moody's, the U.S. Flow of Funds, Fitch, Federal Reserve Disclosures on Term Auction Facility, and money market mutual funds) to piece together the ingredients that contribute to the build-up of financial fragility leading to the crisis. This literature also provides new models to explain the creation of global liquidity. For example, Shin (2011) and Bruno and Shin (2015a) formulate a model of the international banking system where global banks interact with local banks that can explain the surge in cross border flows. In this model, easy monetary policy and lower risk trigger an increase in the banks' balance sheet capacity, with the leverage cycle acting as the mechanism of transmission of financial conditions across borders through banking sector capital flows.

The "push and pull factors" literature as well as the research using dynamic factor models have a broader scope. Researchers use somewhat longer samples that also include crises in emerging economies and examine not only bonanzas in bank flows but also in portfolio flows. These studies also assess the role of global triggers of booms and busts in cross border flows. These estimations have a more nuanced view about the role of global factors. While cross border capital flows around the world are still correlated over the longer sample, this correlation is small as shown in Cerutti, Claessens, and Rose (2017). Importantly, bank flows booms do not predate all crises. For example, bond flow bonanzas are at the core of the financial fragilities predating crises in emerging markets in the late 1990s (for example, Argentina (2001), Brazil (1999), and Russia (1998)), making it important to study the role of various investment vehicles in fueling financial fragilities. Also, monetary policy in the financial center, as captured by the Federal Funds rate, is not necessarily the trigger of bonanzas across all studies (Forbes and Warnock, 2012), suggesting a time-varying pattern in monetary policy that also needs to be studied further. Importantly, the research on capital flows only focuses on the easing in the early 1990s and more recently the easing in the early 2000s. With only a few cycles, it is hard to pinpoint the role of monetary policy in the financial center on the rest of the world, especially because these cycles coincide with other

using international primary issuance of bonds, loans, and shares. Their results indicate that regional factors and not global factors are at the core of capital flow movements.

worldwide shocks, such as the oil shocks in the 1970s, the creation of the European Monetary Union in the 1990s, or the increase in savings in East Asia in the early 2000s.

New research is addressing some of these issues. For example, Kaminsky (2019) examines capital flows using a newly created database on international issuance of bonds, loans, and shares that spans the two episodes of financial globalization (the first episode from 1820 to 1931 and the second episode starting in the early 1970s). Extending the study of capital flows to the first episode of financial globalization has two major advantages. First, during this episode, monetary policy in the financial center is constrained by the adherence to the Gold Standard, thus providing a benchmark for capital flow cycles in the absence of an active role of central banks in the financial centers. Second, panics in the financial center are *rare disasters* that need to be examined in a longer historical episode. By comparing boom-bust cycles across these two episodes, Kaminsky (2019) finds that boom-bust capital flow cycles in the emerging periphery in times of panics in the financial center are milder in the second episode of financial globalization but that other cycles are similar across the two eras of financial globalization. It is in times of crises at the epicenter that countercyclical monetary policy in the financial center is far more aggressive, with severe tightenings predating these crises and drastic easings in their aftermath. This policy cuts short capital flow bonanzas before these crises erupt and mitigates sudden stops in their aftermath.[7] Converse, Levy-Yeyati, and Williams (2018) also examine the time-varying effects of the global financial cycle. In particular, they study how the development of new investment vehicles can affect the incidence of the global financial cycle in emerging markets. In this paper, the authors examine the behavior of traditional mutual funds against that of the new exchange-traded funds (ETFs) and find that the sensitivity of investor flows to global risk factors is between 1.25 and 1.5 times higher for ETFs than for mutual funds. They also show that countries where ETFs hold a larger share of financial assets are significantly more sensitive to global risk factors, both for total equity flows and prices. Converse et al. conclude that the growing participation of ETFs amplifies the incidence of the global financial cycle in emerging markets.

The research on capital flows and crises in the aftermath of the 2007-2009 Global Crisis has made important progress in our understanding of triggers of crises, the role of global factors, and the behavior of gross capital flows. Still, there is also a need to fully understand whether bank flow bonanzas are different. One of the questions still lingering is why global banks took so much risk in the years predating

[7] Interestingly, even when monetary policy in the financial center during the second episode of financial globalization provides far more liquidity in the aftermath of a panic in the financial center, the slowdown in economic activity around the world now is similar to that of the first episode of financial globalization when central banks were adhering to the gold standard and financial panics were followed by drastic and persistent collapses of world liquidity.

the Global Crisis. Some argue that the relaxation of rules was at the core of this bonanza. New evidence using European data is provided by Jiménez, Ongena, Peydró, and Saurina (2014) and Maddaloni and Peydro (2013). They find that a low policy rate induces thinly capitalized banks to grant more loans to ex ante riskier firms. Importantly, the 2007-2009 Global Crisis is not the only crisis fueled by bank flow bonanzas. It is time to examine jointly the bank flow bonanza preceding the 2007-2009 crisis and the bonanza in syndicated loans predating the Debt Crisis that engulfed emerging economies around the world in 1982.

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