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EXTERNAL IMBALANCES AND FINANCIAL CRISES

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ABSTRACT

In broad perspective, there have been essentially two competing views of the global financial crisis, albeit there are some complementarities among them. One view looks across the border: it mainly blames external imbalances, the large-scale mix of unprecedented pattern current account deficits and surpluses which entailed massive and growing net and gross international financial flows in the last decade. The alternative view looks within the border: it finds more fault in the domestic arena of the afflicted countries, attributing the problems to financial systems where risks originated in excessive credit booms in local banks. This paper uses the lens of macroeconomic and financial history to confront these dueling hypotheses with evidence. Of the two, the credit boom explanation stands out as the most plausible predictor of financial crises since the dawn of modern finance capitalism in the late nineteenth century. Historically, we find that global imbalances are not as important as a factor in financial crises as is often perceived, and they have much less correlation with subsequent episodes of financial distress compared to direct indicators like credit drawn from the financial system itself.

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1. Introduction: External Imbalances versus Credit Booms

Did "global imbalances helped to fuel the financial crisis"? In the years since, imbalances have muted, but endogenously, as trade collapsed and EM economies outgrew the US and other DM economies. But prior to 2008 these flows were much larger. Many prominent policymakers, commentators, and economists had focused on large current account imbalances, in the United States, but also in other countries with pronounced booms, and had warned about the potential for a jarring shock should those flows see adjustments due to incipient changes in portfolio allocation, and concomitant shifts in interest rates, growth rates, perceived country or currency risks. Harsh adjustments, sudden stops, or reversals, it was thought, could wreak serious havoc. Much attention was given to the role of the large lenders/creditors in Emerging Asia (especially, China) causing a "savings glut" whilst others focused on savings shortfalls in large borrowers/debtors like the United States.

In these arguments, the public or official sectors tended to attract the most scrutiny, be it the official reserve accumulation trends in developing countries, or the path of government deficits and debt in the United States.[1] But those focusing on the public sector dimensions of the flows ended up missing the main story. Without minimizing fiscal challenges going forward (many of them a result of the crisis), the kind of crisis we ended up having was in almost all cases not a fiscal crisis at all. In the United States, where large-scale financial pressure was first seen, the dollar has rallied on the flight to safety, as have Treasuries, notwithstanding what credit rating agencies have said. In Europe, intraregional imbalances are now seen to have been a source of instability, but ex ante (with the exception of Greece) these cross-border flows were largely private sector debt flows, much of them flowing through bank channels from savers in the "North" to finance real estate or consumption booms in the "South"; public debts and deficits in places like Ireland and Spain only exploded later, as harsh recessions and banking rescues ate resources.

[1] The opening quote is from a speech by the Governor of the Bank of England (King 2011). The term "savings glut" is credited to the Chairman of the Federal Reserve Board (Bernanke 2005).

Of late, thanks to scholars taking a more granular view of the data, we can see more revealing trends. It is clear for example, that China and other EM purchases of U.S. assets focused on (truly) safe AAA assets like Treasuries, or GSE issues; in contrast, it was "advanced" country investors, notable in Europe, who crowded into the securitized products channeling funds to the real estate bubble. Within Europe, the growing debt exposure between countries is now seen to have been a two-way street, with gross flows much larger than net flows. The cross-sectional experience of the Eurozone economies, and also U.S. regions and counties, also strongly suggests that even in a currency union, where balance-of-payments problems and currency risk are in theory absent, or defined away, the threat of a macro-financial crisis via private debt dynamics is still very much present. In light of these experiences, the answer to "does the current account matter?" is probably still yes; but in a world where bank-driven expansions in private sector leverage have reached historically unprecedented levels in advanced economies, it is no longer the only, or even necessarily the most important, question one might ask when evaluating macroeconomic and financial risks.[2]

2. Historical Perspective: Ebb and Flow of Finance Across and Within Borders

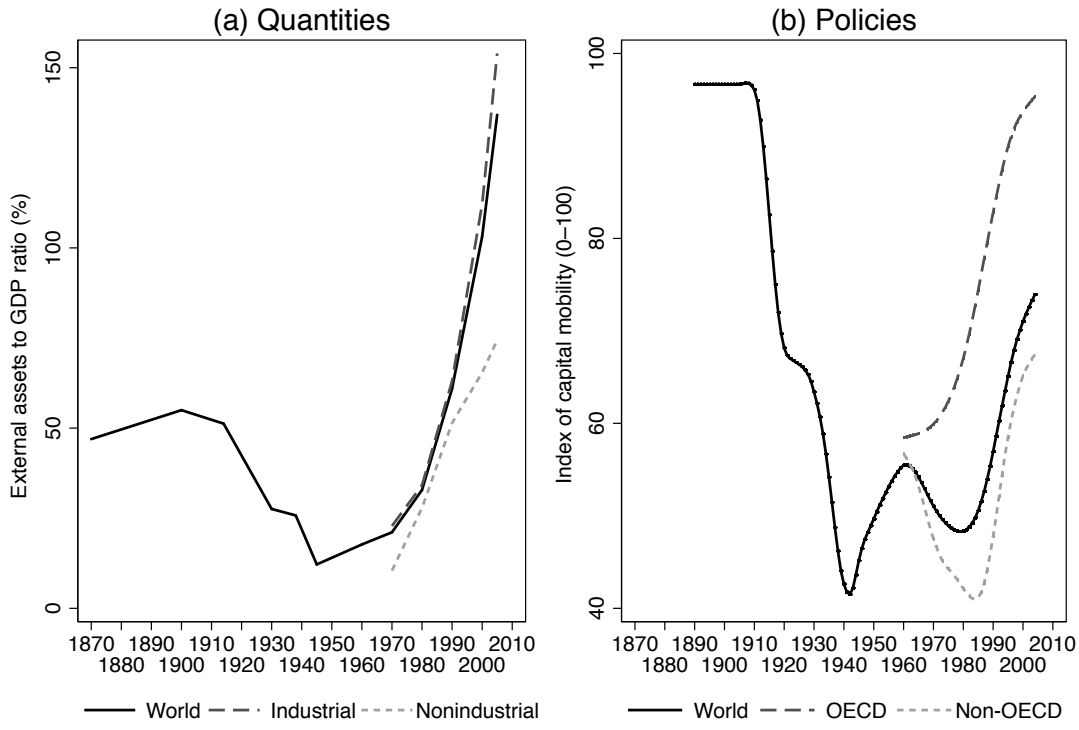
Historically, there has been a broad correlation between the prevalence of external imbalances and the frequency of financial crises, something that is all too apparent in the data, but which needs to be subject to careful causal interpretation.

It is a stylized fact that international capital mobility has followed a U-shape over the course of recent history (Obstfeld and Taylor 2004). Under the classical gold standard until 1913 there were virtually no policy barriers to cross-border financial flows, and the last serious technological impediments were broken down by the arrival of the cable. The interwar period, and especially the 1930s, saw policies veer

[2]See, inter alia, Schularick and Wachtel (2012) on the private versus public financing of the US lending boom; Shin (2012) on the "global banking glut" and Lane (2012) and Obstfeld (2012) on the importance of gross versus net positions.

towards autarky, and this configuration persisted until the 1970s, as governments reconfigured their responses to the trilemma when confronted by shocks like wars and depressions. Only since the 1980s has consensus moved back toward freer capital movements, as a tolerance for floating exchange rates accommodated ongoing monetary policy autonomy. This trend has gone furthest in the advanced economies. Documenting these trends, Figure 1 shows both policy-based and outcome-based indicators of capital mobility over the last two centuries.

Figure 1. Capital Mobility in the Last Two Centuries



Notes and source: Foreign assets to GDP ratio from Obstfeld and Taylor (2004) up to 1970 and from Lane and Milesi-Ferreti (2007) thereafter. Capital account openness from index used by Quinn and Voth (2007).

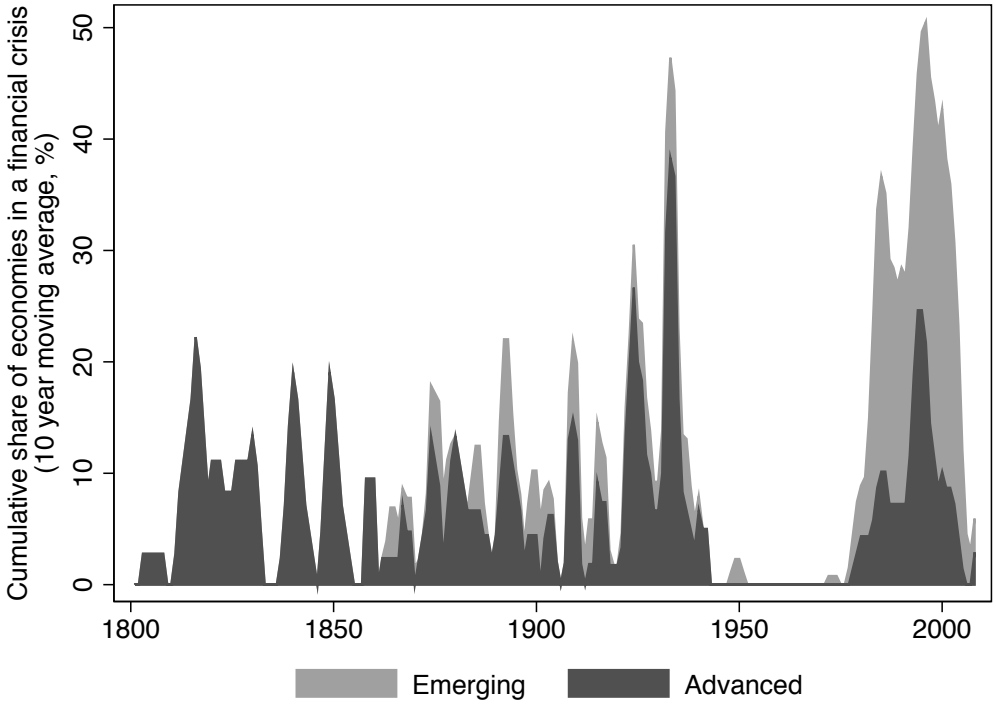
Coincidentally or not, a similar historical pattern characterizes financial crisis events (Reinhart and Rogoff 2009, 155–56). Financial instability was a normal feature of all advanced economies in late nineteenth century period, a feature that continued into the 1930s when the intensity of crises reached an all-time high during the Great Depression. But from the 1940s onward until the early-1970s, the world was virtually free of financial crises, with a few crises witnessed in emerging markets, but none seen at all in advanced economies. This unusually prolonged period of financial calm really stands out from what went before, and what has happened since (Bordo et al. 2001). In the 1980s and 1990s emerging markets experience many financial crises; there were a also few in advanced economies, followed by one of histories worst globally-synchronized financial crises in 2008 across large swathes of the so-called advanced economies. To show these patterns, Figure 2 shows financial crisis indicators over the last two centuries.

Looking at the only economic laboratory we have—that is, history—these two summary charts would appear on the surface to support the notion that, at least empirically, international financial integration (the scope for external imbalances) go hand in hand with financial instability (the prevalence of banking crises). But correlation isn't causation, and such inferences may not be justified for various reasons. For example, we have not performed any statistical controls here, nor have we addressed concerns about possible simultaneity and the role of omitted common factors driving both patterns.

One obvious area for concern with respect to proper statistical control would be changes in other aspect of the macroeconomic and financial policy regime over time and across countries. For example, when we consider the period of unusual calm in the 1940–70 period, we also know that it coincided with what was historically the most stringent era of capital controls (imposed under IMF auspices as the very basis of the Bretton Woods fixed exchange rate regime), and thus the era in which global imbalances were at their all time nadir. However, it *also* coincided with a very stringent era of domestic financial regulation in most countries around the world.

Policymakers reacted strongly to the bank panics and financial distress of the 1930s with a combination of rules and supervision, plus backstops and insurance (in the U.S. case, for example, Glass-Steagall ring-fencing, supervisory agencies, reserve requirements, FDIC deposit insurance, and Fed lender-of-last-resort actions).

Figure 2. Banking Crises in the Last Two Centuries



Notes and source: The chart shows the *cumulative* percentage of economies in a banking crisis in each year from 1800 to 2008, ten-year moving average. Data from Qian, Reinhart, and Rogoff (2010).

Even absent the move toward financial autarky in this period, changes in the domestic financial landscape also pushed economies toward a less risky, less leveraged macroeconomic and financial regime. It would be a mistake, without further careful analysis, to claim that one or the other set of policies played a primary role in creating that stable environment. If we are to learn from the past,

such work is needed as we sit at another historical turning point when the policy architecture is again under heated discussion and under pressure to be redesigned.

3. Event Studies: Correlates of Crises

One clear and simple way to begin to explore at least the proximate causes of financial crises is to use event study techniques. In this approach we can look systematically at the behavior of key variables in the run up to, and in the aftermath of, financial crisis events, with the goal of identifying systematic differences between tranquil periods or "normal" times" outside the window, and what happens in time periods close to a financial crisis. The purpose of such analysis serves several purposes: overall patterns discipline economic models designed to account for crises theoretically by providing patterns that such a theory needs to match; precrisis patterns may lead to "early warning signals" of use to policymakers and others wishing to avert or anticipate problems; and postcrisis patterns should set appropriate historical benchmarks for the evaluation of conditional economic performance (e.g., disputes over whether a recovery is sluggish or not).

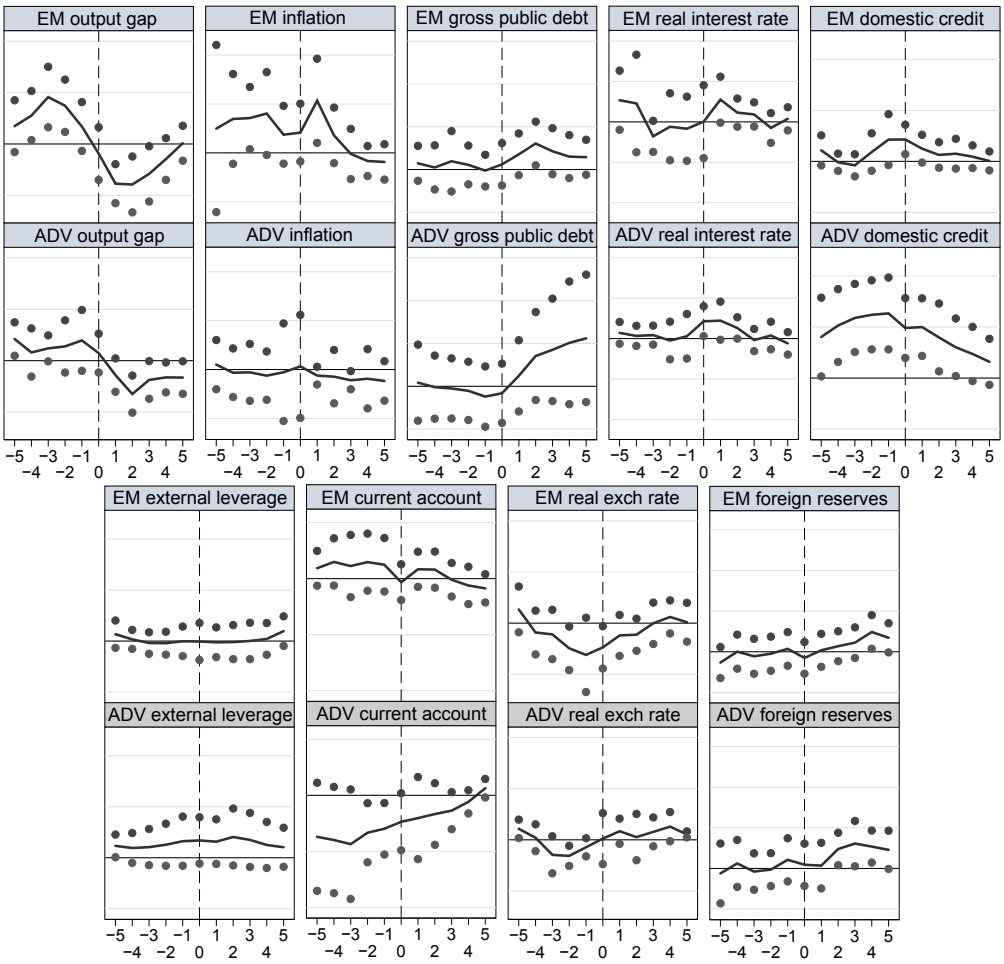
A number of works in the economic literature have followed this approach successfully, such as Cerra and Saxena (2008), Reinhart and Rogoff (2009), Reinhart and Reinhart (2010), Claessens et al. (2010), Gourinchas and Obstfeld (2011), Schularick and Taylor (2012), Reinhart, Reinhart, and Rogoff (2012), among many others, and the technique is also widely used in the policy world, for example in IMF analyses for the WEO and other publications since the 2008 crisis. Other related works in this vein include Chamon and Crowe (2012) focusing on a range of indicators; Goldstein (2010) on the link between fundamentals and panics; Dell'Ariccia et al. (2012) looking at credit boom warning signal; and Claessens et al. (2012) who look at the coherence of business and financial cycles.

Most of this literature is on broad agreement. For representative evidence from a recent sample that includes both advanced and emerging economies using annual data from 1973 to 2010, Figure 3 shows empirical regularities for nine key macroeconomic and financial variables in ±5-year windows surrounding banking crisis events drawn from Gourinchas and Obstfeld (2011).

The estimates of conditional means of each variable, relative to 'tranquil times' are reported on the vertical axes. The horizontal axes represent the number of years before (negative sign) and after a crisis of a given type (in the different columns). Estimates in the top row are for emerging market economies; in the bottom row for advanced economies. The dots denote a 95% confidence interval for each conditional mean. The results can be summed up as follows, with some tentative hypotheses which we can carry forward:

- Output is slightly above normal just before a crisis, but collapses dramatically afterwards. The boom may be slightly larger in emerging economies. Advanced fare no better than emerging in the aftermath. *A long recession is typical*.
- Inflation is close to normal just before a crisis, but collapses dramatically afterwards. Real interest rates are not atypical before a crisis, but can rise afterwards, with the effect seemingly stronger in emerging countries. *Deflationary pressures are strong*.
- Public debt levels are normal just before a crisis, but increase dramatically afterwards, with a wide range. *Crises have adverse fiscal consequences*.
- Domestic credit expansion is typically much high than normal before a banking crisis event. The shift is very strong in advanced countries and highly statistically significant. *Credit booms tend to precede banking crises.*

Figure 3. Empirical Regularities during Banking Crises, 1973–2010



Notes and source: The estimates of conditional means of each variable, relative to 'tranquil times' are reported on the vertical axes. The horizontal axes represent the number of years before (negative sign) and after a crisis of a given type (in the different columns). Estimates in the top row are for emerging market economies; in the bottom row for advanced economies. The dots denote a 95% confidence interval for each conditional mean. Charts from Gourinchas and Obstfeld (2011).

Looking at external indicators, external leverage (gross positions) and the current account do not seem out of line in the window, although in advanced economies these variable gets close to borderline significance. Real exchange rates tend to be strong before a crisis, and weaken a lot afterwards, compared to normal. Foreign reserves show no unusual precrisis trend but tend to accumulate afterwards as the currency weakens and the external accounts move more to surplus. Thus external imbalances and currency appreciation may also be indicative of added crisis risk.

4. Credit and the Current Account: Two Sides of the Same Coin?

The main argument in this paper will be that it is unusually high rates of credit growth that tend to be the main warning signal of incipient financial crises. But as the preceding discussion indicates, some other indicators could also be relevant, and one goal of this paper is to relate these perspectives to external imbalances, which have been such a focus of debate in the last decade.

From a simple accounting perspective, and thinking in conventional theoretical terms, it might be expected that there could be simultaneous correlation between higher credit growth and external deficits in open economies. Countries experiencing booms tend to have higher investment, and may also have lower savings, if consumption-smoothing motives are at work. The investment may, to some degree, be finance via bank lending channels, suggesting that loan growth and current accounts might have a negative correlation.

However, in the data, this correlation is far from perfect. Consider the long-run advanced country dataset of Schularick and Taylor (2012). If we were to regress the change in credit to GDP ratios on change in current account to GDP ratio in every year, then this bivariate relationship has significance (an F-stat over 5) in about 1 out of every 6 years over the course of history since 1870. Some panel tests over multi-year samples are shown in Table 1.

Table 1. Credit Booms and External Imbalances: Only Weakly Correlated since 1870

Dependent variable	Change in credit/GDP			
	(1)	(2)	(3)	(4)
	All years	Post-1980	Pre-1914	1914–1980
Change in CA/GDP	-0.122**	-0.311*	-0.184**	-0.0731
	(-2.83)	(-2.31)	(-2.80)	(-1.38)
N	1531	392	412	727

Notes and source: The t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001. Data from Jordà, Schularick, and Taylor (2011a).

Over the entire sample, in column 1, the coefficient on the external imbalance is only –0.12, reflecting the fact that capital inflows can come in a variety of forms, including FDI or private portfolio securities, or sovereign loans, which have nothing to do with the destination-country banking sector. Indeed, this "pass through" coefficient suggests that about 90% of the time, such flows have bypassed banks. This coefficient rises to –0.31 in the recent post-1980 era of financial globalization, suggesting that the conduits of external imbalances in recent decades have shifted more towards banking channels; but even then 70% of flows appear to be moving outside bank channels.

These results caution that the nexus of financial crises, the domestic banking sector, is only partially coupled to the external balance of payments imbalances of any country, an obvious point. Countries can experience capital inflows that take non-bank forms, so the causation from external to internal is not a given; and they can have credit booms driven by expansion of leverage in domestic banks that need not be related to any new financing flows from abroad, so the causation from internal to external is not a given either.

The historical data back up this idea that the two measures are for the most part distinct, and should therefore not be expected to necessarily play the same role with respect to crisis risk, a point we now examine in greater detail.

5. Let the Data Speak 1: Predictive Ability Tests

Up to now we have documented some basic empirical regularities, but in that kind framework we can only achieve so much. The comparisons are just one variable at a time and ultimately we need a more formal analysis to evaluate which variables really do seem to have distinct dynamics in crisis times, as compared to their normal behavior. Given the focus of this paper, and the results of the last section, I focus on the competing hypotheses relating to whether it is external imbalances or credit booms that are the main feature of crisis events.

Research has therefore turned to the question of predictive modeling, that is, attempting to establish whether certain past variables may contain ex ante "early warning" information about the likelihood of a financial crisis today. In the wake of the 2008 crisis, which caught most economist and policymakers by surprise, the need for careful, robust, and replicable work in this area, is urgent, but this is not to say important prior work did not exist. Work on the determinants of emerging market financial crises certainly existed (e.g., inter alia, Kaminsky and Reinhart 1999). And some work on financial crises in samples including advanced economies had also been undertaken, although this was not heeded by many (e.g., BIS studies, including famously Borio and White 2004; Eichengreen and Mitchener 2004). This literature tended to find that credit booms, meaning faster growth in bank lending relative to "normal times" was indicative of elevated crisis risk. There was also evidence that higher levels of foreign reserves, in emerging markets, could perhaps mitigate risks, all else equal.

These finding have been echoed in more recent work, for example in the logit predictive models presented by Gourinchas and Obstfeld (2011) and Schularick and Taylor (2012). The former employs a short-wide annual panel of both advanced and emerging economies since the 1970s; the latter constructs a long-narrow annual panel from a historical dataset for the advanced countries going back to 1870.

In the context of this paper, however, it is important to ask whether in these and other works one can find any role, much less an independent role, for external imbalances as crisis determinants. The answer, so far at least, seems to be no. In the Gourinchas and Obstfeld (2011) study, the current account is unrelated to banking crisis risk in both the advanced country sample and the emerging country sample, once other controls are included, the most important of which is the credit variable.

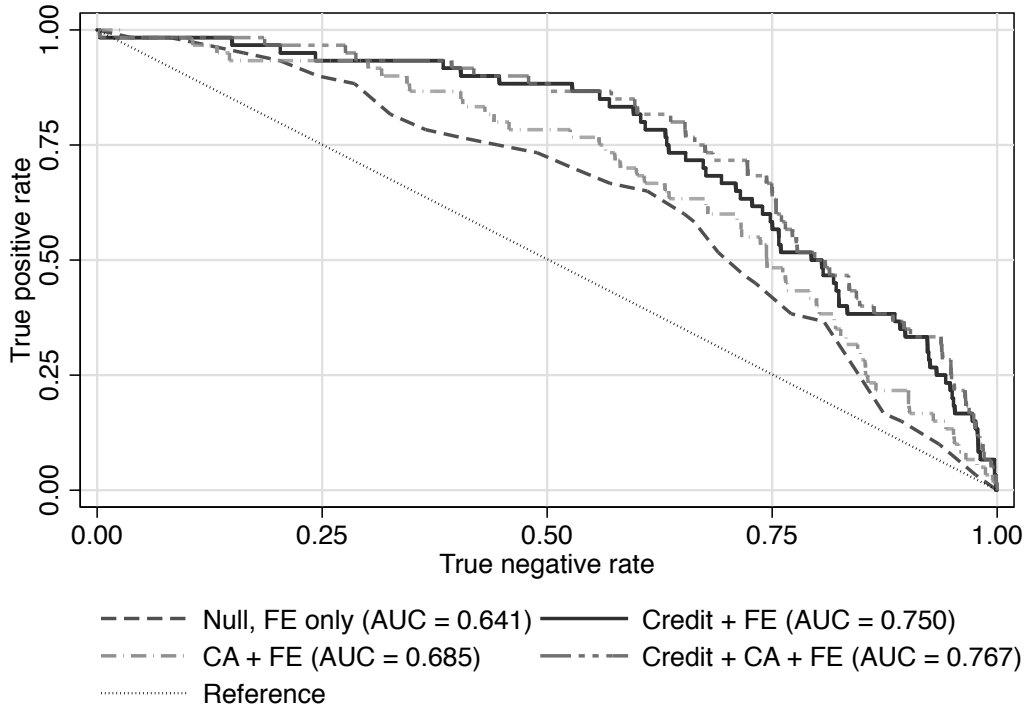
Similar results were found by Jordà, Schularick and Taylor (2012), using the long-wide panel of advanced economies, and a concise exposition of their tests is shown in Figure 4, using a tool referred to as the Correct Classification Frontier, or CCF.[3] Using any one of a family of competing logit models, such as those described above, the CCF curve plots the frontier of true positives TP and true negatives TN that each model delivers depending on how its trigger threshold is set. In a given set of data, with any model, a low enough threshold gets 100% TP but 0% TN; a high enough one scores the opposite. An uninformative model (a random signal) will achieve a CCF curve of TP and TN scores on the diagonal simplex between these points. Statistical tests are need to evaluate whether a model can be judged to be informative, which amounts to having a CCF curve which lies above the diagonal.

A straightforward test, which requires no modeling of preferences, would be to look at the "area under the curve" or AUC as a test statistic. Under the uninformative null AUC equals 0.5 and hypothesis tests are simplified by the asymptotically normal distribution of this statistic. Among other results, Jordà, Schularick and Taylor (2012) present tests based on the AUC for four models using the long panel:[4]

- A model with country fixed effects only (CFE, a better-than random null);
- A model with the lagged credit variable (5y MA change) plus CFE;
- A model with the lagged current account variable (5y MA change) plus CFE;
- A model with both the lagged credit and current account variables plus CFE.

[3] The CCF is a variant of the Receiver Operating Characteristic or ROC curve.
[4] The discussion draws on Taylor (2012).

Figure 4. Using Lagged Credit Growth plus Current Accounts or Public Debts as a Classifier to Forecast Financial Crises: The Correct Classification Frontier



Notes and source: See Figure 8 and Jordà, Schularick, and Taylor (2011a) and Taylor (2012). "CA" uses a 5-year lagged moving average of change in the current account to GDP ratio. In this chart, for all models, the predictions of separate prewar and postwar country-fixed-effects logit models are combined. Relative either to the "Null" or the "Credit" model, the addition of "CA" does not significantly improve the classifier.

As Figure 4 shows, adding the current account variable to the model slightly improves predictive ability relative to the country-fixed-effects null (AUC rises from 0.641 to 0.685, p=0.0165), but adding the credit variable improves predictive ability much more (AUC rises to 0.745, p=0.0010). Once credit is in the model, adding the current account on top achieves little. Why? As history has shown, over the long run economies can have credit booms "fueled" by external imbalances, but that they can also have home-grown credit booms that are unrelated to shifts in the current account. Either type can be potentially dangerous in terms of banking crisis risk, so moves in the balance of payments may not be all that informative.

5. Let the Data Speak 2: Beyond Binary Classification

Finally, it is worth noting the relevance of the credit cycle, not just for the rare events called "financial crises" but for *all* recessions (Jordà, Schularick, and Taylor 2011b). To underscore this point we can classify all recession events in all countries, and classify them as normal recessions or financial recessions based on coincidence (±2 years) with a crisis event. In around 140 years for 14 countries from 1870 to 2008 we observe 50 financial recessions, 173 normal recessions, and 223 recessions in total. The corresponding event frequencies are 3.3% for financial recessions and 11.4% for normal recessions (approximately 1 in 30 years versus 1 in 9).[5]

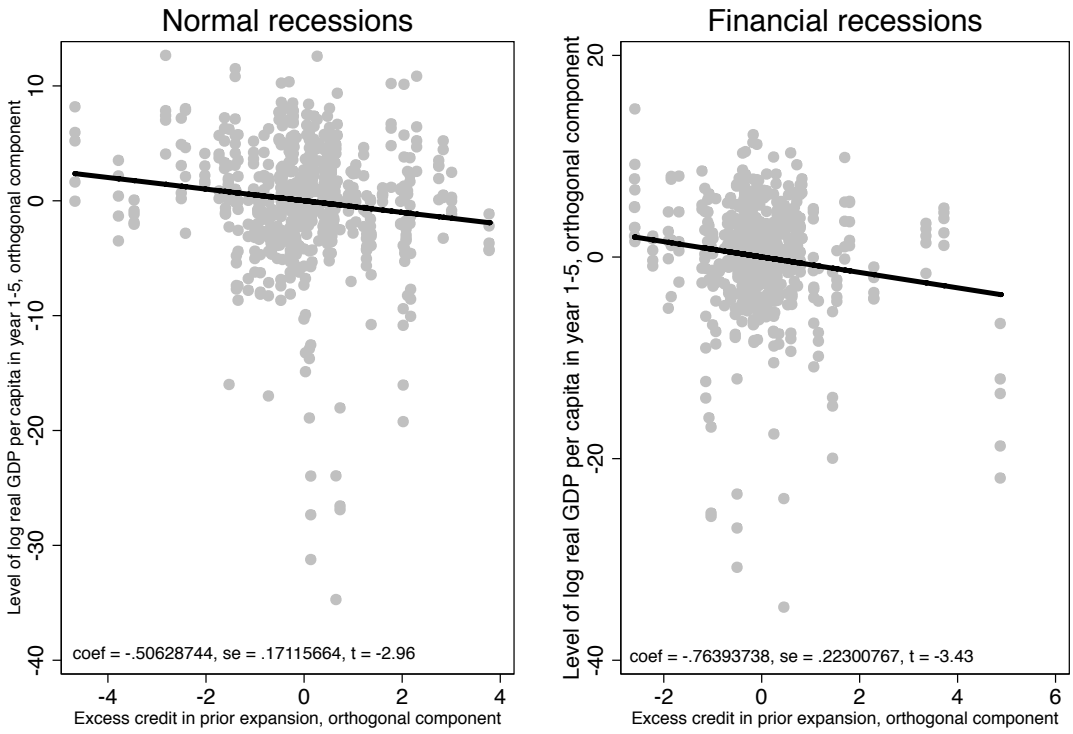
Figure 5 shows that there is a more generalized echo of a credit boom in all recessions. A larger run-up in credit each year during the prior expansion years (in percent of GDP per year) can be traced to weaker performance (lower levels of real GDP per capita) in the subsequent recession/recovery phase out to a horizon of 5 years beyond the cyclical peak. Thus, unusually rapid credit growth poses extra dangers. Not only does it raise the likelihood of a once-in-a-generation financial crisis event, as the binary prediction analysis shows. It is also systematically related to weaker recession paths in all peak-trough episodes, whether the country falls prey to a financial recession or a normal recession.

To put the "marginal effects" of the excess credit treatment in Figure 5 into perspective, the slope is ½ for normal recessions and ¾ for financial recessions. Excess credit has a historical mean of about 1¼ percent of GDP per year in financial recessions (s.d. = 2½) and a mean of ¼ in normal recessions (s.d = 2). This implies that a +1 standard deviation increase in the credit variable during a "high leverage" expansion might later create a 5-year drag of –1% of the level of real GDP per capita after the peak in a normal recession, or–2% in the event of financial recession.

[5] To cleanse the effects of the two world wars from the analysis, the war windows 1914–18 and 1939–45 are excluded, as are data corresponding to peaks which are within 5 years of the wars looking forwards, or 2 years looking backwards (since these leads and lags are used in the analysis below).

These are nontrivial costs: credit booms sow the seeds of future deleveraging pain in all cycles. Monitoring credit is therefore a legitimate concern of policymakers concerned with overall macroeconomic stability at business-cycle frequencies, that is, even in more typical cycles when crises are averted and the economy suffers only a "normal" recession (see, e.g., Drehmann et al. 2011, Turner 2011).

Figure 5. Credit Bites Back: "Excess" Credit Growth in the Expansion Phase and the Deviation of Real GDP per Capita in the 5-year Next Recession/Recovery Phase



Source: Based on the data in Jordà, Schularick, and Taylor (2011b). The charts show simple added-variable plots (partial scatters) between the deviation of the level of log real GDP per capita in recession/recovery years 1-5 after a normal or financial peak, and the annual rate of change of credit-to-GDP in the prior expansion. The left chart shows financial crisis recessions only, the right chart normal recessions only. In the underlying regression, additional control variables include 5-year time fixed effects interacted with normal and financial recession dummies. Both partial correlations are statistically significant at the 1% level.

6. Conclusions

The history of "advanced" countries shows that credit booms and busts can be driven just as easily by domestic savings as foreign saving. Gross stocks and flows can often be delinked from net flows across border, so balance sheets can expand even if no cross border flows are recorded. At a disaggregated level, current account flows can be composed of a widely varying mix of bank, debt, equity, FDI and other claims, and each type has very different risk characteristics, with bank and debt flows being the ones at risk of rollover risk (stops, flight).

Thus there is absolutely no a priori reason why any $1 of gross or net capital flows should make a difference to the risk of a financial crisis in the home country. It is highly likely instead that the nature of the flow, and its route into the local economy, will matter far more. It is when financial flows *of local or foreign origin* build up into large credit exposures in the domestic financial system, that the risks of a financial crisis are elevated, and the likelihood of future deleveraging costs is increased.

We need to move beyond monocausal stories where the current account is relied upon as a unique, special indicator. Evidence shows that domestic credit conditions are a more salient feature of crisis dynamics, and even the dynamics of normal business cycles.

Going forward, a natural dichotomy is emerging. An "external variable" like current accounts may make sense as a key indicator in the analysis of proximate causes of "external crisis" — meaning capital market access, bad spreads, default, or recourse to IMF programs (Catão and Milesi-Ferretti 2012). But an "internal variable" like credit might make much more sense as a key indicator in the analysis of proximate causes of "internal crisis" meaning distress in the domestic financial system, bank panics and failures and so forth.

Future economic and policy analysis may benefit greatly if we can move beyond the narrow and simplistic "global imbalance" framework which all too often dominated discussions in the last decade.[6]

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[6] See, for example, Lane (2012) and Obstfeld (2012) for suggestions as to the way ahead. See also the IMF (2011) postmortem into the global financial crisis, viz.: "For much of the period [2004–07] the IMF was drawing the membership's attention to the risk that a disorderly unwinding of global imbalances [and inflation]…. The IMF gave too little consideration to deteriorating financial sector balance sheets, financial regulatory issues, to the possible links between monetary policy and the global imbalances, and to the credit boom and emerging asset bubbles. It did not discuss macro-prudential approaches that might have helped address the evolving risks."

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