EASY TO EXPLAIN, HARD TO PROGNOSTICATE
Discussion Notes on Systemic Sudden Stops[1]

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I. Introduction

In this note I will offer some reflections on systemic financial crises. Prominent examples are the Mexico *Tequila* crisis in 1994/5, the Asia/Russia crises of 1997/8 and the present one. I will argue that there are many elements in common. Easy though it may be to diagnose the causes ex post, however, to be able to ascertain their causes ex ante and devise appropriate and timely policies is a much more difficult task.

Section II will advance the hypothesis that "all crises are alike," while Section III will show why it may be difficult to snuff them out of existence before they materialize. Section IV ends with a list of do's and don'ts to help to oil the discussion.

II. Systemic Financial Crises: They are all alike

Reverse paraphrasing Tolstoy, one is tempted to say that "systemic financial crises are all alike."[2] The parallels between crisis episodes are striking. Even the small stories knitted around these episodes bear strong mutual resemblance.[3] The single most important common characteristic of systemic crises is that *they start in an obscure corner of the financial spectrum and stocks (especially, debt stocks) play a key role*. Take the Mexican 1994/5 *Tequila* crisis, for example. As the year 1994 was coming to an end, many

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[2] The opening paragraph in Anna Karenina reads "Happy families are all alike; every unhappy family is unhappy in its own way." Completing the reverse paraphrasing, one could then add "every normal economic situation is normal in its own way" – which I believe also contains more than a grain of truth.
[3] The pathbreaking book by Reinhart and Rogoff (2009, forthcoming) shows that strong parallels can be found even if one goes back eight hundred years in financial history!

observers noted that at least a minor crisis was in the offing. Opinions ran from those stressing "*la maldición del sexenio*," i.e., "the six-years curse," the currency devaluation that traditionally preceded presidential transitions – to more sophisticated opinions claiming that devaluation would help to redress currency overvaluation and speed up growth (see Dornbusch and Werner (1994)). In contrast, my concern was that large devaluation might destabilize the system and possibly provoke a bank run or serious debt-rollover difficulties (see my comments on Dornbusch and Werner (1994) in the same volume, and the discussion in Calvo (2005, Introduction to Part I)). Thus, I stressed *stock* as opposed to *flow* issues. Stock issues turned out to be dominant and very harmful. Mexico's peso devalued by around 100% and problems did not go away but got worse. Moreover, the crisis spread around the globe. These are clear signs that Mexico's flow problems were not at the heart of this phenomenon. It is worth noting, incidentally, that as far as I know, nobody anticipated that the Tequila crisis would send shock waves all around the world, cause major damage in Argentina, and even give rise to some tremors in the US stock market.

Much of the same happened in the current crisis (which I will label *Subprime*). The low quality of subprime mortgages was widely known. There was general concern, for example, that those mortgages would become nonperforming as the Fed started to raise interest rates. However, the subprime market did not exceed USD500 billion and, thus, it seemed highly unlikely that problems in that tiny segment of the capital market could not be easily contained by appropriate policy. Subprime mortgages were tiny even compared with the US stock of mortgages which exceeded USD13 trillion.[4,5]

[4] Even bond-market guru Bill Gross from Pimco was taken aback by the Subprime's virulence, see Leonard (2009).

[5] Interestingly, before the Subprime crisis erupted, central in the debate was the phenomenon of *Global Imbalances*, i.e., large US current account deficits. This is a *flow* issue that has now been largely

The disproportionate impact of small capital market dysfunctionality is a feature of all systemic financial crises and inspired Enrique Mendoza and I to use the phrase "petty crime and cruel punishment" in the title of one of our papers about the Tequila crisis (see Calvo and Mendoza (2000)). Why is that so? Main suspects are various kinds of financial *vulnerabilities* which, at the time, are not well understood or are hidden under the surface. Calvo, Izquierdo and Mejia (2008), for example, claim that large current account deficit and foreign-exchange-denominated debt are vulnerabilities common to a large number of systemic financial crises (labeled Systemic Sudden Stops). The paper argues that a large current account deficit exposes the economy to large *real* currency devaluation as the current account has to be adjusted in response to a sudden, and largely unexpected, cut in international capital flows (i.e., a *Sudden Stop*). If debts are denominated in foreign exchange, real devaluation could generate serious financial stress, especially in the nontradables' sector. Empirical analysis shows that the conjecture cannot be rejected at the standard significance levels. More concretely, the paper shows that, in the midst of a systemic financial crisis like the Subprime, the probability of an economy suffering a Sudden Stop, increases with the size of the current account deficit (as a proportion of absorption of tradable goods) and the size of *Domestic Liability Dollarization*, i.e., foreign-exchange-denominated debts vis-à-vis domestic banks.

At first blush, the above result seems far removed from the Subprime episode. The US subprime mortgages' market is not a country, and debt was denominated in USD, not foreign exchange. But a closer look reveals strong parallels. To be sure, the set of subprime mortgage holders does not constitute a country; however, it is a subset of the

overshadowed by financial problems for which, again, stocks are at center stage. Why are fleeting flows so absorbing in macro debates? One conjecture is that they are much easier to measure and identify than stock variables (especially off-balance-sheet items).

world population that displayed a large current account deficit, easily competing with the eye-popping deficits concurrently ran in Iceland and the Baltics. Moreover, the main problem with foreign-exchange denominated debt is not currency denomination per se, it is that devaluation changes the *relative value of debt in terms of the borrower's wealth*;[6] for a country, this is especially notable in the nontradable sector. But, isn't it something like that what happened to holders of subprime mortgages? Mortgage holders in the subprime market saw the relative price of their houses collapse in terms of their mortgage obligations, both because the USD house price fell precipitously and because their USD payments increased as "teaser periods"[7] expired and the Fed started to raise interest rates. Therefore, from an economic point of view, holders of subprime mortgages were squeezed in much the same way as emerging markets that are subject to large current accounts deficits and foreign-exchange-denominated debt.

Another key common element in systemic crises is that they hit the center of the international financial system and, as a result, other parts of the world economy feel the shock. In Calvo (1999) I employ the subtitle "When *Wall Street* is the Carrier" to characterize this situation, for which that paper offers a rationale.[8] The explanation, according to the model in the paper, is that as *Wall Street* is hit, margin calls are set in motion and *Wall Street* has to liquidate its long positions in order to deleverage. If the shock is large enough, *Wall Street* would suffer a liquidity crunch which forces it to sell illiquid assets or stop acquiring them. Even if the latter takes place and there is no massive dumping of illiquid assets, this would be enough to trigger Sudden Stops in economies and

[6] This phenomenon was discussed in connection with the Great Depression by Irving Fisher in his seminal 1933 *Econometrica* paper.
[7] In the mortgage market jargon "teaser period" refers to the initial period after signing the contract in which the cost of servicing the mortgage is negligible, a common strategy to lure unsophisticated home investors.
[8] Wall Street is in italics to signal that the term is used to refer to the central capital market.

sectors outside the epicenter of the crisis. Clearly, the firsts in line to be hit by this portfolio accommodation will be economies or sectors that display large current account deficits and would have suddenly to discontinue their spending plans in a big way. Some might argue that this would never happen if the afflicted economies or sectors had strong *fundamentals* because savvy investors would be ready to buy up their illiquid assets and their prices would not collapse. But this is equivalent to assuming that there is no such thing as an *illiquid* asset. This could be a reasonable first approximation under normal circumstances in which large asset turnover is not accompanied by systematic price collapse and, actually, also takes place during market rallies. However, when *Wall Street* suffers a big blow, the new flow of assets generated by current account deficits will have to be picked up by *non specialists* who are likely to suspect that what appears to be a bargain is a siren's song. They are likely to conclude that specialists are not buying and/or trying to get rid of illiquid assets because they have detected a major flaw in fundamentals, which is not apparent to non specialists. Therefore, non specialists are likely only to buy the illiquid assets at high discounts.[9] In turn, faced with low prices on their illiquid bonds (and implicit high interest rates), current-account-deficit economies or sectors are likely to decide to stop borrowing, which generates a full-fledged Sudden Stop.[10]

The effect of Sudden Stop in emerging economies has been amply discussed in the literature and needs no further elaboration (see, e.g., Calvo (2005)). It is, however, worth recalling that Sudden Stops are typically accompanied by a sharp deceleration in output growth and, in some cases, output collapse (e.g., Argentina's 2001/2 crisis brought about a near 20% peak-to-trough fall in output). A similar phenomenon is presently being

[9] The literature refers to these incidents as cases of "the lemon's problem."
[10] Notice that under the present interpretation, Sudden Stop is essentially a *credit crunch*. Demand for credit eventually falls but as a *result* of higher interest rates or domestic chaos generated by the credit crunch.

experienced in the real estate market. Output of new houses in the US, for instance, increased sharply since 2003, reflecting a large current account deficit by the set of households acquiring those houses. The Subprime crisis brought this process to a full stop in 2007, provoking a sharp fall in house prices and output. *Wall Street* was hit and deleveraging started because new houses were financed by asset-backed securities actively traded, directly or through derivatives, by the central capital market. To illustrate the size of the shock, consider a bank which leverage is 10 times its capital (a low leverage ratio for investment banks); thus, a capital loss of USD1 billion would call for rolling back this bank's loans by USD11 billion if the leverage ratio stays the same (and the bank is not recapitalized).[11] Therefore, a loss of capital by a highly leveraged bank (which for regulatory or reputational reasons is unable to increase its leverage ration) would result in a large credit crunch. Suppose, for example, that the loss in subprime mortgages amounted to USD 200 billion. Using the above formula, this would translate into a credit cutback exceeding USD2 trillion, around 30% of US M2 in 2007! This large deleveraging will likely bring about lower growth or outright depression, much in the same way as in emerging markets' crises.

The real effect from a systemic financial crisis depends mostly on financial considerations; in particular, the ability to issue liquid debt instruments. In the 1998 Russian crisis, for example, emerging markets loss virtually all access to credit markets and credit flowed to the US. At present, we have seen a flight to quality, first, to emerging markets (in 2007 until mid 2008), and then to the advanced economies, mostly the US (which resulted in a significant appreciation of the USD and fall in commodity prices). This helps to explain why the Subprime crisis left a large set of emerging markets

[11] In symbols L(oans) = K(apital) + D(eposits) = (1 + D/K)K = 11K.

unscathed until the Lehman Brothers' collapse, after which there was a flight towards US T-Bills.

Before closing this section, I would like to point out that turning points at which systemic crisis is triggered or there is a sharp change in the speed at which it spreads around countries and sectors depends, in several instances, on factors that are also hard to identify or predict. For example, the 1998 Russian crisis takes place shortly after the IMF refuses to bail out the Russian government, pushing the country into default. Arguably, the market was expecting the bailout because Russia was thought to be too-big or too-"nuke-ish" to fail. Something similar happened when Lehman was allowed to go bankrupt. In both cases, markets collapsed. This is not the place to have detailed discussion of the deeper economics behind these episodes. However, I cannot help but to conjecture that *surprises* in the *financial* safety net provided by multilateral financial institutions or powerful central banks could have strong effects. In both cases mentioned, refusal to provide expected bailout was undertaken with the purpose to "give them a lesson," and prevent "moral hazard." This shows that systemic financial crises are times for healing not for enforcing rules that are optimal ex ante, but either for commission or omission many players have failed to follow.

III. Why We Fail to Prevent Systemic Financial Crises?

The previous section claimed that financial crises are very much alike. So, the question arises, why have we experienced so many crises since 1980 and, in particular, why were US authorities so complacent about the accident-waiting-to-happen taking place in the subprime mortgage market? Part of the answer to this question is answered above, where it was argued that the factors behind a given crisis are hard to identify or predict. In

this section, I will provide more detail by highlighting some issues that were especially relevant for the Subprime.

Greenspan said explicitly that he expected that financial institutions would be capable of self-regulation and was stunned by the results. The fact that he was revered by most other players inside and outside government is strong evidence that his view was widely held. There was also a widely held opinion that if crisis started at a small segment of the economy, the Fed could stop it from spreading by lowering interest rates, or Fannie and Mac could socialize the private debt arising from subprime mortgages, and the fire would be contained.[12] In fact, as noted above, something of the kind happened after the Fed sharply lowered interest rates in 2007. As crisis erupted in advanced economies, capital started to flow to emerging markets, which shows up in the decoupling of emerging market bond yield from those on US junk bonds, for example. However, problems in the real estate market did not vanish and continued to haunt the financial system.

Aside from sheer corruption and mortgage mismanagement, I conjecture that a central explanation for the stunning spread of the crisis is that the Fed missed the risks involved in the so-called "shadow banking." These are unregulated financial institutions, many of which are "too big to fail" and, thus, are implicitly covered by the central bank. It is a banking system without an *explicit* Lender of Last Resort, LOLR. This explains why the sharp fall in the Fed interest rate did not succeed in restoring the health of the financial system (the same applies to the ECB and the Bank of England), and the Fed intervention had eventually to be beefed up by engaging in open market operations with commercial paper and toxic assets. Central banks moved in the right direction and their beneficial

[12] Some evidence about this conjecture was provided by the fact that easy money was effective in preventing recession after the attack on the Twin Towers and the collapse of the dotcoms.

effects were felt, but their pace was too slow relative to the rate at which the crisis was spreading.

The main mistake was to believe that advanced economies were very different from emerging markets, in part because foreign-currency denominated debt was not a major issue in advanced countries.[13] However, the problem faced by advanced countries' central banks was that they were not expected to bail out shadow banks. Thus, even though they did not lack firing power, they lacked a clear mandate to protect the whole of the financial system. This situation led advanced countries' central bank to be "behind the curve" and operate in unpredictable ways – as when Lehman Brothers was not bailed out and, after seeing its consequences, the Fed rushed to rescue AIG, an insurance firm. Therefore, in reduced form, emerging and advanced market economies failed to have an adequate LOLR.

The problem with shadow banking or shadow financial institutions is that they are constantly being reinvented. There are strong incentives for that to happen. For example, from the very beginning banks have been engaged in *money printing*. Asset-backed bonds, for instance, which help transforming illiquid bonds into high-grade and greatly liquid assets is equivalent to money printing. These assets dominate plain cash or even Treasury Bills because illiquidity is associated with higher productivity. The incentives to create those assets increase if, as it happened after 2001, T-Bill interest rates are low. The central bank may try to stop the money-printing machine, but the financial industry has wizards aplenty to outwit poorly paid public officials. Moreover, local financial regulation will not do. As shown in Garber (1998), there are a number of ways to bypass local regulations. Therefore, effective regulation requires global coordination. Unfortunately, I sense a strong resistance on the part of the US in that regard. The hegemon is reluctant to make

[13] The capital sin of thinking the "this time it's different" is a central theme in Reinhart and Rogoff (2009).

commitments that would limit its freedom on these issues. This creates a major difficulty for emerging markets that are left with few options. One such option is accumulation of sizable amounts of international reserves in order to bail out banks and too-large-to-fail corporates burdened with foreign-exchange-denominated debts. Fortunately, the new IMF facilities, e.g., FCL, and the Fed's currency swaps might help to lower the cost of this kind of insurance. I am afraid, however, that the very availability of these instruments may provide further stimulus for balance-sheet vulnerabilities.

In sum, one reason for financial crises' repeat performance is partly due to a poor understanding of how these crises develop and, especially, the wrong belief that they follow a slow-moving path. Under this view, policymakers have plenty of time to apply the right medicine. Unfortunately, it is now abundantly clear that there is a strong non-linearity element in the development of financial crises, partly due to incomplete information and collateral constraints, e.g., margin calls. However, better understanding will not be enough to prevent crisis' recurrence, unless there is effective international financial regulatory coordination and/or central banks and international financial institutions become effective LOLR at a global level – both highly improbable events. In addition, it will be necessary for those institutions to be ahead of financial developments. Otherwise, they will be hopelessly late in reaching the site of the accident.

In closing, it is worth pointing out that, in addition to the technical issues raised above, there are political economy considerations that cannot be discounted. If the public does not understand the nature of the problem, the policymaker that successfully prevents an unsustainable bubble from developing, for example, could be sent to the stake. This is so because on the upswing speculative bubbles are very pleasant: typically consumption

increases and current income goes up. A policymaker who is perceived as stopping the process may have a hard time convincing the public that he has done it for their sake. Moreover, opposition parties are likely to be the first ones to light up the fire, making it even more difficult for the policymaker to defend his case. Therefore, it is crucial that policymakers develop effective communication channels with the public, and ensure the collaboration of opposition parties long before anti-bubble or anti-crisis policies have to be implemented.

IV. Advice Bites

The following do's and don'ts are inspired by the previous discussion:

- Don't underestimate faulty financial arrangements, no matter how small.
- Keep your eyes open about linkages with the rest of the system.
- If concerned about contagion from the rest of the world, focus on strengthening the resilience of domestic banks.
- Beware of rapid bank credit expansion, because it may not reflect the greater creditworthiness of credit recipients. It could just be the result of banks having found new ways to *print money*. The new money instruments may implode unless there is an effective LOLR prepared to back them up in case of a run.
- Controls on capital inflows like in Chile (until a few years ago) can easily be bypassed, making the financial system less transparent and, thus, harder to control and supervise.
- Bank regulation is important, but make sure that regulation encompasses off-balance-sheet and off-shore operations.

- If foreign-exchange-denominated debt is large, make sure that the central bank has enough international reserves or credit lines in case of Sudden Stop. Since this is socially costly, banks and other financial institutions potentially protected by the central bank should be charged for this typically implicit insurance.
- Moreover, recent incidents in Brazil, Latvia, Mexico and Poland, for example, show that central banks may be forced to bail out the non bank private sector if they make wrong foreign exchange bets. If this becomes the rule, the non bank private sector will have to be regulated and eventually charged an insurance premium for potential bailout.
- Policymakers should prepare the public for unpopular policies that have to be implemented to stop a crisis in the bud.

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