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Politics, Policy Regimes, and Financial Crises

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1. Introduction

Financial crises come in a variety of forms and can impose enormous costs. Major varieties include fiscal, banking, currency crises, asset market crashes and sudden large reversals in capital flows (sudden stops). The study of the causes of such crises is obviously important. While it is not realistic to believe that we will ever succeed in entirely eliminating financial crises it is reasonable to hope that by learning more about their causes we are in a better position to reduce the frequency of their occurrence and reduce the magnitude of their adverse effects. There has of course already been a great deal of research that sheds light on these issues but there is also still much that we do not know. Thus the study of various aspects of crises is likely to continue to be a growth industry for many years.

The particular contributions of this paper are twofold. First, we discuss frameworks for analyzing currency crises and banking crises. Second, we provide a guide to some of the most important data and concepts relevant for studying financial crises, geared toward those interested in conducting empirical research on financial crises.

It is clear that there are many causes of crises and that these often vary from case to case. There are some regularities that can help explain a substantial portion of crises, however. Financial crises are frequently generated by perverse interactions among economic institutions and policies, private sector behavior and political institutions and pressures that generate inconsistencies among policies. Inconsistencies can also arise from domestic and international shocks, including foreign policy developments that

require policy adjustments to avoid disequilibrium. Such inconsistencies often do not create problems in the short run but if allowed to persist for long periods they frequently generate crises of one form or another. With respect to currency crises the proximate cause typically is expectations of continuation of a disequilibrium exchange rate which will require policy adjustments. When these seem unlikely to be made through domestic policy adjustments such as tighter monetary and fiscal policies this generates expectations that exchange rate changes or the imposition of controls are the likely course of action. Such expectations in turn generate pressures in the foreign exchange market as both speculators and agents trying to avoid losses pull funds out of the country. Based on this view, in section 2 we discuss models of currency crises and discuss a number of important considerations that go beyond the formal crisis models.

We focus primarily on currency crises and large capital flow reversals but also give attention to banking crises as one of the major sources of shocks that contribute to the generation of currency crises. We offer some observations on fiscal crises, inflation and asset market crashes in passing. We emphasize how a number of types of political factors such as the strength of governments and timing of elections can generate incentives for governments to generate or allow the creation of conditions which create vulnerabilities to crises. We further discuss how these incentives are influenced by different types of policy regimes such as fixed versus flexible exchange rates and the degree of financial liberalization and quality of regulation and supervision.

For the study of such interrelations both analytical case studies and large N quantitative studies have proven to be valuable. Our focus in this paper is on the latter. In recent years a number of new data sets have become available which offer quantitative measures of a wide variety of political and institutional variables that give us insights into important considerations such as various aspects of the strength of governments and underlying social-institutional factors such as the rule of law. Similar progress has been made with respect to the classification of policy regimes. For example, several studies have demonstrated that the relationship between the exchange rate regime that countries officially say that they are following and those that they actually follow is quite low. Likewise the initial measures of capital controls and financial liberalization as 0-1 dummy variables have been replaced by much more

graduated measures that consider various aspects of these policy regimes. This has led to our ability to make important conceptual distinctions such as the difference between hard and soft fixes of exchange rates and controls on capital inflows versus outflows. Likewise we find that the likelihood that financial liberalization will be followed by financial crises depends importantly on the quality of financial regulation and supervision.

Against this backdrop, in section 3, we provide a brief guide to a number of these recently developed indicators of political factors and policy regimes that are highlighted as being of likely importance within the frameworks laid out in section 2. Our guide includes discussions of several pitfalls in how some of these types of measures have been used in the literature. We also evaluate some of the popular measures used to identify different types of crises. For example, there is a tendency to consider currency crises and large capital flow reversals as being largely the same phenomena. Recent research, however, has shown that the correlations among the popular indicators of these occurrences are surprisingly low. Thus we also provide a brief critical analysis of these two types of indicators of external crises.

The paper is organized as follows. Section two presents frameworks for analyzing research on currency and banking crises. In section three we discuss a number of issues involved with quantitative measures of crises and the economic, political, and institutional factors that may cause them. We divide our discussion into two parts: indicators of currency crises (including large capital flow reversals and sudden stops) and banking crises as dependent variables and indicators of the independent variables, such as economic and political institutions and policy regimes (capital controls, financial liberalization and regulation and supervision, and exchange rate regimes). Section 4 offers concluding comments.

2. A Framework for Studying Financial Crises

In this section we discuss an analytical framework for studying currency crises, the most frequent type of financial crisis. While for convenience we use “speculative attacks” and currency crises as synonymous throughout, it should be emphasized that frequently the capital outflows associated with currency crises come as much or more

from domestic residents as from international actors and the motivation is often to attempt to avoid prospective losses rather than to make speculative gains.

Contrary to the arguments of some that the global financial crises showed the bankruptcy of economic and financial analyses because the crisis was not widely predicted, we believe that we do have a valuable, albeit less than perfect, framework for analyzing the economic and financial aspects of financial crises. A number of economists and financial experts did indeed predict the US subprime crises, and the following global financial and euro zone crises. However, these predictions were widely ignored in the financial and policy communities.

We believe that such failures to pay attention to these warnings can be explained in part by factors emphasized in the literature on cognitive psychology now being incorporated into behavioral economics and finance and as we hope to demonstrate in this project are deserving of increased incorporation into political economy analyses. Factors such as imperfect information and the complexity of situations frequently lead agents to adapt popular simplified stories or mental models to which they cling in the face of contrary evidence.¹ Cognitive dissonance and confirmation bias are frequently extremely important as is herding with respect to these simplified models or stories, i.e. the same stories become widely adapted throughout communities of agents. Hence the spread of the “this time it is different” stories that have contributed so much to the generation of crises throughout the ages.²

Within economic and finance (as in political economy) there are many different theories and in any particular case some of these will be wrong, sometimes hugely so. This was certainly true in the case of the global financial crises where beliefs by many agents in both the public and private sector in strong versions of efficient markets theory and the efficiency of mathematical models of risk management contributed importantly to the generation of crisis (and likewise the failure to predict it.) Another contributor to the low proportion of economists who predicted the crises was the tendency within the

¹See, for example, Nelson and Kalzenstein (2014), Roy, Denzau, and Willett (2007) Shiller (2008) and Willett (2012)

² See, for instance, Kindleberger and Aliber (2011) and Reinhert and Rogoff (2009)

profession for excessive specialization. Thus many academic economists presented with a detailed picture of what was going on in the housing and financial markets would likely have predicted trouble ahead, but relatively few were looking at these developments. An important part of the solution to this type of problem in our judgment is to recognize that seldom, if ever, is there ‘one true theory’ that will offer all of the guidance that is needed to analyze a particular situation well. Analysts should be willing to consider the possibility that more than one particular theory may be useful in understanding various situations . This is the approach that we take in this volume and hope that we will convince the reader, as we have ourselves, that, for example, efficient markets theory can be extremely, useful for some analyses and highly misleading and sometimes dangerous for some others. Financial markets do not always operate in the same manner. Likewise that various versions of Keynesian macroeconomics and particular political economy theories such as the median voter model can have considerable explanatory power for some cases and not for others. Thus we make no attempt to develop a general theory of crises but rather emphasize a number of concepts and theories that we believe should be in the toolkit of anyone seeking to understand financial crises just as a good plumber may only need a hammer for one problem and a wrench for another and both for a third.

Of course the specific details of crises will almost always differ from one case to another but often so will the more fundamental causes. We believe that there is a useful middle ground between views that each crisis is fundamentally unique and that there is one general theory that fits almost all cases.³ The boundaries of this middle ground that we pursue are imprecise, but a key feature is that as is discussed below, crises are frequently caused not by one factor alone but by a failure of multiple factors to align in a consistent manner. Thus, for example, a large increase in oil prices will generate inflationary pressure but will only lead to ongoing inflation if it is accompanied by substantial monetary accommodation.

Thus, a major theme of our project is the importance of considering the degree of consistency or inconsistency among economic and financial shocks and the policy

³ Many of the ex post arguments that some particular crisis was unique or caused by a thousand year event are self serving, based on efforts to avoid blame for failing to have foreseen the crisis coming.

responses that are adopted. And of course when looking at choices of economic and financial policies, political as well as economic factors come to the fore.

Given these interdependencies among the causes of crises just adding each particular factor into a regression equation in a linear fashion is not a satisfactory approach. Conceptually there may be an infinite (or at least very large) number of ways in which various shocks, policy regimes, and the actual policies adapted may prove to be insufficiently consistent to avoid some type of serious financial crises.

In any discrete project one must thus limit the range of factors considered to subsets.⁴ In the volume we then have chosen to analyze several types of patterns that we believe have been important, but are by no means the only types of considerations that can be important.

The content of our project should thus be thought of as the analysis of several types of patterns of economic and financial variables that frequently lead to the generation of various types of financial crises and the role of mental models and political forces which either generate or fail to adopt policies which eventually lead to crises. In the process we also emphasize the roles played by policy regimes such as exchange rate policies that influence how these factors interact.

In terms of the particular types of cases that we consider we have chosen ones where we believe that both international and domestic considerations have been important. Our hope is that beyond offering insights into the particular types of crises that we analyze our analysis helps to illustrate how a number of different concepts can prove useful in the analysts tool kits for considering other types of cases.

2.1. Currency Crises

2.1.1. What are currency crises?

While the meaning of a currency crisis seems largely intuitive researchers and analysts do not always agree about whether one has occurred in particular cases. In part this is due to different judgments about how severe a situation must be for it to be termed

⁴ This of course runs the risk of the reductionist problems highlighted by Oatley (2011). One can try to reduce this problem by staying aware that particular issues can usually be fruitfully analyzed from a number of perspectives and not overclaiming the generality of the conclusions from any one particular study.

a crisis. The media is likely to begin to call a situation a crisis well before most researchers would. And in the literature using statistical measures to identify crises substantially different thresholds of severity are found across studies. While most of the literature just treat currency crises as zero-one events there is likely to be much useful research that can be done based on different degrees of severity of crises.⁵ For example, Walter and Willett (2012) discuss how policy responses may change in the face of changing private sector pressures as the severity of a currency crisis increases.

In his discussion of definitions of currency crises Pepinsky (2014a) offers a two-part definition based on Frankel and Rose (1996) and Athukorala and Warr (2002), which is “rapid outflows of financial capital in anticipation of a possible currency depreciation” (p.1467). There are problems with both of these types of definitions, however. Large depreciations occur only after successful speculative attacks, but many speculative attacks fail.⁶ They still can generate meaningful crises, however. As is discussed in section 3, most recent research on currency crises take both successful and unsuccessful attacks into account by focusing on changes both in international reserves and exchange rates and often also in interest rates, a combination that economists term exchange market pressure.

The second definition is too restrictive as large capital outflows can be generated by factors other than exchange rate considerations, for example, capital flight generated by banking or fiscal crises, or in anticipation of monetary policy changes in advanced economies (see e.g. Rey 2015). And it would be extremely difficult to try to categorize capital flows by their specific motivation, especially as several motivations may be involved at the same time. Most of the current empirical literature doesn’t focus directly on the size of capital flows, but these are important for the growing literature on capital flow reversals and sudden stops. There needs to be a better integration of these two types of studies as recent research, Efremidze et. al. (2011) finds that measures of sudden stops and currency crises are not as highly correlated as one might expect.

At the qualitative level there is considerable scope for case study work that focuses on the concepts of crises held by different actors. As Pepinsky quotes Mark Blyth (2002)

⁵ As Leblang and Satyanath (2006) note such difficulties of measuring crises creates an important errors in variables problem that makes finding support for various hypotheses even more impressive.

⁶ See Leblang (2002).

“ideas... provid[e] the authoritative diagnosis as to what a crisis actually is and when a given situation actually constitutes a crisis” (p.10). Clearly the political opposition is much more likely to quickly call a situation a crisis than the sitting government. We cannot hope to capture this level of nuances in large N empirical studies. Thus careful case studies are of considerable importance. However this does not imply that large N quantitative research cannot be highly valuable even though it must rely on crude proxies. As we discuss in section 3 however, the practical impossibility of developing ideal measures of crises (and other variables) should not keep us from paying considerable attention to how our proxy variables are constructed and using the best measures available.

We should note that balance of payments disequilibria do not always generate currency crises. Balance of payments equilibrium is a long run, not a short run requirement. There are many reasons why it may not be efficient to attempt to adjust any payments imbalance immediately since these may often be reversed naturally, for example where the imbalances are resulting from swings in the business cycle. This idea was reflected in the Articles of Agreement of the International Monetary Fund whose philosophy was that temporary or short term imbalances should be financed and only with longer term deficits or cases of fundamental disequilibrium as they were labelled should exchange rates be adjusted. The problem that led to the breakdown of the Bretton Woods exchange rate system was not so much this philosophy as the failure of governments to initiate adjustments before disequilibria became too large and prolonged. The political factors that lead to this bias toward delaying adjustments for too long will be discussed below. These become particularly important where it is hard to be sure how prolonged a current imbalance will last in the absence of adjustment actions.

We should also note that exchange rate adjustments will not always be the best way for countries to adjust to longer term payments imbalances. Balance of payments disequilibrium results from a failure of a constellation of factors that mesh in a consistent manner. Thus there are a number of different ways to adjust payments imbalances and these should take into account the state of possible domestic macroeconomic and financial imbalances as well. The theory of optimum currency areas points to factors that influence the relative economic costs of using exchange rate changes versus domestic

macroeconomic policies to bring about adjustment. Thus while balance of payments and exchange rate disequilibrium are two different names for the same situation, correction of the disequilibrium should not always involve exchange rate adjustments. As we'll discuss below what type of adjustment market actors expect a government to undertake is an important consideration in the second generation of currency crisis models.

Having noted these issues involved in defining and measuring balance of payments disequilibrium and currency crises, for the following theoretical discussion we place these problems aside and assume that we know what currency crises are.

2.1.2. Frameworks for analyzing causes of currency crises: the role of policy inconsistencies

While there are many varieties of causes of currency crisis, a high proportion involve sizeable and prolonged inconsistencies between domestic macroeconomic and exchange rate policies, that is, from the maintenance over substantial periods of disequilibrium exchange rates. There can be many causes for the creation of serious misalignment of exchange rates, both internal and external, and they need not always be caused by the adoption of inappropriate policies. But policies that were initially appropriate may become inappropriate, i.e. inconsistent with external equilibrium, in the face of various types of shocks, such as large falls in the prices of commodity exports or large capital outflows generated by a tightening of monetary conditions abroad. Both internal, for example, domestic macroeconomic policies, and external, for example, a devaluation, policy adjustments can at times be quite costly in both economic and political terms.⁷ Failure to adjust policies in light of these shocks then can allow the resulting disequilibrium to continue to the point where a crisis is generated.

To analyze currency crises it is clear that a political economy framework must be adopted. Both economic and political factors interact. Government behavior can be important in a number of different ways.

In some cases inappropriate government behavior such as the generation of political business cycles can be the proximate cause of disequilibrium. In others governments with

⁷ The factors affecting the relative economic costs and benefits of internal versus external adjustments are the focus of the large literature on optimal currency area theory. For an initial effort to map some of these economic effects into a political framework see Willett (2004).

a short term focus may contribute by accommodating rather than offsetting shocks such as expanding the money supply to validate cost push pressures. In both of these types of cases biases⁸ in government behavior can be important contributors. In still other types of cases the costs of domestic adjustments would be so great that exchange rate adjustments are called for on economic efficiency grounds. Even in such cases, however, biases in government behavior can lead to failures to undertake such exchange rate adjustments promptly and thus create incentives for speculative attacks.

2.1.3. Formal models of currency crises

We begin our discussion with a brief review of the formal models of currency crises. The first generation models focused on cases of fundamental disequilibrium such as large fiscal deficits⁹ that are inconsistent with the maintenance of a pegged exchange rate¹⁰ and governments that do not take actions to reduce these deficits. In such cases a currency crisis and abandonment of the peg are inevitable. The contribution of the models was to specify the timing of the crisis. While the political underpinnings of these models were usually not specified they are consistent with weak governments that lack the political capacity to cut spending or raise taxes, a classic case of time inconsistency. As Thus, as earlier mentioned, one way in which government behavior can affect the probability of a currency crisis, is by initiating the shock that leads to the crisis.

Second generation models made two important innovations. Instead of just being good or bad an intermediate level of fundamentals was introduced, a ‘good’ vulnerable zone in which a crisis was not inevitable but with bad luck was quite possible. The second major innovation was the explicit introduction of political economy considerations in the form of a policy reaction function. With good luck (i.e. the absence of negative shocks) no fundamental inconsistency between exchange rates and domestic macroeconomic policy would develop and the initial ‘good’ equilibrium would be maintained. An adverse shock, however, which could include a shift in agents’ attitude

⁸ We are using biases and inappropriate behavior in the possibly loaded sense of the adoption of behavior that deviates from aggregate economic efficiency. Of course in practice there are often considerable disagreements about what policies are economically efficient.

⁹ For more detailed discussions of formal crisis models see, for example, Pilbeam (2013) or other texts in international money and finance

¹⁰ The counterpart of these large fiscal deficits are often current account deficits, the twin deficits problem.

and expectations generated perhaps by contagion from a crisis elsewhere could generate an inconsistency between internal and external policies.¹¹ Whether or not this leads to a self-fulfilling speculative attack that forces the country off of its peg depends on the markets' expectations about whether the government will be willing to undertake the costly domestic macroeconomic adjustments necessary to successfully defend this peg. This in turn depends on the markets' views of the political strength of the government and its perception of the costs and benefits of the alternative policy strategies. Thus, for example, if a country is facing high unemployment, and a close election is coming up, the government will be less likely to adopt restrictive macroeconomic policies. A major speculative attack thus becomes more likely.

The so called third generation crisis models do not follow a standard theoretical structure as do the first two generations. Concern with moral hazard is often described as one of the features of third generation type models, but moral hazard considerations can also be incorporated into the earlier general models (see, for example, Dooley 2000). A common theme of many of the third generation models is a focus on issues of stock rather than just the flows on which the first two generations of models tend to focus. Issues include liquidity and solvency of financial institutions as well as contagion. Key here are issues of bank runs applied in an international rather than purely domestic context. Such models help to justify the empirical results that a country's ratio of short term foreign debt to international reserves is an important determinant of a country's vulnerability to currency crises.¹² An important contribution from one class of these later models is attention to the implications of amending the standard assumption of the first and second generation models that agents are well informed with common knowledge about the fundamentals.¹³

More generally, there will often be considerable uncertainty not only about the initial state of the fundamentals but also about the severity of the initial shock. These uncertainties are compounded by possible doubts about how the government will

¹¹ Such shocks could worsen the country's current account deficit directly such as a fall in foreign demand or indirectly through higher domestic inflation and shifts in international capital flows caused by monetary tightening abroad or the election of a new populist government.

¹² Of course the potential claims on a country's international reserves during a crisis are not limited to just short-term foreign debt. Domestic actors and foreign portfolio investors can also run for the exit.

¹³ See Leblang and Satyanath (2006) who draw on the model developed by Morris and Shin (1998).

respond to adverse shocks. In some cases domestic policy or exchange rate adjustments may not be needed. For example short term disequilibria could be met by running down ample international reserves and official borrowing from abroad. Such ability to “cushion” the effects of adverse shocks will then depend on factors such as the severity of the shock and the degree to which it is likely to be temporary or permanent and on the country’s reserve position, international borrowing capacity, and reputation for good economic policy.

It is sometimes stated that second generation models show that even countries with strong fundamentals can be forced to devalue due to self-fulfilling speculation. This isn’t correct. In the second generation crisis models the case of multiple equilibrium can occur only when the fundamentals fall into the vulnerable intermediate zone.¹⁴ With strong fundamentals such a shock creates no crisis while with bad fundamentals a crisis is inevitable at some point. This is because these models assume rational expectations.¹⁵ With destabilizing speculation a country with strong fundamentals could be subject to a major speculative attack. In our judgment such situations occur only rarely. Often allegations that speculative attacks were unjustified come from focusing on a subset of relevant fundamentals. Even with rational speculation a country can be an innocent victim of developments beyond its control which generate balance of payments disequilibrium. i.e. a country can itself have strong fundamentals but a major shock creates a substantial international disequilibrium. An example is France during the crisis in the European Monetary System in the early 1990s. France had strong domestic

¹⁴ In these models the causes of shifts in expectations is not specified. They could be arbitrary mood swings. This has lead some economists to refer to these as sun spot equilibria. In the cases we have studied, however, it is quite common to have shocks that understandably generated shifts in expectations.

¹⁵ Of course it is also possible that currency crises could be generated by destabilizing, i.e. unjustified speculation. In considering this possibility, however, it is important to keep in mind the distinction between destabilizing in the common usage sense of being disruptive and destabilizing in the technical economic sense of generating pressures to move prices away from rather than toward equilibrium. Thus for example, speculation against an overvalued exchange rate would be disruptive in the sense that it would contribute to the generation of crisis conditions but it would not be destabilizing in the technical economic sense of generating pressures for the exchange rate to move away from equilibrium. Indeed they would be stabilizing in the sense of generating pressures to force the rate to be adjusted toward an equilibrium position. Failure to make this distinction was a major contributor to the widespread belief at the time of the Bretton Woods negotiations that the interwar period had shown that flexible exchange rates would be prone to frequent episodes of destabilizing speculation. See Willett (1977).

fundamentals but fell victim to high interest rates in Germany associated with reunification.¹⁶

2.1.3. Beyond the formal models

An empirical issue not addressed in the formal models is what variables should be counted as fundamentals¹⁷ and what interrelations among them would qualify as good, bad, or intermediate fundamentals. Such issues are addressed to some degree in studies on the quantitative determinants of crises, but while this literature has made some important contributions concerning such factors as large current account deficits and ratios of international reserves to short-term foreign debt there is still much about the importance of a number of variables that we do not understand.

While the second generation models focused on the importance of intermediate states of fundamentals in truth fundamentals do not come in just three distinct flavors. There is a continuum where different strengths of various types of fundamentals interact with different types and degrees of severity of shocks and expectations about government responses. For example a country with a large stock of international reserves can weather a given capital flow reversal more than a country with lower levels of reserves. And a government with a strong record of responsible economic policy is less likely to be attacked than one that has been prone toward economic excesses. Thus actual analyses will often need to take a considerable number of factors into account.

There is often considerable (justified) uncertainty about many aspects of potential crisis scenarios. This in turn contributes to dynamic processes for many crisis episodes. In our framework (which we stress is only one of a number of possibilities) some initial adverse shock (which can but need not come from domestic policy actions such as the generation of political business cycles) creates a stage one crisis where the sustainability of a country's current policy mix begins to be questioned. This creates at least some degree of crisis atmosphere but doesn't lead to massive speculative attacks and runs for cover. As the nature (for example, temporary or permanent) and magnitude of the

¹⁶ This is a good illustration of Oatley's (2011) concern that recent IPE has tended to put too much emphasis on domestic relative to international or systemic considerations.

¹⁷ A major reason that many international investors did not pick up early warning signs of the coming Asian crisis was their focus on domestic macroeconomic variables which were strong while ignoring current account deficits and financial weaknesses. See Willett et.al. (2005).

imbalance becomes clearer and the government begins to develop its policy strategy for dealing with the situation¹⁸ expectations about the seriousness of the stage one crisis may begin to abate with the “crisis” ending up causing only modest disruption. On the other hand if little progress appears to be made toward correcting the disequilibrium agents’ expectations will worsen, leading to a severe (stage two) crisis with much greater costs. Of course as noted with respect to fundamentals this simple stage one-stage two dichotomy will in practice be a continuum. We believe this simple framework, while far from comprehensive, can prove useful both for qualitative and for quantitative analysis of crises. We discuss in section 3 aspects of the factors from first, second, and third generation currency crisis models that should be included in empirical structures of the determinants of crisis and the quantitative measures available to proxy these factors.

Note that in models of perfect capital mobility such as Krugman’s first generation model there is no scope for sterilized exchange market intervention. However, as discussed in section 3 there is considerable empirical evidence that many emerging market economies have been able to engage in substantial sterilized intervention, implying that they face less than perfect capital mobility. It is also worth noting that with perfect capital mobility the trilemma that a country cannot have all three (a fixed exchange rate, independent monetary policy, and free capital flows) holds in the short run, giving rise to the importance of a country having an inconsistency between their exchange rate and domestic monetary policies unless they adopt controls.¹⁹ With imperfect capital mobility the trilemma is only a long-run constraint and can be violated in the short-run through sterilized intervention. This is a two-edged sword. While it gives more scopes for countries to protect themselves from temporary shocks, it also allows the development of policy inconsistencies with incentives for delaying adjustments leading to crises.

¹⁸ One uncertainty is how much of their international reserves are they willing to use to cushion the shocks. As Aizenman, Cheung and Ito (2015) show there was great variability across the emerging markets in their willingness to run down their international reserves during the global financial crisis.

¹⁹ Rey (2015) has recently argued that in fact there is only a dilemma since flexible exchange rates do not provide full insulation from credit developments abroad. This interpretation is open to question. It has been well known that exchange rate adjustments can give only partial insulation in the face of many types of shocks. Indeed this is an important implications of the popular Mundell-Fleming model. This gives nuance to the trilemma analysis but doesn’t force it to collapse to a dilemma model where considerable monetary autonomy can be gained only through the use of controls.

In the first generation models international reserve considerations would not influence whether a crisis occurred, only its timing. In second generation type models, however, reserve positions can take on an important role. Along with the state of the underlying fundamentals within a vulnerable zone, they would influence how large a negative shock could be handled without generating a major speculative attack.

In summary an important commonality of these formal models is that they all focus on policy inconsistencies. The first two generations focus on inconsistencies between policies that generate disequilibrium patterns of flows. The third generation broadens the analysis to consider vulnerabilities to stock imbalances such as insufficient reserves to cover sudden capital flight.

2.1.4. Failures to Adjust

A key question becomes why governments allow such disequilibria to develop to the point that the risk of severe crises becomes quite high. While a full treatment of this issue is beyond the scope of this paper we do wish to offer a few observations. Adjustments to remove inconsistencies are usually costly in both economic and political terms. Governments typically wish to remain in power and unless they are quite strong they will tend to fear that such adjustments will adversely affect their political survival. Thus another major way for government behavior to affect the likelihood of a currency crisis is through failure to make necessary adjustments that could have prevented major shocks from leading to a crisis.

In addition to purely rational calculations government officials will often be subject to some of the types of behavioral biases identified in the literature on cognitive psychology and increasingly being applied in studies in behavioral economics and finance. Wishful thinking and over-optimism are common traits. Perhaps the disequilibrium is just temporary and the economy will be hit by favorable rather than unfavorable shocks. And confirmation bias can lead to interpretation of ambiguous situations as providing favorable evidence. So why bear the certain costs of offending

domestic interest groups and the general public now to avoid something that may or may not happen in the future.²⁰

Many of the same factors that can generate incentives to avoid taking timely adjustments can also provide incentives to adopt policies that help generate disequilibria. Besides the standard distributional considerations there are frequently serious time inconsistency problems. Less than fully anticipated changes in macroeconomic policies typically affect quantities more rapidly than prices as reflected in standard short-run Philip Curves. Where political pressures are based heavily on short time horizons, this gives incentives for macroeconomic policies to have an expansionary bias (think political business cycles) and a disinclination to adopt disinflationary policies since the costs in terms of recessions and high unemployment tend to show up before inflation begins to slow substantially. The pressures for higher inflation have often come from the need to finance large fiscal deficits generated in turn to increase various types of government spending by more than tax revenue increases. With an ideally functioning regime of flexible exchange rates such developments would lead to inflation and/or fiscal crises without generating currency crises in the common sense of the word. These domestic developments would lead to large depreciations of the currency, e.g., currency crashes, but without major speculative attacks. The latter are much more likely to occur under regimes of sticky exchange rates such as adjustable or crawling pegs. This could also occur under regimes of managed floating, where the management is heavy. Indeed regimes of managed floating have not infrequently been managed in ways that do not differ substantially from adjustable or crawling bands. This occurred in several of the East Asian countries prior to the Asian Crisis of 1997-98.

If exchange rates under such regimes are adjusted promptly then there is no economic reason why domestic economic instabilities need generate the types of major exchange rate misalignment that would generate large speculative attacks. We observe, however, that such prompt adjustments is frequently absent under such regimes. Again

²⁰ For more discussions on these issues in the context of the political economy of international money and finance see Bird and Willett (2008), Walter and Willett (2012), Walter (2013), and Willett, Chiu, and Walter (2014).

both distributional and time inconsistency problems are an important part of the explanation for such tendencies to delay adjustment.

Contrary to the case with macroeconomic policies, exchange rate adjustments tend to show up more quickly than the quantity effects. Thus in political economy terms the costs to voters in terms of higher import prices (from a devaluation) tend to show up much faster than the benefits to exporters from greater sales. Thus for governments subject to short run political pressures there are strong incentives to delay both exchange rate and domestic macroeconomic policy adjustments. In such cases it is often the emergence of major speculative attacks that force exchange rate and/or domestic policy adjustments to be made. As earlier noted, this failure to adjust is another major way in which government behavior can affect the probability of a currency crisis.

It is important to note that these tendencies to delay adjustments until they are forced by major currency crises do not occur only with respect to domestic policy generated disequilibria. The source of the shocks that generate this initial disequilibria can come for example, from developments in commodity markets as huge drops in export and tax revenues that hit Russia in 1998 or the shock from German unification that hit France in the early 1990s.²¹ In figure 1, we summarize how both domestic and external policy shocks can both generate a currency crisis.

The pressures to postpone needed adjustments often reflect sectoral distributional issues as well as the time inconsistency issues discussed above. The expected economic effects will be mediated through domestic political structures as well as the degree of awareness that groups have of how they will be affected. (Rational ignorance is often an important factor). Political structures will both affect the pressures placed on governments and their abilities to respond. These will often also be affected by ideological factors and the mental models through which agents view developments. There is now a large political economy literature focusing on such considerations. Some of these considerations will be discussed further in section 3.²²

²¹ On the latter see the analysis and references in Willett and Wihlborg (2012).

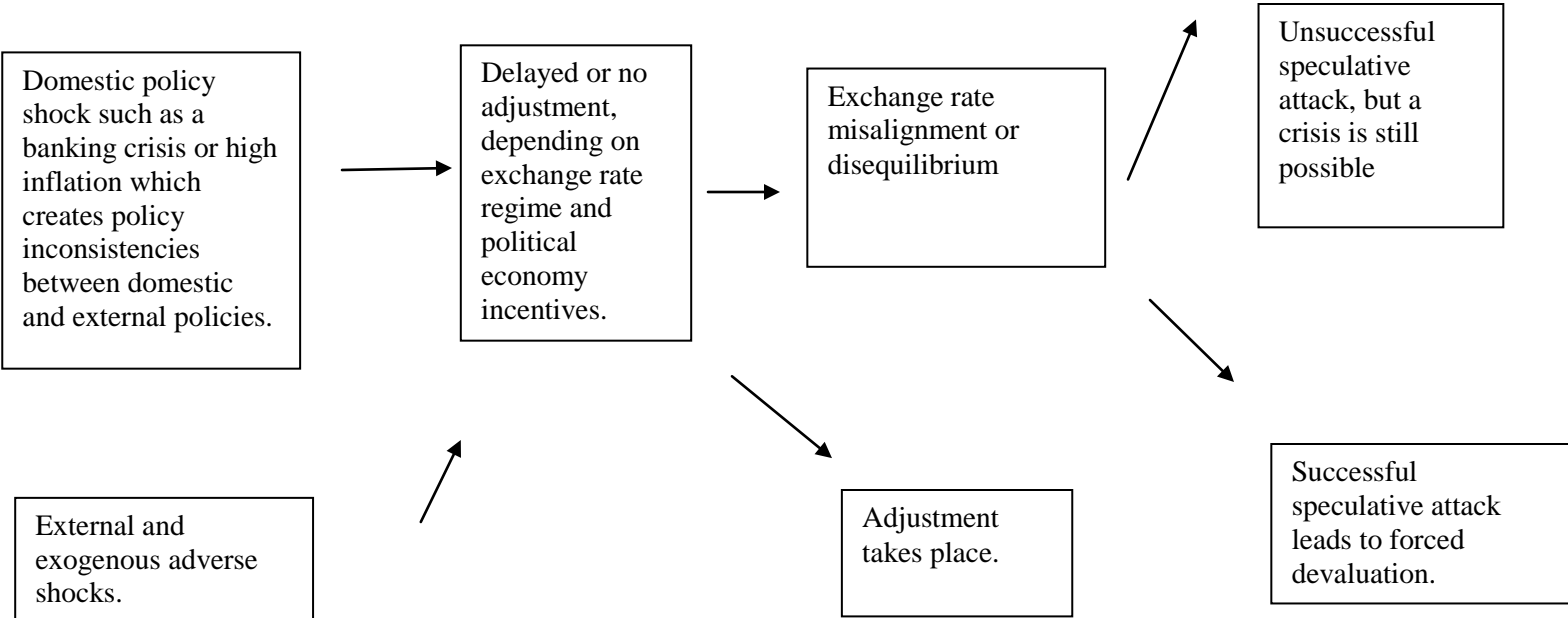
²² The papers in Oatley and Winecoff (2014) offer nice reviews of much of this literature. Note that most of the political variables used in the literature on the determinants of exchange rate policies is also relevant for the analysis of the adoption and failure to adopt both exchange rate and domestic policy adjustments. On this literature see Bearce (2014), Frieden(2015)and Steinberg (2015). This literature is also directly relevant to the generation of currency crises. The type of exchange rate regime adopted has been shown to

Of course it is also possible that currency crises could be generated by destabilizing, i.e. unjustified, speculation. In considering this possibility, however, it is important to keep in mind the distinction between destabilizing in the common usage sense of being disruptive and destabilizing in the technical economic sense of generating pressures to move prices away from rather than toward equilibrium as in the case of stabilizing speculation. Thus for example, speculation against an overvalued exchange rate would be disruptive in the sense that it would contribute to the generation of crisis conditions but it would not be destabilizing in the technical economic sense of generating pressures for the exchange rate to move away from equilibrium, indeed they would be stabilizing in the sense of generating pressures to force the rate to be adjusted toward an equilibrium position. Failure to make this distinction was a major contributor to the widespread belief at the time of the Bretton Woods negotiations that the interwar period had shown that flexible exchange rates would be prone to frequent episodes of destabilizing speculation.²³

have a major impact on the frequency of currency and banking crises. See the analysis and references in Angkinand and Willett (2011) and Chiu and Willett (2009). Likewise countries with overvalued exchange rates are much more likely to suffer currency crises than those with undervalued exchange rates. We should note that the emergence of overvalued rates is not always a direct choice by governments as is analyzed in Steinberg (2015) but may be the consequence of factors such as domestic policies combined with a hesitancy to change exchange rates.

²³ The modern reinterpretation of the interwar experience were stimulated by Milton Friedman. For analysis and references see Willett (1977).

Figure 1. An Anatomy of Currency Crises



2.2. Analyzing Causes of Banking Crises

Banking crises on a systemic level are “widespread failures of banks which lead to closures, mergers, takeovers, or injections of government resources into a financial sector” (Caprio and Honohan 2010, p.3) due to severe declines in the (actual or perceived) value of banks’ assets (Brunnermeier et al. 2009). A non-systemic banking crisis is a smaller affair, involving the failure due to insolvency of one or two banks that are not central to the payments system (Caprio et al. 2005). Our discussion draws largely on systemic banking crises.

Banking sector instability can be an important source of shock that increases vulnerability to currency crises. As events in Thailand and other Asian countries in 1997 demonstrate, the realization²⁴ that banks and finance companies had amassed an alarmingly high level of foreign-currency loans which were used to finance risky investments triggered massive capital flow reversals, followed by a currency crisis. Thus troubles in the banking sector initially spilled-over into a currency crisis, yet once the currency was devalued, the currency turmoil came back to exacerbate problems in the banking sector. Moreover, when banking crises lead to recapitalization from the state, as they often do, these costs can generate fiscal crises that further increase pressures in the foreign exchange market through capital outflows. Ireland in the recent euro crisis is a prime example. Given the close link between banking and currency crises, in this section we briefly review causes of banking crises.

Like currency crises, banking crises are often triggered by exogenous shocks. Unless these shocks are huge, however, whether they result in a major crisis will depend on how vulnerable the system is. Even minor shocks such as small changes in asset prices can trigger a huge crisis given information asymmetry and concerns that the financial system may be overextended and/or that the government and regulators are not capable of handling the situation. Unsure of who is safe and who is not, a “bank run” on the repo market followed the collapse of Lehman Brothers in the fall of 2008 (Claessens and Kose 2013). There is a sizable theoretical literature on banking crises which focuses on

²⁴ This realization was triggered by an announcement made by the Thai authorities in March 1997 that recapitalization for some troubled financial institutions had secretly been under way (Lindgren et al. 1999).

explaining the anatomy of bank runs.²⁵ As often noted by researchers however, bank runs are only a proximate cause to banking crises. In the remaining paragraphs we discuss some of the most common build up of vulnerabilities that preceded banking crises.

Some argue that the vulnerabilities are inherent in the key function that banks perform.²⁶ For example, banks need to bridge the gap between depositors who wish to have access to their money in the short term while businesses need to be able to borrow long term (“maturity transformation”). As a result, banks perpetually have a mismatch in their balance sheet: their assets (e.g., loans) are far less liquid than their liabilities (e.g., deposits), and this makes them prone to bank panics (Diamond and Dybvig 1983).

This is not the only source of financial vulnerability, however. Domestic financial policies can also lead to vulnerabilities in the financial sector. One example is perverse financial liberalization, such as liberalization of the domestic banking sector and deregulation of the capital account, without a good framework for regulation and supervision of bank behavior. The situation is exacerbated where financial institutions believe that they have an implicit guarantee from the government that they will be bailed out in the case of large losses. It creates moral hazard, which is further exacerbated by the expectation of the private sector of the government’s ability and willingness to maintain a stable exchange rate. Many banking crises episodes in liberalized financial systems are preceded by a build of rapid private credit growth, which was not accompanied by an adequate framework for good financial sector supervision to monitor the quality of bank loans. For example, the risky loans made by banks in the Asian financial crises were facilitated by the surge in capital inflows from abroad. Not only did authorities fail to prevent risky loans from piling up due to weak accounting standards and disclosure requirements, but domestic policies such as managed exchange rates may have encouraged excessive foreign-currency borrowing.²⁷ This absence of robust supervision comes at a time when it is most needed, since credit risks rise when credit is abundant,

²⁵ Diamond and Dybvig (1983)’s model of bank runs paved the way for further theoretical models in this area. See Allen and Gale (2007) and Singh (2012) for reviews of this line of work.

²⁶ For further analysis of the range of inherent bank vulnerabilities, see Caprio and Honohan (2010).

²⁷ In both Thailand and the Philippines, banks received favorable tax treatment when borrowing in foreign-currency. See Lindgren et al. (1999).

such as immediately after liberalization, as banks have difficulties and have less of an incentive sorting good risks from bad ones (Gavin and Hausman 1996). It has been argued that regulation and supervision are often slow to catch up with greater competition and innovation (Barth et al. 2006).

Poorly designed and poorly implemented policies were also a major factor in the in the U.S. subprime financial crisis. It manifested in the failure of financial regulatory authorities to anticipate the negative consequences of financial innovation. It has been argued that financial innovation has created tendencies for bank managers to take on excessive risk (Rajan 2005) because banks faced increasing competition from nonfinancial institutions. These institutions have come to play a far greater role in credit provision, but were not as tightly regulated as banks.

Even if regulations were to provide the appropriate incentive structure for risk-taking, behavioral finance considerations (e.g., over-optimism, confirmation bias, herding) might adversely affect the propensity of economic agents to make excessively risky loans. These biases would skew agents to take more risks than is socially optimal, even under the appropriate incentive structure. Given this tendency of behavioral biases, the role of good regulation and supervision to constrain such behavior becomes even more important.

Two consequences of financial innovation are notable for increasing vulnerability. One is that banks became more and more dependent on non-traditional (i.e. non-deposits) wholesale funding such as repo markets and money markets and two, banks increasingly hold more securitized assets in their portfolio, rather than just loans. This has made banks more prone to fluctuations in the values of these securitized products, as was the case that the banking crisis in the U.S. in 2008 was triggered by a run on the shadow banking system (Gorton and Metrick 2012). Securitization also increased the number and significance of financial actors who fell outside of traditional prudential regulations covering commercial banks (Singh 2012). The political factors behind the failure of authorities to detect problems early on are highly debated. One explanation is that besides excessive faith in risk management techniques there was an over-emphasis on an ideology or faulty mental model regarding the ability of markets to self-regulate (Willett 2012, Buitert 2012). Others argue that in the eyes of policymakers, non-banking

institutions were not as important to the overall system as banks and hence, a failure of shadow banks probably had no capacity to damage the entire system.

Note that financial liberalization need not by itself be a major cause of financial crises. It is true that in a majority of cases financial liberalization has been followed by an increase in the incidence of systemic banking episodes. However, recent research has found that this relationship occurs most frequently when liberalization is not accompanied by appropriate regulation and supervision. This is an important source of vulnerability. With strong regulation and supervision liberalization does not appear to be associated with major increases in banking crises (Angkinand, Sawangyoengyang, Wihlborg 2010). Although it typically takes strong governments to create and maintain strong regulatory regimes, there are plenty of cases of strong governments without a sufficiently strong score in banking regulation and supervision (e.g. Finland from 1984-1992).²⁸ In a similar vein, strong actions by the authorities can help protect countries against the potentially dangerous effects of capital inflow surges. It is frequently argued that such surges are a major cause of credit boom and banking crises. Our research finds, however, that these linkages are much weaker than is frequently assumed.²⁹ Central banks frequently have the ability to largely sterilize the effects of these financial inflows and strong regulatory systems can keep the greater availability of credit to banks from generating major credit booms.

In both the global financial crisis 2007-09 and the Asian crises in 1997, rapid credit growth (“credit booms”) have been touted as the primary cause of vulnerability, particularly when there is a parallel rapid growth in the asset prices (e.g. Jordà, Schularick and Taylor 2013, Dell’Arriccia et al. 2012). What is less known, however, is that only a minority of all credit booms are followed by a subsequent banking crisis (Barajas et al. 2008, Amri, Prabha, and Wihlborg 2013). Indeed, several countries have experienced persistently high private bank credit growth on occasion such as Australia, Canada, and Singapore, and yet are resistant to systemic banking crises. The questions we

²⁸ Government strength is based on the variable *government stability* from International Country Risk Guide and banking regulation and supervision data source is Abiad et al. (2008). On average, the two variables are positively correlated but there are some exceptions. The problem is that existing data for bank regulation and supervision do not appropriately capture this concept. We elaborate this issue in the following section.

²⁹ See Amri, Richey and Willett (2015).

should be asking are what are factors that can prevent an existing credit boom to metastasize into a banking crisis? One possible factor is more robust financial regulation and supervision.

Nor is the maintenance of repressed systems a guarantee for avoiding crises. The fact that banking crises can and do occur in financially repressed systems is often overlooked. In such systems, the government controls a large part of the banking system by directing bank credit to “strategic” sectors, directly owning banks, or framing rules and regulations for private banks to be consistent with government’s planning strategy (Singh 2012). This type of arrangement can put in place bad incentives, as banks may be forced to become indefinite providers of financing for government deficits and corporations and politicians may be tempted borrow too much from banks, thus causing vulnerabilities in the system.³⁰ According to Honohan (2008), China’s banking crisis in the 1990s centered on the failures of four state-owned commercial banks which were directed to lend to certain sectors that subsequently collapsed. Other cases of banking crises that had its roots in government interventions in the credit markets include Zimbabwe 1995, Zambia 1995, Yemen 1996, Vietnam 1997, Uganda 1994-2002, Sri Lanka 1989-93, Peru 1983-90, and India 1993-96 (Reinhart and Rogoff 2009, Singh 2012). Political factors that are relevant in sustaining this vulnerability include election timing and distributional factors, since credit is being directed to industrial sectors that are close to the government.

3. Measurement Issues in Empirical Work on Currency Crisis

In this section we assemble a reader’s guide to the data and measurements involving currency crises and capital flow reversals, the dependent variables, and the economic and political institutional contributors to financial crises, including banking crises and policy regimes. The write ups include a discussion of how variables are measured and where to access them, as well as relevant critiques on the suitability of the use of these variables to

³⁰ In the case of Thailand, political interference in the lending market actually left villagers with a high amount of debt (Kern and Amri 2014). It has also led to higher loan defaults in India (Cole 2009), and Pakistan (Khwaja and Mian 2004). For more examples of how government interventions in the loan market led to higher systemic risks see e.g., La Porta et al. 2000 for the case of Mexico and Fisman 2000 for Indonesia.

predict financial crises. Definitions are strongly influenced by the theories that try to explain crises (Claessens and Kose 2013).

3.1. Dependent Variables

3.1.1. Currency Crises and Capital Flow Reversals

Standard measures of currency crises are fairly easy to construct so most recent research generates their own data sets. One general set of classifications is given in the large sets of variables provided in Laeven and Valencia (2008) and in Reinhart and Rogoff (2009).³¹ Unfortunately the type of measures used in both of these sources is based on looking only at the extent of currency depreciation. As noted in section 2, this picks up only successful currency attacks. A substantial portion of such attacks are not successful in forcing large exchange rate changes (Leblang 2002) such as when the central bank successfully rides out the crisis by running down their foreign reserves and/or increasing interest rates. To capture such behavior one needs to use a more comprehensive measure of exchange market pressure that includes not only changes in exchange rates but also changes in interest rates and international reserves that can be used to defend the exchange rate. See Eichengreen, Rose, Wyplosz (1996). While the appropriateness of this approach is widely accepted by those doing research in this area there is not general agreement about the best ways to weigh the different components of exchange market pressure and what thresholds to use to designate crises.³²

So far almost all studies just create 0-1 variables of whether there is a crisis or not. It will be important for future research to also develop measures of the intensity of crises. This will also be important for measures of sudden stops and other large reversals of capital flows.

While the initial literature on capital flow surges and reversals focused on net capital flows more recent literature has shown that the behavior of foreign and domestic based investors and borrowers is sometimes quite different. For example the concept of sudden stops is generally thought of in terms of the behavior of foreign investors and thus

³¹ Laeven and Valencia, following Frankel and Rose (1996) define a currency crisis when annual depreciation exceeds 30%, while Reinhart and Rogoff (2009) use a threshold of 15% annual depreciation.

³² For further discussion see Willett, Kim, and Bunyasiri (2012).

should be measured by gross rather than net capital flows.³³ We have also found that at times there are substantial differences in the behavior of different types of capital flows. While it is generally agreed that foreign direct investment is the most stable form of capital flows the evidence has been mixed on the relative volatility of bank versus portfolio flows. While the general concepts of capital flow surges and reversals as larger than usual developments there has been considerable disparity in the research literature on how these are measured. For example Crystallin et al. (2015) find that on a common data set the number of capital flow surges identified by the different major methods that have been used differ by a factor of almost three. Clearly this is an area that requires a good deal more analysis.

Capital account crises have become increasingly frequent in recent years and have given rise to substantial re-evaluations of the possible needs for capital flow management. Surprisingly the correlations between measures of capital account reversals and of currency crises is not nearly as high as one would expect a priori. The reasons for this is another important topic for further research.³⁴

3.1.2. Measurements of Banking Crises

One of the earliest efforts to document cross-country occurrences of banking crises was made by Caprio and Klingebiel (1997, 2003), henceforth CK. Other sources such as Reinhart and Rogoff (2009, 2011), Demirguc-Kunt and Detragiache (DD), and Laeven and Valencia (2008,2010,2012), largely adopt CK's method and definitions and expand the time period and country coverage. The more recent data sets show substantial improvements from earlier data sets, but more progress is still needed. Table 1 below summarizes the key differences between the four data sets mentioned above. Given that these four different data sets share the same origin, one can reasonably expect a significant amount of overlap between them. Remaining differences should be due primarily to different sets of sample countries or period coverage.

Comparing two major data sets of banking crises (Reinhart and Rogoff, 2009 and Laeven and Valencia at the IMF, 2012) over the same set of countries, we show that this

³³ For a recent review and references to this literature see Kim et al. (2015)

³⁴ See Efremidze et. al. (2011) This paper also gives a recent survey of measures both of currency crises and capital flow reversals.

is not necessarily the case. Figure 2 counts the number of banking crisis episodes identified by RR and LV using 64 identical sample countries from 1970 to 2010. While both sources confirm that the majority of crisis episodes took place in the 1980s and 1990s, and their numbers of crises identified are fairly similar for the 2000s, they differ substantially for the 1980s and 90s.

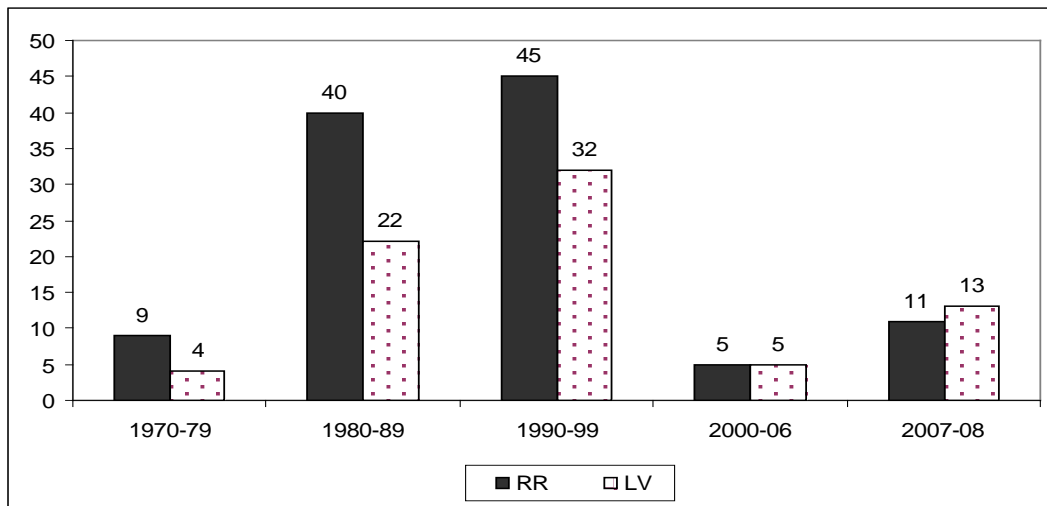
One key distinction between the two is that LV's coding does not actually require there to be a bank failure to be labeled a systemic banking crisis, while it is the first item in the RR criteria (see Table 1). For LV, the announcement of government measures to intervene in the banking sector is enough to count as a crisis. We can see some serious problems with dating banking crises using this "post hoc" approach. First, some bank runs only occur *after* a government support measure was introduced (e.g. Argentina 2001). Second, governments may adopt national measures to support their banking system even when problems have not yet developed in their country. LV data set counts 2008 as the onset year of Greece's systemic banking crisis, because the government guaranteed deposits in banks that count for 80% of the banking system assets. However, this policy was a result of an EU-wide directive adopted in October 2008 (LaRoisiere report). In fact, it was argued that Greek banks, with virtually no exposure to the U.S. subprime crisis, survived the post Lehman collapse crisis quite well compared to its German, French, and Belgium counterparts.³⁵ This suggests that dating crises based on events or government support measures are problematic.

An alternative method of defining financial crises (banking crises in particular) is to use a continuous variable that combines different bank-level and market-related information that capture financial fragility (IMF 2003, Cardarelli et al. 2011). Commonly known as the Financial Stress Index (FSI), this family of models combine elements of market data (e.g. falling asset prices, larger bond spreads, weakening foreign exchange) and/or bank balance sheet data (e.g., non-performing loans, foreign currency liabilities) into one single indicator. The application of this technique has been increasingly common, both as early warning indicators or to analyze effects of

³⁵ The New York Times, June 21, 2011

recessions.³⁶ A variety of aggregation methods have been used from principal-component analysis (e.g. Hakkio and Keeton 2009) to portfolio-theory based aggregation schemes (Hollo et al. 2012). Although one of the uses of FSI is to be a leading indicator of financial crises, the correlation between them and ex-post binary crises measures is not very strong. This family of models may be more suitable as proxies for risk taking (Amri et al. 2011) rather than indicating a crisis itself, as we may see periods with risk-taking in the economy, without necessarily leading to a banking crisis.

Figure 2. Banking Crisis Episode by Decades: Data Set Comparisons



Source: The numbers are calculated based on a sample of 64 countries, from 1970-2010. LV: Laeven and Valencia (2008,2010) and RR : Reinhart and Rogoff (2009)

³⁶ See Vermeulen et al.(2015) for a recent survey of FSI and its various applications.

Table 1. BANKING CRISIS DEFINITIONS AND CRITERIA

	Caprio and Klingebiel 1997 and Caprio et al. (2005)	Reinhart & Rogoff (2009)	Laeven and Valencia (2008,2010)	Demirguc-Kunt & Detragiache (2005)
Broad Definition	A situation when all or much of bank capital is exhausted or a situation of financial distress, in which the banking system has negative net worth.	A situation marked by bank runs, or in the absence of bank runs, events that involve the closure, merging, or large-scale government assistance for an or several important financial institutions.	1. Signs of financial distress such as bank runs, bank losses and liquidations. 2. Significant policy intervention measures such as deposit freezes, blanket guarantees, as well as bank take-overs.	Banking sector distress that pose problems of a systemic or severe nature, rather than a localized banking crisis.
Systemic (Y/N)	Considers cases of both systemic and non-systemic cases, both cases are clearly marked.	Considers cases of both systemic and non-systemic cases, but makes no distinction which is which.	Considers only systemic crisis episodes.	Considers only systemic crisis episodes.
Specific Event Criteria	Large scale government interventions based on country experts, official reports, and the financial press.	1. Bank runs 2. Bank closures, mergers, and take-overs of one or more of the financial institutions. 3. Large scale government assistance for one or more (important) financial institutions.	1. significant bank nationalizations. 2. significant guarantees on liabilities put in place. 3. deposit freezes and bank holidays.	1. Large scale nationalization of banks 2. The introduction of emergency measures (e.g. deposit freezes, bank holidays, blanket guarantees)
Specific Quantitative Criteria	1) loan losses, 2) the erosion of bank capital	Not applicable. RR uses mainly event-based coding of banking crisis episodes, due to the paucity of quantitative data over long historical periods.	1. Extensive liquidity support (claims from monetary authorities on deposit money banks >5%). 2. bank restructuring costs >3% of GDP. 3. asset purchases >5% of GDP. 4. Monthly decline in excess of 5% (bank runs). 5. nonperforming loans/total assets >20%. 6. at least 20% of the financial system's assets were closed.	1. Non-performing loans/total bank assets >10%. 2. Cost of rescue operation >2% of GDP.

3.2 Independent variables: Frequent Contributors of Financial Crises

We discuss in this section some of the possibilities for developing new quantitative measures that reflect aspects of these types of scenarios. We also briefly discuss there some of the factors from first, second, and third generation currency crisis models that should be included in empirical structures of the determinants of crises.

3.2.1. Government as a cause or as delayers for adjustment? Political Considerations and Currency Crises

Government behavior can affect the likelihood of currency crises in three major ways. They can initiate shocks such as when a government plays the political business cycle game, they can help sustain the effects of shocks such as by monetary accommodation of cost push pressures, and they can take adjustment actions to keep shocks from leading to crises.³⁷ The extent to which governments engage in these different types of behavior will depend on many things including their ideologies (e.g., Leblang and Bernhard 2000, Block 2002), their perceptions of how the world works (their mental models), their competence and the pressures or constraints on their behavior. The latter in turn can be influenced by institutional factors such as central bank independence that reduces the likelihood that supply shocks will be accommodated by excessive monetary expansion and political institutions such as the degree of democracy.³⁸

Within these formal institutional structures a number of aspects of political behavior may be important such as the popularity of the government, the extent to which there are important political challengers, and the strength of the pressures from interest groups.³⁹ Furthermore the extent to which formal rules are followed in practice can vary a great deal. A legally independent central bank may still be subject to strong political pressures and a strong set of financial regulations may not be effectively implemented in practice. The full complexity of the interactions may be difficult to always capture even

³⁷ On the distinction between initiating and sustaining causes of inflation see Willett (1988).

³⁸ For the effects of political regimes (e.g. democracy vs. authoritarian) on the likelihood of currency crises see Steinberg et al. (2016, forthcoming)

³⁹ Some studies attempt to draw distinctions between the effects of institutions and forms of behavior that are sometimes viewed as aspects of governance although the dividing line between these categories is open to controversy. For a recent discussion of some of these issues see Pepinsky (2014b).

in case studies. For cross country comparisons in large N empirical studies the problem is even worse. The number of possible interactions could well exceed the number of data points available even without the issue of how well available quantitative proxies capture the concepts being investigated.

Despite these problems we believe that as has been demonstrated in many recent studies there is considerable scope for many large N empirical studies that investigate particular aspects of these complex interactions. As several authors have noted, however, there is a strong need for clear conceptualizations of the propositions being investigated and awareness of what empirical proxies actually measure (or don't measure). In hopes of contributing to this clarification process in this section we offer perspectives on a number of measures of political considerations and in the following sub-section, of economic and financial policy regimes. Our coverage is far from complete but we do cover a number of variables that we believe are quite important for studying the causes of currency crises and ways to reduce their frequency. We explicitly focus on different concepts of strong and weak governments.

It is generally recognized that weak governments make a currency crisis more likely.⁴⁰ For example, a weak administration facing a tough elections would be more likely to over spend and generate high budget deficits, without much consideration for the impact this may have on BOP disequilibrium, thus generating conditions that make a country more vulnerable to speculative attacks. This means that besides directly generating a crisis, a government can also follow policies that move the economy into a vulnerable zone (to borrow the term from second generation currency crises models), which would then raise the probability that some shock turns into a crisis. Research has generally supported this hypothesis (e.g., Frieden, Ghezzi, and Stein 2001, Chiu and Willett 2009), however the concepts and measurements of weak governments vary substantially. While a number of new cross-country data sets on political institutions, including government strength, have become available in recent years, existing studies

⁴⁰ Of course a more complete political economy analysis would also treat banking crises as a dependent variable since currency crises can contribute to the generation of banking crises.

are marked by substantial disagreements regarding the impact of some of these variables on the likelihood of currency crises.

Take the example of the number of veto players, which measures one dimension of state strength: the ability of its executive to implement policies without needing the agreement of others. Chiu and Willett (2009) find that speculative attacks on adjustable pegs are more likely when there is a large number of veto players, a finding supported by Han (2009), while Leblang and Satyanath (2008) do not find the veto player variable to be significant in predicting currency crises.⁴¹

We believe that the distinction between the generation of shocks⁴² and the adjustments (or failure to adjust) to them can help explain these differing results. A bias toward inaction generated by a substantial number of veto players should make such governments less likely to take actions that generate crises but also make them less able to undertake policy adjustments necessary to keep shocks generated by other causes from leading to crises.

The first concept we discuss is government strength as defined as the legislative power of the government versus the opposition (Huber et al. 2003). Does the executive have the ability to carry out its preferred policy without being challenged by the opposition? The literature on the political economy of fiscal policy suggests that stronger governments are associated with lower fiscal deficits (Grilli et al. 1991 and Roubini and Sachs 1989). Since high fiscal deficits under a pegged exchange rate regime make a currency crisis more likely, it follows that a stronger government is expected to have a lower likelihood of experiencing a currency crisis (governments as cause or initiator of shocks). Similarly, a stronger government can reduce the likelihood of a currency crisis

⁴¹ Such disagreements regarding the empirical effects of political institutions on financial crises are apparently quite common. See e.g., Pepinsky (2014a) and Gandrud and Hallerberg (2014) for a review.

⁴² Government ideology can also by itself be an important source of the shock that generates a currency crisis. Left-wing governments are predicted to be more crisis-prone compared to rightist governments because market participants do not firmly believe in left-wing government's commitment to an exchange rate peg (Bernhard and Leblang 2000). The source of the distrust is the tendency for left-wing governments to pursue domestic policies that are inconsistent with BOP equilibrium under pegged exchange rates, such as expansionary fiscal policies that are accompanied by easy monetary policies. While important, ideology is not an aspect of government strength. It deserves its own categorization. For more on the relationship between government ideology and currency crisis see e.g., Bernhard and Leblang (2000), Leblang (2002), Block (2002), Wibbels and Roberts (2010).

because it can more easily adopt unpopular policies that are necessary to prevent from currency crises, such as exchange rate and /or fiscal adjustments.

Various metrics are offered to measure this concept of government strength (see Table 2 below). One straightforward measure is a dummy variable based on whether the government has a majority in the legislature (Paldam 1981). However, Frieden et al. (2001) point out that this has limitations as it does not account for the margin of majority which can effect the government's ability to pass key legislations, and instead suggest to calculate the share of government seats in the legislature. Borrowing from the political economy of fiscal deficit literature (e.g. Roubini and Sachs 1989), Bussiere and Mulder (2000) defined degrees of government strength based on the stability of their coalition. The most stable (strong) government is a single-party government while the weakest is a minority government, because the more parties are involved in a coalition, the harder it is to get successful coordination in adopting adjustment measures.

The degree of government strength can also be viewed from the opposite side: how weak is the opposition (Huber, Kocher, and Sutter 2003). The more united the opposition party, the weaker is the executive in power (Block 2002). Table 2 provides more detailed description of measures of opposition strength.

The discussion above suggests that there is quite a broad range of measures of government strength in terms of the ability to carry out policies without obstruction from the opposition. Given the wide range of concepts and measures used here, it is not surprising that we find contradictory results in large N studies. Bussiere and Mulder, in their sample of emerging and less developing countries, find that measures of government strength (strength of ruling coalition, as well the effective number of parties) are not significant in predicting currency and banking crises. Frieden, Ghezzi and Stein (2001) suggest that strong governments (dummy for majority governments, lower number of effective parties and higher share of government's seat in the legislature) may be less vulnerable to currency crises, through their tendency to have misaligned exchange rates. Block (2002) find similar evidence.

Table 2. Definitions and measures of government strength in the currency crises literature.

Nr	Conceptual Definition	Operational Measurement	Source
1	Government strength as defined by the structure of the decision-making process vis-a-vis the opposition party. Also known as the strength of the majority.	<p><u>Strength of the majority:</u></p> <ol style="list-style-type: none"> 1. A dummy variable that takes the value of 1 when the chief executive's party controls the legislature (Chiu and Willett 2009, Frieden et al. 2001, Block 2002, Leblang and Satyanath 2008). 2. The share of government's seat in the legislature (Frieden et al. 2001). 3. A 4-point scale for the size and strength of the ruling coalition (Roubini and Sachs 1989, Bussiere and Mulder 2000). <p><u>Strength of the opposition:</u></p> <ol style="list-style-type: none"> 1. Effective number of parties; the inverse of the sum-squared of the proportion of representatives a certain party has in the lower house (Laakso and Taguepera 1979, Scully and Mainwaring 1995, Bussiere and Mulder 2000) 2. Herfindahl index of concentration of opposition (Block 2002). 3. Strength of ruling coalition (Roubini and Sachs 1989) 	Database of Political Institutions (DPI), World Bank.
2	<i>Veto players.</i> Actors who provide institutional constraints on executive power in the policy making process.	<ol style="list-style-type: none"> 1. Checks and balances from DPI 2. Political constraints. See Appendix for more detailed comparison of these two measures.	DPI (2012), Henisz (2000)
3	<i>Government effectiveness.</i> Ability of the government to stay in office and carry out declared programs.	A common proxy for this variable is the government stability index, from International Country Risk Guide. It is a weighted average government turnover, legislative strength, and popular support.	International Country Risk Guide (2012)

The second measure of government strength we discuss is veto players, actors whose consent is necessary to change a status quo policy (Tsebelis 1995, 2002). Two commonly used measures of veto players in large N studies are the *checks* variable from the World Bank's Database of Political Institutions and *polcon* from Henisz (2000). We review the differences between the two in more detail in the Appendix. Higher values of both variables indicate a higher degree of checks/constraints on the executive power. To

an extent, the number of veto players in a political system is analogous to the unified versus divided government distinction, as the larger the size of the veto players, the more fragmented is the political system. However, unlike the divided government dummy variable, measures of veto players include similarity of ideological preferences among actors.⁴³ Thus, divided government and veto players are not necessarily interchangeable.

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The concept of veto players introduces a more nuanced analysis on the desirability of government strength. On the one hand, a resolute executive is likely to act more quickly and make necessary policy reforms in a decisive manner, yet this has a downside since it also conveys the power for arbitrary decision making (Walton et al. 2008). By and large, scholars tend to agree that multiple veto players with distinct ideological preferences ensures that more viewpoints and interests are represented, but also make it more difficult to implement policy reform (e.g. Cox and McCubbins 2001, Haggard and Kaufman 1995, Tsebelis 2002). However, this trade-off generates ambiguous theoretical predictions regarding the effect of the number of veto players on the probability of currency crisis.

A bias toward inaction makes it less likely that the government itself will generate a shock but it also means that a government is less likely to be able to make necessary adjustments to deal with shocks generated by other causes. Such balances may also operate differently with respect to different policy instruments. For example a government may have more effective freedom to increase public spending than to raise the tax revenues necessary to avoid this leading to a large budget deficit.

Consider the case of governments as cause (i.e., initiator of shocks) of currency crises. Suppose that this government overspends and runs a fiscal deficit ahead of elections. A strong degree of political checks and balances can limit the ability of the executive power to change policy at their own discretion, including cyclical budget manipulation. This means that more veto players should constrain the propensity to

⁴³Of course ideological differences do not always assure such actors will not form coalitions on some issues such as the far right and left in the current Greek government. Another example is the tendency of the far right and left in the US Congress to oppose funding for the IMF.

⁴⁴Leblang and Satyanath (2008) find that veto players do not have a significant effect in affecting the likelihood of currency crises but divided governments do, and the relationship is positive.

overspend ahead of elections, lowering the likelihood that we will have an inconsistency between domestic and external policies, and thus a lower likelihood of a speculative attack. On the other hand, more veto players combined with strong electoral competition can exacerbate this expansionary bias, if the institutional veto players have the same objectives as the executive. Thailand during and after the Thaksin administration is a case in point. While Thailand has many veto players, they largely support populist policies that lead to high budget deficits to get (re)elected (Pongphaichit and Baker 2004). After Thaksin was ousted, the promises being made by the incumbent government or take over government is largely the same, which suggests that there is similarity in preferences in this regard. One question to consider is whether independent central banks can act as an institutional veto player on their own right. Again, taking the Thai case as an example, a relatively dependent central bank (measured according to data from Bodea and Hicks 2015) failed to prevent the massive amount of budgetary spending on credit subsidies and other populist programs to mobilize previously disenfranchised voters in the northern part of Thailand.

While it goes beyond the scope of this paper to discuss these in detail there are important similarities between analysis of the effects of veto players and of the effects of democracy. As with veto players, within a democracy there are effects that can promote both financial stability and instability, and this is to be expected given that democracy is a multidimensional factor that comprises several different features such as rule of law, free and fair elections, executive constraints, and freedom of expression (Lipsy 2011). While some literature argues that the accountability and checks and balances provided by democracy makes financial crises less likely because it makes governments more credibly committed to sound policies (e.g., North and Weingast 1989) the literature on political business cycles cuts in the opposite direction, as competitive elections increase the pressure to engage in pre-election fiscal expansion which can prompt speculative attacks. At the same time, some characteristics of authoritarian regimes such as insulation

from domestic interest groups⁴⁵ can be conducive for preventing currency crises (Steinberg et al. 2016).

It is also reasonable to expect that the effects of veto players on currency crises are non-linear. To a certain point, more veto players are beneficial because this means more limitations on arbitrary strength in policy, but an excessive amount of veto players is an impediment for adjustment that is necessary to prevent crises (Leblang and Satyanath 2008). The effects could thus be non-linear. MacIntyre (2001) argues that during financial crises, a premium is placed on political systems that provide institutional checks against policy volatility, but at the same time are flexible enough to implement reforms on pressing issues. In his analysis, the Philippines (with an intermediate number of veto players) had the better track record in minimizing the disruptive effects of the 1997-98 financial crisis on investor confidence, compared to Thailand (a high number of veto players) and Malaysia and Indonesia (unitary veto players).

Of course there are societal groups such as labor unions, manufacturing sectors, or finance groups that can act as important constraints on executive power, although they lie outside the formal political structure and thus may not be captured directly by the commonly used veto player⁴⁶ variable (*checks* or *polcon*), unless they have formed political parties (e.g., labor parties). On a national scale, these groups exert their influence on one or more of the government veto players, and at the international level, scholars have pointed to the presence transnational veto players in the area of global financial regulations. who can act as veto players by defining and delimiting the pool of ideas available for reform (Tsingou 2015). In practice these may be more important in constraining government behavior than the number of formal veto players. In the

⁴⁵ It should be noted that this aspect of insulation from interest group pressure is highly debated. Bueno de Mesquita et al. (2003) argue that by virtue of being more inclusive, democracies give fewer incentives to serve the interests of narrow elites. The higher is the ratio of the winning coalition (the section of the population whose support is essential for the leader to survive in office) to the selectorate (the group that selects the leader), the more inclusive is the political regime. This may be a more versatile measurement of veto players, as it can be applied to both autocratic and democratic regimes. The variable *checks* is more appropriate for democratic regimes, since this variable equals zero if there are no competitive elections in the country.

⁴⁶ The role of interest groups as potential veto players is broached in Tsebelis (1995). Although interest group consent is not formally required to pass a legislative, Huber et al. (1993) argue that veto points (i.e. the institutional structure of policy processes) provide opportunities for interest groups to block policy change, thus offering certain groups a veto over policy change. See Hallerberg (2011) for a review.

comparative politics literature, one concept of a strong state is one that has an institutional environment that protects itself from excessive pressures from such interest groups (Walton et al. 2008). Interest groups⁴⁷ can affect the likelihood of currency crises by pressuring governments to adopt their preferences for certain exchange rate regimes (fixed or flexible) or maintain under- or over-valued exchange rates (Frieden 1991). In this regard, interest group pressure can be either an initiator of a shock that causes a crisis or be responsible for generating a currency crisis by blocking necessary adjustments after an external shock. For example, non-tradable firms with high imported-input components may pressure the government to maintain overvalued currencies (Frieden 1991, Walter 2013, Steinberg and Walter 2013), which make them prone to a currency crises. Similarly, given an external shock that clearly necessitated fiscal adjustment to avoid a crisis, such as the case of Russian currency crisis in 1998, interest group pressures may block the adoption of much needed fiscal adjustments (Kopits 2000).

A third concept of government strength we review is related to the effectiveness of governments. By effective, we mean the executive's ability to stay in power and carry out declared economic policies. This also means sufficient technical capacity to execute their programs.⁴⁸ To be able to stay in power, adopt, and implement stated policies, governments need to have a long time horizon for judging the costs and benefits of necessary policies. An important reason the importance of this concept is the problem of time inconsistency emphasized in much of the recent literature on macroeconomic policy. We believe it can be useful to view some of the structural issues and measures discussed above through the lens of how they affect governments' effective discount rates. The tendency to delay corrective actions is in large part a result of frequent time asymmetries in the effects of policies. For example, the costs of exchange rate adjustment (which theoretically reduces the likelihood of a currency crisis) are felt in the short-run, while the benefits (i.e., an economy less prone to speculative attacks) are only manifested in the longer run. Politically insecure governments are predicted to be less willing and able to

⁴⁷ Labor political influence is often measured by Mosley's Collective Labor Rights, while a common measure of industry interest is the manufacturing production as a percent of GDP (e.g., Frieden et al. 2001, Steinberg and Malhotra 2014).

⁴⁸ For example, a technically competent bureaucracy helps to improve implementation of adjustment policies that could prevent a speculative attack.

undertake much needed yet politically difficult adjustments that could have prevented the likelihood of a currency crises.⁴⁹ A weak government in this regard is one who is uncertain of whether they will/can stay in power and thus are less willing to adjust today only to inflict pain later. Among stronger government leaders themselves they may have quite different time horizons. For example they may be concerned with how they will be judged by history, how much they want to reap current gains of popularity and what theories about how the economy operates do they believe in.

Proxies purported to capture this type of concept of government strength are quite varied. They tend to be subjective indicators or perceptions regarding the government strength and effectiveness. With regards the technical quality of the government, a commonly used indicator is the World Bank's 'effectiveness' indicator which according to Kurtz and Schrank (2007, p. 543) is indicative of "the ability of the state to formulate and implement its goals." This includes perceptions of the quality of public services, civil service, and the quality of budgetary and financial management. Subjective indicators are also a common way of measuring the effectiveness of the state in staying in power. A government that is not popular or subject to constant criticisms and disapproval from their citizens would be reluctant to undertake adjustment policies. Government instability is also defined by frequent election turnover either by regular/formal means such as schedule and unscheduled elections or by irregular means, or frequent incidents of political violence and large-scale protests. These types of instability would be expected to raise the likelihood of financial crises because it increases the propensity to postpone policies. One often used measure of political strength is *government stability* taken from the International Country Risk Guide (see Table 2 for a definition). Herrera et al. (2014) find that the ICRG variable captures shifts in the public opinion quite well. Shimpalee and Breuer (2006) find that weak government stability leads to a higher likelihood of currency crisis as do Chiu and Willett (2009).

This concept is also quite useful for viewing the case for and effects of institutional constraints on economic and financial policies. The case for central bank independence, inflation targeting, and rules that limit fiscal deficits are typically based on their abilities to focus policies on longer run time horizons than are generated frequently

⁴⁹ See Chiu and Willett (2009) and Schamis and Way (2003)

by democratic politics. We believe it may be fruitful to devote more analysis to how such institutions operate as a form of veto player. The relationship between such constraints and issues of the strength of government is complex, however. If strength is taken to mean maximum autonomy for the executive then institutional constraints make the government weaker. On the other hand from the standpoint of having governments act on longer time horizons effective constraints can make the government stronger in terms of its ability to fight pressures that would destabilize the economy over the longer term. And it may take a strong government in the conventional sense to allow such reforms to be adopted.

As noted previously one needs to also be concerned with how effectively such constraints operate. The eurozone agreement to limit the size of members' budget deficits was frequently violated, and by France and Germany, not just Greece. Likewise formal arrangements of central bank independence have been found to be associated with lower inflation to a much greater extent in advanced than in developing countries (e.g., Cukierman et al.1992. See Arnone et al. 2007 and Bodea and Hicks 2015 for more recent surveys). One reason that has been suggested to explain such findings is that the rule of law is stronger on average in advanced than developing countries and this affects the extent to which formal rules are followed. Adherence to the rule of law also varies even among countries in the euro zone. Contrast Germany with Greece on fiscal policy.

Furthermore as argued by Willett, Chiu, and Walter (2014) some types of institutions such as regimes of fixed exchange rates often do not operate as absolute constraints but are better seen as influencing incentive structures facing governments⁵⁰. For example a soft fix does not operate as an absolute constraint over monetary policy because the peg can be changed, albeit at greater political costs than depreciation under a flexible rate regime. Countering this additional cost to inflationary policies, however, is the consideration that expansionary policy causes less inflation relative to growth in the short run. This makes incentives to follow overly expansionary policies greater for governments with short time horizons. The net effect could go either way.⁵¹

⁵⁰ The same exchange rate regime may also have different effects on monetary than on fiscal policy.

⁵¹ On average, however, for developing countries soft fixes have been associated with higher rates of inflation than flexible rates. See Chiu et. al. (2012). Focusing on the distinction between de facto and de

To sum up, governments can be a source of shock to a currency crisis, or they can increase vulnerability to crisis by having political incentives to accommodate or validate shocks with expansionary policies or delays in adopting necessary exchange rate or domestic policy adjustments that can prevent longer run disequilibrium from emerging and thus making crises less likely. Likewise the effects of institutional regimes to limit perverse policies can vary substantially and will often interact with other variables. The discussion emphasizes that there are various important dimensions of government strength, and the measures to capture it are just as numerous. While each concept can be useful for particular purposes, our analysis suggests that we should not expect the relationship between government strength and currency crises to be linear.

3.2.2. Economic and Financial Institutions and Policy Regimes

3.2.2.1 Financial liberalization and Financial Regulation and Supervision.

Financial liberalization is often blamed for banking and currency crises (e.g. Demirguc-Kunt and Detragiache 1998, Kaminsky and Reinhart 1999), yet studies have shown that this fragility is mitigated when accompanied by robust financial supervision (e.g. Angkinand et al. 2010). Recent data on financial liberalization (e.g. Abiad et al. 2008, Kaminsky and Schmukler 2005) do provide substantial improvements over earlier binary⁵² measures (e.g. Demirguc-Kunt and Detragiache 1998). These new measures are more nuanced since they incorporate the degree and intensity of liberalization along several dimensions such as bank deregulation, capital market liberalization, bank privatization, and securities market liberalization, although they are still somewhat problematic as the sub-indexes that make up the overall financial liberalization score are highly correlated since one type of liberalization is often accompanied or followed by other types of liberalization. Furthermore, these new measures do not capture perverse or poor-sequencing of financial liberalization, which is often a more relevant contributing factor to the likelihood of financial crises. Financial liberalization can also be studied through the extent of government ownership of the banking sector (e.g., La Porta et al. 2002, Abiad et al. 2008).

jure regimes Guisinger and Singer(2010) find that de jure fixed rate regimes do not reduce inflation unless they are backed up by de facto behavior.

⁵² In these “older” measures, a value of one was assigned for the binary variable for a country-year that has removed price floor on interest rates.

With regards to the strength of financial regulation and supervision one often used data set is the Capital Regulation and Supervision (CRS) index, which is one of the components of the Financial Reform Dataset by Abiad et al. (2008). CRS is constructed based on whether a country has adopted international standards of financial supervision (i.e. Basel Standards of Effective Supervision). Each country's score is the sum of the following dimensions: 1)stringency of capital adequacy ratios, 2) independence of regulatory authorities from executive influence, 3)effectiveness of on-site and off-site monitoring, and 4)the universality of types of financial institutions that fall under the purview of the official supervisory agency. The index has four possible values/categories: unregulated (0), less regulated (1), largely regulated (2), and highly regulated (3). Among competing data sets⁵³ on banking regulation and supervision, this CRS index has the most extensive cross-country and time-series coverage. Alternative and more comprehensive data sets on bank regulation and supervision⁵⁴ are only widely available since the late 1990s.

Such data sets are of course far from perfect proxies, but they have been used in a number of studies (e.g. Ongena et al. 2013). One interpretation that has emerged is that the CRS index is a good proxy for “regulatory independence” (see e.g. Masciandaro et al. 2011).The main caveat⁵⁵ however, is that there is no compelling evidence that high compliance with international standards of capital stringency substantially reduces the likelihood of financial crises, as the 2008 global financial crisis attests.

One other cautionary note when using the CRS index is that the quantitative scores do not always match the qualitative narratives found in country case studies. For example, LoGerfo and Montinola (2001) argue that in Thailand, prudential supervision is strong on paper, but it was poorly implemented. Through a series of emergency decrees

⁵³ To name a few: Barth, Caprio, Levine (2006), IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), and a recently published data set by Jordana and Rosas (2014) on the degree of autonomy of banking regulators .

⁵⁴ Barth, Caprio, Levine (2011) has a very wide scope (more than 100 dimensions) ranging from limitations on bank activity, entry regulations, as well as the regulatory features of deposit insurance system. The IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) data set contains useful variables such as regulations on limitations on foreign-currency borrowing and loan-to-value ratios.

⁵⁵ Another weakness of this data set is that it has been rescaled by the authors in its published version. Originally, a highly regulated country would have a final score that adds up to 6 (see Appendix B). However, in the dataset this figure is rescaled to be between 0 and 3. The problem arises when interpreting changes in CRS scores from 0 to 1 (e.g. Thailand 1995). We cannot ascertain from which dimension the change originated (capital stringency or effectiveness of on-site monitoring)

(1983-1985), Bank of Thailand supervisors had been given increasing power to intervene in the financial sector, but Thai bankers repeatedly escaped stringent monitoring. This seems to contradict the data set of FRS constructed by Abiad et al. (2008), which reports Thailand as having a score of 0 from 1973-1994.

3.2.2..2 *Capital controls*

The early studies on the effects of capital controls tended to use 0-1 measures based on IMF data indicating whether there were any controls in existence. These were too crude to address most of the interesting issues involving capital controls. Fortunately recently several data sets that give much more finely grained measures are available. For a recent survey of these measures see Clark, Hallerberg, Keil and Willett (2012).⁵⁶ Most of these new classifications are based on the number of categories of flows covered, i.e. their extensivity. Some measures also attempt to judge the intensity of the controls within categories.⁵⁷ While these new data sets provide substantial improvements recent case studies of India and Korea, however find that the new measures still fail to pick up some substantial changes in policies.⁵⁸ It is particularly important to distinguish between controls on capital inflows and outflows as some of the new data sets allow. For example one recent study finds that controls on outflows are associated with more frequent currency crises while controls on inflows are associated with fewer crises.⁵⁹

Even in the absence of controls the degree of international capital mobility varies substantially across countries. While capital mobility is substantial for most advanced and emerging market economies, it is generally considerably less than perfect.⁶⁰ Thus many countries have scope to sterilize capital flows in the short run which in turn can give

⁵⁶ Even more recently further updated data sets have been provided by Fernandez et al. (2015), which is an update to Schindler (2009).

⁵⁷ This later approach, which is much more time consuming and requires more judgement, was pioneered by Quinn (1997). For an updated set see Quinn, Schindler and Toyoda (2011). We should note that while the popular data set constructed by Chinn and Ito (2006) purports to measure the intensity of controls it is actually more a measure of the extensivity of the controls. It also does not distinguish between controls on inflows and outflows. While their use of five year averages for their calculations is appropriate for some purposes, Steinberg and Karcher (2013) have recently shown that for looking at issues such as the determinant of changes in capital controls calculations based on shorter time periods are essential.

⁵⁸ See Ghosh (2012) and Willett et. al. (2009).

⁵⁹ See Chiu and Willett (2015) and Pothcamanawong et al. (2008)

⁶⁰ For a recent review of this literature see Clark et al. (2012). One common measure is the sum of countries' foreign assets and liabilities. While quite useful this type of measure does not correspond to the standard definition of capital mobility in economic models which refers to the degree of capital movement in response to changed incentives.

countries some degree of short term monetary independence even under fixed exchange rates. This gives countries additional freedom to cushion the effects of shocks. It also gives rise to inconsistencies between domestic and exchange rate policies which, if maintained for a prolonged period, are a major cause of currency crises as discussed in section 2.

3.2.2.3 Exchange Rate Regimes

It has become well known that countries often follow exchange rate policies that differ substantially from what they officially announce. This has led to the construction of a number of data sets that attempt to measure countries *de facto* exchange rate regimes. The most prominent of these based on statistical measures are by Reinhart and Rogoff (2004) and Reinhart, Rogoff, and Illetzki (2011) and Levy Yeyati and Sturzenegger (2005) while the IMF now produces a set of classifications based on the Fund's staff judgments about what policies are actually being followed.⁶¹ These classifications provide substantial improvements over *de jure* measures, but some of them suffer from conceptual problems. The Reinhart and Rogoff classifications are based only on the behavior of exchange rates, but as with indices of currency crises, low variability of an exchange rate can be due either to heavy government management or an absence of major shocks. And with large shocks there may be considerable government exchange market intervention even when there are large exchange rate movements.⁶²

Conceptually the most appropriate type of measure of the degree of flexibility of an exchange rate regime is the government's propensity for intervention, i.e. the proportion of exchange market pressure that is taken on the exchange rate versus changes in reserves (as a proxy for official intervention).⁶³ Unfortunately there is as yet no large data set available using this method, although it has been used for the classifications of individual countries regimes.⁶⁴ One important issue concerns the number of classifications of regimes to be used. While ten or more gradations are often available in

⁶¹ For a recent survey see Willett et al. (2011). Even more recently further updated data sets have been provided by Habermeier et al. (2009)

⁶² Their focus only on exchange rate movements has led Reinhart and Rogoff to classify some regimes as free floating when they were in fact managed floating.

⁶³ See Willett, Kim, and Bunyasiri (2012).

⁶⁴ For applications to Japan and Korea see Willett et al. (2012) and (2009)

data sets seldom can one get significant results with such a large number. Some studies have just used a two way classification of fixed versus flexible rates. This is often unsatisfactory, however. For example in investigating the effects of exchange rate regimes on the likelihood of currency crises and on macroeconomic discipline Chiu et. al. (2012) find that it is essential to distinguish between hard fixes and adjustably pegged rates with the latter being associated with more crises and less discipline.⁶⁵ We also find that it is often more important to see how heavily countries intervene in the foreign exchange market than whether they are classified as having crawling bands or managed floats⁶⁶.

3.2.2.4 Exchange Rate Overvaluation and Current Account Deficits

There is no question that exchange rate overvaluation is a major cause of currency crises.⁶⁷ But measuring the amount of a country's exchange rate overvaluation is much more complex than just measuring a country's amount of exchange rate appreciation and the latter is itself not a simple matter. Too often in the literature simple measures of currency appreciation are described as measures of currency overvaluation. The high profile debate about whether the RMB was substantially undervalued should make clear the measuring currency misalignment is no simple matter.

One can make a valid judgment about the extent of a currency's overvaluation only by comparing the actual exchange rate with an estimate of the equilibrium exchange rate. Given the wide range of exchange rate models and disagreements about parameter estimates, the confidence for judging whether currencies are over or undervalued are quite broad. For example prior to the Asian crisis in 1997 while some economists estimated that the Korean won was overvalued by varying amounts some other economists even estimated that it was undervalued. This doesn't mean that one can never make reasonable judgments about whether a currency is overvalued. There was

⁶⁵ In looking at effects on fiscal policy it is essential to attempt to remove the effects of business cycle fluctuations and create what are called cyclically adjusted or full employment deficits in order to isolate the effects of exogenous policy versus endogenous responses to economic fluctuations. For example in recessions tax revenues automatically fall but the resulting increase in the fiscal deficit is not an indicator of expansionary policy. See Burdekin et al. (2011)

⁶⁶ See Willett et.al. (2009) and Ghosh et. al. (2015)

⁶⁷ Substantially undervalued exchange rates can also stimulate currency crises, such as the case of Germany in the later days of the Bretton Woods regime, but speculative attacks on surplus countries occur much less frequently than those on deficit countries.

widespread agreement among economists that the Thai baht was substantially overvalued prior to the crisis, but one should be careful of putting great faith on any one particular set of estimates even from sophisticated models, much less simpler ones such as measures of devaluation from purchasing power parity.⁶⁸

While real exchange rate appreciation due to high inflation under a pegged exchange rate regime is a fairly reliable indicator that a currency is becoming overvalued, real appreciation under a flexible exchange rate can be much harder to interpret. The distinction between short term and longer term equilibrium is the crucial issue here. By definition currency appreciation generated under a regime of freely floating rates reflects short run equilibrium, at least in the market clearing sense. Whenever the appreciation is due to short-term developments that have a substantial probability of being reversed, such as a capital flow surge, then the short run equilibrium rate can be pushed well above the medium or longer term equilibrium rate and hence can be a danger sign that the currency is vulnerable to a sharp fall. This may occur in a crisis atmosphere. A further complication here is that where appreciation is driven by destabilizing speculation then the market clearing rate will not correspond to the equilibrium exchange rate based on the fundamentals. Despite these important qualifications a substantial appreciation of a country's real exchange rate tends to increase a country's vulnerability currency crises.

Note that initial overvaluation of a currency isn't the only cause of a crisis. For example capital flight motivated by domestic political consideration may have little relation to exchange rate expectations. The capital flight, however, can turn an initial equilibrium exchange rate into an overvalued one which in turn stimulates further capital outflows from agents concerned about the likelihood of currency depreciation.

Analysis of exchange rate appreciation should focus on real rather than nominal exchange rates. Most frequently because of the ease of data availability consumer price indices are used to convert nominal to real exchange rates. There is considerable debate in the economic literature, however, about the most appropriate price index to use. There is also a tendency for many studies just to focus on bilateral exchange rates against the US dollar. For many countries, however, other exchange rates are as or more important

⁶⁸ One popular method is to use deviations from trend of the real exchange rate. Useful sources for real exchange rate data include the Bank for International Settlements, Bruegel, Eurostat, IMF, and World Bank.

than the USD. For example with respect to effects on trade competitiveness the Chinese RMB and Japanese Yen rates are more important than the USD rate. Thus for many purposes it is most appropriate to use trade weighted or effective exchange rate measures. Data on such measures is available from a number of sources such as the IMF's International Financial Statistics and Bank for International Settlements.

As with currency appreciation a current account deficit per se need not be a danger sign that a country is vulnerable to currency crisis. A current account deficit is the natural counterpart in equilibrium to net capital inflows. Perhaps the clearest danger sign is where the current account deficit is associated with balance of payments deficits under a pegged exchange rate. Even under free floats current account deficits can be a danger sign, however, even though they reflect short run equilibrium. The issue is the sustainability of the capital inflows. There is little reason to worry about a current account deficit of 2 percent of GDP financed primarily by direct investment. As with short run fiscal deficits there is no magic number at which the magnitude of a current account deficit becomes a serious danger. In general however, above 2 or 3 percent of GDP the larger the deficit and the greater the proportion of it financed by highly reversible capital flows (so called 'hot money') the greater is the danger.⁶⁹

3.2.2.5 Monetary and Fiscal Policy Regimes

Monetary and fiscal policy shocks are very common contributors to currency crises, yet there are still some disagreements among economists on how to measure the stance of monetary and fiscal policy (Burdekin et al. 2012). Conceptual frameworks for monetary policy stance originates in a central bank's "reaction function," a term used to described how monetary authorities respond to changes in economic growth and inflation.⁷⁰ However, the stagflation experience of the 1970s paved the way for more rigid rules (as opposed to discretionary power to authorities) for monetary policymaking. The rule generally involves an inflation target of varying degrees of strictness.⁷¹

⁶⁹ There is considerable disagreement in the literature on what types of capital flows are the safest. There is general agreement that FDI flows are the most stable but not about whether banks or portfolio flows are the least stable. See the analysis and reference in Kim et al. (2015).

⁷⁰ Partisan leanings and electoral cycles could influence the reaction function. See, e.g., Willett 1988 for a review.

⁷¹ A highly strict regime is one like a mandated inflation target embraced in the EU or New Zealand, while the US Federal Reserve adopts a more implicit inflation target (2% is the norm).

Interest rates have replaced money supply as the main instrument for monetary policy stance in many countries, given that money velocity has proven to be quite unstable (Siklos 2002). The Taylor rule (after John Taylor, 1993) — interest rate targeting to achieve a desired level of inflation and a sustainable level of output gap — became an appealing tool to understand central bank behavior in general. Siklos and Bohl (2009) review variations to the original Taylor rule to include exchange rates or asset prices in setting interest rates. A less well-known alternative regime is the McCallum rule of connecting monetary aggregates to the GDP gap and velocity growth (McCallum, 1999), which is more appropriate for deflationary situations like Japan, or countries that have not fully liberalized their financial markets like China. It appears, however, that empirical work estimating the effects of monetary policy on exchange rates do not often use the Taylor rule. Hutchinson, Noy, and Wang (2010) as well as Ha and Kang (2015) use changes in central bank discount rates as indicators of policy shifts, while Baig and Goldfajn (2001) and Goldfajn and Gupta (2003)⁷² use changes in interbank market rate. Changes in interest rates above or below a certain threshold are then interpreted as contractionary or expansionary monetary policy stance.

We should emphasize that Taylor type rules are guides for measuring or recommending policy, they aren't rules in the sense of requirements that central banks must follow. Traditionally central banks reported to governments, typically the finance minister, and thus were politically controlled. Since governments tend to face time inconsistency problems that lead to temptations for overly expansionary policies, especially in terms of financing government deficits, there has been a strong movement toward granting central banks political independence. Lately this has tended to be combined with inflation targets.⁷³ Such institutional arrangements have been shown to be strongly associated with lower inflation rates in the advanced economies. This correlation has been less strong in developing countries, presumably in part because of lower standards of the rule of law. Thus rather than making evaluations based on institutional arrangements many researchers looking at developing countries have used behavioral measures such as the turnover of central bank heads as proxies for the degree of central

⁷² See also Alesina and Roubini 1992, and Boix 2000.

⁷³ Such arrangements first adopted in New Zealand give central banks operational but not goal independence.

bank independence. Using newly updated data on central bank independence which covers a panel of 78 countries from the 1973 to 2010, Bodea and Hicks (2015) found that central bank independence is associated with lower inflation only in democracies and not autocracies.

There has been a good deal of disagreement about the best ways to measure central bank independence, especially as there can be a number of different dimensions to independence. For a recent survey see Burdekin et. al. (2012). We should stress that formal independence does not mean that central banks are not subject to political pressures, but in general we would expect that stronger degrees of central bank independence would be associated with fewer currency crises. Studies have found that central bank independence is on average associated with higher financial stability (see e.g., Arnone et al. 2007 and Klomp and de Haan 2009).

Empirical measurements of fiscal policy stance is also controversial (Blanchard 1990). One source of the disagreement as pointed out by Mountford and Uhlig (2009) is how to identify “true” fiscal policy shocks. That is, we cannot know for certain if the change in fiscal policy is due to a shock, or due to business cycle changes or even monetary policy changes. One way to deal with this problem is to use a cyclically adjusted budget balance. These are also sometimes called structural or full employment deficits. These are measures of fiscal policy direction that are adjusted for the state of the economy (Hutchinson, Noy, Wang 2010, Ha and Kang 2015). Thus for example recessions will automatically increase fiscal deficits as tax revenues fall and support payments increase. A common practice to calculate such measures is to take the residual from regressing the budget balance (over GDP) on the real growth rate and a trend component, the residual of which will be a proxy for the discretionary only component of fiscal policy. While the literature has not identified any one best way to make these cyclical adjustments no study of fiscal behavior should be based only on actual deficits.

A second issue is the measurement of institutional arrangements designed to directly limit the sizes of deficits, such as the fiscal rules of the eurozone, or to improve budgeting procedures to reduce the political tendencies to generate excessive fiscal deficits. For example the greater the degree to which measures to expand government spending in one area are tied to considerations of their opportunity costs such as

requirements to raise taxes or cut other areas of spending the less should be the tendency toward fiscal deficits. For a recent survey of such issues see Burdekin et al. (2012). Of course as with monetary policy there are important issues with respect to how well such rules are actually followed. For example there have been numerous violations of the fiscal rules adopted for the eurozone.

4. Concluding Remarks

As we've indicated in this paper researchers have been blessed in recent years with a quite sizeable increase in large N data sets for political, institutional and policy variables relevant for the study of a wide range of issues in political economy and economic policy. Here we have focused on a limited number of these that we believe are of major importance for the study of currency crises and many other types of financial crises as well.

Not only have data sets for new variables become available but for a number of types of variables such as capital controls, exchange rate regimes, and financial liberalization new data sets provide substantially more reliable measures than did the initial data sets available. For example we now have measures based on the exchange rate policies that governments actually follow rather than what they say they follow (and the differences are quite substantial). Despite all of these improvements, not surprisingly many of these series are still subject to large errors in variables and different data sets for the same variable sometimes differ substantially. For example, the number of veto players in Japan between 1993-1995 is substantially higher under the *checks* variable compared to the *polcon* variable (see appendix). In addition the quantitative measurements often do not match the narratives of country experts.

Thus not only should efforts continue to improve our measures of many variables but substantial care needs to be given to the interpretation of the results from using many of these variables. In particular we would like to stress the importance of thinking carefully about the concepts underlying the variables being used. For example there are a number of different concepts of the strength of governments and what type of proxy is most appropriate for a particular study will often depend on the specific hypotheses being tested. Likewise the most appropriate number of categories of exchange rate regimes to

be used can vary substantially from one issue to another. But for almost no issue is the simple fixed versus flexible rate dichotomy sufficient.

While our discussion of frameworks for analyzing the political economy of currency crises is far from complete⁷⁴ we hope that readers will find it useful. A key point is that in only a limited number of situations is there a single cause of a crisis. Most frequently currency crises are the result of a failure of a number of variables to mesh in a consistent manner. This follows the standard definition of balance of payments disequilibrium. Any such disequilibrium can usually be eliminated in several different ways. But such alternatives are frequently costly in the short run and thus there are strong tendencies to suffering a currency crisis. In the first generation crisis models the forces generating disequilibrium are so strong that it is only a matter of timing before a crisis occurs. This type of crisis is much less frequent today than in say the 1980s but still sometimes occur. The Greek crisis is an example.

More common today is the situation emphasized in the second generation models where delays in adjusting put countries into vulnerable zones where crisis are not inevitable but are much more likely than if a country had strong fundamentals. And as is also stressed in the second generation models expectations about how governments will respond to shocks can become crucial determinants of whether a crisis occurs. This perspective provides a strong rationale for the increase in research on political economy aspects of crises that we have seen in recent years. It also suggests the importance of not limiting quantitative research to linear equations. Often it is the interactions among variables that are of critical importance. Thus we welcome the recent trend in the literature to give much greater attention to the use of interaction variables. We have no doubt that the study of the wide range of political economy aspects of currency and financial crises more generally is a progressive research program.

⁷⁴ Not only have we not been able to cover all of the potentially relevant factors but we have focused only on the causes of currency crises, not their effects.

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Appendix. Comparing checks and political constraints as measurement of Veto Players

Two common proxies used to measure the number veto players in large N empirical studies are: 1) the variable *checks* from the World Bank's *Database of Political Institutions* (DPI) and 2) the variable *polcon* from the Political Constraints Index data set

assembled by Henisz (2000). As of January 2013, DPI ⁷⁵ covers 180 countries from 1975-2012, while *polcon*⁷⁶ covers over 200 countries from 1962-2012.

Conceptually, the two measures are similar: both consider the number of actors with veto powers (individual or collective⁷⁷) and take into account the degree to which these actors have their own distinct policy preferences. This is parallel to Tsebelis's (1995) definition of veto players, which not only emphasizes the number of actors, but also the similarities or dissimilarities of policy positions among the veto players. However, there are a few important methodological differences between the two variables, which we discuss briefly in this section.

First, *checks* is a discrete variable, ranging from 1-18, while *polcon* is a continuous variable ranging from 0-1. The methodology behind the construction of the two variables is quite different: *checks* simply counts the number of veto powers with distinct policy preferences, while *polcon* is an index constructed using a spatial model of political interaction between the executive and the number of independent legislative branches with veto powers.⁷⁸ Henisz argues that alignment across branches increases the feasibility of policy change; therefore the *polcon* index takes into account the extent of alignment across branches of government using data on the party composition of the executive and legislative branches. Possible scores for the final measure of *polcon* range from zero (no constraints) to one (most constrained).

Second, the number of veto points in Henisz's data set is weighted by the distribution of policy preferences among the executives and each legislative veto point (Angkinand and Willett 2008). In other words, veto players with an ideological orientation ⁷⁹ that is close to the chief executive will be weighted less in the construction of the *polcon* index, and not in the *checks* variable. For example, new parties to a

⁷⁵ The link to the DPI data can be found at <http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/DPI2012.zip>

⁷⁶ Henisz's data on the political constraints is available at <http://www-management.wharton.upenn.edu/henisz/polcon/contactinfo.html>.

⁷⁷ An example of a collective veto player is an entire legislative chamber. For example, in the US, the president is one individual veto player. If the House of Representatives is controlled by a political party different than the president's, the entire House is a separate, collective veto player.

⁷⁸ The number of independent legislative branches is taken from the Polity IV data set collected by Gurr (2001). For legislative branches, each chamber (upper or lower branches) are counted separately.

⁷⁹ This is measured using information on the party composition of the legislative branches, or the party composition of a cabinet coalition.

coalition are only added to the *polcon* index if it results in greater fractionalization of the legislature. Meanwhile, *checks* linearly adds as new veto players each party in the majority government coalition (parliamentary systems) or each chamber of the legislature which is not controlled by the executive's party (presidential systems).⁸⁰ These differences can be illustrated through the case of Japan 1993-94, when the then dominant Liberal Democratic Party (LDP) party lost their majority position in the 1993 election (Krauss and Pekkanen 2010).⁸¹ From 1993 to 1994, *checks* in Japan increased from 3 to 11, while the increase was more modest in the variable *polcon*, from 0.53 to 0.59. According to Henisz (2004), *polcon* shows diminishing marginal returns on the feasibility of policy change to the addition of subsequent veto points.

Both proxies have some limitations for use in empirical analysis. In particular, heterogeneity of preferences is defined purely based on ideological preferences: veto players belonging to the same party as the chief executive are not counted as separate players. However, even veto actors with similar ideology may have different preferences depending on the policy at stake.⁸² For example, President Clinton pursued free-trade oriented policies such as NAFTA, while a large number of Democratic Congressmen preferred to protect the import-competing sectors in America. At the same time, many political parties in developing economies have little ideological differences among them, yet treating these ideologically-similar parties as one veto player would be inaccurate given that they often package themselves as being different from each other “to ensure necessary leverage in capturing side payments.” (MacIntyre 2001, p. 91). Moreover, the likelihood of veto players exercising their veto will vary depending on the issue or policy that is at stake. While veto players may have different ideological preferences, they may not act on their preferences unless the issue is salient (Dash 2005). In other words, if the piece of legislation being discussed is not highly visible to the public, veto players may not necessarily attempt to block it.

⁸⁰ This adding rule also explains why *checks* can have very large values such as 18 (India 1997-1999) or 16 (France 1987-88).

⁸¹ In 1993, the LDP still won the most seats of any party, however it did not go on to form a government because almost all the opposition parties unprecedentedly united in a short-lived (9 months) “unwieldy coalition.” (Krauss and Pekkanen 2010).

⁸² It may be worth noting that McCarty et al. (2013) argue that ideology is a pretty significant predictor of differences in policy preferences in the case of the United States.