If You're Going Through Hell, Keep Going:
Non-linear Effects of Financial Liberalization in Transition Economies

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ABSTRACT

Financial liberalization, whether internal or external, has facilitated the creation of market economies, but it also has exposed transition countries and their real economies to volatility from international financial markets. With uneven financial liberalization across the transition space, does increasing the level and pace of financial liberalization during transition unduly expose countries to crises? And if a crisis does strike, does a liberalized financial sector help these countries to weather crises better they would have otherwise? Using a database of 28 transition economies from 1989-2010 and Prais-Winsten and GMM estimators, I examine the probability of a crisis and performance of several economic indicators in periods of crisis as a function of financial sector liberalization and other institutional factors. The results provide evidence that, while liberalization and integration in international financial markets may increase the probability of a crisis at low levels of liberalization, once higher levels of liberalization are reached the prospect of a crisis drops dramatically. Moreover, the benefits of liberalization long-term far outweigh the risks of passing through these intermediate stages.

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I. Introduction

Financial liberalization has been part and parcel of the transition to capitalism. Prior to the fall of communism, 'the bank in the centrally planned economy was an administrative agency and had almost no common features with any commercial bank' (Blazyca and Dabrowski (1995)), acting as another arm of the government for resource allocation and not as a financial intermediary. With the fall of the Berlin Wall and the collapse of the Soviet Union, the challenge thus faced was how to create a modern banking system in an environment that had no experience with anything of the sort. This process of financial liberalization entailed both extensive internal reforms (freeing interest rates and allowing foreign and private bank entry) and external reforms (liberalization of the capital account).

But financial liberalization, and in particular external liberalization, also appeared to expose the transition countries of Central and Eastern Europe (CEE) and the former Soviet Union (FSU) and their economies to volatility from international financial markets that was not present during the days of communism. Similarly, internal liberalization created its own set of problems in transition economies, especially given the steep learning curve for financial sector institutions, which for the most part (unless they were foreign-owned) only operated in a non-market system before.

In line with the extensive literature pointing out the dark side of financial liberalization (see, for example, Demirguc-Kunt and Detragiache 2001 or virtually anything by Stiglitz), it appeared that the weak markets and institutional foundations in transition exacerbated the negative effects of liberalization. Indeed, the years following the start of transition saw a series of international crises beginning in Asia in 1997 and continuing with Russia in 1998 and through the recent (and ongoing) global financial crisis, which have deeply affected the real economy in transition countries. Moreover, these exogenous shocks have occurred in addition to (or in many cases, in tandem with) home-grown banking crises that were brought on by poor macroeconomic policies and the difficulties of transition, further harming growth and, in many cases, derailing needed reforms. It appeared that the transition economies had experienced the effect that Caprio (1998) postulated, namely that 'premature liberalization could be cited in virtually all cases' of financial crises.

However, in tandem with this reality of banking crises, the empirical research on financial liberalization in transition showed a different result in the long-term. In fact, a long line of previous research has established that financial sector liberalization in transition economies, despite proceeding at different paces in different countries, facilitated the expansion of credit to the private sector (Cottarelli, Dell'Ariccia, and Vladkova-Hollar (2005)), development of sound banks (Fries and Taci (2002)), growth in firm sales and use of debt for financing (Giannetti and Ongena (2009)), and, in conjunction with efficient institutions (Coricelli and Maurel (2011)) or governmental fiscal and monetary responsibility (Berglof and Bolton (2002)), sustained economic growth (Akimov, Wijeweerab, and Dollery (2009)).

So which effect predominates? That is, was financial liberalization to blame for the apparently increased incidence of crises (as suggested in, among others, Kaminsky and Reinhart (1999))? And was the probability or severity of a crisis related directly to financial liberalization? Over twenty years of transition in the CEE and FSU countries gives us an opportunity to examine these questions empirically, a task made more interesting by the simple fact that the transition countries have not behaved as a monolithic bloc in their financial sector liberalization policies. For countries such as the Czech Republic and Slovakia, liberalization of the financial sector occurred rapidly and was predicated on the entry of

foreign financial institutions, while others such as Tajikistan and Kazakhstan have either liberalized haltingly or have opened their doors only to banks from the neighborhood (mainly Russian).

Given the reality of the disparity in financial liberalization in CEE and the FSU countries, this paper offers a novel contribution to the literature on financial liberalization by examining the effects of liberalization in contributing to crises in transition economies. Using data from 1989-2011, I postulate that there is a non-linear relationship between financial liberalization and successful economic outcomes across the board in transition; while liberalization may increase the likelihood of a crisis from the outset of transition, on average financial liberalization is much better for an economy than not liberalizing. By going beyond the question of causation of crises to see if they even matter in terms of long-term transition paths, this paper hopes to bring together the disparate and separate literature streams of financial crises and transition economics into a comprehensive picture of the experience of liberalization in transition. Moreover, this paper breaks new ground by moving beyond GDP to examine the effects of financial liberalization on a whole host of economic indicators, including savings, FDI, and growth of the private sector. These first-order effects were, after all, the real reason for transition, with growth a hoped-for second-order effect. It is my supposition that the other metrics I will examine in this paper, especially growth of investment and expansion of the private sector, are more important indicators of success in transition, especially in relation to the financial sector.

The rest of this paper is structured as follows: Section II will structure the theory of the link between financial liberalization and crises, while Section III briefly review the literature regarding financial crises, including in regards to transition economies and their move towards financial liberalization. Section IV discusses the econometric model and outlines the methodology for testing the research questions noted above and Section V presents the results. Section VI concludes with some thoughts on the future of financial liberalization in transition.

II. Theory: Financial Sector Liberalization and its Influence on a Crisis

What is a 'Crisis?'

Before examining the effects of financial sector liberalization on the incidence and effects of crises in transition, it is perhaps most important to define what exactly is meant by a 'crisis.' As many have noted (see Reinhart and Rogoff 2009 for an extensive overview), the types of crises that may be caused by or afflict a financial sector are many and diverse: sovereign debt defaults, inflationary episodes and currency debasement, exchange rate crashes, and banking crises are just a few of the most prevalent types of crises (Reinhart and Rogoff 2009:39). For the purposes of this paper, I will focus exclusively on banking crises, based on the reality that banking crises are almost wholly tied into the progress of financial liberalization (as well, of course, as other external factors). By contrast, inflationary episodes, exchange rate crashes, and sovereign debt defaults may both be transmitted and amplified by the financial sector, but these types of crises never wholly *originate* within the financial sector, nor does financial sector liberalization purport to be the main cause of any of these governmentally-based crises. In the transition context as well, with no experience of deep or broad capital markets, financing relied on (and to some extent still does rely on) bank-based lending, meaning that bank crises were more likely to have an effect on the real economy (an effect confirmed by Hutchison and Noy (2005), who find that banking crises harm output growth more than currency crises).

Given this narrowing of a crisis to banking crises exclusively, there still exists an issue of marking what a crisis is and how one knows if a 'crisis' is indeed occurring. Laeven and Valencia (2012) have compiled

perhaps the most comprehensive database of 'systemic' banking crises over the past 35 years, defining a 'systemic' banking crisis as the first year that both the following criteria are met:

1. Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations)
2. Significant banking policy intervention measures in response to significant losses in the banking system (Laeven and Valencia 2012:4).

Thus, under their definition, a banking crisis is an event that both causes a severe deterioration in bank assets and the structure of the financial sector, while at the same time attracting the attention of governing authorities. This is similar to the Reinhart and Rogoff (2009:44) approach of dating a banking crisis by the events that it generates, namely bank runs that lead to some form of public sector intervention (whether it be nationalization or large-scale government assistance) and financial distress that 'marks the start of a string of similar outcomes for financial institutions.' Given this concurrence of definitions, and our admittedly limited data on other variables that could constitute a crisis, I will thus rely on these definitions and the Laeven and Valencia dataset (2012) to mark what a banking crisis is and when and how long it occurred.

Liberalization and Crises: The Link

Financial liberalization is commonly understood to consist of two related but exclusive components, one 'internal' and one 'external.' 'Internal' liberalization often refers to the dismantling of governmental regulations designed for financial repression of the domestic banking system (McKinnon 1980), including interest rate liberalization, private sector competition, and bank solvency guidelines. Conversely, 'external' liberalization refers more to the policy stance on capital flows, and whether or not a country is open to international capital movements, has an absence of capital controls, allows banks to raise funding on international capital markets, and other attitudes towards the financial sector *vis a vis* the world. While it is often the case from a policy standpoint that these two facets of financial sector liberalization go hand-in-hand, there are many examples of internal reform being undertaken first and capital account liberalization being slowly phased in afterwards (see Johnston *et. al* 1999 for case studies).

The theory relating financial liberalization to financial fragility has focused on both of these facets of liberalization to varying degrees (and, in some cases, as we will see below, has mixed aspects of both internal and external liberalization uneasily), but has thus failed to 'specify a clear theory-based hypothesis for the relationship between the level of financial liberalization and banking crises' (Angkinand *et. al* 2010:265). Much of the theoretical work that has been done has contained an explicit focus on the negative effects of (implicitly) the differing facets of liberalization on the real economy in emerging markets, effects that would contribute to the likelihood of a crisis:

<u>Internal Risks</u>

- By lifting interest rate ceilings, banks may now finance riskier ventures in return for a higher promised return; thus, the entire risk profile of a country's banking system increases after facets of liberalization are implemented (Demirgüç-Kunt and Detragiache 2001:105; Daniel and Jones 2007 model this explicitly);
- Removal of government constraints on credit institutions would expose these institutions to risks such as maturity, interest rate, and exchange rate risk, which would not have occurred prior to liberalization (Weller and Morzuch 2000);

- Interest rates will be more variable in a market-based system, and liberalized banks may find it difficult to deal with liquidity shortages engendered by greater volatility (Demirgüç-Kunt and Detragiache 2001:106); and
- Relaxation of regulations on banking combined with poor institutional underpinning and/or lack of managerial capacity may lead to over-lending or lending done without heed to due diligence (as noted in the case of Indonesia in Bennett (1995)).

External Risks

- The freeing of capital accounts, in tandem with world economic conditions and capital flows, could overwhelm nascent banking institutions, who have no experience in dealing with foreign capital markets or large sums of money (especially in transition economies);
- Due to informational asymmetries in capital markets and especially in emerging markets, external liberalization will necessarily lead to sub-optimal lending or investment decisions by domestic banks (this argument was made strongly in Stiglitz (2000), who asserted that financial markets are fundamentally different than markets for goods and services, and thus capital account liberalization requires a different set of rules for oversight than, say, trade liberalization); and
- External financial sector liberalization takes away policy sovereignty to a certain extent from national governments.

However, despite these possible risks would come with financial sector liberalization, there are several factors which may make liberalization (of both types) insulation against a crisis. In the first instance, many of the 'risks' that are cited above are exactly the sort of beneficial effects one would hope for in the long-run for an economy: risk-taking should be priced appropriately using market-based interest rates (which would then improve the intertemporal allocation of capital), and the loss of policy sovereignty in many countries would be a blessing and not a curse (given the usage of repressed financial sectors to fund public sector and politically-connected firms, see Diaz-Alejandro 1985). Beyond these obvious benefits, the freeing of the financial sector would be expected to encourage savings and better allocate credit (through interest rate effects, see Fry 1997), as well as allow firms to access credit as financing frictions are reduced (Laeven 2003). All of these results would contribute to a stronger and more fundamentally sound economy, which would mitigate banking risks.

These trade-offs suggest that there may be a non-linear relationship between financial liberalization and the probability of a crisis, that follows a Kuznets curve dynamic: the initial stages of financial opening (both internal and external) can increase the probability of a crisis (see Figure 1), but increasing the levels of liberalization will create a sturdier banking system *ceteris paribus*, one that is more resilient and less likely suffer an endogenously-generated crisis. This relationship would explain why pervasive regulation and state ownership can prevent banking crises, as countries such as the USSR, North Korea, and Cuba have done fairly well at insulating themselves from financial turmoil (although this superficial observation misses the fact that that these countries do/did not have a "financial sector" to speak of, at least one that operates in a capitalist framework).[1] This could also explain why countries taking steps to emerge from financial liberalization see higher incidence of crises at first, but (hopefully) less as time passes and reforms progress. There also may be, as Figure 1 postulates, a differential effect of liberalization on the incidence of crises: internal liberalization may raise the probability of a crises less

[1] This issue will be revisited below in the context of transition economies.

than external liberalization, and they may not be on the same timing (that is, external liberalization before internal liberalization is complete may increase the prospects of a crisis).

Moreover, even if these changes in the economy were not enough to prevent a banking crisis from occurring (either due to exogenous shocks or poor due diligence and lending behavior, as noted above), the adjustment mechanisms in a liberalized financial sector can be expected to operate much more swiftly than in a repressed financial sector (as in, for example, working out of distressed assets or mergers/consolidations of failing banks). Moreover, as liberalization makes the financial sector (in theory) dependent on the private sector for its business rather than the government, there should be internal financial institutional changes that makes the sector more resilient: in the words of Angkinand *et. al* (2010:270), liberalization means 'banks are subject to market discipline providing incentives for improved governance, risk management, and innovation.' Additionally, relaxing constraints on foreign bank entry would 'promote the stability of the domestic deposit base, and thus the stability of domestic banking and financial system, because they are less susceptible to domestic economic shocks' (Yilmaz, Yabasakal, and Koyuncu 2009:3). Thus, if a shock were to occur, the presence of foreign financial institutions in a liberalized financial sector would help to guarantee a deposit base for continued lending and cushion the effects of a domestic disruption.

Finally, there may be a benefit to financial liberalization in regards to crises that accrues specifically to transition economies. Attitudes towards financial liberalization are often caught up with the entire range of reforms that a transition economy is undertaking, meaning that a government's policies in financial liberalization are also often similar to the policies they pursue in price, trade, and goods market liberalization as well. As Demirgüç-Kunt, Laeven, and Levine (2004:539) correctly note in a different context, 'bank regulations cannot be viewed in isolation; they reflect broad, national approaches to private property and competition.' Thus, financial sector liberalization in transition would also signal the removal of other distortions in the transition to market, which in turn strengthens an economy at both the micro- and macro-level. Stronger property rights correlates highly with successful economic transitions (Hartwell 2013), meaning a country less likely to see a home-grown banking crisis strike out of the blue; it also means the presence of an economy strong enough to withstand exogenous shocks.

III. Literature Review: Previous Research in Financial Liberalization and Volatility

The empirical evidence on the link between financial liberalization and crises is extensive and, as noted by Demirgüç-Kunt and Detragiache (2001), tends to break into two separate streams: one stream focuses on the likelihood of financial crises (through an examination of underlying causes) due to financial reform, while the other examines the link between financial sector liberalization and improved economic outcomes (typified by (King and Levine (1993), as well as an entirely theoretical rejoinder from Stiglitz (1994)). Uniting these two streams in the context of transition is the goal of this paper.

Liberalization and Probability of a Crisis

Demirgüç-Kunt and Detragiache (2001) were one of the earliest to model the likelihood of financial crises in the face of liberalization, laying out what is now the standard framework for econometrically investigating the connection between financial reform and what they term 'financial fragility.' Using a multivariate logit model covering 53 countries (both developed and developing) from 1980-95, they find that banking crises are indeed more likely in their sample for financially liberalized countries. However, perhaps more importantly, they also found that the gains from liberalization were higher than the risk of fragility for financially repressed countries (albeit with methodological caveats). Finally, they also found

that the relevant institutional frameworks can mitigate the risk of a crisis, with respect for contract enforcement leading to less banking fragility.

Mehrez and Kaufmann (2000) came to similar conclusions about the institutional frameworks necessary to support successful financial reform. Their study examined how transparency, loosely defined as a lack of corruption (or, in one specification, as perceptions regarding the government's communication of its policies), affects the probability of a financial crisis. Using a multivariate probit model for 56 developed and developing countries over 1977-97, they report a higher probability of a crisis during the five years following financial liberalization. In line with earlier research, they also find that the likelihood of a crisis is higher in countries that have poor transparency than in countries that are more transparent.

A great leap forward in the literature was made by Ranciere, Tornell, and Westermann (2006), who sought to unify the two streams of analysis and examine both the likelihood of a crisis in the face of financial liberalization as well as the benefits of liberalization weighed against the probability of a crisis. Fashioning a model that decomposed the effect of financial liberalization on growth into a direct growth channel and an indirect 'fragility channel,' they expanded the examination of crises to 60 countries (also both developed and developing) over 1980-2002. With more data points than the Demirgüç-Kunt and Detragiache (1998) or Mehrez and Kaufmann (2000) datasets (and a timeframe that encompassed more crises), their analysis concluded that 'financial liberalization typically leads to financial fragility and occasional financial crises. In net terms, however, financial liberalization has led to faster long-run growth' (Ranciere, Tornell, and Westermann (2006:13)).

More recent research has supported these results, with Shehzad and De Haan (2009) using multivariate probit modeling over a much longer time frame (1973-2002) to find that financial reform in general *reduces* the likelihood of systemic crises, in addition to its benefits in growth. As a political economy corollary to these results, they also find that initial reforms lead to a virtuous cycle of further reform, which in turn increases the stability of the financial sector and makes it even less susceptible to crisis. Angkinand *et. al* (2010) reinforced these results, showing that 'the common view that financial liberalization leads to an increase in the likelihood of banking crises is not robust.' They also bring the financial crisis research full circle by noting that intermediate levels of liberalization appear to be the worst for fostering crises, but general institutional quality has a significant negative effect on the probability of banking crises for all of the countries in their sample.[2]

While the results from the prior literature are mostly in agreement, they rely on a mixture of developed and developing economies over various time frames, perhaps obscuring the role of developing and transition dynamics in financial liberalization. This is not to say that there is no research focusing on the role of financial reform in crises in emerging economies exclusively (see Weller (2001), Bird and Rajan (2001), and Komulainen (2004)), but even much of this literature takes a slightly different angle in modeling the various channels that recent financial crises were operating through (see, for example, Chang and Velasco (2001)). Most importantly for our purposes, none of the papers cited have focused

[2] The most visible piece of recent research regarding financial crises comes from Reinhart and Rogoff (2009), which has become holy writ in regards to the effects of a crisis. However, their discussion of liberalization and its influence on probability of a crisis is limited to noting the correlation between liberalization in the 1970s and the preponderance of crisis. Moreover, they do not perform any analysis of their own, instead referencing Kaminsky and Reinhart (1999) and Demirgüç-Kunt and Detragiache (1998b) and missing a decade's worth of research that comes to different conclusions.

exclusively on the transition economies of CEE and FSU, who have undergone a sustained and accelerated liberalization process unlike any other.

This lack of direct examination of crises in transition was perhaps a consequence of the treatment of the broader transition processes. The transition countries of CEE and FSU were *all* subjected to numerous financial crises over the past 20 years, both at a country- and regional-level.[3]). Indeed, financial crises hit in both seemingly isolated incidents (such as the Czech Republic in the late 1990s and Slovakia from 1998 to 2002) and in broad, multi-country waves such as the Russian ruble crisis in 1998-99 and the global financial crisis of 2008-2010 (Table 1 shows a list of banking crises in transition, derived from Laeven and Valencia's (2012) database of crises).[4] Given that the commonality amongst these countries was the fact that they were transitioning, it was only natural that the examination of these financial crises in the various transition economies was treated in the literature as part of the transition process (Arvai and Vincze (2000)). The focus in the transition literature was thus on how specific conditions in specific countries created susceptibility to crisis (and how governments could overcome the effects of crisis, as in Tang, Zoli, and Klytchnikova (2000)).

Table 1 – Banking Crises in Transition Economies

Country	Start Date	End Date
Albania	1994	1994
Armenia	1994	1994
Azerbaijan	1995	1995
Belarus	1995	1995
Bosnia	1992	1996
Bulgaria	1996	1997
Croatia	1998	1999
Czech Republic	1996	2000
Estonia	1992	1994
Georgia	1991	1995
Hungary	1991	1995
Hungary	2008	present
Kazakhstan	2008	2010
Kyrgyz Republic	1995	1999
Latvia	1995	1996
Latvia	2008	2010
Lithuania	1995	1996
Macedonia, FYR	1993	1995
Mongolia	2008	2010
Poland	1992	1994
Romania	1990	1992
Russia	1996	1998
Russia	2008	2010
Slovakia	1998	2002
Slovenia	1992	1992
Slovenia	2008	Present
Tajikistan	1996	1996
Ukraine	1998	1999
Ukraine	2008	Present

Source: Laeven and Valencia (2012), supplemented with author's update

[3] This was in direct contrast to the experience under communism, where there were no 'financial crises;' given the administrative role of banks in the socialist economy, financial crises were really governmental or budget crises and not bank runs, losses in the banking system, and/or bank liquidations. The now-transitioning economies were not subjected to 'financial' crises during their communist days mainly because they had no 'financial system,' not because of the excellence of their financial regulation. Thanks to an anonymous referee on an earlier version of this draft who noted the somewhat obvious lack of financial crises in the Soviet Union, but not the also obvious cause of this fact.

[4] Laeven and Valencia (2012) date the end of a banking crisis as the year before both real GDP growth and real credit growth are positive for at least two consecutive years.

However, while the whole processes of price and trade liberalization and institution-building may have been novel in accompanying financial liberalization, it is still possible that the causes of financial crises in transition economies were not actually related to transition *per se*. That is, the real "transition" in the financial sector was a process of financial liberalization that other countries had already undergone, albeit in an accelerated timeframe; thus the incidence of crises in CEE and FSU were part of the commonalities already identified in the *crisis* literature.[5] Given the differing pace of pace of financial sector development across the transition space (and of which much has been written, see Bonin and Wachtel (2003) on the first decade and Bonin and Schnabel (2011) for a more recent and expansive view), it is probable that variables shown in the broader research to influence the likelihood of a crisis would also hold true in the transition laboratory. Included amongst these possible explanators would be financial liberalization. Simply put, do prior results regarding the linkages between financial liberalization and the probability of a crisis hold for transition economies as well?

Liberalization and Crises: the Aftermath

This broad literature examining the probability of a crisis as a function of financial liberalization, but an additional question of note (as well as a contribution of this paper), is how financial liberalization affects economic outcomes if a crisis does occur. By contrast with the previous literature, the research into the linkages between financial liberalization and the effects of a crisis is comparatively thinner, with an emphasis on external liberalization rather than internal. Bonfiglioli and Mendicino(2004) noted that the adverse effects of banking crises seem to be less in countries that have liberalized externally (i.e. that have open capital accounts), while Ranciere, Westermann, and Tornell (2006:3331) empirically show that the "direct growth gain of financial liberalization significantly outweighs the growth loss associated with more frequent financial crises." In a transition context, as well, Brezigar-Masten, Corricelli, and Masten (2011) find that financially more open countries experience a smaller decline in the supply of finance during a crisis. Kose *et. al* (2009:8) summed up the empirical evidence to this point as 'there is little systematic evidence to support widely-cited claims that financial globalization by itself leads to deeper and more costly developing country growth crises.'

Theoretical heft has been given to this idea in Gayton and Ranciere (2006) and Daniel and Jones (2007), who show that there are also non-linearities in the effects of financial crises related to liberalization; in both papers, it is shown that "middle income" countries or countries with intermediate levels of liberalization suffer more due to a financial crisis than do poorer or richer countries. There is even evidence of this effect from the transition literature (Furceri and Zdzienicka (2011), where results showed that continued financial liberalization worked as a possible way to mitigate against future shocks. Thus, even if transition had exposed the countries of CEE and FSU to the possibility of financial crises, perhaps the cure was to continue liberalizing; or, in the words of Winston Churchill (and the title of this paper), "if you're going through hell, keep going."

The challenge for this paper is thus to pick up where these papers have examined but have not explored fully: namely, did financial liberalization mitigate the effects of financial crises across a broader set of metrics? The prior literature, including Brezigar-Masten, Corricelli, and Masten (2011), has focused almost exclusively on the effects of crises on growth, which, in a transition context, is a bit misleading;

[5] Enoch, Gulde, and Hardy (2006) are a notable attempt to somewhat rectify this omission, drawing parallels in transition economies with industrial-country crises. However, their analysis is restricted to Mongolia, Bulgaria, and Lithuania.

after all, the purpose of transition is *eventually* to lead to higher growth rates and better aggregate outcomes for a country's citizens, but in the short-term there are other, more pressing goals. Indeed, the immediate purposes of transition are to:

- increase the volume of private sector activity;
- reallocate investment from less-productive to more-productive uses;
- change institutions to successfully facilitate market transactions

Seen through this lens, GDP growth is merely a second-order effect of transition after other preconditions have been fulfilled (that is, the change from communist institutions to capitalist ones, leading to the 'transformational recession' that Popov (2007) speaks of).

For the purposes of this paper, I will thus examine the effect of financial liberalization in mitigating the effect of a crisis on three separate metrics of economic success: the size of the private sector, inflows of foreign direct investment (FDI), and overall savings. This also presents a problem, for, if the literature on the effects of liberalization during a crisis on growth is thin, the literature on these metrics during a crisis is almost non-existent. For example, work on the size of the private sector in transition economies in relation to a financial crisis has surprisingly thus far been neglected in the literature NOTHING THERE. And while a rich literature exists on the determinants of FDI in the context of financial liberalization (Lucas (1993), Jun and Singh (1996), Campos and Kinoshita (2010)), including in transition economies (see, for example, Lankes and Venables (1996) and Bevan and Estrin (2004)) and with a corresponding wealth of information on macroeconomic variables that influence FDI flows (for example, De Mello 1997 or Lederman, Mengistae, and Xu (2013)), there is very little work done on the effects of a crisis on these flows *in the presence of liberalization*. Similarly, there is also an extensive literature regarding determinants of saving in developing and transition countries, including Borensztein and Montiel (1991), Conway (1995, 2000), Denizer and Wolf (2000), Bandiera *et. al* (2000), Chowdhury (2004), and Osoian *et. al* (2008). However, as with FDI, there is little to no examination of how savings performs during a banking crisis in the presence of varying levels of financial liberalization. Filling these holes in the literature will be the task of the rest of the paper.

IV. Data and Methodology

Does Liberalization Make a Crisis More Likely?

Using a database of 28 transition economies[6] from 1991-2011 compiled from World Bank and Global Insight data, our first research question follows in the steps of Demirgüç-Kunt and Detragiache (2001), Shehzad and De Haan (2008), and Angkinand *et. al* (2010) and is based on determining the likelihood for a banking crisis in a transition country. Mirroring these earlier papers' analysis but including non-linearities, our baseline specification for determining the likelihood of a banking crisis is:

$$(1)\ \ln\left(\frac{p_{it}}{1-p_{it}}\right) = \alpha + \beta FINLIB_{it} + \theta FINLIB_{it}^2 + \delta INST_{it} + \gamma MACRO_{it-1} + \varepsilon_t$$

[6] The countries included in this dataset are Albania, Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, the Former Yugoslav Republic of Macedonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. Mongolia is included due to its heavily socialist economy and the fact that it has truly undertaken reforms to transition from socialism to capitalism.

Where

$$p_{it} = Prob(CRISIS_{it}|X) = \frac{1}{1 + e^{-(\alpha+\beta FINLIB_{it}+\delta INST_{it}+\gamma MACRO_{it-1})}}$$

The multivariate logit model shown in Equation 1 is estimated as both a maximum-likelihood Model with country clustering and a population-averaged model in order to (as in Demirgüç-Kunt and Detragiache (2001), Shehzad and De Haan (2008), and Angkinand *et. al* (2010)) avoid the issue of having countries without crises being dropped from the analysis under a fixed-effects specification.[7] Additionally, the population-averaged specification (as used in Chan-Lau, Jobert, and Kong (2004) and Büyükkarabacak and Valev (2010)) allows for the use of Huber/White sandwich robust standard errors and can provide a 'more useful approximation of the truth' based on the underlying distribution (Hubbard *et. al* (2010:467)).

The dependent variable in Equation 1 is a crisis dummy, taken from Laeven and Valencia's (2012) database of banking crises (with one additional change for Tajikistan in 1996 taken from Caprio *et. al* (2005)). As in Angkinand *et al.* (2010), the crisis dummy is set to 1 in the year that a crisis occurs, and 0 if a crisis did not occur that year; in their words, 'the hypotheses refer to the impact of liberalization on the likelihood that a crisis will occur but not to the duration of the crisis. A crisis lasting more than 1 year would get excess weight in the analysis and possibly bias the results if all crisis years were included' (Angkinand *et al.* 2010:275).

A key problem econometrically for testing this theory will be measuring variable FINLIB, the financial liberalization of a country. Here, we run into the familiar debate in institutional economics of subjective versus objective indicators: Moers (1999) explicitly makes the case for subjective indicators in the transition context, noting that subjective measures 'are likely to reflect more closely and directly… the concerns about the quality of institutions,' as, '[c]ontrary to objective institutional measures, they also do reflect uncertainty, which is subjectively perceived' (Moers 1999:9). On the other hand, Voigt (2013) asserts that 'objective measures are generally preferable over subjective measures' for measuring institutions because 'subjective evaluations are tainted by the theories, ideologies, prejudices, and so forth of the respondent' (Voigt 2013:19). To satisfy both camps, I approach the quantification of institutional change through utilization of both subjective and objective indicators.

However, this raises another point regarding the external versus internal nature of 'liberalization,' as noted in Section II above: what form of liberalization will be captured in our indicators, and which would be most important for preventing a crisis? In regards to 'internal liberalization,' I will focus on the EBRD's transition indicator of bank reform, which captures major measures of internal liberalization (including interest rate policies and bank competition) on a scale from 1 to 4.33 (higher being better). While there have been numerous critiques of the EBRD indicators (see Campos and Horvath (2012) for an excellent overview of their issues), they remain a common gauge of transition progress, especially in the financial sector.

A further problem with the indicator, however, is that it captures convergence to Western European standards, rather than necessarily capturing absolute liberalization. To correct for this, I also use

[7] Additionally, random-effects was chosen over a population-averaged model so that the random intercept can capture the combined effect of all omitted country-specific covariates that may cause these countries to be more prone to crisis. Results of the marginal effects model will be reported in the next section.

objective measures for internal liberalization to attempt to remove the bias of subjectivity. The key indicator used to proxy for internal liberalization is the extent of deposit money bank assets as a percentage of all bank assets (including central bank assets), a key indicator that measures a country's performance against itself.[8] Additionally, I will also utilize a measure of financial efficiency in our regressions, namely average bank return on assets, defined as the ratio of net income to total assets. We should expect to see a higher ratio of income to assets signaling a more efficient financial sector and, in most cases, a more open (i.e. allowed to profit/non-repressed) financial sector (see Das and Drine 2011).

In order to quantify external financial liberalization, I will focus on the Chinn-Ito (2008) indicator of financial openness, which is constructed as the first standardized principal component of four separate variables for a country taken from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). The indicator index takes on higher values the more open the country is to cross-border capital transactions, with a mean (across all countries) of zero and a range in practice of -1.86 to 2.46 (Chinn and Ito (2008)). While the Chinn-Ito indicator is more concerned with measuring the presence of multiple exchange rates, restrictions on current account transactions, and presence of requirements to surrender of export proceeds, it can also serve as a proxy for a government's attitude towards financial openness in a country. In the logit regressions and also in the following section, the Chinn-Ito indicator will be used both by itself and in conjunction with the EBRD bank reform indicator to capture both facets of financial liberalization.

Additionally, as the Chinn-Ito indicator is a collection of subjective measures, I will check it with an objective indicator for external liberalization, namely the share of foreign bank claims in the economy. As Naaborg et. al (2004) has noted, the presence of foreign banks in transition economies has been a prime determinant of their financial sector development, while the proportion of foreign bank involvement has correlated strongly with less crises (Tschoegl 2005, Yilmaz, Yabasakal, and Koyuncu 2009). I anticipate this relationship to hold here, with the presence of foreign banks acting as an indicator for external liberalization.

Finally, given the theoretical possibilities of non-linearities of financial liberalization (shown in Figure 1), a quadratic term of liberalization will be included to capture these effects. This quadratic term will be utilized for all objective and subjective indicators used for liberalization.

The macro variables utilized as a control in the analysis of Equation 1 will be similar to Demirgüç-Kunt and Detragiache (1998), Shehzad and De Haan (2008), and Angkinand *et. al* (2010), with slight variations to account for the results of these earlier papers, the results of other research regarding the importance of certain macroeconomic variables on the financial sector in transition economies, and advances in institutional measurement. In particular, I will utilize a parsimonious model of macro variables more in line with Demirgüç-Kunt and Detragiache (1998), including:[9]

[8] The precise definition of our objective indicator is the ratio of deposit money bank claims on the domestic nonfinancial real sector to the sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector. This indicator is taken from Beck and Demirgüç-Kunt (2010) and countries with higher ratios of deposit money bank claims as opposed to central bank claims will exhibit higher levels of financial freedom (and liberalization).

[9] Sensitivity tests on other macroeconomic variables featuring in the literature will be used in the next section.

- *Log of GDP per capita:* This is utilized, as in Demirgüç-Kunt and Detragiache (1998), Kaminsky and Reinhart (1999), and many others, to control for the level of development of the particular transition country.
- *Inflation*: Inflation can affect banking crises in several different ways. In the first instance, the presence of high inflation can bloat a financial sector through excess liquidity (Eichengreen and Rose (2004)), meaning that any expectations of inflation stabilization will harm the balance sheets of financial sector institutions and thus make a banking crisis more probable (Gavin and Hausmann (1996)). Moreover, inflationary volatility can cause a decline in real economic activity, and banking crises are more likely in the face of economic contraction (Goldstein and Turner (1996)). Additionally, in the words of Demirgüç-Kunt and Detragiache (1998), high inflation may proxy for macroeconomic mismanagement, and they find that high inflation makes crises more likely.[10]
- *Bank credit as a % of bank deposits:* Bank credit is often utilized in the literature as a proxy for financial sector liberalization or depth (see Pill and Pradhan 1995). However, in my estimation this is an incorrect usage in the transition context, where large swathes of the financial sector may still be state-owned and yet state-directed; thus, credit levels may be rising but the financial sector is no more 'liberalized.' Instead, given its role as a prime culprit in the global financial crisis and a proven determinant of banking crises (also Pill and Pradhan (1995)), this indicator will be used in this paper to proxy for indirect monetary policy effects, as well as financial maturity. Measuring private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks, the bank credit indicator used here was compiled by Beck and Demirgüç-Kunt (2010) from IFS data and is a better indicator than overall credit growth, as it allows for the scaling of credit growth relative to each country's banking system rather than to the entire economy.
- *Deposit Insurance Coverage as % of Per Capita Income:* The presence of deposit insurance is often thought to have a mitigating effect against a crisis occurring, and has been utilized extensively through the literature to gauge its effect (see, for example, Demirgüç-Kunt and Detragiache (1998)). The effect of deposit insurance should be more theoretically ambiguous, however, depending on its size: for small levels of deposit insurance, there may not be enough of a guarantee to keep a panic from rising to crisis levels, and at too-high levels, it may encourage excessive risk-taking (as agents know that losses will be socialized). Given these likely threshold effects, the scaling of this variable is relative to per capita income, as done in Demirgüç-Kunt *et. al* (2008). However, given that their commonly-used indicator only runs through 2003, I have painstakingly updated and extended the time series of deposit insurance coverage through 2010 for all transition economies.

As in earlier papers, these variables are mainly included at their first lag to eliminate reverse causality and trace the line from liberalization to crisis (if it exists), apart from deposit insurance (which should theoretically mitigate against a crisis in the current period). Finally, given that "institutions matter," I also include an additional explanator for institutional quality, the International Country Risk Group's (ICRG) annual ranking of "investor protection."[11] This indicator is an index that covers three subcomponents (contract viability/expropriation, profit repatriation, and payment delays), each with a maximum score of four points and a minimum score of 0 points, for a total of 12 (with higher scores

[10] As in previous work (Staehr (2005), Hartwell (2013)), I utilize the logarithmic transformation of log (100 + inflation rate) in order to smooth out the rather large changes in inflation that occurred during transition.

[11] The use of this index will provide a more nuanced approach to institutional quality than in Angkinand *et. al* (2010), who use log of real GDP per capita to proxy for institutional effects.

signifying more property rights). The ICRG indicator will be included without lags, as I hypothesize that not only can a stronger institutional environment help to guard against crises in the future, but they may also help to prevent an economic disruption from rising to the level of a crisis (that is, a macroeconomic shock may not rise to the level of a banking crisis in a country with stronger rule of law while in countries with weaker institutions, it may reach crisis level quickly).

Does Exposure to a Crisis Even Matter?

While Equation 1 goes over somewhat familiar territory in terms of relating bank crises to financial liberalization, I will also examine the performance of several economic indicators in periods of crisis as a function of financial sector liberalization and other institutional factors. Specifically, I will be testing whether or not a liberalized financial sector can help countries to overcome or mitigate the effects of a crisis, should it occur; if the results of the logit regressions show that liberalized countries are less likely to suffer a banking crisis, this does not mean that a crisis will never occur!

With this as a starting point, I can structure an empirical model for the effect of financial liberalization on countries in transition in the presence of a crisis:

$$(2)\quad Y*_{it} = \alpha FINLIB_{it} + \rho FINLIB_{it}^2 + \beta INST_{it} + \gamma MACRO*_{it} + \delta CRISIS_{it} + \theta IC1_{it} + \mu IC2_{it} + e_t$$

Where

$$e_t = \rho e_{t-1} + \varepsilon_t$$

Equation 2 that models the success metrics (Y) as a function of financial liberalization (as well as non-linearities, as in the first section), other relevant institutions (INST), macroeconomic variables derived from previous literature (MACRO), a dummy variable for years that a banking crisis occurred (CRISIS), and two initial conditions indicators.

As noted earlier, and as in Hartwell (2013), the expansion of variables beyond GDP is a key tenet of this paper, and thus I focus on a broad range of economic 'success metrics,' including private sector share of GDP, FDI inflows, and per capita savings rate (see Table 2), as the Y variables in Equation 2. In theory, a more efficient and open financial sector should lead to better financial intermediation (i.e. enabling resources to move from lower- to higher-valued activities), a larger private sector/more investment, and thus more resilience to a crisis. Of course, GDP growth will be included as a robustness test, but to focus on GDP exclusively is to miss the point of transition.

Table 2 - Dependent Variables for Analysis

Dependent Variable	Definition	Source
Size of Private Sector	Private sector as % of GDP	World Bank WDI
FDI	Foreign direct investment, net inflows (new investment inflows less disinvestment) as % of GDP	World Bank WDI
Savings Rate	Gross savings per worker, S/L	Derived from World Bank WDI

In regards to the independent variables, a rich literature exists on the effects of initial conditions on the transition path of the economies of CEE and FSU, including but not limited to de Melo *et. al* (2001), Havrylyshyn and van Rooden (2003), and Hartwell (2013). The initial conditions clusters IC1 and IC2 are thus designed to capture country-specific effects in a different manner than a standard fixed-effects specification, an approach that is defensible due to the information embodied in the country-specific initial condition clusters: in the words of Havrylyshyn and van Rooden (2003:14), the benefit to using 'the variables representing initial conditions instead of fixed effects [is] because the former have more 'economic' content.' Indeed, I will utilize their initial conditions clusters, derived from principal components analysis (as shown in Table 3), based on work from de Melo *et. al* (2001), to proxy for fixed-effects amongst countries and the initial distortions that were present at the beginning of transition; it is likely that greater distortions would make a country more susceptible to financial crisis regardless of financial liberalization. Given the composition of the two clusters, we would expect to see cluster IC1 have lower scores as a more desirable outcome (that is, less of a black market exchange premium, less represses inflation), while there should be an overall positive correlation between the IC2 cluster and metrics of success.[12]

As above, the investor protection indicator from ICRG will be used as an institutional control. Additionally, in some areas, it may be necessary to dig deeper into the institutional framework and examine an objective measure of property rights as a robustness check on institutional quality; to address shortcomings in the ICRG index, I will also use property rights as calculated as in (among others) Clague *et. al* (1996, 1997) and Hartwell (2013) as 'contract-intensive money,' defined as

$$(3)\ \frac{(M_2 - C)}{M_2}$$

Where M_2 is a broad definition of money supply and C is the amount of currency held outside of formal financial institutions. As Clague *et. al* 1996 demonstrate, variation in this indicator across countries tracks actual changes in institutions and policies, and thus may be empirically more reliable than subjective data regarding property rights enforcement.[13]

As earlier, the crisis dummy is taken from Laeven and Valencia's (2012) database of banking crises, with the exception that, in this specification, we are looking for the effect of both the length and duration of a crisis. Thus, from Equation 2 onward, the crisis dummy will be coded at 1 for every year in which there

[12] The further advantage of the clustering approach, as de Melo *et. al* (2001:17) note, is that this use of principal components "reduce[s] the dimensionality of the initial conditions variables" and deals with multicollinearity of the constituent variables in a much more effective manner. Additionally, they also correctly note that initial conditions often "exert their effect jointly, so that the individual approach suffers from the omitted variables problem and results estimated coefficients that are biased." These all argue for inclusion of the clusters here.

[13] While contract-intensive money is an objective indicator for property rights, this indicator might also catch some effects of financial sector efficiency (that is, the amount of money held outside of formal financial institutions may be due to the failings of a country's financial sector instead of the entire institutional system). Even if this is the case, however, as an instrument it is still theoretically sound: the failures of a financial sector could be expected to determine the government's stance on financial sector liberalization in the following period. I also believe that any financial sector effects it could capture would be more than overwhelmed by the systemic issues (and approach to property rights) that it is meant to represent. Moreover, this definition of property rights is suitable econometrically, as it passes diagnostic checks (notably the DWH test noted above) for its suitability as an instrument for financial sector liberalization.

is a crisis (whether it began in that year or not) and 0 for every year that did not have a banking crisis, unlike earlier when it was coded 1 only for the onset of a crisis.[14] Where appropriate, and given that the effects of a crisis may be felt farther out than during the period in which it begins, I will also include lags of the crisis dummy up to two years out to correct for their long-term legacy. This approach also reduces somewhat the problem of endogeneity in the analysis (which I will discuss further below).

The macroeconomic control variables for Equation 2 will not be uniform across the regressions, but instead will be based upon the specific metric of success:

Private Sector Size

For macroeconomic controls of the size of the private sector in transition economies, I will include inflation, the size of government (as percentage of GDP), and the lag of the GDP growth rate, as well as a dummy for EU accession to capture effects of convergence to Western European institutions. We should expect to see inflation and the size of government have a negative effect on the private sector, with growth both a positive lagging and leading indicator of the size of the private sector's contribution to the economy.

Foreign Direct Investment (Net)

Based on the prior literature noted above, I have selected inflation, share of government's role in the economy, and the (log of) the total external debt stock of a country as control variables, as well as an EU dummy to capture the effects of anticipated EU accession. It is likely that high inflation, a higher role of government, and higher external debt are all negatively correlated with GDP inflows, while our variables of interest (financial liberalization) would be correlated positively. These variables will all be included at their lags to mitigate reverse causality.

Per Capita Savings

As also above, there is an extensive literature regarding determinants of saving in transition, and based on this work, I have chosen a range of macroeconomic variables proven to be significant, including the:

- real interest rate, which, as Osoian *et. al* (2008) note, would have an ambiguous effect on savings due to income and substitution effects
- dependency ratio, included, as per Chowdhury (2004) to measure the impact of demographic variables on the savings rate, and
- ratio of M2 to GDP, to capture the level of monetization of the economy.

The estimator used in Equation 2 for all of these Y variables is a specialized FGLS estimation, a Prais-Winsten regression using panel-corrected standard errors, in order to correct for the heteroskedasticity and autocorrelation issues that are present in the data and that may bias the results; in particular, the persistence of correlation of the standard errors will be mitigated through panel-specific AR(1) transformations. The Prais-Winsten approach is favored over the Cochran-Orcutt transformation given the relatively small size of the dataset, so as to not lose the first observation (Prais and Winsten (1954)).

As a final check on these results, and as many have noted (including more recently Tressel and Detragiache (2008) and Rousseau and Wachtel (2011)), there is almost a certainty that financial sector institutions in transition economies are endogenously determined. Thus, after performing an

[14] This distinction means that, although similar, Equations 1 and 2 differ slightly and are not simultaneous. The use of methods for solving simultaneous equations, such as maximum likelihood, would thus be inappropriate.

augmented Durbin-Watson-Hu (DWH) endogeneity test on the separate models above, I will utilize a panel instrumental variable (IV) regression with a two-step system generalized method of moments (GMM) estimator. Not only has GMM been utilized extensively in the financial liberalization literature (see, as just one example, Joyce and Nabar (2010)), but the exigencies of our panel dataset makes GMM a good choice; in the first instance, the dataset has a shorter time dimension (t=20) than country panels (n=28), a problem which the GMM estimator was designed for. Another key reason for inclusion of such a specification is related not only to endogeneity of the liberalization variables, but the very argument made in the first half of the paper: financial liberalization influences the incidence of a crisis, and thus inclusion of a crisis dummy would be endogenous on prior periods of liberalization. The GMM specification, by instrumenting liberalization with the crisis variable, takes this reality of the first half of this paper into account.

However, unlike other work in this field (Bonfiglioli and Mendicino (2004), Saidi and Aloui (2010)), I eschew the system-GMM estimator of Arellano and Bover (1995) and Blundell and Bond (1998). The reasons for this connect directly to the transition experience: as Egger and Merlo (2007) have argued (and Roodman 2009 has reinforced), system-GMM requires that initial levels of an included dependent variable (in their case, FDI, which I also use here) do not deviate systematically from their long-run value. In a short-time frame and in a country in transition, it is precisely the deviations from a long-run value that we are interested in, as they move to a new, long-run equilibrium.[15] Thus, an IV-GMM approach is more efficient and appropriate in the context of our dependent variables.

As a final diagnostic, despite the similarity in some of the variables (in that they are all measuring some facet of financial sector development, implicitly or explicitly), multicollinearity is not a problem within the data itself. The correlation matrix shown in Table 4 shows that the correlations amongst all the independent variables are not very strong, with the highest correlation being the fact we noted above, that external and internal liberalization tend to go in tandem. However, given that even this correlation is somewhat low (0.60), we can be satisfied that multicollinearity is not present in the analysis.[16]

V. Results

Results: Does Liberalization Make a Crisis More Likely?

The results of the multivariate logit regression are shown in Table 5, detailing the maximum-likelihood specification including all control variables, as well as a control marginal effects (population-averaged) specification. Columns 1, 3, 5, and 7 utilize the EBRD subjective indicator to proxy for internal financial liberalization, while Columns 2, 4, 6, and 8 utilize the deposit money indicator noted above. Columns 1, 4, 5, and 8 include the Chinn-Ito capital control indicator, while 2, 3, 6, and 7 use the objective indicator of foreign bank claims instead to proxy for external liberalization.

The results across all specifications and utilizing both subjective and objective indicators appear to confirm our hypothesis of the non-linear nature of liberalization on a banking crisis. Internal liberalization, as measured by the EBRD indicator, is consistently and significantly associated with a higher probability of a bank crisis, while the quadratic term for the EBRD indicator is consistently

[15] This argument has also been made in reference to growth; in an unpublished paper by Kohler, Sperlich, and Yoon (2012:20), they argue that "In growth regressions it is generally very unlikely that the residuals are perfectly uncorrelated because growth can be a theory of everything, and therefore there are always drivers for growth which are not incorporated in the growth regression."

[16] Thanks to Taufiq Choudhry for his suggestion to include this as a diagnostic.

negative. A look at the scatterplot of the EBRD indicator versus the residuals of model (Figure 2) shows this curvilinear relationship, with intermediate levels of liberalization corresponding to higher probability of a crisis, dropping precipitously when the highest levels of liberalization are reached. However, this relationship only holds for the subjective indicator of internal liberalization: using despoit money assets as an indicator, we see a marginal but negative influence of liberalization on a banking crisis. This apparent contradiction can be explained in terms of what the different indicators are capturing, in that the EBRD indicator ranks *potential* liberalization (in the sense of the legislative framework for financial liberalization), while the deposit money indicator captures *realized* liberalization (in the sense of the outcomes of internal liberalization).

For external liberalization, the results are clear-cut in terms of direction, if not in terms of magnitude, as both the subjective and objective indicator show a negative relationship with the probability of a banking crisis. However, the significance of this indicator is dependent upon the model specification, with marginal significance in the maximum-likelihood estimations and somewhat stronger significance in the population-averaged model. In no specification, however, is external liberalization correlated with *higher* probability of a banking crisis, comporting with the results of Shehzad and De Haan (2009) and Angkinand *et. al* (2010).

The results of the controls are, for the most part, as expected. The inclusion of deposit insurance is consistently correlated with higher probability of a crisis, although whether this means it creates moral hazard and encourages a crisis or is merely capturing other effects, I cannot say here. Property rights also perform exactly as expected, with higher levels of rights significantly correlated with lower probability of a crisis. The lag of inflation somewhat paradoxically enters the models, in all specifications, as negative (although insignificant in one regression), perhaps suggesting again that countries with high levels of macroeconomic mismanagement do not need to worry about banking crises, as their banking sectors are just one distortion in a bundle of them.

Finally, as a check against the endogeneity of financial liberalization in this specification, a two-step instrumental variables probit (IV-probit) regression in the manner of Shehzad and De Haan (2009) is used in Column 9 for the subjective indicators of liberalization. It is plausible that initial conditions and institutions can influence the choices for financial liberalization; that is, the path of financial liberalization is determined by where the financial system began in transition, as well as the distortions that existed economy-wide. To incorporate this path dependence, I instrument the two financial liberalization indicators with the two initial conditions clusters (described above), the level of financial system deposits in 1995 (the first year available for many countries), and the current level of property rights. Using this specification, the results for internal liberalization hold and remain concave, but it appears that external liberalization performs better as a result of instrumentation; capital openness is now a significant and negative explanatory of banking crises. This model also is the first to capture the "correct" sign of the bank credit control, which is a positive and significant determinant of a banking crisis.

Results: Does Exposure to a Crisis Even Matter?

If financial liberalization made transition economies less likely to experience a banking crisis, what happened when they did indeed experience a crisis? The results of the various specifications and models are shown in Tables 6-9, and the results are fairly consistent across the various success metrics: there is a strong correlation between financial openness and positive economic outcomes in three of our four

dependent variables, even during crisis periods, and in the last metric (savings) there is still support for our hypothesis that liberalization can mitigate a crisis.[17]

The first success metric, size of the private sector, is shown in Table 6. The macro variables perform as expected, with inflation in previous periods leading to a lower private sector share of GDP, as does government size; growth is a positive contributor to the size of the private sector, while the EU dummy is almost wholly insignificant. Two measurements of property rights are used as well, given that the ICRG indicator has less coverage, but they both point to positive influence of property rights on the development of the private sector. More importantly, across every specification, internal liberalization is positive and (economically and statistically) significant correlates with a larger private sector. This result holds whether we measure internal liberalization by the EBRD indicator or the objective indicator of bank deposits as a percentage of GDP. Likewise, external liberalization as measured by capital openness is a positive (but smaller) force driving the private sector in every model (although the foreign bank claims measure is both insignificant and results in a large loss of observations). The quadratic terms for capital openness, as in the logit/probit estimations earlier, also show no non-linear effect. However, the quadratic term for internal liberalization is exactly the opposite as in the likelihood of crisis, in that it appears that internal financial liberalization increases the size of the private sector to a point, and then tapers off. Put together with the results from the first series of regressions above, it appears that private sector growth occurs most rapidly at the exact same time that crises are more likely, a reality that perhaps hell (in this case, a crisis) might have things to recommend it.

Turning to foreign direct investment (Table 7), I swap out the ICRG indicator for property rights with contract-intensive money from Equation 3, due to the low coverage of the investor protection index with this dependent variable. Including this proxy, we see that, on the whole, internal financial liberalization is mildly positively correlated with more FDI using the EBRD indicator, while positive and insignificant while using the objective indicator of bank deposits, controlling for times of crisis.[18] The capital openness indicator is positive but insignificant across most specifications. For both facets of liberalization and both objective/subjective indicators, the quadratic indicators are insignificant, meaning that there are minimal non-linear effects. The controls mostly perform as expected, with both government size and external debt as negative correlates of FDI inflows, albeit only significant when paired with the subjective liberalization indicators. The key takeaway from this formulation appears to be that internal financial sector liberalization is a potential determinant of FDI net inflows, more so than even external openness, but the relatively poor specification of the model (and its low explanatory power) means that these relationships should be explored further.

Table 8 shows the final success metric, the per capita savings rate; due to reduced coverage of the investment profile indicator and this metric, as with FDI I have utilized the measure of contract-intensive money exclusively as a proxy for property rights.[19] In most regressions, we see a significant negative effect of financial sector liberalization on savings (as in Bandiera *et. al* (2000)), with once again a non-

[17] For each Prais-Winsten specification, an alternative specification was attempted that included a full complement of time dummies (thanks to Nikolay Ushakov of the Higher School of Economics in Moscow for pointing out the need for them); however, in every specification, the time dummies were insignificant and did not alter the significance of the main effects. Given the loss of degrees of freedom in the model from including 20 years of dummies, the results reported below do not have time dummies included.

[18] In a simple bivariate regression (not reported), the EBRD bank indicator is continually positively correlated with FDI (for all models, including FE, GLS, and PCSE), showing that this relationship isn't conditioned on choice of controls.

[19] This specification gives us almost one hundred more observations due to the low coverage of the ICRG index.

linear relationship; savings decline as liberalization increases, but eventually bottoms out and increases at the highest levels of internal liberalization (this could be a function of the relationship between internal liberalization and banking crises as shown in the earlier section). On the other hand, capital openness and property rights are positive and significant explanators of savings rates (apart from the objective indicator of foreign bank claims, which is negative but statistically no different from zero), with external liberalization appearing to fill in the holes that loss of confidence in the domestic banking sector may have opened.[20] Inclusion of an interaction term of property rights and internal liberalization leads to perfectly zero effect on the model.

Finally, turning to the instrumental variable regressions, we see the results in Table 9 of the IV-GMM equations for all success metrics. The instruments chosen for each dependent variable are derived from the appropriate literature and diagnostics carried out throughout the regressions, with the best-fit results satisfying the assumptions of the IV-GMM estimator presented here. Given well-known endogeneity issues with growth regressions, I have held off from utilizing growth as a metric of success until now, but in Column 1 of Table 9, growth is modeled as a function of internal and external financial liberalization, crises, and standard macroeconomic controls from the literature (investment, government size, secondary enrollment, and inflation) as a further robustness check.[21] In this regression, the financial institutions are instrumented with the initial conditions of the specific country: specifically, the two initial conditions clusters from the Prais-Winsten regressions, the banking crisis dummy, and property rights. The results are broadly similar to other metrics of economic success, in that internal liberalization appears to have a negative linear effect on growth, but in reality is only negative until an inflection point. The exact opposite effect obtains for external liberalization, where external liberalization leads at first to growth gains but then a slowdown and reversal.

Turning from the cursory look at growth to our various success metrics, the results from the Prais-Winsten regressions in Tables 6-8 are replicated here, In regards to private sector size (Column 2), Durbin-Wu-Hausman tests of endogeneity revealed that financial liberalization was exogenous to this model, but property rights and, importantly, the crisis dummy were not.[22] Thus, unlike in growth (or the other metrics of success), both facets of financial liberalization are retained as exogenous regressors and property rights and the crisis dummy are instrumented. Drawing from extensive work on the political factors that can instrument for property rights (Hartwell 2013), I instrument property rights and crises with the initial conditions clusters, as well as the EU accession dummy and two political indicators: the extent of democracy (taken from the Polity IV database) and the effectiveness of the legislature (taken from the Cross-National Time Series dataset, Banks and Wilson 2013). Under this specification, we see both a positive effect of internal and external liberalization, with a slight curvilinear effect at higher levels of liberalization. This fits intuitively, as private sector growth should be reliant in later stages on capital markets and less on banks (or reliant on foreign investors). In terms of controls, property rights have a strong positive effect again, and the incidence of a crisis has a significant negative effect on the development of the private sector.

[20] The objective indicator for external liberalization showed as a poor fit in diagnostics. For this reason, I place more emphasis on the subjective models.

[21] Obviously this is not a wholly robust growth specification in the vein of Sala-i-Martin (1997), but is included to show the reduced-form effects of liberalization, controlling for crises, on economic growth.

[22] Using ivreg2 in Stata 13 with the command "orthog," the crisis dummy showed as exogenous in each of the other IV-GMM specifications. It was only with private sector size as a dependent variable that it was endogenously determined.

Net FDI inflows (Column 3) once again shows a non-linear influence of internal liberalization (with flows increasing through the liberalization process but tapering at higher levels of liberalization), but the opposite effect for external liberalization. Interestingly, it appears that initial external liberalization leads to capital flight abroad, as investors search for safe havens, but higher levels of liberalization bring FDI back into the country.

Finally, in regards to savings (Column 4), other instruments were necessary to specifically capture the financial liberalization variables in this model. In addition to property rights and the crisis dummy, initial banking conditions (total assets of the banking system in 1995), initial conditions in the economy (GDP in 1995), and the extent of executive constraints (taken from Polity IV) are included. Additionally, a cultural, exogenous instrument is introduced, the proportion of the population that reports itself as Catholic. This is used as to capture the cultural effects that may influence savings, where Catholic teachings may encourage savings (this effect was observed in Guiso, Sapienza, and Zingales (2006)). In the IV-GMM specification, the results show a very strong curvilinear relationship for both internal and external liberalization, with an average negative effect on savings from financial liberalization but a concave upward relationship in the quadratic term. Thus, we can surmise that, not only are both facets of liberalization endogenously determined (as shown in Table 8), but that they have an initial negative impact on savings that turns positive at higher levels of liberalization. Once again, this links nicely with the results from the first set of regressions: if intermediate stages of liberalization are prone to more crises, it is less likely that individuals will increase savings in financial institutions in such an environment. It is better to wait until there is less chance of a crisis and losing it all. This too may be an effect of transition, a "wait and see" approach that is conditioned on the fact that the original transition had a negative effect on those who had their life's fortune in communist currencies.

VI. Conclusions

This paper has comprehensively examined the effects of internal and external financial sector liberalization in the transition economies of CEE and FSU, focusing on the question "has liberalization made the formerly socialist economies more susceptible to banking crises?" The results shown above provide evidence that, while liberalization and integration in international financial markets may increase the probability of a crisis at low levels of liberalization, once higher levels of liberalization are reached the prospect of a crisis drops dramatically. Indeed, the most dangerous time for a transitioning country is to be caught in a hybrid situation, where state-owned banks are operating alongside private ones or where there is still use of directed credit or interest rate ceilings.

Moreover, as the results of our examination of the effects of liberalization on several transition metrics show, the benefits of liberalization long-term outweigh the risks of passing through these intermediate stages, as liberalization can help to moderate the effects of a crisis if and when it does strike. These findings are consistent with previous literature for developing countries, but show a much stronger and highly significant correlation in transition economies.

These results also confirm earlier studies that draw a link between institutional quality and a crisis. Going further than earlier work, however, my two indicators for property rights show that stronger rights help to safeguard against the possibility of a crisis, as well as mitigate its effects. This is especially true in instrumental regressions, where property rights are a major determinant of the path of financial liberalization, which in turn leads to better economic outcomes.

The future research agenda from these results is promising and virtually limitless, as every passing year brings more data points and the transition continues. A key issue for future papers may be to formally theoretically model the distinction between exogenously-determined crises and endogenously-determined ones in transition, which could account for differential effects on economic outcomes. Also, looking at the effects of financial liberalization on more micro attributes of transition, including on specific private sector firms or other metrics of success, would be a natural follow-on to these results, as would examining regional effects of liberalization and if there are thresholds of stability. Finally, utilizing other econometric tools such as the ARCH family of models (as used in Kim and Singal (2000) and Campos *et. al* (2012) in the context of financial volatility) to capture the persistent exogenous shocks in transition economies could also shed light on relationships between liberalization and economic success.

On a final policy note, these results also argue for a completely different policy approach in transition economies to financial liberalization than the path many countries are now on. Since the global financial crisis, financial sector openness has taken a step back, with Hungary the most egregious offender in creating financial transaction taxes and introducing new and more stringent regulations. The lessons from this analysis again say that you shouldn't seek to stay in hell, but keep going. Steps backwards in financial liberalization in transition only heighten the probability of a crisis, rather than lessen it, and can make the effects of a crisis needlessly more protracted. Indeed, coupled with supra-national regulations (such as Basel III), the trend recently has been to retreat from the same traits that made transition economies able to weather crises. This may now make them more vulnerable.

Figure 1 – A Kuznets Relationship between Financial Liberalization and Probability of a Crisis

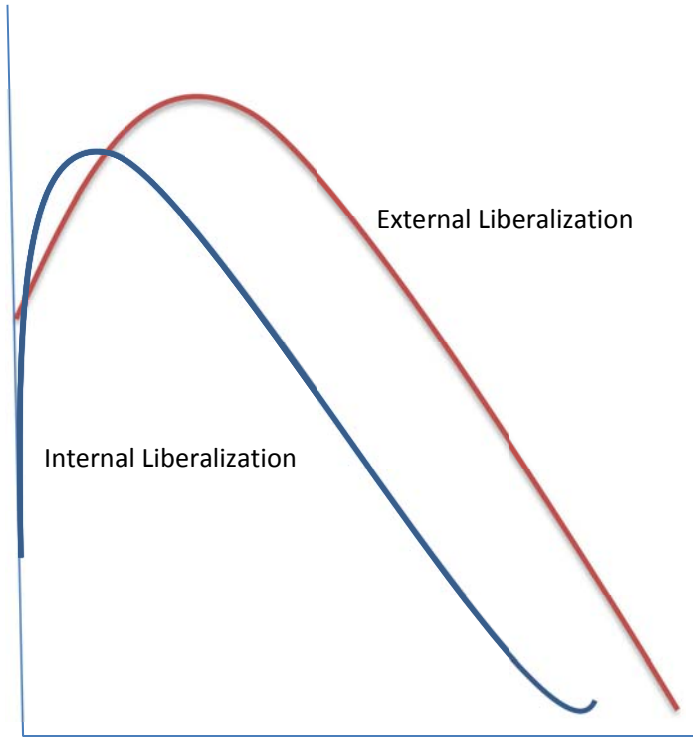

Table 3 - Components of the Initial Conditions Clusters

IC1		IC2	
De Melo variable	**Description**	**De Melo variable**	**Description**
TDEP	Trade share of GDP	PRGR	Reported prior economic growth rates in CEE and FSU during the second half of the 1980s
REPR	Repressed inflation, defined as increase in deflated wages less the change in real GDP from 1987 through 1990	RICH	Natural resource richness, defined as either poor, moderate, or rich
BLMKT	Black market exchange rate premium	INDIST	Industrialization, the difference between the actual share of industry in GDP and the share predicted by the regression analysis in Chenery and Syrquin (1989)
MARMEM	Market memory, defined as years under socialism	URBAN	Degree of urbanization
STATE	A categorical variable differentiating among countries that were independent states prior to 1989 (value of 2); members of decentralized states (USSR) (value of 1); and new nation states (value of 0).	INC	Per capita income, 1989$
LOCAT	Location, measuring geographical proximity to thriving market economies		

Source: Hartwell (2013), based on Havrylyshyn and van Rooden (2003)

Table 4 – Correlation Matrix for Independent Variables

	EBRD Bank Reform	Deposit money bank assets/deposits	External Liberalization	Foreign Bank Claims	Deposit Insurance Cover	Property Rights (ICRG)	Bank Credit/Deposits	Property Rights	Inflation
EBRD Bank Reform	1.00								
Deposit money bank assets/deposits	0.48	1.00							
External Liberalization	0.60	0.48	1.00						
Foreign Bank Claims	0.31	0.10	0.04	1.00					
Deposit Insurance Cover	0.27	0.15	0.03	0.11	1.00				
Property Rights (ICRG)	0.78	0.40	0.52	0.26	0.31	1.00			
Bank Credit/Deposits	0.07	0.06	0.10	0.15	0.11	0.00	1.00		
Property Rights	0.31	0.27	0.04	-0.03	0.38	0.12	-0.13	1.00	
Inflation	-0.54	-0.26	-0.36	-0.23	-0.24	-0.48	-0.17	-0.04	1.00
Size of Government	0.20	0.30	0.17	-0.08	0.02	0.03	0.02	0.23	-0.02
Growth	0.34	0.13	-0.02	0.27	0.15	0.51	0.06	-0.07	-0.57
EU Membership	0.41	0.30	0.44	0.01	0.19	0.38	0.17	0.15	-0.18
Initial Conditions Cluster 1	-0.47	-0.28	-0.15	-0.05	-0.14	-0.25	0.13	-0.54	0.22
Initial Conditions Cluster 2	0.40	0.38	0.48	0.02	-0.01	0.24	0.02	0.14	-0.10
Crisis Dummy	0.09	0.02	-0.06	0.04	0.11	-0.11	0.11	-0.04	0.08
External Debt	0.45	0.22	0.06	0.14	0.21	0.14	0.03	0.42	-0.39
Real Interest Rate	-0.02	-0.05	0.13	-0.15	-0.02	-0.01	-0.03	-0.13	-0.32
Dependency Ratio	-0.57	-0.32	-0.23	-0.16	-0.23	-0.42	0.17	-0.52	0.34

Table 4 (continued) – Correlation Matrix of Independent Variables

	Size of Government	Growth	EU Membership	Initial Conditions Cluster 1	Initial Conditions Cluster 2	Crisis Dummy	External Debt	Real Interest Rate	Dependency Ratio
EBRD Bank Reform									
Deposit money bank assets/deposits									
External Liberalization									
Foreign Bank Claims									
Deposit Insurance Cover									
Property Rights (ICRG)									
Bank Credit/Deposits									
Property Rights									
Inflation									
Size of Government	1.00								
Growth	-0.22	1.00							
EU Membership	0.09	0.05	1.00						
Initial Conditions Cluster 1	-0.23	0.00	-0.16	1.00					
Initial Conditions Cluster 2	0.28	-0.04	0.23	-0.28	1.00				
Crisis Dummy	0.08	-0.08	-0.04	-0.11	0.11	1.00			
External Debt	0.10	0.19	0.21	-0.16	0.28	0.06	1.00		
Real Interest Rate	-0.04	0.01	-0.01	-0.04	-0.09	0.00	-0.10	1.00	
Dependency Ratio	-0.15	-0.19	-0.26	0.44	-0.58	-0.09	-0.58	0.09	1.00

Table 5 - Probability of a Crisis: Maximum-Likelihood and Population Averaged Logit Regressions

	1	2	3	4	5	6	7	8	9
	ML	ML	ML	ML	PA	PA	PA	PA	IV-Probit
Bank Reform	19.27		13.88		18.86		13.81		0.55
	*2.87***		*2.33**		*3.03***		*2.31**		*4.26***
Bank Reform^2	-5.05		-3.89		-4.86		-3.87		-0.13
	*2.75***		*2.48**		*2.98***		*2.45**		*6.02***
Deposit Money Assets/All Assets		-58.07		-42.04		-75.02		-57.92	
		*1.96**		*1.43*		*3.88***		*1.87**	
Deposit Money^2		40.22		26.92		55.00		39.69	
		*1.91**		*1.34*		*3.89***		*1.88**	
Capital Openness	-1.40			-4.93	-1.97			-7.90	-0.04
	0.48			*1.81**	*0.65*			*2.41**	*3.05***
Capital Openness^2	*-0.92*			*-2.92*	*-1.04*			-4.58	0.0003
	0.50			*1.58*	*0.55*			*1.83**	*0.06*
Δ Foreign bank claims		-0.02	-0.01			-0.03	-0.01		
		*1.79**	*1.30*			*3.13***	*1.30*		
Foreign Bank Claims^2		0.00	0.00			0.00	0.00		
		*3.08***	*2.64***			*3.32***	*2.62***		
Deposit Insurance Cover/GDP	0.18	0.12	0.15	0.14	0.19	0.09	0.15	0.16	0.002
	*4.15***	*3.27***	*5.00***	*3.01***	*4.12***	*2.10**	*4.97***	*2.65***	*1.52*
GDP cap (-1)	7.53	6.33	8.87	7.94	7.05	4.71	8.87	8.45	0.03
	*2.40**	*3.39***	*2.88***	*2.13**	*2.69***	*3.34***	*2.85***	*2.03**	*1.99**
Property Rights	-0.95	-1.54	-0.93	-1.69	-0.98	-1.54	-0.94	-1.99	
	*2.18**	*2.69***	*3.59***	*1.98**	*2.24**	*3.02***	*3.60***	*1.98**	
Inflation (-1)	-11.08	-5.51	-13.59	-2.30	-11.36	-4.11	-13.53	-2.48	-0.19
	*2.79***	*3.55***	*3.92***	*1.01*	*2.80***	*2.68***	*3.88***	*0.59*	*4.53***
Bank Credit/Deposits (-1)	0.69	-3.28	-0.07	-2.57	0.60	-2.13	-0.06	-2.86	0.03
	0.67	*1.88**	*0.09*	*1.21*	*0.61*	*1.70**	*0.07*	*1.38*	*2.45**
C	-15.85	19.68	-7.42	2.54	-13.97	24.67	-7.48	6.35	0.30
	1.00	*1.79**	*0.52*	*0.23*	*0.94*	*3.13***	*0.52*	*0.45*	*1.64**
n	210	214	221	203	210	214	221	203	174
Wald chi2	315.74	135.99	176.57	39.7	151.24	221.08	172.41	130.66	2040.57
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo-R2	0.51	0.51	0.56	0.46					
Log pseudolikelihood	-16.74	-16.62	-16.55	-16.43					

*Dependent variable is the crisis dummy, as noted in the text. Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level.* ML *=maximum likelihood, PA = population averaged. Test performed with logit and xtlogit in Stata.*

Figure 2 - Plot of Residuals versus EBRD Indicator

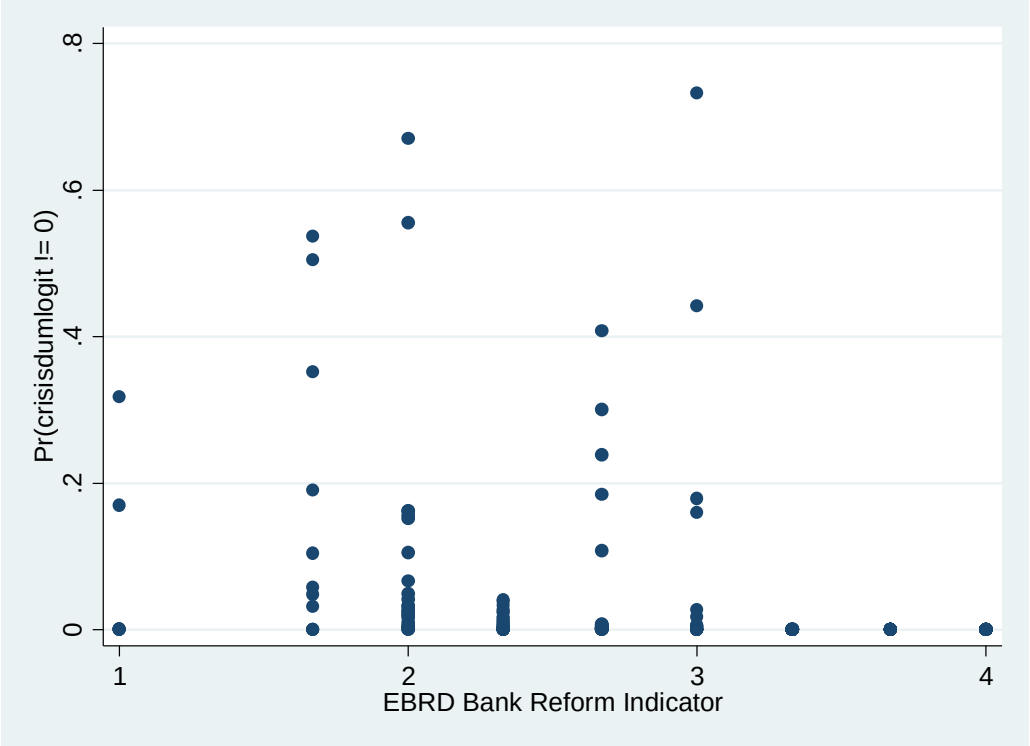

Table 6 – Effects of a Crisis on Private Sector as % of GDP, Prais-Winsten Regressions

	1	2	3	4	5	6	7
INSTITUTIONAL Variables							
EBRD Bank Reform	4.58	4.59	5.08	5.56		6.07	
	*8.23***	*7.62***	*8.76***	*7.79***		*5.65***	
Bank Reform^2	-0.60	-0.54	-0.62	-0.57		-0.72	
	*5.97***	*3.21***	*6.11***	*5.27***		*3.91***	
Bank Deposits as % of GDP					9.84		7.41
					*3.03***		*2.54**
Bank Deposits^2					-12.07		-10.64
					*3.43***		*3.34***
Capital Openness	0.43	0.43	0.41	0.20	0.26		
	*5.66***	*5.57***	*4.90***	*5.04***	*2.53**		
Capital Openness^2	0.01	0.01	-0.03	-0.04	0.01		
	0.22	*0.19*	*0.59*	*0.67*	*0.15*		
Foreign Bank Claims						0.0002	0.0001
						0.42	*0.32*
Foreign Bank Claims^2							0.00001
							0.09
Property Rights (ICRG)	0.30	0.39			0.50	0.35	0.53
	*5.30***	*1.84**			*8.41***	*3.63***	*8.35***
Property Rights (contract-intensive money)			0.58	2.58			
			0.78	*1.18*			
Bank Reform*Property Rights		-0.03		-0.94			
		0.46		*1.15*			
MACRO Variables							
Inflation (-1)	-1.25	-1.26	-2.13	-2.17	-2.19	-0.07	-2.39
	*2.68***	*2.68***	*4.78***	*4.89***	*3.05***	*0.09*	*3.64***
Government Size (-1)	-0.03	-0.03	-0.05	-0.05	-0.02	-0.02	-0.02
	1.36	*1.35*	*2.73***	*2.99***	*0.50*	*0.57*	*0.57*

Growth (-1)	0.02	0.02	0.02	0.03	0.03	0.05	0.03
	*1.87**	*1.80**	*2.75***	*2.79***	*1.58*	*2.95***	*1.84**
EU Accession Dummy	-0.15	-0.14	0.22	0.24	-0.16	0.08	-0.08
	0.64	*0.59*	*1.01*	*1.15*	*0.49*	*0.23*	*0.24*
INITIALCONDITION Variables							
IC Cluster 1	-0.36	-0.39	-0.26	-0.29	-0.27	-0.13	-0.08
	*2.39**	*2.58***	*1.57*	*1.73**	*0.98*	*0.57*	*0.26*
IC Cluster 2	-0.28	-0.32	-0.71	-0.75	0.36	-0.75	0.83
	*1.66**	*1.84**	*3.39***	*3.77***	*1.29*	*1.84**	*3.53***
CRISIS Variables							
Crisis Dummy (-1)	0.28	0.28	0.03	0.03	0.25	0.54	*0.22*
	*1.78**	*1.77**	*0.26*	*0.29*	*1.13*	*2.07**	*1.05*
C	5.34	5.07	8.28	7.29	13.11	-1.32	13.46
	*3.95***	*3.65***	*5.63***	*3.73***	*7.27***	*0.50*	*7.94***
n	215	215	366	366	186	238	195
R-squared	0.96	0.96	0.88	0.88	0.93	0.80	0.89

*Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Prais-Winsten regressions run as xtpcse in Stata 13 with option "c(psar1)".*

Table 7 – Effects of a Crisis on Net FDI Inflows as % of GDP, Prais-Winsten Regressions

	1	2	3	4
INSTITUTIONAL Variables				
EBRD Bank Reform	5.76	5.97		
	*2.45**	*2.38**		
Bank Reform^2	-0.74	-0.60		
	1.51	*0.96*		
Bank Deposits as % of GDP			7.56	8.96
			0.96	*1.20*
Bank Deposits^2			-9.22	-10.49
			0.72	*0.89*
Capital Openness	0.26	0.27	0.51	
	0.79	*0.82*	*1.76**	
Capital Openness^2	-0.06	-0.08	0.22	
	0.28	*0.31*	*1.16*	
Foreign Bank Claims				0.003
				*2.25**
Foreign Bank Claims^2				-0.00001
				*2.09**
Property Rights (Contract-Intensive Money)	10.20	12.98	13.81	10.54
	*2.53***	*1.53*	*3.44***	*3.06***
Bank Reform*Institutions		-1.29		
		0.34		
MACRO Variables				
Inflation (-1)	-1.49	-1.51	-2.21	-2.84
	0.57	*0.57*	*0.85*	*2.28**
Government Size (-1)	-0.24	-0.24	-0.09	-0.14
	*3.80***	*3.73***	*1.45*	*2.32**
Log Total External Debt (-1)	-0.69	-0.68	-0.24	-0.01
	*3.00***	*2.80***	*0.64*	*0.04*

EU Accession Dummy (-1)	-0.99	-1.03	-1.16	-1.57
	0.69	*0.71*	*0.80*	*1.02*
INITIALCONDITION Variables				
IC Cluster 1	2.22	2.19	2.38	2.48
	*3.20***	*3.11***	*4.69***	*5.08***
IC Cluster 2	-1.14	-1.17	-0.88	0.02
	*2.06**	*2.16**	*0.94*	*0.03*
CRISIS Variables				
Crisis Dummy	0.57	0.55	-0.23	-0.02
	1.01	*0.96*	*0.33*	*0.02*
C	10.27	9.04	5.29	5.73
	1.40	*1.15*	*0.59*	*0.68*
n	254	254	184	201
R-squared	0.26	0.26	0.34	0.38

*Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Commands as in Table 6 above.*

Table 8 – Effects of a Crisis on Per Capita Savings Rate, Prais-Winsten Regressions

	1	2	3	4
INSTITUTIONAL Variables				
EBRD Bank Reform	-1.37		-1.39	
	*3.22***		*2.42**	
Bank Reform^2	0.26		0.29	
	*3.80***		*4.16***	
Bank Deposits/GDP		-8.52		-4.96
		*3.87***		*2.54**
Bank Deposits^2		4.73		1.76
		*2.02**		*0.75*
Capital Openness	0.30	0.28	0.31	
	*6.36***	*3.40***	*6.70***	
Capital Openness^2	0.03	0.03	0.03	
	1.18	*0.77*	*1.06*	
Foreign Bank Claims				-0.0001
				0.42
Foreign Bank Claims^2				-3E-06
				0.53
Property Rights (CIM)	2.00	0.62	2.38	-0.32
	*3.94***	*0.79*	*1.30*	*0.36*
Bank Reform*Property Rights			-0.11	
			0.18	
MACRO Variables				
Dependency Ratio	-0.15	-0.11	-0.15	-0.12
	*13.08***	*5.13***	*14.22***	*4.22***
Real Interest Rate	-0.01	-0.02	-0.008	-0.01
	*4.81***	*4.14***	*4.61***	*3.74***
M2/GDP	-0.008	0.04	-0.01	0.03
	*2.13**	*4.18***	*2.54***	*2.45**

INITIALCONDITION Variables				
IC Cluster 1	-0.19	-0.17	-0.16	-0.32
	*2.08**	*0.87*	*1.57*	*1.74**
IC Cluster 2	-2.38	-2.17	-2.50	-1.88
	*17.36***	*11.98***	*16.10***	*6.98***
CRISIS Variables				
Crisis Dummy	0.12	0.04	0.12	-0.14
	1.14	0.33	*1.14*	*1.53*
C	17.17	14.77	17.38	14.98
	*17.51***	*10.35***	*10.61***	*9.00***
n	332	265	332	286
R-squared	0.93	0.93	0.93	0.89

*Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Commands as in Table 6 above.*

Table 9 – Effects of a Crisis Against All Success Metrics, IV-GMM Results

	Growth	Private Sector as % of GDP	FDI Net Inflows	Per Capita Savings
	1	2	3	4
INSTITUTIONAL Variables				
EBRD Bank Reform	-49.65	7.80	180.71	-12.16
	*3.12***	*5.63***	*2.41**	*2.57***
Bank Reform^2	8.04	-1.28	-35.50	2.54
	*2.91***	*4.43***	*2.33**	*3.21***
Capital openness	4.99	0.81	-16.38	-2.27
	*3.19***	*5.15***	2.68**	4.39**
Capital Openness^2	-2.35	-0.24	10.34	0.72
	*3.06***	*2.50***	*2.71***	*2.83***
Property Rights (contract-intensive money)		9.45		
		*3.37***		
MACRO Variables				
Growth (-1)		-0.07		
		1.54		
Inflation (-1)	-16.80	-5.11	10.50	
	*1.89**	*2.98***	*0.65*	
Government Size (-1)	-0.34	-0.003	-0.02	
	*2.95***	*0.07*	*0.08*	
Investment (-1)	-0.02			
	0.24			
School enrollment (-1)	0.09			
	1.37			
External Debt (-1)			-3.33	
			*2.58***	
Dependency Ratio				-0.02

				0.45
Real Interest Rate				0.04
				*1.69**
EU Accession Dummy	-4.86		25.94	
	*3.51***		*2.64***	
C	114.42	6.54	-178.96	21.89
	*3.16***	*1.33*	*1.62*	*2.49**
n	310	277	283	284
Kleibergen-Paap LM Statistic (p)	0.0002	0.039	0.060	0.0004
Hansen test (p)	0.586	0.423	0.418	0.5344
Endogeneity test (p)	0.0001	0.0002	0.009	0.000
Instrument(s)	Crisis dummy, initial conditions clusters 1 and 2, property rights	Initial conditions clusters 1 and 2, EU dummy, Democracy, Legislative effectiveness	Crisis dummy, initial conditions clusters 1 and 2, lagged FDI	Property rights, executive constraints, crisis dummy, bank deposits 1995, GDP per capita 1995, percentage Catholic

*Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Regressions performed via ivreg2 in Stata 13 with robust standard error and two-step GMM estimation.*

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