Sucker Punched by the Invisible Hand: the World Financial Markets and the Globalization of the U.S. Mortgage Crisis*

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*This title is a play on Gorton's 2010 book Slapped in the Face by the Invisible Hand. The punch delivered by the financial crisis was certainly more than a slap and its rapid spread across the developed world was certainly like a sucker punch, unexpected and not well understood.

Abstract

The worldwide financial crisis that began in 2007 was set off by the collapse of the subprime mortgage market in the U.S. The crisis simultaneously reverberated to banks around the world, and eventually brought about a worldwide recession. This paper documents why other countries, especially in Western Europe, were so susceptible to the American housing downturn. The biggest banks in the developed world got in trouble because they were pursuing the same strategies to make profit as the American banks. They had joined the market in the U.S. for mortgage backed securities and funded them by borrowing in the asset backed commercial paper market. When the housing market turned down, they suffered the same fate as their U.S. counterparts. Our study makes a broader theoretical point suggesting that subsequent studies of global finance and financial markets need to consider the identities and strategies of the banks as their tactics explain a lot about how the global markets for different financial products are structured.

Introduction

The price of houses in the United States began to fall in 2006 and defaults on subprime mortgages began to increase. This rising wave of defaults spread to the wider mortgage market. By the fall of 2008, banks in the United States and Western Europe were announcing devastating losses, touching off a financial panic that culminated in a wave of bank failures in the United States and at least ten different European nations during September and October of that year. By one count, 23 countries experienced a systemic bank crisis by the end of 2009 (Laeven and Valencia, 2010). These crises were followed by a deep and long-lasting recession.

There are three unusual features of this financial crisis. First, it started in the U.S. While the U.S. has not been immune to financial crises in the postwar era (Kauffman, 2010), they have tended to be mostly contained and not spread to other countries. Second, the crisis was most severe in the advanced industrial societies and in particular Western Europe. Most of the cases of economic contagion in the postwar era have involved less developed countries, but this crisis did not spread to the less developed world. Finally, the crisis spread almost instaneously in the fall of 2008 and most of the developed countries found themselves in recession in 2009. What theories are useful to explain what happened?

In international economics and political economy, economic contagion and the mechanisms by which financial crises spread are a central concern (Forbes and Rigabon, 2001; Reinhart and Rogoff, 2008; 2009; Claessens, Dornbusch, and Park, 2001; Allen and Gale, 2007; Moser, 2003; Forbes, 2004; for a recent review, see Claessens and Forbes, 2004). This perspective has been applied to the current crisis (Rose and Siegel, 2010, Claessens, et.al, 2010). Here, scholars have drawn mostly negative conclusions. There is little evidence that countries

that went into recession in 2008 and 2009 shared fundamental features that may have left them more likely to have a recession or pushed financial investors towards a flight to safety.

Our goal is to provide a different account of what happened. We show that after 2001, the largest banks in the U.S. and in other developed countries came to hold massive amounts of securities based on American mortgages. In essence, banks from around the world came to be major players in the same market and pursued the same strategies as their American counterparts to make profit. When the housing market in the U.S. turned down, banks around the world suffered the same crisis that American banks did. They needed to be bailed out by their governments. The banking crises then became the basis of economic downturn and caused recessions in many countries. Our account thus offers an explanation for which countries were affected by the crisis and the rapidity of the spread of the crisis.

Social scientists interested in the globalization of finance have tried to document the origins and spread of new financial markets, financial motives, and financial flows at the national and the international level (Ertuk, et. al., 2008; Martin, 2002; Krippner, 2005; 2011; Stockhammer, 2004; Fligstein, 2001; Davis, 2009). They have focused on the role of the various kinds of new financial instruments, particularly the securitization of assets such as mortgages, as being at the core of this integration of global financial markets (Knorr Cetina and Bruegger, 2004; McKenzie, 2006; 2011; Aalbers, 2009; 2010; Leyshon and Thrift, 2007; Carruthers and Stinchcombe, 1999; Bryan and Rafferty, 2006).

What is missing in these accounts is a way to understand how American mortgage backed securities and collateral debt obligations based on those securities (hereafter MBS and CDO) became so important to the strategies – and the fates – of so many American and European banks. We use Fligstein's "markets as politics" approach (1996; 2001) to explain why the largest

banks in the global financial system adopted the same strategy to make money as their American counterparts after 2001. Their main source of profit for the largest banks became their investments in American MBS and CDO that were bought using short term finance procured in the U.S. asset backed commercial paper market (hereafter ABCP).

We present descriptive evidence showing that between 2001 and 2007 banks from mostly Western European countries dramatically increased their holdings of U.S. MBS and CDO and their activities in the ABCP market, the market most closely linked to the funding of MBS and CDO (see Adrian et. al. (2011) and Stigum (1989) for an account of how these markets work). We use quantitative data to show how the holdings of MBS and ABCP were the direct cause of the banking crisis across countries and these crises were the most significant factor predicting economic downturn. Our models include controls that measure alternative explanations of the crisis. We show that these factors have little or no effect on banking crises in line with the previous literature.

This paper has the following structure. First, we review the literature in sociology, economics, and political economy to develop the hypothesis proposed above. Then we consider the alternative explanations of the crisis suggested in the literature. Next, we discuss our data and methods and provide results. In our conclusion we return to the empirical case and how our theoretical approach might inform subsequent research on financialization, globalization, and the sociology of finance.

Theoretical Discussion and Hypotheses

Our goal is to understand why the downturn in U.S. housing prices beginning in late 2006 eventually caused widespread economic devastation not just in the U.S. but also in Western Europe. Our purpose is not to explain the rise and fall of the housing market in the U.S. but to treat that event as the catalyst for bank crises in different countries and the subsequent global recession. There is now a small mountain of literature on why the U.S. mortgage market got so overheated. Recently, for example, Lounsbury and Hirsch (2010) have collected two volumes of papers that consider various aspects of that crisis in the U.S. from a sociological perspective.

Scholars in political science, sociology, and geography have focused on how global finance has changed and evolved since the early 1970s (Block, 1978; Hellener, 1994; Frieden, 1991; Epstein, 2006; Harvey, 2010; Arrighi, 1994; Montgomerie, 2008). The American government gave up on a more coordinated approach to global finance as laid down by the Bretton Woods agreement (Block, 1978). Instead, they encouraged the deregulation of worldwide financial markets and the use of market mechanisms to determine exchange rates and the allocation of capital in general (Krippner, 2011). This American-led transformation of the global financial system dramatically increased the size of such markets and the cross border trade of financial products of all kinds (Montgomerie, 2008; Krippner, 2011). It has also spurred the development of new techniques for converting investments into standardized financial products (Carruthers and Stinchcombe, 1999; Leyshon and Thrift, 2007).

Over the past 30 years, scholars have amply documented how financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions have become increasingly important at the national and international level (see the papers in Epstein, 2006 and Ertuk, et. al., 2008). Harvey (2010) has argued that the growth of financial integration in the world economy reflects the fact that after the 1970s,

investors in the richest countries could not find good and safe investments in their own countries. This pushed investors to look elsewhere for both riskier forms of investment with higher returns, including currency, credit, and various kinds of asset markets.

Securitization is one of the core strategies in finance. It emerged in the mortgage market in the U.S. for the first time in 1970 when the American government issued the first MBS (Fligstein and Goldstein, 2010: 37). [1] The U.S. mortgage market remained heavily dependent on the government which orchestrated the production of MBS through the so-called government sponsored enterprises, otherwise known as Fannie Mae and Freddie Mac (Carruthers and Stinchcombe, 1999). Carruthers and Stinchcombe (1999) provide a lucid discussion of how mortgages, which are contracts made with individuals who live in different places and have differing abilities to pay back their mortgages, can be turned into standard products like bonds. They argue that turning mortgages into mortgage-backed securities and using bond ratings to describe their riskiness takes messy individual mortgages and turns them into standard products whose riskiness and return can be evaluated "objectively". These products then can be easily bought and sold without buyers having knowledge of individual borrowers thus allowing a large and liquid market in mortgages (Carruthers and Stinchcombe, 1999). It is not just mortgages that can be securitized. Securitization allowed potentially nearly any kind of asset capable of generating revenue to be converted into a standardized financial product with an expected rate of return and risk. By the mid-1980s, the ability to create the tools to engage in securitization were

[1] Securitization is the process whereby one takes a given asset that generates a cash flow and one sells the rights on that cash flow to an investor in a standardized product that looks like a bond. The technology of securitization can be applied to a wide variety of financial assets. The riskiness of these assets and the likelihood of default are then rated by credit rating agencies. The riskier the investment is the higher rate of return. Securities may be backed by insurance policies and more exotic financial products that mimic insurance.

well known in the mortgage market and had spread to credit cards, new car loans, manufactured housing, and industrial loans.

Securitization strategies and products quickly spread across the world. Leyshon and Thrift (2007) view the securitization of assets as one of the key financial innovations underlying the integration of global finance. Banks in most of the advanced industrial countries used securitization to raise money, to buy assets, to create securities based on those assets and to both hold onto those securities and sell those securities to others. Markets for securitized products are amongst the largest financial investments worldwide. ABA Alert.com reported that in 2010, there were over $93.5 trillion in asset backed securities worldwide.

The important missing link in our argument is why American MBS became the core investment of the largest banks in the U.S. and Western Europe. Here we start with the observation from the sociology of markets that a market is made up of a set of players who observe one another and then position themselves in a role structure (White, 2004; Fligstein, 2001). Fligstein argues that it follows from this definition that for a market to be global, that market must contain participants from countries around the world who form a field where they watch one another and are organized around a recognizable set of rules and strategies (2001: 224). We suggest that beginning in 2001, foreign banks decided to enter the U.S. MBS and CDO markets in a massive way. This created a new international financial market centered on MBS and CDO. Why did this happen?

In the period 2001-2006, interest rates were low in many countries and therefore investors got low returns for holding government bonds. What they were seeking out was higher return investments that were relatively low risk. What they found was products based on

American mortgages. Aalbers (2008; 2009) argues U.S. MBS and CDO became a huge source of investment for banks around the world particularly after 2001. [2]

These investments were consequential because they involved large sums of money, had high bond ratings, and were quite profitable. The mortgage origination market in the U.S. fluctuated between $2-4 trillion a year from 2001-2007 (Fligstein and Goldstein, 2010). About 90% of these mortgages were being packaged into securities. In 2003, the American banks that were involved in these markets which comprised about 9% of GDP and 7% of employment in the economy were producing 40% of the profits in the economy (Krippner, 2011). Foreign banks saw this opportunity and they began to emulate the tactics of American banks in order to try to make such outsized profits for themselves.

The sociology of markets pushes us to also ask how banks were making money in these markets. Many American banks were making fees off of originating mortgages and packaging mortgages into securities and selling them. But the bulk of the money they were making came from their holding onto the financial products they were producing. Gorton (2010) and Brunnermeister (2009) document that American banks were making money by borrowing money on short term loans to buy these securities. Acharya et al. (2013) show that the purchase of these bonds was financed by borrowing in the ABCP market.

The ABCP market (hereafter, ABCP market) has a long history (Stigum (1989) tells this story). The market was originally created by the Federal Reserve in 1914 in order to provide a market so that banks could borrow or lend money on a very short term basis (usually 1-90 days)

[2] Aalbers has also argued that the U.S. mortgage market has further encouraged international financial expansion by providing a model for practices around using securitization to fund mortgages adopted by some countries. For the purposes of the analysis presented here, this kind of influence can be seen as an element of wider changes in the fundamental structural conditions of different countries, rather than the financialization of international linkages in the sense they are discussed here.

that was backed by collateral. For much of the history of the market, government bonds were the form of collateral that was most frequently put up as assets. The original purpose of the market was to aid exporters who might have to wait for their goods to arrive overseas before they were paid. They would borrow short term to cover their expenses. But over time, both banks and other large nonfinancial corporations saw the advantage of being able to borrow money to fund their short term needs as well as to lend money that they did not immediately have a use for.

In the wake of the stock market crash of 2001, interest rates were very low. Banks could borrow money at 1-2%. They were searching for higher yielding assets in which to invest this money. They found MBS and CDO which could pay 5-7% and were often rated "AAA". Acharya et al. (2013) and Adrian et al. (2011) show that during the early 2000s, the market for ABCP became the source of cheap money to buy MBS and CDO. Between 2003 and 2006, for example, Acharya et al. show that something like 75% of the $1.4 trillion ABCP market was issued to buy MBS and CDO. Gorton (2010) describes these investments as "borrowing short to buy long."

The market for MBS and CDO and the strategy of "borrowing short to buy long" was not just for U.S. banks and financial firms. Foreign banks were drawn into this market and they formed a huge part of it between 2003 and 2007. They recognized that American banks were making record profits by buying "AAA" rated MBS and CDOs with borrowed money. Beginning in 2003, they entered the market with a vengeance. We argue that by 2007, the market for U.S. MBS and CDO was a global market. It contained players from many countries around the world who held substantial shares of MBS and CDO and purchased those products by borrowing money in the ABCP market. Its main players, both U.S. and foreign banks were pursuing the same strategy: use ABCP to buy MBS and CDO.

Hypothesis 1: After 2000, the U.S. MBS and ABCP markets witnessed a large influx of foreign banks, particularly those in Western Europe thereby creating a global market for American MBS and the use of ABCP to fund those purchases.

This global market was directly connected to the fortunes of the U.S. mortgage market and housing prices. When U.S. housing prices stopped rising and foreclosures begin to occur, many foreign banks found themselves facing the same kind of liquidity crises as American banks. The money they were borrowing short term came due and many of these banks were unable to find funding for their MBS and CDO holdings. There was little market to buy these bonds as their value was unknown because of the foreclosures. This proved to be a big problem when banks found themselves in the summer of 2008 with large amounts of MBS and CDO that were losing value and had to quickly raise funds to cover their borrowing. It was this crisis that spread across U.S. banks, but also to the financial investors around the world who were now key players in this global market. To the degree that banks and investors in many countries had purchased such securities, the banking systems in those countries plunged into a systemic banking crisis. That crisis brought that country's economy into recession.

Hypothesis 2: Countries where banks had large holdings of U.S. MBS and ABCP were more likely to experience a bank crisis because when the underlying value of the MBS began to drop these losses were transmitted through the banking system vie these financial instruments. The crisis made credit difficult to come by in those countries and recession followed.

Alternative Explanations for the Spread of the Crisis

The word "contagion" is often used to describe how financial crises in one country can spread to other countries (Forbes and Rigobon, 2001; Claessens, Dornbusch, and Park, 2001; for some formal modeling, see Allen and Gale, 2007). There are three sorts of mechanisms by which economic problems in one society can move to other societies. First, the fate of different countries can be closely because they have similar underlying structures to their economy. When

something happens in one economy it quickly occurs in others with similar characteristics because of common fundamentals,. Second, financial crises may spread via links between countries' economies. Countries dependent on trade or remittances may experience spillover effects when their trading partners experience adverse economic conditions. Finally, contagion may occur through the actions of financial intermediaries. In the context of financial crises, financial investors may perceive the risks in one society as high relative to others and therefore they shift their investment strategies by moving funds from one place to another in response to uncertainty. Here, the principal mechanism is that investors disinvest in the local stock, bond, or property markets in order to reinvest in markets where there is less risk. This is termed the "flight to safety."

There are two main structural factors that have been identified as exposing countries to the risk in this particular crisis. The first is the deregulation of the financial sector. Allowing banks to enter into many markets potentially encourages them to take more risks (Minsky, 2008). In the context of the current crisis, deregulation meant banks with lots of risky assets were unprepared to take on the challenges of the downturn (Johnson and Kwan, 2009; Kaufmann, 2010; Schiller, 2003; Nestailova, 2011). This implies that in countries with higher levels of deregulation, we should observe more banking crises and a deeper recession.

Hypothesis 3: Countries with recent financial deregulation were more susceptible to bank crises and recession because of higher levels of risk and indebtedness in those societies.

The second structural factor is the presence of a housing bubble in a country. As housing prices increased, banks had a booming business loaning as much money to as many people as possible. Borrowers who faced rising house prices took out ever larger loans premised on the idea that prices would continue to rise. This created a speculative bubble (Reinhart and Rogoff, 2008; 2009). Many borrowers were so stretched that they took out adjustable rate mortgages that

put them in the position of having to re-finance every two or three years or face steadily increasing house payments. They paid for refinancing out of price increases in the underlying value of the house (Davis, 2009). When housing price appreciation started to slow down, this created a wave of defaults on loans. These defaults cascaded and produced lower housing prices and more defaults. We would expect that countries that shared in the rapid appreciation of housing prices would be more susceptible to a bank crisis and the resulting recession.

Hypothesis 4: Countries that experienced housing price increases between 2000 and 2006 were more at risk of both a bank crisis and a recession because of their exposure to defaults when those prices turned down.

In the discussion of contagion through direct linkages between economies, the dependence of a country on exports for economic growth is commonly seen as the most important factor. If trading partners experience a recession (here induced by the housing bubble bursting followed by a systemic banking crisis), then they will simply import less. To the degree that any given economy is more dependent on export partners for growth, they are likely to suffer a recession themselves. So the most likely countries to be affected by economic recession are those that are highly dependent on exports. One could also argue that a high level of trade with the U.S. would trigger a bank crisis or a recession as well.

Hypothesis 5 Countries with large amounts of exports and exports to the U.S. in particular were more likely to have a bank crisis or recession because as the U.S. economy turned down, their economies turned down as well.

The last factor to discuss is the "flight to safety". There are several ways to measure the risk of capital flight. One is the current account deficit (measured as the gap between a country's imports and exports) which requires countries to borrow to fund the deficit. A second measure is whether or not a government is running a large and unsustainable government debt. Countries that are running a high current account deficit or have governments that are deep in debt may not

be able to raise sufficient funds to keep that debt funded. Investors who are worried that a given country will not be able to continue to service its debts, will liquidate their holdings and flee to what they view as safer investments. This flight could cause a systemic banking crisis and a recession. It was this kind of contagion that some have argued caused the Asian financial crisis of the late 1990s (Claessens, et. al., 2004; Halliday and Carruthers, 2009).

Hypothesis 6: Countries that were running a large budget public debts or current account deficit were more susceptible to financial crisis. These deficits led to both a financial crisis and a recession as investors sold assets to buy safer assets thereby raising borrowing costs dramatically and making loans less available.

Who held U.S. MBS?

In this section, we consider what we know about the foreign ownership of U.S. MBS in the period before the crash in order to test hypothesis 1.[3] Between 2001 and 2007, investors increased their holdings of American MBS dramatically (Inside Mortgage Finance, 2009). In this period, U.S. commercial banks increased their holdings from about $700 billion to almost $1.1 trillion, an increase of over 50%. Mutual fund holding more than doubled from about $425 billion to almost $850 billion. But the category that showed the most dramatic increase was foreign holdings of MBS. Holdings grew from about $200 billion to over $1.2 trillion at the peak. In the space of five years, foreigners increased their holdings of U.S. MBS by $1 trillion, an increase of nearly 600%.

[3] It is quite difficult to get detailed data on the holdings of foreign banks in any of these markets. There is no central reporting of these statistics nor do national governments generally break this data out. This means that we must rely on fragmented sources of evidence or data painstakingly collected by scholars on a deal by deal or bank by bank basis.

The Inside Mortgage Finance data does not allow one to decompose the holders of those bonds by country. The U.S. Treasury, however, gathers this data on a yearly basis (2007: table 11, p. 15, table 24, p. 51-55). Table 1 provides evidence on the ten largest holders of MBS by country in 2006. The ten countries who were the largest holders of American MBS in 2006 were the United Kingdom, Belgium, Ireland, Japan, Germany, Iceland, Netherlands Norway, Switzerland, and France. All of the largest holders of American MBS were advanced industrial societies and nine out of ten were in Western Europe.

(Table 1 about here)

Unfortunately, neither Inside Mortgage Finance nor the U.S. Treasury collects information about individual bank holdings of U.S. MBS and CDO. But, the Federal Reserve Bank bought $1.25 trillion of government sponsored enterprise MBS during the crisis from 13 banks including seven foreign banks. Barclays (UK), BNP Paribas (France), Credit Suisse (Switzerland), Deutsche Bank (Germany), Mizoho (Japan), Normura (Japan), RBS (UK), and UBS (Switzerland) sold almost $625 billion to the Federal Reserve. These foreign banks all were in advanced industrial countries and most were in Europe. Beginning in January 2008 the Federal Reserve expanded its short-term loan activities for banks to help them through a "liquidity crisis." During the period 2008-2009, the Federal Reserve lent money to 438 banks of which 156 were branches of foreign owned banks. Most of the banks (138) were branches of European banks.

A very similar pattern is apparent in the market for asset-backed commercial paper. Table 1 contains information on the countries where the banks resided who were the largest purchasers of ABCP as of January 2007. These include the Netherlands, Belgium, Germany, United Kingdom, France, Canada, Switzerland, Japan, Denmark, and Spain. We note that this list

overlaps with the list on MBS for seven of the ten countries implying a link between a country's banks purchasing MBS and CDO and the ABCP market.

(Table 2 about here)

We have some information on the identity of the largest banks in the ABCP market. Table 2 presents the 20 largest foreign banks in that market and the 8 largest U.S. players. The foreign list confirms that many of the world's largest banks were substantially involved in the ABCP market. All of these banks with the exception of Mitsubishi and the Royal Bank of Canada were either substantially reorganized or went bankrupt during the crisis. On the U.S. list, all of the banks were either bailed out by the government or went bankrupt. We note that both Bear Stearns and Lehman Brothers are on the list. Lehman Brothers failure is seen by most observers as the event that caused the crisis to spike (Swedberg, 2010).

It is clear that the largest banks in the world financial system became players in the American MBS market during the peak of the housing bubble from 2001-2007. They increased their holdings 600% in a six year period and came to own almost $1.2 trillion in American MBS. The bulk of these banks were located in Europe with a few in Japan. Many of these banks were funding their purchases of MBS by using the ABCP market. U.S. MBS were huge investment vehicles for the largest banks and investors in the developed world. The evidence supports hypothesis 1 that during this period, the market for these securities became global and the main strategy to buy them became borrowing in the ABCP market.

Data and Methods

It is useful to begin our discussion of our data and methods by discussing our research design. Our argument has two dependent variables. We attempt to model whether or not a country had a systemic banking crisis by operationalizing variables to test our hypotheses. The second dependent variable is to examine how these underlying conditions predict the depth of a recession in any given country.

In order to test our hypotheses, we must solve several serious data problems. The systemic banking crises and the recessions occurred very close in time and it is difficult to untangle these events. Macroeconomic data is rarely available at any finer temporal resolution than the quarter and only for the wealthiest and most developed countries. This problem is compounded by the fact that dating a systemic banking crisis is difficult to do. For example, in the U.S., does the crisis begin with the collapse of Bear Stearns in the spring of 2008, the government takeover of Fannie Mae and Freddie Mac in September 2008, the collapse of Lehman Brothers a week later, the passage of the Troubled Asset Relief Program (TARP) by the Congress in October 2008, or the government forcing banks to be reorganized and accept TARP money in December 2008? The official definition of a recession as two straight quarters of GDP decline makes it hard to exactly date the beginning of a recession. These events moved very fast and in the space of less than a year many countries experienced both a systemic banking crisis and the onset of a recession.

In order to model the process by which we try to determine the "causes" of the banking crisis and recession, we have to pursue a data strategy that recognizes these problems. We use a cross sectional design of events that did or did not occur in as particular time frame. Our independent variables are initial conditions that might be useful to predict whether or not a country had a systemic banking crisis or a recession. This approach is standard in econometric

analyses. For the sake of avoiding problems of endogeneity in constructing our model of "causation", all of our independent variables refer to measurements that occurred before 2007, the earliest one might date as the beginning of the crisis.

The inclusion of banking crises in our model as an explanatory factor for the onset of recession creates a similar problem. Both the systemic banking crises and countries' entry into recession unfolded over the same time period from 2008 to 2009, meaning that our measure of banking crisis may be an effect of the crisis not its cause. In order to produce the cleanest possible model, we use as a measure of economic performance, the change in GDP in 2009 as our second dependent variable. In coding which countries had banking crises, we chose to focus only on countries where we could clearly identify that the banking crisis had occurred by the end of 2008. This leaves us with a smaller set of cases of banking crises, but gives us a stronger claim that the crisis occurs before the change in GDP. It is a more conservative test of our central hypotheses but also a more compelling test.

Selecting a sample of countries also was difficult. Ideally, we would like to have data on as many countries as we can in order to include as many countries as we can who did and did not have a financial crisis and a serious recession. We are highly limited by data availability. We have relatively complete data for 75 countries. These are listed in Table 3. They include countries that are both very rich and very poor, and countries from many parts of the world. However, they tend to exclude the very poorest parts of Africa, the Middle East, and Latin America because the legal and institutional infrastructure for collecting the relevant macroeconomic indicators simply does not exist.

(Table 3 about here)

One of the biggest problems is missing data on house price appreciation. Using multiple sources, we were still only able to find comparable data on this variable for 44 countries, and these countries were overwhelmingly developed European, North American, or Asian countries with liberalized economies, creating major selection problems. We tried several strategies to deal with this problem, and report three types of models in order to mitigate it. First, we ran models without this variable on the whole sample of 75 cases and models including this variable on the reduced sample of 44 cases. Then, we ran models where we treat the missing data as a variable in the 77 cases and compare it to the results from the 44 cases. We do this first recoding the house price appreciation variable so that it codes the percentage change in house price appreciation from 2000-2006 if there is data and is coded "0" if there is no data house price appreciation. Then we created a second variable coded "0" if the data is not present and "1" if it is present. This allows us to examine the effect of having or not having data on whether or not countries are more likely to have a financial crisis. Finally, we estimated models for sample selection and missing data which we do not report here. Models using the Heckman correction for data censoring and Bayesian multiple imputation do not change the substance of the results.

The two dependent variables refer to 2008 and 2009. All of the independent variables refer to conditions that existed in the country in 2006 unless otherwise indicated. Systemic banking crisis is measured with a dichotomous variable coded "1" if there was a systemic banking crisis in 2008 and "0" if there was not such a crisis, following Laeven and Valencia (2010). Laeven and Valencia use five criteria to determine whether or not a systemic banking crisis has occurred in any given country. These include: (1) banks required extensive injections of liquidity, (2) banks were required to significantly re-structure their activities, (3) governments engaged in significant asset purchases from banks in order to provide them with liquidity, (4)

governments provided significant guarantees on liabilities, and (5) governments nationalized some banks. A systemic banking crisis is said to have occurred if a country meets at least four of these five criteria. We also ran a regression analysis where the dependent variable was a count of the number of conditions a country experienced. The result is similar to the one reported here.

Table 4 presents the list of the countries that fit our definition. One can see from the list the predominance of developed countries in general and European countries in particular. We note that the U.S. and Great Britain are both on the list. We also note that Iceland, Ireland, Latvia, and Spain are on the list as well. Less well known is the fact that Germany experienced a systemic banking crisis, and that both France and Switzerland met the criteria of a banking crisis.

(Table 4 about here)

The second dependent variable in the analysis is the percent change in real GDP in 2009. We constructed this measure using real GDP as reported by the Economist Intelligence Unit (2010). This measure can take on both negative and positive values. So, a positive effect of a given independent variable indicates an increase in GDP over the course of the year, while a negative effect of an independent variable indicates a decrease in GDP.

Our measure of country holdings of MBS codes holdings of U.S. non-agency MBS (that is, issued by private lenders and not enjoying guarantees from the U.S. federal government) in each country in 2006 using securities data reported by the U.S. Treasury's International Capital System (2007). Holdings are measured in millions of U.S. dollars and we have standardized this measure by making it a percentage of GDP and logging the result. The importance of scaling for the size of a countries economy is intuitively clear. We logged the variable in order to adjust for outliers because small countries that house large banking centers like Bermuda and Luxembourg

have MBS holdings several times the size of GDP. Our measure of ABCP as a percentage of GDP was created in a similar fashion. The source for this data was Achaya, et al. (2013).

To obtain a measure of credit market deregulation, we used each country's 2006 Credit Market Freedom Score, from the Fraser Institute's Economic Freedom of the World Index. The score is scaled from one to ten. The higher the score, the more deregulated the country's credit market. This is a score that many scholars who study the effects of financial deregulation on economic growth (Rose, 2009; Rose and Speigel, 2010; Giannone, 2010) have found useful as a metric to measure the degree to which societies have taken government regulation and intervention out of their financial sector.

In order to measure the vulnerability of a country to default in the event of an economic downturn, we use a variable measuring the current account balance in 2006 as a percentage of GDP. The source for this measure was the World Bank's "World Development Indicators" database. We measured trade linkages in terms of export dependence using a measure that reflected exports in 2006 as a percent of GDP. We also coded up the percentage of exports that were sent to the U.S. in 2006. The source was also the World Bank's Development Indicators.

Our measure of house prices was the percent change in the price of the median residence from 2000-2006. To construct this variable we relied primarily on data from the Bank of International Settlements, but supplemented it with information from Claessens et al. (2010) and the European Mortgage Federation (2009). We note that this measure is tricky to interpret because the underlying way in which median house price was determined varied across countries. In compiling housing data, different countries may choose to include or exclude different regions of the country, different types of dwelling, and different vintages of housing stock. In order to deal with this heterogeneity, for each country we chose the maximally

inclusive annual measure of median house price available, and computed the percent change in house prices between 2000 and 2006. Therefore this measure is in units of percent change with respect to a baseline of prices in 2000. The means and standard deviations of all of the variables are in table 5.

(Table 5 about here)

We ran two kinds of models. First, we ran a logit model predicting whether or not a bank crisis occurred during the period 2008. Then, we ran an ordinary least squares regression modeling the percentage change in GDP in 2009. Because our sample is small and the distribution of cases is often quite skewed, we employ robust estimates of the standard errors in all cases.

Results

Table 6 presents the results of a logistic regression analysis where the dependent variable is whether or not a country has a systemic banking crisis in 2008. The first column of the table presents results for our sample of 75 countries and the second column adds the variable for house price appreciation. The third column presents the model run only on the 44 cases for which we have data on house price appreciation. The two strongest predictors of whether or not a country has a systemic banking crisis is the size of the U.S. MBS as a percentage of GDP and the ABCP as a percentage of GDP. This confirms hypothesis 2 that the cause of the banking crises around the world was the participation of that country in the U.S. MBS and ABCP markets. The fact that both of these variables predict banking crises implies that they exert independent effects on bank crises. Holding lots of MBS that were losing value pushed banks in many countries to the financial brink. But, equally important was the use of short term ABCP to fund those and similar

instruments. Obviously in countries where both of these conditions were present, financial crises were more likely.

(Table 6 about here)

The models provide no support for hypothesis 3 that credit market deregulation drove the banking crisis. It also provides no support for hypothesis 4 that countries that experienced housing bubbles were more likely to have a banking crisis than countries that did not experience such house price increases. This runs counter to many claims in the literature and in the press. But, our result is consistent with the results of other empirical studies. While some countries that had the financial crisis also had a housing price bubble (Spain and Ireland are the cases most frequently referenced), many countries without a housing bubble also had a crisis (Germany, France, and Switzerland), and some countries with rising house prices did not have a crisis (Canada).

There is no support for hypothesis 5 that countries with large exports or exports to the U.S. experienced crises. Indeed, countries with lots of exports to the U.S. actually were consistently less likely to have a banking crisis than countries with large exports, though the effect is not significant. Finally, government debt and current account deficits (hypothesis 6) also do not have statistically significant effects on whether or not a country had a bank crisis. Our results confirm earlier work that the "usual suspects" for causes of the spread of financial crises are simply not factors this time around.

Table 7 presents the results for predicting GDP change in 2009. There is a large statistically significant negative effect of the presence of a banking crisis on change in GDP in both samples. Having a systemic banking crisis in 2008 reduces GDP by 5-7% in 2009. This is a very large effect. There are no consistent effects for either the MBS or ABCP measures on

change in GDP. We note that in two of the models (the ones for 75 countries that includes the measure for systemic banking crisis), there is an effect of MBS as a percentage of GDP. This effect does not appear in the sample restricted to the 44 cases. Our interpretation of these results is that the effect of MBS and ABCP on economic growth goes entirely through the presence or absence of a systemic banking crisis. This exposure caused larger economic problems by precipitating a systemic banking crisis and that crisis triggered a substantial drop in GDP. Taken together, these results support hypothesis 2.

(Table 7 about here)

There is some evidence for effects of some of the other variables on change in GDP. Countries with high levels of credit market deregulation experience greater decreases in GDP (although this effect disappears in the regression with 44 cases) implying that part of hypothesis 3 is true. One interpretation of this result is that once the banking crisis got going and the economy turned down, countries with highly deregulated credit markets found that years of easy lending had left borrowers vulnerable in the economic downturn. In this case, the banking crisis caused by MBS and ABCP precipitated a cascading economic decline. Similarly, we also found a nearly significant effect of a local housing bubble on negative GDP growth providing some evidence for hypothesis 2, but only in the sample with 44 cases. To the degree that these countries had a housing bubble, their economies were more vulnerable to economic turndown. We interpret this to imply that once the banks went into crisis, lending dried up and the economic growth that had been propelled by house price increases dried up.

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Conclusions

We began by pointing out that the "Great Recession" originated in the U.S. and spread to the more industrialized world. The main path to the crisis was through the American housing market. The housing price bubble in the U.S. fuelled the production of MBS and CDO. These securities were extensively sold and marketed around the world to banks and investors in the richest countries who funded much of these purchases with ABCP. Foreign investors increased their holdings of these securities by $1 trillion. As those securities began to lose their value in 2007 and 2008, banks in the U.S. and in foreign countries began to fail. It was these failures which spurred systemic banking crises in many countries around the world. These crises forced governments in the rich world to intervene aggressively into their banking systems to stabilize them. But, the damage was so extensive that a deep recession followed. This recession was made worse in countries that had more deregulated systems of finance and had experienced their own housing bubbles. Put colloquially, it was the global character of the American mortgage backed security market which sucker punched the world economy and brought it to its knees in the richest countries.

Some caveats are in order. First, we acknowledge that just because in this case the alternative explanations of the crisis do not help explain the spread of this crisis, does not mean that in some future crisis they will not be operative. Second, in the years since the financial crisis began in 2008, the market for non-agency American MBS dropped dramatically and the subprime market virtually has disappeared (Inside Mortgage Finance, 2009). The use of ABCP to fund these securities has also ceased as the contracts supporting those purchases expired and were not renewed (Acharya, et. al., 2013). From the point of view of the sociology of markets, this particular international financial market no longer exists as most of the big players went bankrupt, were reorganized, or exited the market. This implies that whatever the next financial

crisis is, it will not emanate from this particular market and this strategic use of financial instruments.

Future research should try and explore the links between the supply of mortgages for securities and the demand for those securities. One way to read what happened is that the demand for MBS and CDO from American and foreign investors pushed forward the housing bubble in the U.S. Given the high demand for these securities, banks needed to constantly keep the origination of mortgages coming. When the market for prime originations faltered, banks discovered the market for subprime and other nonconventional mortgages. There is certainly prima facie evidence that the bubble was not exogenous to the growth of the MBS and CDO markets but instead was at least partially by the high demand for those securities. Gorton (2010) suggests this argument.

Our study has implications for the study of financialization, global financial markets, and the sociology of finance more generally. The theoretical payoff of our study is that it adds a new conceptual tool for studies of global finance and financial instruments. The sociology of markets causes scholars interested in global finance and financial instruments to consider the embedding of those flows and instruments in the underlying structure of the market. This study has demonstrated the utility of extending our empirical work to the financial organizations that make up these markets. Scholars will get a clearer understanding of what is going on by considering who are the players, what are the main tactics, how what they are doing changes over time, and how people are making money.

This implies that scholars interested in the sociology of finance and its role in globalization should dissect each market by the identities of the market participants, their tactics, and what is causing either crisis or growth. There are many facts to be discovered. First, how

many of these markets are really global, i.e. contain banks from many countries including those outside of the U.S. and Western Europe? What is the degree to which many of the global financial markets are actually dominated by a small number of participants? Are these the same participants across markets implying that the 30-40 largest banks might be dominating all of these markets? Finally, and perhaps most importantly, how are these markets connected to one another and to particular national market systems?

Hardly anyone saw that American mortgages were the hottest commodity being traded across this system. While the next international financial crisis will not be caused by a housing bubble originating in the U.S., it will require some of the same conditions. There will have to be a huge market of underlying assets that can be traded as securities, securities that can be rated for risk, and probably by a relatively few number of players who are pursuing very high returns by believing they can control those risks. This follows from the insights of Carruthers and Stinchcombe (1999) and Leyshon and Thrift (2009). Dissecting these markets and their dynamics requires delving not just into the flows and the instruments but to the social structure of these markets.

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Table 1: Foreign Countries with the highest amount of MBS/GDP, 2006 (Source: U.S. Treasury Department, 2007) and countries with highest amount of ABCP/GDP (Source: Achaya, et. al., forthcoming).

Highest MBS/GDP

Ireland
Belgium
France
Germany
Iceland
Netherlands
Norway
Switzerland
United Kingdom
Japan

Highest ABCP/GDP

Netherlands
Belgium
Germany
United Kingdom
France
Canada
Switzerland
Japan
Denmark
Spain

Table 2: Largest sponsors of ABCP conduits with country of origin (Source: Achaya, et. al., forthcoming).

Foreign

ABN Amro (Netherlands)
HBOS (United Kingdom)
HSBC (UK and Hong Kong)
Deutsche Bank (Germany)
Societe Generale (France)
Barclays (United Kingdom)
Mitsubishi (Japan)
Rabobank (Netherlands)
Westdeutsche Landesbank (Germany)
ING Groep (Netherlands)
Dresdner Bank (Germany)
Fortis (Belgium)
Bayerische Landesbank (Germany)
Credit Agriciole (France)
Lloyds Banking Group (United Kingdom)
Hypo Real Esate (Germany)
Royal Bank of Canada (Canada)
BNP Paribas (France)
KBC Group (Belgium)
Bayerische Hypo-und Vereinsbank (Germany)

U.S.

Citigroup
Bank of America
JP Morgan Chase
Bear Stearns
GMAC
State Street Corporation
Lehman Brothers
Countrywide Financial

Table 3: List of countries in the analysis, by first year negative change in GDP

2008	2009		No recession	
Bahamas	Armenia	Lithuania	Albania	South Korea
Denmark	Austria	Macedonia FYR	Argentina	Kyrgyz Republic
Estonia	Belgium	Malaysia	Australia	Mauritius
Ireland	Brazil	Malta	China	Morocco
Italy	Bulgaria	Mexico	Colombia	Panama
Japan	Canada	Netherlands	Dominican Rep.	Peru
Latvia	Chile	Norway	Egypt	Poland
Luxembourg	Costa Rica	Paraguay	Haiti	Sri Lanka
New Zealand	Croatia	Russia	Indonesia	Tunisia
Portugal	Cyprus	Singapore	Israel	Uruguay
Sweden	Czech Rep	Slovakia	Kazakhstan	
	Ecuador	Slovenia		
	El Salvador	South Africa		
	Finland	Spain		
	France	Switzerland		
	Georgia	Thailand		
	Germany	Trinidad/Tobago		
	Greece	Turkey		
	Guyana	Ukraine		
	Hong Kong	United Kingdom		
	Hungary	Venezuela		
	Iceland			

Table 4: Countries that experienced a banking crisis, 2008-2009.
Source: Laeven and Valencia, 2010.

Systemic Banking Crisis (13 countries)	Borderline Banking Crisis (10 countries)
Austria (late 2009)*	France
Belgium	Greece
Denmark	Hungary
Germany	Kazakhstan
Iceland	Portugal
Ireland	Russia
Latvia	Slovenia
Luxembourg	Spain
Mongolia (late 2009)*	Sweden
Netherlands	Switzerland
Ukraine	
United Kingdom	
United States	

*We treat these cases as non-incidences of systemic banking crises in our models because they did not meet Laeven and Valencia's conditions for a systemic banking crisis before the end of 2008.

Table 5: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
2009 Change in GDP	75	-2.62	4.85	-18.00	8.70
Log 2006 Corp. MBS % GDP	75	0.29	0.64	0	3.98
Log 2006 ABCP % GDP	75	0.21	0.58	0	2.98
Systemic Banking Crisis	75	0.15	0.36	0	1
2006 Credit Market Dereg'n	75	8.55	1.00	5.74	9.98
2006 Current Account % GDP	75	-1.02	10.42	-25.75	39.49
2006 Gov't Debt % GDP	75	47.16	30.02	4.41	191.34
2006 Exports / GDP	75	51.65	38.57	14.30	243.44
2006 % Exports to USA	75	16.75	20.29	0.93	85.97
Housing Price Reported?	75	0.59	0.50	0	1
Real Housing Price App'n '00-'06	44	54.35	55.91	-25.64	228.05

Table 6: Logit models of systemic banking crisis

Model	**1**	**2**	**3**
Log 2006 Corp. MBS % GDP	1.766+	2.907*	2.540*
	(0.955)	(1.283)	(1.246)
Log 2006 ABCP % GDP	3.036***	2.240**	2.248**
	(0.883)	(0.717)	(0.696)
2006 Credit Market Dereg'n	-0.649	-1.201	-1.131
	(0.808)	(1.079)	(1.035)
2006 Current Account % GDP	-0.113	-0.128	-0.129
	(0.086)	(0.099)	(0.097)
2006 Gov't Debt % GDP	-0.056+	-0.039	-0.035
	(0.033)	(0.026)	(0.025)
2006 Exports / GDP	0.009	-0.003	-0.004
	(0.013)	(0.015)	(0.017)
2006 % Exports to USA	-0.081	-0.065	-0.041
	(0.065)	(0.052)	(0.038)
Real Housing Price (no misses)		0.010	
		(0.012)	
Housing Price Reported?		4.494+	
		(2.406)	
Real Housing Price App'n '00-'06			0.009
			(0.011)
Constant	4.011	3.877	7.629
	(6.900)	(8.072)	(8.605)

N	75	75	44
Ll	-13.243	-10.830	-10.640
Chi-square	29.891	33.311	24.679
d.f.	7	9	8

Notes: Robust standard errors are in parentheses.

† $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 7: OLS models of 2009 change in GDP

Model	**1**	**2**	**3**	**4**
Log 2006 Corp. MBS % GDP	0.424	1.657*	1.212+	1.525
	(0.624)	(0.650)	(0.690)	(1.194)
Log 2006 ABCP % GDP	-0.603	1.249	1.278+	0.878
	(0.619)	(0.794)	(0.713)	(0.829)
Systemic Banking Crisis		-6.567**	-5.432**	-4.898*
		(2.244)	(2.005)	(2.240)
2006 Credit Market Dereg'n	-1.879***	-2.067***	-1.593*	-1.498
	(0.532)	(0.524)	(0.665)	(1.139)
2006 Current Account % GDP	0.062	0.017	0.014	0.086
	(0.055)	(0.050)	(0.046)	(0.081)
2006 Gov't Debt % GDP	0.022	0.006	0.001	-0.028
	(0.024)	(0.023)	(0.023)	(0.023)
2006 Exports / GDP	-0.006	-0.003	-0.005	-0.021
	(0.012)	(0.012)	(0.012)	(0.014)
2006 % Exports to USA	0.027	0.018	0.006	0.042
	(0.021)	(0.021)	(0.024)	(0.036)
Real Housing Price (no misses)			-0.020	
			(0.013)	
Housing Price Reported?			-0.686	
			(1.269)	
Real Housing Price App'n '00-'06				-0.026+
				(0.014)

Constant	12.312*	14.777**	12.284*	12.951
	(5.040)	(5.063)	(5.817)	(10.569)
N	75	75	75	44
Ll	-211.924	-205.546	-202.872	-115.526
R-square	0.281	0.393	0.435	0.499
d.f.	7	8	10	9

Notes: Robust standard errors are in parentheses.

† p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001