Chapter 4 Banking Crises and Economic Freedom

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Are financial crises more likely among countries that have more economic freedom? At one level, the answer to this is obvious. Consider an economy such as North Korea, which has a totally repressed financial system run by the government. The possibility of a financial crisis is not a problem for North Korea, even if a lack of economic growth is a problem for the citizens. Beyond that extreme though, the relationship between economic freedom and financial crises is not so obvious.

Just as for economic freedom, a careful definition of financial crises is necessary before examining it empirically. Financial crises often are not well defined: many definitions are broad, such as sharp decreases in asset prices, and would include many relatively common decreases in stock prices; others are quite narrow, including only runs on banking systems. Reinhart and Rogoff (2009) define a financial crisis either by events (banking crises, domestic defaults, or external debt defaults) or by "quantitative thresholds" (inflation crisis, currency crashes, currency debasement, and the bursting of asset-price bubbles). We limit our empirical analysis in this chapter to banking crises, which can be defined by relatively objective criteria and are an important aspect of recent events.

There is a large empirical literature that looks at financial crises and the role government regulation or the lack thereof played in the financial crises and subsequent events. For example, after the Asian financial crisis, several empirical papers examined the relationship between capital controls and currency crises and capital-account liberalization and the likelihood of a financial-market and exchange-rate crisis.[1] As for North Korea, the answer is partly obvious. A closed economy cannot have a crisis due to inflows or outflows of foreign funds. On the other hand, permitting capital flows into and out of a country can improve the economy's efficiency and can make the country's citizens better off (Bekaert, Harvey, and Lundblad, 2005)

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1 See for example Edwards, 2007; Glick and Hutchinson, 2005; and Mishkin, 1999.

even though it does make capital-account crises possible. Similarly, prohibiting stock exchanges prevents stock-market crashes. On the other hand, opening a stock market can improve a country's prospects for economic growth (Baier, Dwyer, and Tamura, 2004). While a financial crisis is possible after an economy liberalizes capital flows, this does not mean the citizens of the country are necessarily worse off, even if there is a financial crisis. Similarly, a stock-market crash is more likely if a country has an active stock exchange but that does not imply that a country would be better off without a stock market and the improved economic efficiency that goes along with it. Liberalization of capital and stock markets without a crisis clearly is better than having a crisis, but that does not imply that people in an economy are better off without the liberalization.

Banking crises are similar to exchange-rate and stock-market crises. Everything else the same, the disruption, difficulties, and recessions usually associated with banking crises are best avoided. If everything else were the same though, a crisis would would not be avoided. Avoiding crises requires changing some things, possibly making the banking system less efficient or less supportive of economic growth. Even with a crisis, citizens can be better off in an economy that permits crises (Rancière, Tornell, and Westermann, 2008). The question is how to avoid or at least ameliorate these crises without stifling growth. How to do that? In order to answer this question, it is necessary to have some idea of how regulation and crises are related.

In this chapter, we examine the relationship between economic freedom and banking crises. We focus on this subset of financial crises because banking crises can be defined in a moderately objective way, which is a substantial advantage. In addition, banking develops at relatively low income levels when not suppressed and therefore is common across most countries. Issues of financial-market development are not so pressing when examining banking crises. We examine the relationship between banking crises and measures of economic freedom from Gwartney, Lawson, and Hall (2011). Economic freedom can be defined as having "personal choice, voluntary exchange coordinated by markets, freedom to enter and compete in markets, and protection of persons and their property from aggression by others" as its central elements (Gwartney, Lawson, and Hall, 2011: 1). Government regulation, that is, lower economic freedom, typically involves more government restrictions on private economic activity. These restrictions can be explicit regulations or they can be implicit responses by the government to private activity that distort that activity. In addition to an overall measure of economic freedom, we examine subsets of the overall economic freedom index related to the financial sector. We investigate the relationships of credit-market restrictions and the soundness of the monetary system with the likelihood of a banking crisis. Monetary developments can help create a banking crisis and monetary developments are affected by banking crises.

There is an informative literature on the relationship between financial crises and government regulation of banking.[2] Demircüç-Kunt and Detragiache (1998) provide one of the first empirical studies of the determinants of banking crises across a large number of countries. Their results indicate that more deposit insurance is associated with a higher probability of banking crises. Later studies by Barth, Caprio

2 These studies use a summary variable to indicate whether or not a banking crisis occurred with little indication of its severity. Reasonably accurate and comparable data on banks' losses in banking crises, for example, would be extremely expensive to compile and would require a great deal of judgement.

and Levine (2004) and others also find that deposit insurance raises the probability of banking crises. In a recent paper, Shehzad and De Haan (2008) find that financial liberalization leads to a lower probability of a banking crisis.[3] Johnson (2011) and Beltratti and Stulz (2012) analyze the effect of the recent crisis on banks' stock returns, one measure of the severity of the crisis's effects because smaller falls in stock returns can reflect fewer problems and more resilient banking systems. Johnson's results (2011) suggest larger government, higher taxes, and more government regulation are associated with more difficulties during the crisis. Beltratti and Stulz (2012) find little evidence that more banking regulation resulted in banks performing better during the crisis.

We also examine the effects of banking crises on regulation, the monetary system, and economic freedom more generally. While the answer to this seems obvious from casual empiricism since the most recent crisis—politicians' increase regulation and restrict freedom after a crisis—we are aware of only one empirical paper on this issue. De Haan, Sturm, and Zandberg (2009) examine the effects of crises on economic freedom in a case study for Norway and Sweden and by cross-country regressions. They find that economic freedom is hardly affected in Norway and Sweden and goes up over time if it was affected. Their regressions suggest that economic freedom falls right after a crisis but then increases.

Banking crises and economic freedom across countries

Our data on banking crises span over 30 years from 1976 to 2008. The data are from Laeven and Valencia (2010), who define a banking crisis as occurring when there are "significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and bank liquidations)" and "significant banking policy intervention measures in response to significant losses in the banking system" (Laeven and Valencia, 2010: 6).[4] Sufficient conditions are either: [1] non-performing loans above 20% of loans or banks closing with at least 20% of total banking assets; or [2] outlays by government for restructuring banking of at least 5% of Gross Domestic Product (GDP). These crises last for more than one year and are defined as ending when real GDP growth and real credit growth are positive for two consecutive years (Laeven and Valencia, 2010: 10).

Figure 4.1 shows the fraction of countries in our dataset in which a banking crisis begins in each year. The year 2008 stands out as the year with the highest fraction of countries—21 out of 152 countries—in which a banking crisis starts. There is another peak, though, with 14 of the countries having a banking crisis starting in 1995. There were also eight years in which no banking crisis started in any country; in fact, no banking crisis started from 2004 to 2006 before the sharp increase in 2007 and 2008.

Figure 4.2 shows a different view of these crises over time, which is the fraction of countries at the start of a crisis or not yet out of the aftermath. The year 1995 stands out with nearly 20% of the countries in a banking crisis. In terms of the

3 They distinguish systemic banking crises—those in which bank capital in the country is exhausted—and non-systemic banking crises—those of lesser significance in which large banks fail. We discuss only their results concerning systemic banking crises. All the crises in this paper and our source (Laeven and Valencia, 2010) are systemic banking crises as defined by Laeven and Valencia.

4 The commonly used earlier definition of a banking crisis as occurring when all or almost all bank capital has been depleted seems more precise but it is not, because accounting rarely keeps up with reality and stock-market prices reflect both banks' activities and government bailouts.

Figure 4.1: Countries with a banking crisis starting, by year

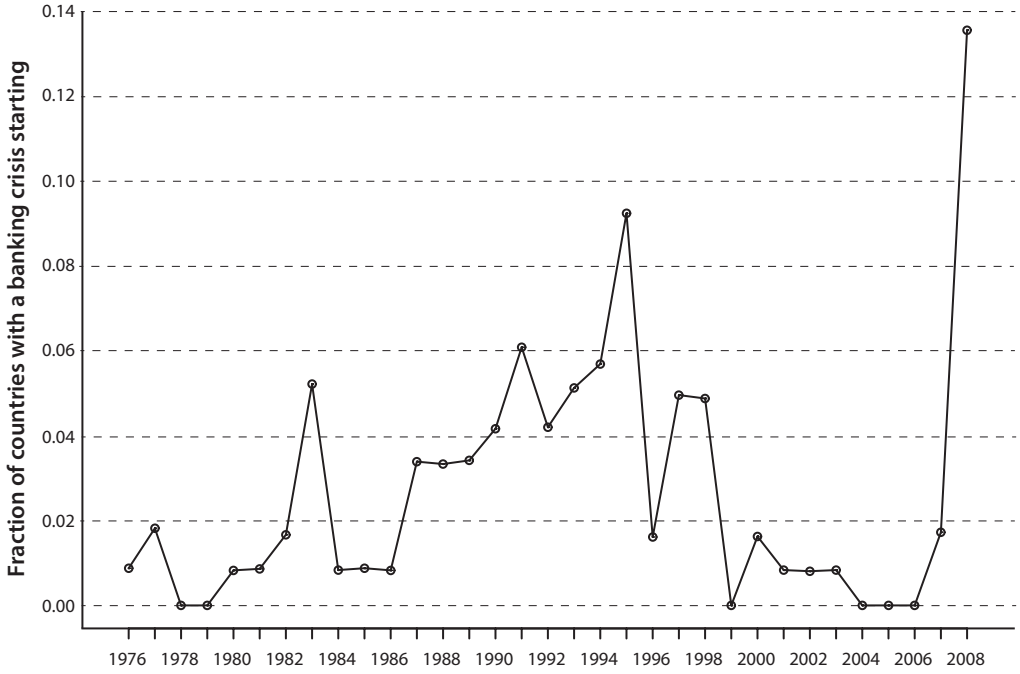
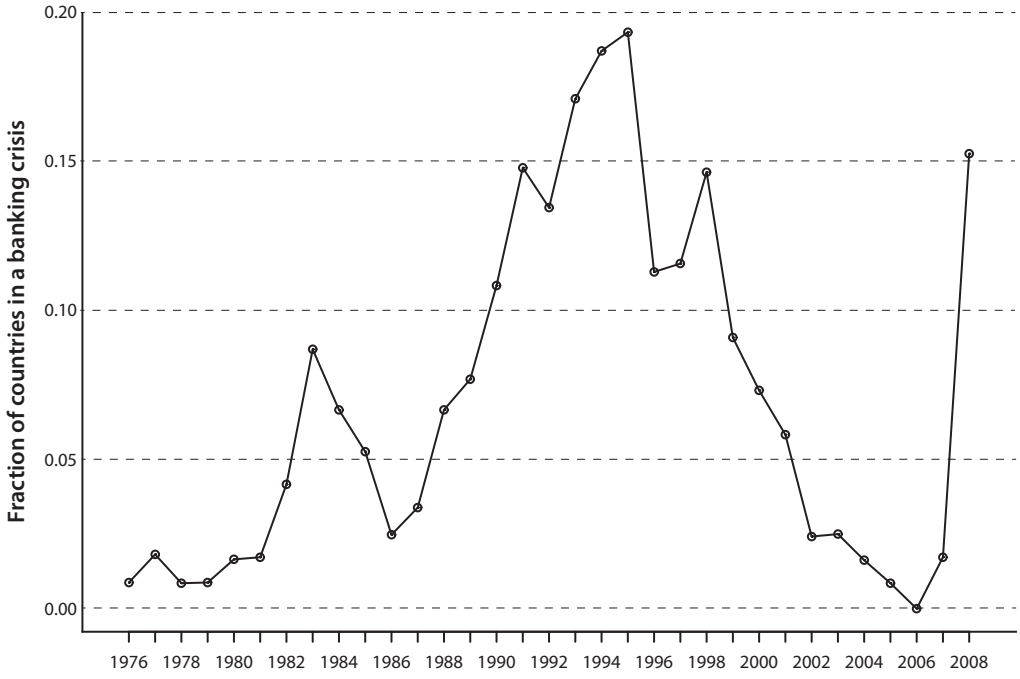


Figure 4.2: Countries in banking crises, by year



fraction of countries dealing with a crisis or its aftermath, 2008 stands out but it is a secondary peak compared to 1995.[5] Also, 2006 stands out as the only year in the data set in which no country is in a banking crisis.

We use the economic freedom index published in Gwartney, Lawson, and Hall (2011) and two of the subcomponent indices: credit-market regulation, and the soundness of money. Because evidence indicates that deposit insurance is linked to banking crises, we also use data from Demircüç-Kunt, Karacaovali, and Laeven (2005) and Barth, Caprio, and Levine (2008) on deposit insurance. Figures 4.3a, 4.3b, and 4.3c show the evolution of overall economic freedom from 1975 to 2009. The horizontal axes shows the years in which economic freedom is available from 1975 to 2009. The vertical axes are identical, making it easier to compare across the figures showing economic freedom and the components.

The indicators for regulation of the credit market and access to sound money provide insight in addition to what can be learned from overall economic freedom (Gwartney, Lawson, and Hall, 2011: Appendix). Fewer restrictions on the credit market are given a higher score in these data. This is consistent with this aspect of economic freedom increasing as the index increases in magnitude. We will use the

5 Laeven and Valencia limited the length of crises to five years but then introduced immediately succeeding crises in Brazil in 1990 and Zaire in 1991. We code the crises with durations of nine years and eight years, respectively.

Figure 4.3a: Average economic freedom by year, 1975–2009

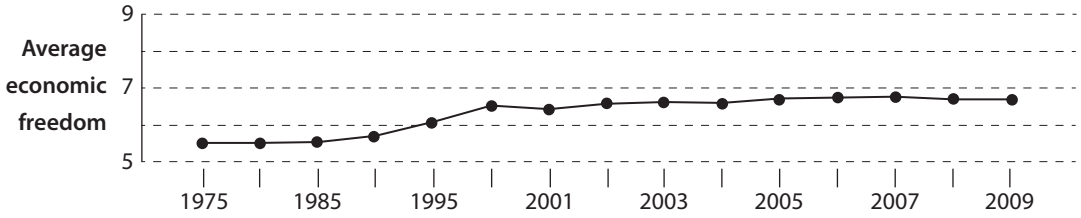


Figure 4.3b: Average economic freedom by year—credit market, 1975–2009

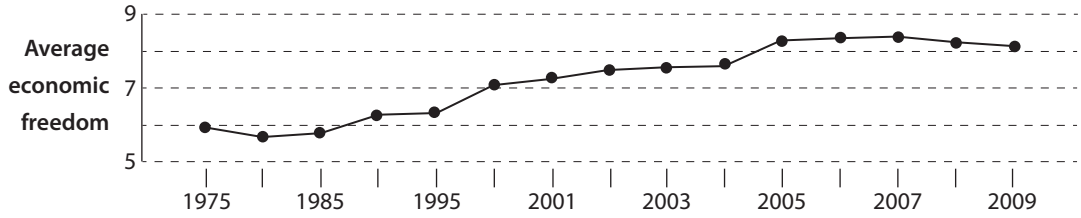
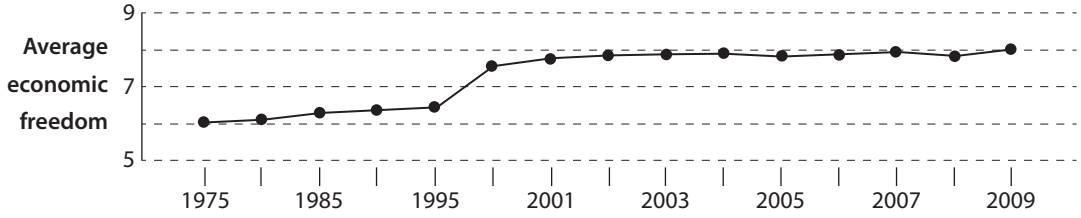


Figure 4.3c: Average economic freedom by year—sound money, 1975–2009



term "credit market freedom" although this strains the use of the word "freedom." The indicators included in the index for credit market freedom are: 1. private versus government ownership of banks; 2. approval of applications for competition by foreign banks; 3. government borrowing compared to private borrowing; and 4. interest rate controls and the magnitude of negative real interest rates if present. The indicators included in the index for access to sound money include: 1. money growth; 2. the standard deviation of inflation; 3. the level of inflation in the most recent year; and 4. citizens' freedom to own foreign bank accounts.

Overall economic freedom is highest in the late 2000s after a gradual rise from 1975 to 2000. Overall economic freedom increases relatively less than the more specific measures: economic freedom in the credit market and economic freedom in terms of having access to sound money.

Figures 4.4a, 4.4b, and 4.4c provide a more detailed view of changes in economic freedom over time. Again, the scales are the same on the vertical and horizontal axes for each of the graphs. The vertical scales are different from those in figures 4.3a, 4.3b and 4.3c because there the means do not range from almost zero to almost 10, whereas the values for individual countries do vary over almost that wide a range. Economic freedom has increased on average and higher economic freedom is more typical in 2009 than in 1975. Some countries reach levels of economic freedom in 2009 not seen in 1975, and countries less commonly have levels of economic freedom in 2009 as low as the lowest levels in 1975. The figures show much more dispersion of credit market freedom and sound money than of overall economic freedom. This is not surprising because overall economic freedom is an average of many components including credit market freedom and access to sound money. It is clear that the increases in economic freedom in credit markets and

Figure 4.4a: Economic freedom by year, 1975–2009

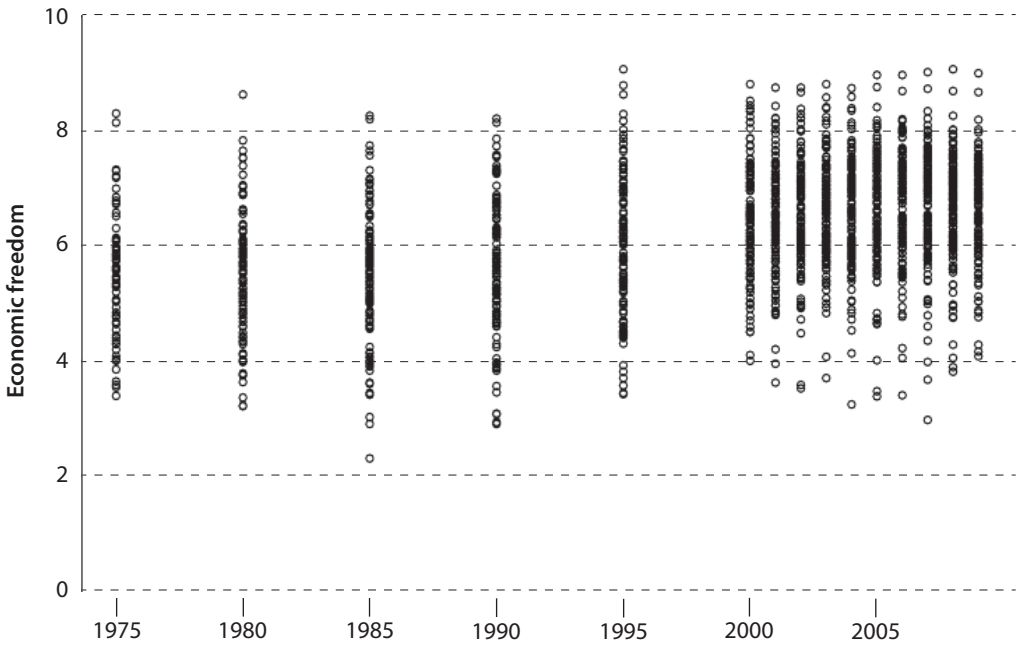


Figure 4.4b: Economic freedom by year—credit market, 1975–2009

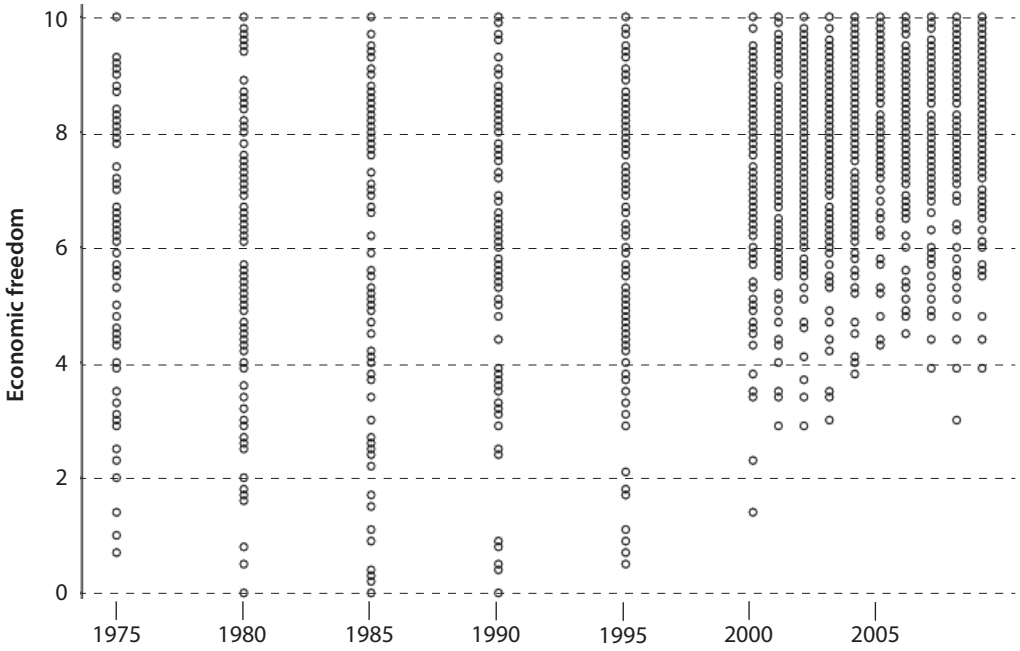
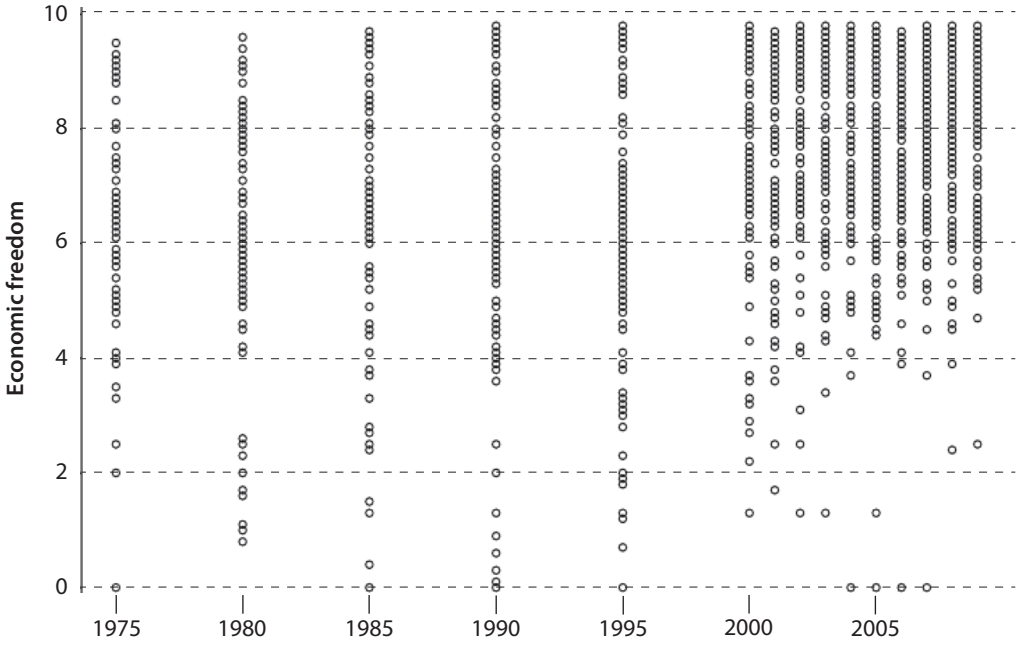


Figure 4.4c: Economic freedom by year—sound money, 1975–2009



access to sound money occurred in no small part because the countries with the lowest scores have increased their scores substantially. This is less obviously correct for overall economic freedom.

The trend of increasing economic freedom in these figures does appear to be loosely correlated with more countries being in banking crises in 2008, which is consistent with the conventional wisdom. On the other hand, it is not obvious that higher economic freedom is contributing to the banking crises across countries. A simple way to examine the relationship between economic freedom and banking crises is to classify countries based on their economic freedom and examine the frequency of banking crises for the levels of economic freedom. We use four categories for the freedom indices. The categories are:

- High economic freedom = $8 \leq$ economic freedom
- High-medium economic freedom = $6 \leq$ economic freedom < 8
- Low-medium economic freedom = $4 \leq$ economic freedom < 6
- Low economic freedom = economic freedom < 4.[6]

An observation is the five-year interval between each release of the freedom data from 1975 to 2005. For each observation, we calculate the number of countries in each category and whether the country is in a banking crisis in the five years after the observed level of economic freedom.[7] Table 4.1 provides a summary of the data. The table shows the proportion of countries in a crisis by level of economic freedom. It suggests that more economic freedom is associated with a lower proportion of countries experiencing a banking crisis.

We also examine the relationship between banking crises and deposit insurance. As indicated above, prior studies have found a relationship between banking crises and explicit deposit insurance. This can be interpreted as reflecting the effects of deposit insurance on banks' riskiness. With deposit insurance, depositors are not as concerned about the risk on banks' balance sheets. As a result, banks' interest rates on deposits become less sensitive to the riskiness of banks' activities and possible fall. If deposit insurance is associated with a higher likelihood of guarantees being provided to others providing funds to banks, the rates on those funds can become less sensitive to risk and possibly lower as well. These effects lower the cost of engaging in riskier activities, which can lead to banking crises, and banking crises become more likely. An alternative explanation of the relationship inverts the causality. Countries that are not likely to have a banking crisis also are not likely to create a deposit insurance program.

The data on deposit insurance are easily summarized. Demircüç-Kunt, Karacaovali, and Laeven (2005) and Barth, Caprio, and Levine (2008) collected data on explicit government-provided deposit insurance across countries in 2003 and 2008.[8] There are 142 countries, 75 of which (52%) had deposit insurance in

6 These four ranges are narrower than the three ranges in Gwartney, Holcombe, and Lawson, 2006.

7 The exception is 2005, for which we have four years of economic freedom from 2006 to 2009.

8 There are a few inconsistencies between the data sets. In addition, the data for 2003 include the year deposit insurance was adopted; the 2008 data do not. As a result, we had to determine adoption dates between 2003 and 2008. We adjusted the inconsistencies, determining that three countries did not have explicit deposit insurance from 1975 to 2008: the Dominican Republic, Sri Lanka, and Thailand.

Table 4.1: Economic freedom rankings and the relative frequency of countries in banking crises

	Number of observations	Number of countries in banking crisis	Proportion
Overall Economic Freedom			
High	93	11	0.12
High-middle	435	34	0.08
Low-middle	358	47	0.13
Low	95	23	0.24
Credit Market Freedom			
High	487	40	0.08
High-middle	225	20	0.09
Low-middle	154	24	0.16
Low	213	35	0.16
Access to Sound Money			
High	446	41	0.09
High-middle	350	26	0.07
Low-middle	179	22	0.12
Low	121	30	0.25

Note: This table shows the proportion of countries in banking crises by level of economic freedom for the three measures of economic freedom: overall economic freedom, credit market freedom, and access to sound money. Economic freedom is measured once every five years, from 1975 to 2005. For each level of overall economic freedom and the two components, the table shows the proportion of countries in a banking crisis in the subsequent five years.

1975. No country dropped explicit deposit insurance from 1975 to 2009 and a few countries adopted it. Morocco adopted deposit insurance in 1996; Bolivia, in 2001; Armenia and Moldova, in 2005; and Hong Kong and Singapore, in 2006. This is a fairly small change in the percentage of countries with deposit insurance, an increase from 52% to 56%.[9]

Economic freedom and the probability of having a banking crisis

We examine the relationship between banking crises and economic freedom in more detail using a linear probability model and a probit model.[10] Table 4.2 presents estimates from a simple regression of the indicator for banking crises on economic freedom and other variables. Estimates of statistical reliability are of uncertain value in

9 The stability of the countries' deposit insurance schemes indicates that dummy variables by country "explain" almost all the variation in deposit insurance across countries. This does not mean that including deposit insurance and dummy variables by country are the same because the coefficient of deposit insurance is assumed to be the same across all countries. It does mean that estimating the effect of deposit insurance in equations that include dummy variables by country is likely to be problematic.

10 Logit estimates are similar.

Table 4.2: Linear probability regression estimates of effect of economic freedom on banking crises

	Overall Economic Freedom				Credit Market Freedom				Sound Money			
Economic freedom	−0.032***	−0.031**	−0.017	−0.032	−0.013***	−0.016***	−0.012	−0.025**	−0.022***	−0.021***	−0.015*	−0.017**
GDP growth	−0.179**	−0.141	−0.119	−0.019	−0.229***	−0.177**	−0.137	−0.020	−0.183**	−0.141	−0.141	−0.056
Deposit insurance	0.047	0.049	−0.066	−0.090**	0.041	0.044	−0.064	−0.087**	0.055*	0.053*	−0.045	−0.075
Constant	0.347***	0.240***	1.152***	1.028	0.252***	0.159***	0.131	0.093	0.299***	0.311***	0.062	−0.023
Fixed effects												
Time	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R-squared	0.018	0.049	0.151	0.179	0.020	0.057	0.149	0.192	0.028	0.062	0.144	0.181
№ of observations	747	747	747	747	780	780	780	780	792	792	792	792

Note: The dependent variable equals one if the country experiences a banking crisis in the five-year interval and zero otherwise. The measures of economic freedom are the levels of overall economic freedom, credit market freedom, and access to sound money in the year before the five-year period covered by the crisis variable. GDP growth is the growth rate of real Gross Domestic Product in the five-year period before the five-year period covered by the crisis variable. Deposit insurance equals one if the country has explicit deposit insurance in the year in which economic freedom is measured and zero otherwise.

*** denotes statistical significance at the 1% level; ** denotes statistical significance at the 5% level; and * denotes statistical significance at the 10% level.

these estimates but the estimates are nevertheless informative about overall results before examining estimates from more complicated procedures.[11] We use data that span five-year intervals except for the final period. Economic freedom is based on the values at five-year intervals from 1975 to 2005.

The dependent variable indicates whether a country is in a banking crisis at any time in the following five years.[12] A value of one indicates that the country is in a banking crisis for one or more years in that period. In separate equations, we use the three measures of economic freedom discussed in the prior section, the overall freedom index, credit market freedom, and access to sound money. Because it is commonly thought that large increases in asset prices often precede a banking crisis, whether or not those increases are bubbles, we include an indicator of growth, which is likely to be associated with increases in asset prices, namely the growth rate of real GDP in the prior five-year period.[13] The equations include an

11 A benefit of a linear probability model is the ease of assessing the effect of a change in the right-hand-side variables, the effect being provided by the coefficients. In the next section, we use a probit model, which is more appropriate given a dependent variable equal to only one or zero. The coefficients of the probit model, though, do not themselves provide the marginal effects of changes in the right-hand-side variables and the marginal effects are different for every observation.

12 Our data on banking crises end in 2008, which means the final data include only three years with banking crises. This shortened time scale is not likely to make a great deal of difference given that the period includes the Financial Crisis of 2007/08.

13 To be more specific, an observation for a banking crisis between 1976 and 1980 includes the growth rate of real GDP from 1971 to 1975 on the right-hand side of the equation. We also estimated equations that include the level of real GDP in addition to these variables because economic and financial development might be related to the level of real GDP and economic

indicator for whether or not a country has explicit deposit insurance, with the indicator taking the value of one if a country has explicit deposit insurance. The values of variables on the right-hand sides of the equations occur before the dating of a banking crisis, which reduces concern that estimates are affected by reverse causality. Finally, because world-wide developments in any given year—such as 2008—may be important, some estimated equations include dummy variables to indicate the year. Similarly, countries may have different average incidences of crises and other variables for reasons unrelated to the factors considered in the estimated equations. Some equations include dummy variables by country to allow for these different average values. We included these estimates for completeness but put less weight on them because the deposit insurance variable is almost perfectly correlated with the dummy variables for countries.

The linear probability model indicates that a one-unit increase in the overall index of economic freedom is associated with a reduction of about three percentage points in the probability of there being in a banking crisis. Banking crises are not common—on average there is a 9% probability that a country will be in a banking crisis in a five-year period—and a one-unit increase in economic freedom implies a decrease of three percentage points in the probability.[14] When we include year- and country-fixed effects, an increase in the overall freedom index is also associated with a decrease of three percentage points in the probability of there being a banking crisis; the effect, however, is imprecisely measured.[15] An increase in the index for credit market freedom is associated with a reduction of about two percentage points in the probability of there being a banking crisis. The estimated results are similar when indicators are included for country and time. The evidence in the table indicates that higher GDP growth is associated with a lower probability of a banking crisis, if there is any relationship. This is consistent with an explanation of banking crises being the result of low growth but not necessarily supportive of an explanation based on extraordinary and unsustainable prosperity—"bubbles" or "credit booms." The countries with explicit deposit insurance in table 4.2 hardly changed, suggesting there is limited evidence about deposit insurance in these data when dummy variables for each country are included in the estimates. In regressions without dummy variables by country, the estimates of deposit insurance's coefficients are consistent with increases in deposit insurance increasing the probability of a banking crisis. The coefficients, however, also are imprecisely measured. On net, we interpret table 4.2 as providing some evidence that deposit insurance makes banking crises more likely.

Table 4.3 presents the estimates of the effects of economic freedom on the probability of there being in a banking crisis in the next five years based on a probit model. The results in table 4.3 provide substantial support for an inverse relationship

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freedom. The estimated coefficients for economic freedom and their statistical signficance hardly change. The data for real GDP are from the World Bank Development Indicators Database online in early 2012.

14 Of course, the linear model makes extrapolation difficult because at some point the probabilities will become negative or greater than one. The following probit analysis allows us to examine the effect of economic freedom at different levels without this problem.

15 The errors in this equation are heteroskedastic, which implies standard errors of estimated coefficients are not consistently estimated and statements of statistical significance are at best approximate.

Table 4.3: Probit Estimates of Effect of Economic Freedom on Banking Crises

	Overall Economic Freedom				Credit Market Freedom				Sound Money			
Economic freedom	−0.138***	−0.144**	−0.070	−0.155	−0.058***	−0.073***	−0.047	−0.130**	−0.084***	−0.083***	−0.056	−0.049
GDP growth	−0.681**	−0.061	−0.591	−0.133	−0.898***	−0.63**	−0.6663	−0.081	−0.704*	−0.505	−0.659	−0.218
Deposit insurance	0.225**	0.234*	−0.275	−0.558**	0.129	0.215	−0.261	−0.527*	0.246*	0.230*	−0.198	−0.486*
Constant	−0.220	−0.078	−0.567	0.186	−0.632***	−0.398	0.622	0.158	−0.505***	−0.377***	−0.611	0.445
Fixed effects												
Time	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Psuedo R-squared	0.021	0.064	0.064	0.134	0.023	0.074	0.066	0.149	0.036	0.078	0.075	0.135
№ of observations	747	747	525	525	917	780	554	554	792	792	565	565

Note: The dependent variable equals one if the country experiences a banking crisis in the five-year interval and zero otherwise. The measures of economic freedom are the levels of overall economic freedom, credit market freedom, and access to sound money in the year before the five-year period covered by the crisis variable. GDP growth is the growth rate of real Gross Domestic Product in the five-year period before the five-year period covered by the crisis variable. Deposit insurance equals one if the country has explicit deposit insurance in the year in which economic freedom is measured and zero otherwise.

*** denotes statistical significance at the 1% level; ** denotes statistical significance at the 5% level; and * denotes statistical significance at the 10% level.

between banking crises and economic freedom. Whether measured by overall economic freedom, credit market freedom, or access to sound money, higher economic freedom is associated with a lower probability of a banking crisis. The estimated effect of GDP growth is consistently negative although only statistically significant when economic freedom is measured by credit market freedom. The estimated coefficients for deposit insurance are positive but not statistically significant at the 5% significance level when dummy variables for each country are excluded from the regressions. The point estimates are consistent with the possibility that deposit insurance increases the probability of a banking crisis but they also are consistent with no effect. Because probit estimates are nonlinear, the coefficients in table 4.3 do not provide estimates of the marginal change in the probability of a banking crisis with increases in economic freedom.

Table 4.4 presents estimates of the probability of a country being in a banking crisis for the four different levels of economic freedom: high, high-middle, low-middle, and low. These estimated probabilities are calculated from the probit estimates (columns 2, 6, and 10 in table 4.3) using the coefficient estimates and the mean values of the right-hand-side variables for each the countries in each of the groups. Because deposit insurance is measured by a dummy variable, countries are classified into countries with and without deposit insurance and the table shows the probability of a banking crisis separately for countries that have deposit insurance and those that do not.[16] These estimated probabilities should be roughly similar to the proportions

16 In columns 2, 6, and 10, the statistical relationship between deposit insurance and the likelihood of a banking crisis is positive. This implies that having deposit insurance means a country is more likely to be in a banking crisis.

Table 4.4: The probability of being in a banking crisis for different levels of economic freedom

	Overall Economic Freedom Index		Credit Market Regulations		Sound Money	
	No deposit insurance	Deposit insurance	No deposit insurance	Deposit insurance	No deposit insurance	Deposit insurance
High economic freedom	0.079	0.117	0.097	0.137	0.091	0.132
High-middle economic freedom	0.105	0.152	0.124	0.170	0.123	0.174
Low-middle economic freedom	0.205	0.147	0.150	0.202	0.146	0.202
Low economic freedom	0.209	0.279	0.210	0.273	0.220	0.289

Note: This table shows the predicted probability of a country being in a banking crisis in a five-year period given the level of economic freedom and whether or not the country has deposit insurance and the average level of GDP growth in the prior five years.

All estimates are statistically significant at the 5% significance level and most at the 1% significance level.

in table 4.1.[17] Table 4.4 shows that the relationship between economic freedom and the likelihood of a country being in a banking crisis can be important. For example, a country with high economic freedom and no deposit insurance on average has an 8% probability of having at least one year in a banking crisis in the following five years. A country with low economic freedom and no deposit insurance has a 21% probability of having a banking crisis. Deposit insurance itself increases the probability of being in a banking crisis given the level of economic freedom, consistent with the positive coefficients in the underlying probit estimates.

Marginal probabilities, the effects of changes in the right-hand-side variables on the left-hand-side variables, also are of interest. Table 4.5 provides estimates of marginal probabilities for the four levels of economic freedom and for countries that have deposit insurance and those that do not. The estimates are based on the same estimated equations as table 4.4. The marginal probabilities presented in the table show the effect a one-unit change in economic freedom on the probability of being in a banking crisis. To calculate the response probabilities, we use the coefficient estimates from the probit equations and evaluate changes in the probabilities using the mean values of the right-hand-side variables. Unlike the linear probability model, the response probabilities from the probit estimates are nonlinear and differ depending on the level of economic freedom. Table 4.5 indicates that countries with low economic freedom experience the biggest decrease in the probability of being in a banking crisis when economic freedom increases by one unit. This relationship holds for all three measures of economic freedom, and deposit insurance enhances this effect.

Banking crises and subsequent economic freedom

After a banking crisis, does economic freedom increase or decrease? Casual observation of experience since the Financial Crisis of 2007/08 suggests that economic freedom declines. Table 4.6 presents estimates for banking crises from 1976 to 2005. These estimates use the measures of economic freedom on the left-hand sides of regressions and an indicator of whether the country is in a banking crisis in prior years. We use an indicator for whether the country was in a banking crisis at any

17 The growth of real GDP and dummy variables for years effects account for the largest part of the difference.

Table 4.5: The estimated change in the probability of a banking crisis for an increase in economic freedom by unity

	Overall Economic Freedom Index		Credit Market Regulations		Sound Money	
	No deposit insurance	Deposit insurance	No deposit insurance	Deposit insurance	No deposit insurance	Deposit insurance
High economic freedom	–0.020	–0.027	–0.012	–0.015	–0.013	–0.017
High-middle economic freedom	–0.032	–0.025	–0.014	–0.018	–0.016	–0.020
Low-middle economic freedom	–0.032	–0.039	–0.016	–0.019	–0.018	–0.022
Low economic freedom	–0.039	–0.046	–0.020	–0.023	–0.023	–0.027

Note: This table shows the marginal effect of a change in economic freedom on the probability of being in a banking crisis in the subsequent five years given the level of economic freedom, whether or not the country has deposit insurance and the average level of GDP growth in the prior five years.

All estimates are statistically significant at the 5% significance level and most at the 1% significance level.

Table 4.6: Banking crises and subsequent economic freedom

Dependent Variable	Overall Economic Freedom				Credit Market Freedom				Sound Money			
Banking crisis	–0.413***	–0.400***	–0.267***	–0.232***	–0.721***	–0.595***	–0.425***	–0.291**	–1.025***	–0.975***	–0.735***	–0.667***
Banking crisis lagged	–0.230*	–0.365*	0.148	0.009	–0.060***	–0.232	0.525**	0.361**	–0.666***	–0.865***	–0.028	–0.203
Constant	6.196***	5.505***	7.454	6.146***	6.930***	5.451***	9.287***	6.612***	7.234***	6.864***	8.518***	7.033***
Fixed effects												
Time	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Country	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R-squared	0.015	0.190	0.551	0.772	0.008	0.197	0.462	0.665	0.030	0.147	0.399	0.546
№ of observations	855	855	855	855	872	872	872	872	877	877	877	877

Note: The dependent variable is economic freedom measured at five-year intervals starting in 1980 and ending in 2005. The measures of economic freedom are the levels of overall economic freedom, credit market freedom, and access to sound money. The dummy variable for a banking crisis equals one if there is a banking crisis in the prior five years and equals zero otherwise. The lagged value is an indicator for a banking crisis six to ten years before the measured level of economic freedom.

*** denotes statistical significance at the 1% level; ** denotes statistical significance at the 5% level; and * denotes statistical significance at the 10% level.

time in the previous five years. The effect of a crisis may continue for more than five years, and we also include an indicator for whether the country was in a banking crisis six to 10 years ago. We present estimates with and without indicators for the years and countries.

The evidence is unequivocal. Economic freedom decreases after a financial crisis. The effect is largest for access to sound money. The estimated change in access to sound money varies from a high of one index point to a low of two thirds of a point, which is a tight range given the variability evident in figures 4.3 and 4.4. The index for sound money reflects four equally weighted components: 1. money growth; 2. the standard deviation of inflation; 3. the level of inflation in the most recent year; and 4. citizens' freedom to own foreign bank accounts. The change in one or more of these components is substantial. Credit market freedom also falls, indicating that our result for overall economic freedom is not solely due to effects on access to sound money.

Our results are different from those in the last part of the paper by de Haan, Sturm, and Zandbergde (2009). They find that economic freedom falls in the year after banking crises but is higher five years later. Our results are for five-year periods only, and we find that economic freedom is lower. There are some differences in the specifications that may affect the results.[18] Perhaps most importantly, they include the lagged value of economic freedom on the right-hand sides of the equations and include dummy variables for countries. There is a large literature on estimators of dynamic panel models such as these that indicates that such estimates are problematic. Rather than deal with these complicated problems directly, we do not include lagged values of economic freedom in the estimated equations. While not fully satisfactory either, our relatively simple estimates by ordinary least squares are likely to recover the sign if not the magnitude of the long-run effects of banking crises.

Conclusion

The financial crisis that began in many countries has yet to run its course completely in 2012. A financial crisis that began in banks and financial markets has become a sovereign-debt crisis, partly due to ensuing deficits associated with severe recessions, partly due to obligations associated with bailouts of financial institutions, and partly due to extravagant increases in government spending. While a final summary of this financial crisis cannot yet be written, past financial crises can be informative about what might be expected if this one follows a course similar to those in the past.

Our results from that crisis and prior ones indicate that higher economic freedom is associated with a lower probability of a banking crisis. And the effect is substantial. This is the opposite of what may well be conventional wisdom: "deregulation" or economic freedom more generally made the financial crisis more likely. Our results indicate this conventional wisdom is incorrect. More economic freedom makes banking crises such as the recent one less likely.

Given this result, it seems at best odd that lowering economic freedom is the common reaction to a crisis. If lower economic freedom makes a financial crisis more likely, responding to a crisis by lowering economic freedom makes a subsequent crisis more likely, not less. One reaction would be simply to assert that politicians and citizens are stupid or irrational and be satisfied with this explanation. We think such a reaction is not warranted and is less informative than examining developments in more detail. Our results indicate that access to sound money is most adversely affected by banking crises, and this may well reflect higher inflation or restricted access to foreign exchange. Our results also indicate that credit market regulation increases after a financial crisis. These changes and possibly changes in other components of economic freedom are associated with lower overall economic freedom. Further research on these issues will be quite informative about responses to financial crises.

18 A superficial difference is de Haan et al.'s (2009) use of the change in economic freedom as the dependent variable and the lagged level of economic freedom on the right-hand side of their equations and our use of the level of economic freedom on the left-hand side and the lagged level on the right-hand side, but this only affects the estimated coefficient of lagged economic freedom by a linear transformation. Our estimated coefficients on lagged economic freedom are comparable to their coefficients plus unity.

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