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Financial Fragility: Issues and Policy Implications

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1. Introduction

This article addresses the question of how financial institutions, contracting forms, and government financial policies affect the degree of macroeconomic volatility. Models that posit such relationships are sometimes referred to as models of "financial fragility." These models explore ways in which the financial system can add to the volatility of economic activity by defining sources of financial "shocks" and financial "propagators" of other shocks. Financial shocks are defined as disturbances to the real economy that originate in financial markets. Financial propagation refers to the ways in which financial contracts, markets, and intermediaries can serve to aggravate shocks that originate elsewhere. Economists have not always been receptive to the idea that financial arrangements matter for business cycles. From the standpoint of traditional neoclassical general equilibrium theory, financial arrangements (which include financial contracting, the actions of financial intermediaries, and government policies toward the financial sector) typically are viewed as epiphenomenal—simply as a set of mechanisms for executing Arrow-Debreu contingent claims to allocate resources optimally. Mainstream macroeconomists and finance specialists of the 1960s seemed to agree.[1] Corporation financial decisions were neutral according to Modigliani and Miller (1958), with the addition of minor caveats to take account of physical bankruptcy costs and tax incentives; and firms all faced identical costs of funds adjusted for systematic risk factors according to the capital asset pricing model. Thus, there was no call to object to the standard IS-LM macroeconomic framework's assumption that all firms effectively faced the same cost of funds (summarized by "the" interest rate) and that this cost equaled the marginal product of capital.

One of the reasons that macroeconomic theorists and financial economists have changed paradigms in recent years, and have come to view financial relationships as more than epiphenomenal, is the growing evidence that financial relationships affect the volatility of economic activity. Such effects fall into two categories—namely, financial shocks to the macroeconomy, and financial propagators of disturbances that originate elsewhere.[2] Models that incorporate these financial effects imply "excessive" volatility of output from the standpoint of the neoclassical benchmark model. In an environment that allows financial arrangements to act as sources and propagators of shocks, output will vary more than in an environment in which financial arrangements are merely epiphenomenal.

In this article, I will briefly review a small subset of the theory and evidence that underlie the argument that financial factors can contribute to macroeconomic volatility. I do not provide a comprehensive review of the literature here; rather my aim is to illustrate important categories of effects and supporting evidence for those ideas.[3] In conclusion, I consider appropriate policy responses in light of theory and evidence.

2. Financial propagators

Some of the most important financial propagators include: (1) the cash-flow constraint, (2) balance-sheet (or more narrowly, leverage) constraints, (3) external supply-of-funds constraints (limitations on bank credit), and (4) financial regulations that magnify business cycles. These constraints really are not different phenomena, but different aspects of the same underlying costs of information and control attendant to corporate finance. Each acts as a financial propagator, in the sense that, relative to the benchmark of neoclassical financial neutrality, the economic activity of firms is more volatile in response to variation in exogenous disturbances as a result of these related factors.

2.1. The cash-flow constraint

The "cash-flow constraint" is simply shorthand for the statement that firms raise funds more cheaply internally than externally. Information and transaction costs account for the wedge between the cost of internal and external funds (e.g., Stiglitz and Weiss, 1981; Bernanke and Gertler, 1990; Greenwald and Stiglitz, 1990; Calomiris and Hubbard, 1990). This constraint increases the sensitivity of investment to changes in firm earnings (a "financial accelerator"), and thus makes investment more volatile that under the standard neoclassical, "flexible-accelerator" model. Empirical evidence from panel data studies emphasizes that this effect is not uniform across firms (Fazzari, Hubbard, and Petersen, 1988; Calomiris and Hubbard, 1995; Bernanke, Gertler, and Gilchrist, 1994; Calomiris, Himmelberg, and Wachtel, 1995; Kashyap, Owen, and Stein, 1993; Carpenter, Fazzari, and Petersen, 1993; Himmelberg and Petersen, 1993). Firms with identifiably higher costs of external finance display much greater cash-flow sensitivity of fixed investment and inventory accumulation, even after controlling for fundamental investment opportunities (using innovations in sales, or measures of Tobin's Q).[4]

Calomiris and Hubbard (1995) analyze the characteristics and behavior of different classes of firms, divided according to their shadow costs of external finance. The shadow cost of external finance is derived from the firms' responses to the undistributed profits tax of 1936, which placed a progressive surtax on retained earnings. They find that firms with high external finance costs tend to be small, tend to have high debt ratios and low ratios of profits to sales, and tend to experience high profits growth. Calomiris and

Hubbard argue that these attributes can be seen as characteristics of "unseasoned" credit risks, that is, of fast growing firms, that require the discipline of short-term debt when financing themselves externally, and which have not achieved their long-run scale of operations.

Table 1 shows that firms facing high costs of external finance exhibit much greater cash-flow sensitivity of fixed investment and working capital investment than other firms,

Table 1. The cash-flow sensitivity of investment in fixed capital and working capital by firms' costs of external finance (A = Low, B = Middle, C = High)

Fixed Capital Investment Regressions, 1936				
Regression number	(1)		(2)	
Dependent variable	I_{1936}/K_{1935}		I_{1936}/K_{1935}	
Number of observations	244		244	
Adjusted *R*-squared	0.063		0.217	
	Coefficient	Standard error	Coefficient	Standard error
Constant	−0.019	0.022	0.015	0.021
Type B			−0.037	0.036
Type C			−0.112	0.051
Q_{1935}	0.044	0.016	0.024	0.011
Q_{1935} × Type B			0.024	0.019
Q_{1935} × Type C			0.039	0.051
$(CF_{1935} + CF_{1936})/K_{1935}$	0.018	0.016	−0.004	0.014
$[(CF_{1935} + CF_{1936})/K_{1935}]$ × Type B			0.003	0.018
$[(CF_{1935} + CF_{1936})/K_{1935}]$ × Type C			0.248	0.100
Change in Working Capital Regression, 1936				
Regression number	(1)		(2)	
Dependent variable	$\Delta WK_{1936}/K_{1935}$		$\Delta WK_{1936}/K_{1935}$	
Number of observations	244		244	
Adjusted *R*-squared	0.276		0.209	
	Coefficient	Standard error	Coefficient	Standard error
Constant	−0.016	0.047	−0.017	0.048
Type B	−0.025	0.076	−0.031	0.079
Type C	−0.211	0.385	−0.149	0.300
Q_{1935}	0.054	0.040	0.046	0.037
Q_{1935} × Type B	−0.026	0.067	0.002	0.068
Q_{1935} × Type C	0.171	0.257	0.354	0.355
$(CF_{1935}+CF_{1936})/K_{1935}$	−0.028	0.056		
$[(CF_{1935}+CF_{1936})/K_{1935}]$ × Type B	0.214	0.061		
$[(CF_{1935}+CF_{1936})/K_{1935}]$ × Type C	1.005	0.737		
CF_{1935}/K_{1935}			−0.023	0.093
CF_{1935}/K_{1935} × Type B			0.390	0.100
CF_{1935}/K_{1935} × Type C			0.841	1.447

Note: Heteroscedasticity-consistent standard errors are presented.
Source: Calomiris and Hubbard (1995).

after controlling for firm opportunities as measured by Tobin's Q. Moreover, the sensitivity of working capital is especially pronounced, which is consistent with the notion that firms with high finance costs self-insure against cash-flow fluctuations with working capital. They accumulate liquid assets during high earnings periods and draw them down during low earnings periods. Other firms, with lower cost access to external finance need not follow this same practice.

Calomiris, Himmelberg, and Wachtel (1995) study the characteristics of firms that differ in terms of access to credit markets. At the top of the "pecking order" are firms with access to commercial paper and rated bond markets; next are those with access to rated bond markets only; and at the bottom are firms without any rated debt. The researchers find that the size of firms, and their stocks of liquid assets, vary importantly across credit classes. Firms with limited access to credit markets tend to be smaller firms with larger stocks of liquid assets (inventories and financial working capital). As in Calomiris and Hubbard (1995), Calomiris, Himmelberg, and Wachtel show that the sensitivity of a firm's inventory accumulation or financial working capital investment decreases with the firm's access to sources of external finance.

The conclusions of these and other recent panel studies of cash-flow sensitivity are that fixed investment, R&D investment, and working capital investment are all "excessively" sensitive to cash flow (relative to the benchmark neoclassical model of investment). Sensitivity to cash flow (or "financial slack") varies systematically with the firm's costs of external finance. Liquid assets (inventories, cash, and net accounts receivable) tend to be most sensitive to cash flow, reflecting their role as a "buffer stock" to prevent fixed capital (which is costly to adjust) from fluctuating as much in response to earnings shocks. All of the above-referenced studies conclude that the "financial accelerator" is an important contributor to the macroeconomic relationship between earnings and investment.

2.2. Balance-sheet constraints

Since Keynes (1931) and Fisher (1933), economists have considered the possible role of balance sheets as "state variables" that propagate shocks. In simpler terms, firms with large amounts of debt relative to assets, or with large ratios of illiquid assets relative to liquid assets, may find it particularly difficult to attract additional external funds if sales demand falls off. Firms that increase their leverage during booms run the risk of suffering a greater response of their investment levels to any given decline in demand. This "debt-overhang effect" was invoked by several academics and chroniclers to explain the slow recovery from the recent recession in the United States and Great Britain, among other countries. Clearly, balance-sheet constraints and earnings constraints work together. "Financial slack" (as defined by Myers and Majluf, 1984) includes the firm's available internally generated funds, its liquid assets, and its capacity to float riskless debt. Thus, leverage constraints that restrict future borrowing can have a similar effect to that resulting from reductions in cash flow.

Table 2, drawn from Calomiris, Orphanides, and Sharpe (1994) provides evidence of the importance of a debt-overhang effect for employment, inventory accumulation, and

Table 2. The effect of leverage on employment, inventories, and investment

Variables	Employment	Inventories	Investment
Constant	−0.011	−0.006	−0.001
	(0.002)	(0.003)	(0.002)
Lag Dependent Variable	0.110	0.203	0.048
	(0.016)	(0.017)	(0.019)
Leverage	−0.011	−0.014	0.024
	(0.008)	(0.013)	(0.009)
Total Assets	−0.012	0.000	−0.005
	(0.010)	(0.015)	(0.010)
EXP × "Sales"	0.398	0.513	0.031
	(0.013)	(0.021)	(0.004)
REC × "Sales"	0.418	0.327	0.044
	(0.018)	(0.028)	(0.005)
EXP × LEV × "Sales"	−0.045	−0.326	−0.024
	(0.049)	(0.077)	(0.008)
REC × LEV × "Sales"	0.449	1.519	0.028
	(0.121)	(0.191)	(0.006)
EXP × Assets × "Sales"	−0.276	−0.384	0.066
	(0.071)	(0.111)	(0.015)
REC × Assets × "Sales"	0.600	1.070	0.062
	(0.163)	(0.256)	(0.018)
Adjusted *R*-Squared	0.191	0.118	0.045

Variable definitions: Employment and inventories are defined as log differences; investment is defined as the ratio of gross fixed investment to fixed capital. In the employment and inventories regressions, sales are defined as a log difference, while in the investment regression sales are defined as the ratio of sales to capital. Sales are defined over a two-year period (lagged plus contemporaneous years), while dependent variables are defined over one year. Sales are instrumented using firm-level and economy-wide lagged variables. EXP is an indicator variable for non-recession phases of the business cycle, and REC is an indicator variable for recession phases. LEV is an abbreviation for leverage. Standard errors are corrected for heteroskedasticity.
Source: Calomiris, Orphanides, and Sharpe (1994).

fixed capital investment, for a sample of U.S. durables manufacturers between 1959 and 1985. The table shows that the responsiveness of each of these three variables to an exogenous (instrumented) change in sales was conditioned by the lagged leverage of the firm. During times of increasing sales, higher leverage had little effect, but acted to dampen the responses of employment, inventory accumulation, and fixed capital to changes in demand; during times of decreasing sales, higher leverage magnified the decline in these variables in response to falling sales. This is consistent with the notion that debt overhang can punish firms that expand through debt during booms with greater contractions during recessions.

2.3. Supply-of-funds constraints

The recent banking/corporate finance literature has emphasized the role of intermediaries in reducing costs of external finance (for a review, see Bhattacharya and Thakor,

1994). Microeconomic studies have provided clear evidence of the importance of banks (often referred to as "delegated monitors") in reducing financing costs. For example, Slovin, Sushka, and Polonchek (1993) find that borrowers from Continental Bank suffered excess negative stock returns during its 1983 crisis, and excess positive returns during its rehabilitation. The magnitude of these returns depended on the "exclusivity" of the relationship between Continental and the borrower. Similar value-creating banking relationships were found by Petersen and Rajan (1994).

Macroeconomists have argued that shocks to the economy which reduce the net worth of banks and their borrowers, and possibly cause many bank failures, can magnify the effects of those initial shocks both by weakening borrowers' balance sheets and by reducing the supply of credit available to borrowers who depend on banks as sources of funds (Bernanke, 1983; Bernanke and Gertler, 1989; Calomiris and Hubbard, 1989; Grossman, 1993).

American macroeconomic history saw frequent episodes of banking panics or waves of bank failures, which did not always coincide.[5] Calomiris and Gorton (1991) show that historical banking panics resulted when a sufficient amount of sudden bad news about bank borrowers led depositors, who were unable to observe the precise incidence of the disturbance across banks, to doubt the solvency of their banks.[6] Banking panics during the period 1880–1913 followed moments of rapid decline in the stock market which were also associated with large (seasonally adjusted) increases in the liabilities of failed businesses. These panics occurred at business cycle peaks. While banking panics were the result of adverse macroeconomic news, they magnified the effects of that news by forcing a shrinkage of credit and disorder within the payments system. This sometimes resulted in suspension of bank convertibility (typically, for several weeks), until the uncertainty over the incidence of the disturbance within the banking system could be resolved.

Calomiris and Mason (1994) argue that the banking crises of the 1930s were different from these earlier banking panics in several respects. The collapse of the 1930s occurred in the midst of a severe depression rather than at a business cycle peak, and was associated with enormous fundamental declines in bank asset values. The transmission of bank instability was from "the bottom up"—initially bank distress was largely limited to small, rural banks, then it spread to regional financial centers, and eventually to national financial centers. Calomiris and Mason argue that existing evidence supports the view that, like bank failures during the earlier era, bank failures in the 1930s seem attributable to fundamental insolvency rather than to unwarranted closures of banks as a result of confusion or panic.

2.4. Regulatory distortions: Unit banking, credit subsidies, deposit insurance

It follows from the discussion thus far of financial "non-neutrality" that regulatory interventions by the government can affect the stability of the economy through the interventions' influences on financial contracting and financial institutions. Three illustrative examples from the U.S. experience are (1) regulations limiting bank consolidation, (2) direct and indirect credit subsidies to farming and real estate, and (3) deposit insurance.

Calomiris (1993a) reviews the history of unit banking restrictions in the United States, and argues that it was a significant contributor to American financial and economic instability. Unit banking meant greater fragility of individual banks due to less diversification and less potential for coordination among banks in response to crises. Unlike the banking systems of Britain, Canada, and Australia, the U.S. banking system was prone to large numbers of failures and to episodes of suspension of convertibility. And unlike those other systems, U.S. banks were unable to develop nationwide arrangements to coinsure risk and limit system-wide crises. Not only were individual bank failures, credit crunches, and banking panics unusually likely in the United States, but they seem to have been an especially important contributor to business cycles, as compared to other countries.

Calomiris (1995) and Calomiris and Raff (1995) argue that unit banking also inhibited the development of efficient bank-firm relationships during the pre-World War I industrial revolution. Unit banking implied a scale mismatch between the new large industrial firms and their bankers. This created a relatively high cost of external finance for American firms, and may have magnified the "financial accelerator" in the United States.

Government directed-credit programs or assistance to banks can also be destabilizing, especially when asset markets are subject to bubbles and crashes. Carey (1994) argues that subsidized financial structures that weaken or remove lenders' vigilance against the credit risk associated with asset price bubbles can magnify shocks and promote bubbles and crashes. Such structures have the effect of subsidizing and amplifying the overinvestment behavior of excessively optimistic people.

Carey draws empirical evidence from panel data on the behavior of the market for U.S. farm land and related credit markets during the period 1970–1990. Land is different from some financial assets (like stock) in that land is in fixed supply, and it is virtually impossible to sell short individual tracts of land. His model permits agents to have heterogeneous beliefs about the future, and, in the absence of short-selling, this means that optimists will set the price of land, since only those who already own land or who are interested in purchasing land will influence land's market value. If a group of agents controlling sufficient wealth becomes sufficiently overoptimistic about land values, it will push land prices away from fundamental values.

Lenders' behavior is key to the size of the distortion produced by the short-selling restriction. Lenders can dampen the price effect by refusing to loan to the optimists, as would be prudent. But if lenders are insensitive to credit risk, and willing to lend to optimists, they allow optimists to push up land prices. This, in turn, may boost further optimism and further excessive investment through the effect which inflated land values have on future borrowers' willingness to borrow, and future bankers' estimates of collateral.

Carey argues that the Farm Credit System was especially guilty of "feeding the optimists" during the agricultural boom and bust cycle of the 1970s and 1980s. Figure 1 plots the path of the real price of farm land during that period. Figure 2 plots the share of the Farm Credit System in net new farm mortgage lending. This lender's incentive structure and guaranteed funding sources made it unlikely to be vigilant or wary of a land market bubble when making loans. Unsurprisingly, its share of net new lending went to 100 percent, as prices approached the peak. A federal bailout of the Farm Credit System was ultimately the result of its imprudence, but that cost was only a fraction of the total cost of years of misdirected resources used to finance an unwarranted expansion.

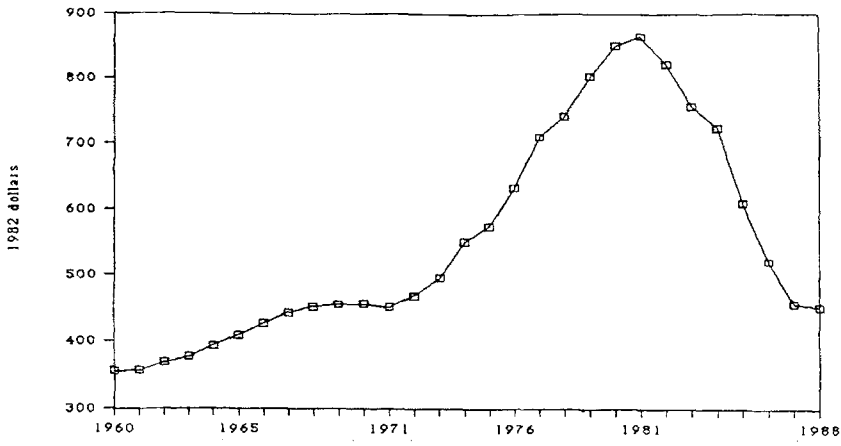

Figure 1. Average U.S. farm land price, constant dollars (Source: Carey (1994)).

The broad lessons from Carey's work are that bubbles should be taken seriously as risks when designing financial institutions or government credit programs, and that government subsidies (broadly defined) can significantly amplify macroeconomic shocks. By feeding the optimists, and promoting asset price bubbles, distortionary subsidies that the U.S. government provided to real estate investment may have played an important role in the agricultural boom and bust of the 1970s and 1980s (Calomiris, Hubbard, and Stock, 1986; Carey, 1994), in the southwestern oil and real estate boom and bust of the 1970s and 1980s (Horvitz, 1992), and in the urban real estate boom and bust of the 1980s.

Deposit insurance was part of the credit subsidy to investments in land during the recent booms, and once land and oil prices began to fall, the perverse incentives created by fixed-price deposit insurance added significantly to the subsidization of high-risk real estate investments financed through savings and loans, and in Texas, through commercial banks (Horvitz, 1992; Brewer, 1994). Boyd and Gertler (1994) also link the perverse incentives of the "too-big-to-fail" doctrine to the poor performance of large eastern banks, which undertook large amounts of high-risk lending for commercial real estate projects. The fallout of the banking and savings and loan losses and failures of the 1980s was a "capital crunch" that restricted surviving banks' abilities to lend (Baer and McElravey, 1992), and thus magnified the contractionary effects of the asset price declines.

Calomiris (1990, 1992) studies historical experiments with state-sponsored deposit insurance in several states during the 1920s. Deposit insurance acted as a credit subsidy to speculative agricultural expansion and produced a boom-and-bust cycle during the period 1914–1930 which was in many ways similar to the events of the 1970s and 1980s (Calomiris, 1990, 1992). During the years of high relative prices for agricultural products, states that had passed state-level bank deposit insurance laws—effectively subsidizing rural agricultural finance by small, vulnerable unit banks—experienced faster growth in their agricultural sectors and in bank assets than did other states. They also suffered greater losses on bank assets once the collapse came.

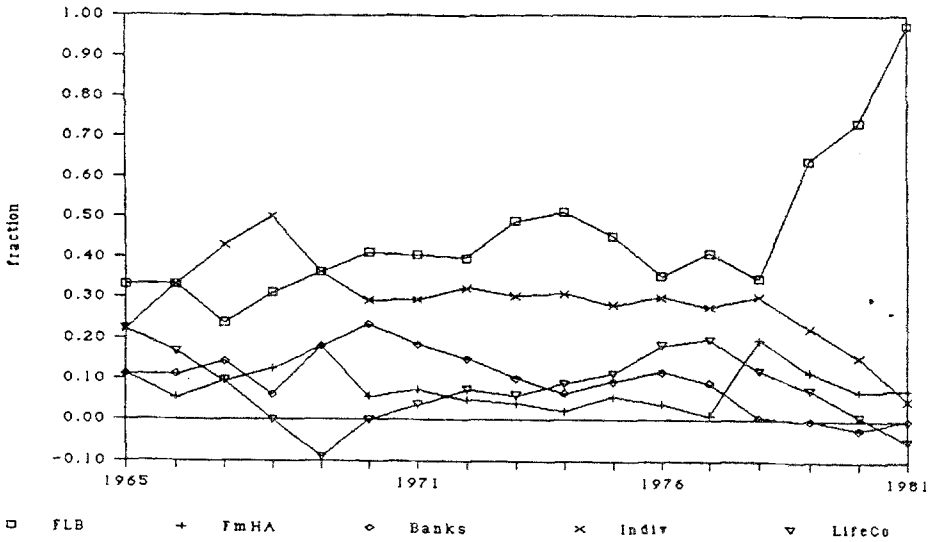

Figure 2. Changes in the fraction of new new real estate loans made by each type of lender as land prices increased during the boom (FLB = Federal Land Banks of the Farm Credit System; FmHA = Farmers Home Administration; Banks = Commercial Banks; Indiv = Non-Bank Lenders.) (Source: Carey (1994)).

The message in these regulatory examples is that financial and macroeconomic instability, manifested in waves of bank failures, banking panics, land price bubbles, and collapses in banks' abilities to lend, can be the unintended consequences of financial regulation. Ironically, the stated purposes of unit banking laws, oil, farm and real estate subsidies, and deposit insurance regulation are often at odds with the consequences of the regulations.

3. Financial shocks

Thus far I have emphasized ways in which financial arrangements can magnify disturbances that originate in "fundamentals" such as international price declines or sales demand. But financial shocks can be as important as financial propagators in contributing to macroeconomic fragility. Sometimes the distinction between financial shocks and propagators is unclear. For example, during the Great Depression, or more generally during periods of tight monetary policy, bank credit declines may have been important sources of initial shock in the economy, as well as propagators of other shocks.

Examples of shocks that unambiguously originated in the financial sector are hard to identify, particularly since asset prices respond to expectations of future shocks that have originated elsewhere, and because monetary policy (an important source of financial shock) itself responds to economic news.

One clear example of an exogenous shock coming from a financial disturbance is the commercial paper crisis of June 1970 (the Penn Central Crisis). While the collapse of Penn Central was the result of fundamental insolvency rather than a financial shock, the reverberations of its failure constituted a financial shock for other commercial paper issuers. The crisis is described in detail in Calomiris (1994). In June 1970, Penn Central, a large railroad firm with significant real estate holdings, declared bankruptcy and defaulted on its outstanding debts, including a substantial amount of commercial paper. The surprising, unprecedented failure of so prominent an issuer as Penn Central sent shock waves through the commercial paper market, and set the stage for a reevaluation of the requirements for access to this market, the method for rating issuers, and the "backup" arrangements (from banks) that were necessary for commercial paper programs. The immediate effect of the crisis was the refusal to roll over large quantities of the maturing commercial paper of other firms, that is, a "run" on commercial paper, as shown in figure 3. This forced issuers to seek emergency loans from banks en masse, a process that could have had important macroeconomic consequences for interest rates and the availability of credit. The intervention of the Fed, which encouraged banks to borrow at the discount window to finance loans to issuers, prevented the crisis from materializing, by targeting subsidized credit (indirectly through banks) to issuers with maturing paper.

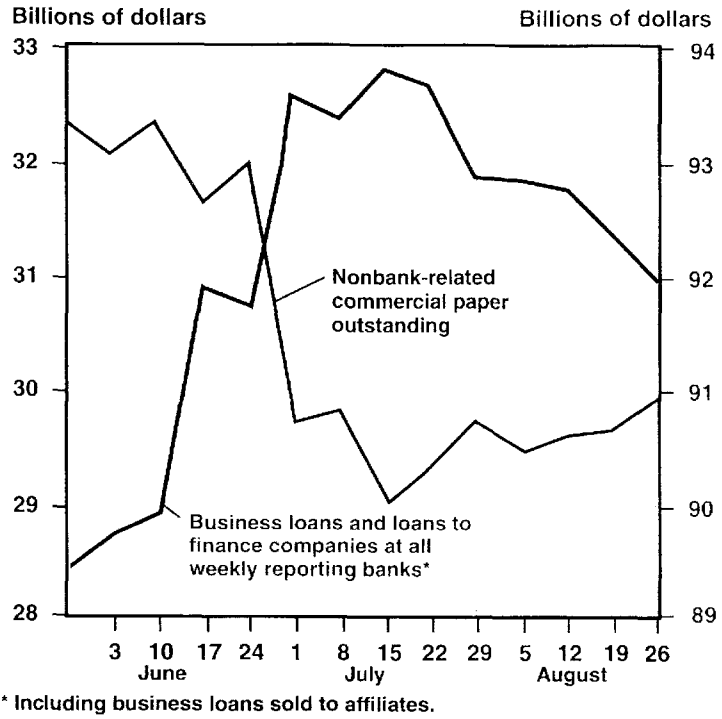

Figure 3. Commercial paper and business loans, June–August 1970.

The Penn Central example illustrates that financial disturbances are particularly likely to occur in changing financial markets, as part of the "growing pains" of financial innovation. As long as financial markets continue to change, there will be occasional episodes of painful learning about the systemic risks of new ways of managing risk and executing transactions. The potential for destabilizing financial shocks is the price we pay for a dynamic financial system. That price can be minimized, however, by an appropriately structured lender of last resort—one that provides backup protection during systemic crises, while minimizing the moral-hazard consequences of its interventions (Calomiris, 1994).

4. Policy implications

What policy implications does this summary of findings offer for reducing macroeconomic fragility? Specifically, I want to address four areas of policy. How aggressively should government protect banks, depositors, or other debt holders from insolvency? How does an awareness of financial contributors to macroeconomic instability affect monetary policy making? What improvements in fiscal policy are suggested by an emphasis on financial constraints? Can government directed-credit policies overcome costly financing constraints on firms and thus stabilize the economy?

4.1. Designing the safety net

The new literature on financial fragility emphasizes the constraints on efficient capital market allocation imposed by information and control problems in corporate finance. This new focus on the reasons for capital market "failures" defines beneficial government interventions to stabilize financial markets as those that offset the destabilizing effects of private capital market failures. Beneficial intervention requires either superior government information and control technology, or government possession of a means to offset negative externalities that come from private market failures. Most of the arguments for a financial safety net, which I define to include deposit insurance, actions by the lender of last resort, and regulation or deregulation of the activities of banks, revolve around the latter view that government interventions can offset negative externalities and thereby produce greater systemic stability.

Experience teaches that deposit insurance can be stabilizing or destabilizing, depending on the incentives that accompany the insurance. Successful, privately operated deposit insurance systems, for example, stabilized banking systems in the antebellum United States, because they were set up to encourage proper risk taking and monitoring by banks that were members of the system (Calomiris 1989, 1990; Calomiris and Schweikart, 1991). "Incentive-incompatible" deposit insurance systems destabilize banks, and can contribute to asset-price bubbles and credit crunches, all of which increase macroeconomic fragility.

Similarly, banking deregulation can provide stability or instability. Expanding banks' powers and allowing them to expand their operations can reduce risk if banks face proper incentives; alternatively, deregulation can provide greater opportunities for destabilizing risk taking by banks that face perverse regulatory incentives.

The same can be said of the lender of last resort. If the discount window is employed irresponsibly to prop up insolvent institutions, then it will promote greater macroeconomic instability. If it is structured properly to provide temporary backup protection only to "innocent victims" and only during systemic shocks, it can have a stabilizing effect. The Fed's response to the Penn Central crisis is an example of a desirable intervention. Penn Central was allowed to fail, but other commercial paper issuers were protected from the adverse temporary consequences of that failure. Government assistance came in the form of a short-term credit subsidy to commercial paper issuers, passed on through discount window lending to commercial banks. Importantly, default risk on individual loans still remained with the commercial banks that lent funds to issuers.

It is worth emphasizing the differences between the safety net policy implications of the new literature on financial fragility and those of the alternative view advocated by Minsky and Kindleberger. The new literature on financial fragility stresses the ways in which costs of information and control in corporate finance make the macroeconomy more vulnerable to shocks. Unlike the alternative view of financial fragility pioneered by Minsky and Kindleberger, the new literature views fragility as a consequence of inherent costs of corporate finance, rather than as irrational market psychology that promotes booms and busts. Consequently, the new literature leads to different perspectives on policy for dealing with financial fragility. In contrast to Minsky and Kindleberger, who call for aggressive government intervention to stabilize the financial system, advocates of the new view tend to emphasize potential costs of government intervention which were not considered before. The new literature's assumption of rational behavior (and hence the importance of private incentives) implies potentially high incentive costs of government bailouts, as rational individuals take advantage of perverse incentives created by the safety net. Furthermore, to the extent that overly optimistic (or myopic) beliefs are important driving forces in speculative booms and busts, government subsidies or government protection may fuel irrational speculation, as discussed in Carey (1994). Thus, well-intentioned government stabilization policies may actually be destabilizing.

Once one recognizes that government intervention can be destabilizing as well as stabilizing, important implications follow. First, government policy rules that presume a need for constant intervention may be falsely self-justifying—that is, the more government intervenes the more its (destabilizing) intervention seems to be necessary. Second, the costs of government intervention raise the threshold for activist policy. If there were no costs to intervention, then even a very small probability of a benefit (a trivially small probability of a financial "meltdown") can justify a very aggressive safety net. But if an aggressive safety net is costly, then advocates of such policy must do more than construct a scenario under which intervention will be helpful. They must show that the expected benefits outweigh the expected costs. Given the costs to taxpayers of the recent bailout of

the savings and loan industry in the United States, and the costs of the recent Finnish bank collapse (which required a capital infusion into the banks equal to 18 percent of GDP according to Nyberg and Vihriala, 1994, p. 41), both of which reflect perverse incentives created by government intervention, advocates of a broad safety net may find it difficult to meet that challenge.

4.2. Monetary policy and financial fragility

Monetary policy is likely to be very important, and its effects may be long-lasting. Monetary policy not only affects the average level of economic activity, but the relative viability of certain firms. As Bernanke, Gertler, and Gilchrist (1994) show, small firms do poorly during recessions, and this is plausibly linked to their higher costs of credit, particularly during monetary contractions. Because unseasoned, high-growth firms (the Schumpeterian innovators of the next generation) suffer disproportionately during contractions, as Schumpeter (1939) recognized, shocks to aggregate demand (including monetary policy) can limit the growth of aggregate supply.

Monetary policy shocks will have varying effects over time, and will not be "symmetrically reversible." Because financial state variables (e.g., leverage) condition the response of investment to demand shocks, there may be no stable relationship between monetary policy and output response. In particular, it may be hard to undo a financial collapse (like the Great Depression) with stimulative, open-market operations (Calomiris, 1993b).

These considerations may have implications for monetary policy rules. In particular, they emphasize that the effects of monetary policy on firms' balance sheets and on the availability of bank credit may be important, and that these variables may be useful as indicators to guide policy. Furthermore, they suggest that there are long-term costs of extreme swings in the economy through the financial consequences of lost income during severe recessions and declines in the values of assets, which argue for making contractionary monetary policy cautious and predictable.

4.3. Fiscal policy in the presence of financing constraints

Tax policy is an important and somewhat neglected vehicle for reducing the financial accelerator. If the corporate tax were eliminated, the potential for cash-flow or balance-sheet constraints to bind for young growing firms would be reduced. As Calomiris and Hubbard (1990) argue, tax reductions that increase average after-tax corporate cash flow improve economic efficiency by reducing the frequency with which financing constraints bind. Thus a movement toward consumption taxation or personal income taxation, and away from corporate taxation, would both improve the allocation of resources on average over time and reduce volatility by weakening the financial accelerator.

4.4. Directed-credit policy

Calomiris and Himmelberg (1994a, 1994b) discuss possible benefits from directed-credit programs in relaxing financing constraints, even when government lacks any information advantage about the quality of recipients. Conceivably, such policies could reduce financial fragility by weakening firms' dependence on internal funds to finance investment. But Carey's (1994) arguments about destabilizing effects of government subsidies on asset prices provide a counterweight to that salutory effect. Furthermore, "political-economy" considerations place an important wedge between espoused justifications and likely consequences of government credit policies.

5. Conclusion

I conclude that the theory and evidence for financial fragility suggest that interventions by the government can be stabilizing or destabilizing, and that government policy should take into account the destabilizing consequences of its policies in the areas of bank regulation, taxation, credit subsidization, monetary control, and the lender of last resort.

Activist governments will not be able to rid their economies of financial fragility, and attempts to reduce fragility can backfire by producing unintended consequences (e.g., through magnifying land price bubbles). Knowing that financial factors act as sources or propagators of shocks typically does not translate into effective options for eliminating destabilizing financial effects. Financial fragility is, to a large extent, an unavoidable consequence of a dynamic capitalistic economy. Its fundamental sources—information asymmetry and learning about new systemic risks—cannot be eliminated by government intervention, and attempts to do so may create more instability than they prevent.

Notes

1. There was significant dissent against this view, as exemplified by Gurley and Shaw (1960), Kindleberger (1973), and Minsky (1975).
2. I adopt the shock and propagation view of the mechanism through which financial factors contribute to business cycles, which is consistent with rational economic behavior under asymmetric information and/or imperfect corporate control. An alternative view, espoused by Kindleberger (1973) and Minsky (1975), relies on myopia to generate endogenous boom and bust cycles in financial markets. While there is surely room for both views in understanding macroeconomic fragility—and the recent literature provides convincing evidence for waves of excessive optimism regarding stock prices (Loughran and Ritter, 1994)—the shock and propagation view is better able to explain interesting cross-sectional variation in panel data, which this article summarizes. For example, not all banking systems are equally unstable, and cross-sectional variation in instability can be linked to flaws in the regulation of banking systems and related incentive problems. Similar cross-sectional differences in the importance of cash flow constraints, leverage constraints, and bank credit constraints also argue for the "rational" view of financial fragility. The new literature on financial fragility also can explain other facts about financial-real linkages. For example, in

addition to financial influences on the volatility of output, recent research has also argued that financial constraints may lower the average level of economic activity, or limit the ability of the economy to grow as quickly as it otherwise might over long periods of time (Calomiris, 1993a, 1995; Calomiris and Raff, 1995).

3. For the sake of coherence, I emphasize "corporate-finance" examples, and neglect interesting examples from the literatures on consumption and agricultural investment. For discussion of evidence for agricultural investment, see Calomiris, Hubbard, and Stock (1986), and Calomiris and Himmelberg (1994a).
4. In most studies, firm-level differences in the costs of external finance are identified on a priori grounds by firm size, dividend payout, or access to public debt markets. In Calomiris and Hubbard (1995), cost differences are measured directly, using firms' responses to a special tax experiment in 1936.
5. Waves of large numbers of bank failures and suspensions of convertibility did not generally coincide. For example, the Panic of 1907 saw a protracted suspension of convertibility but few bank failures. Similarly, the 1920s witnessed thousands of bank failures among rural banks without suspensions of convertibility.
6. For useful reviews of the literature on information externalities among banks, see Kaufman (1994), and Bhattacharya and Thakor (1994).

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