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Economic Letter

Bank Asset Concentration Not Necessarily Cause for Worry

by Ricardo T. Fernholz and Christoffer Koch

ABSTRACT: U.S. banking assets have become substantially more concentrated within a few large institutions. However, decreasing relative rates of big-bank growth and of idiosyncratic volatility—an indicator of individual bank susceptibility to shocks and a resulting redistribution of assets—suggest a reduction in systemic financial system risk through contagion.

Today, the top 1 percent of U.S. bank holding companies control more than 60 percent of banking system assets. Two decades ago, the share was half that, raising the question of whether policymakers and the public should be concerned about the increase in asset concentration (*Chart 1*).

The global financial crisis of 2008–09 was about the common systemic risk accumulated on the balance sheets of the largest U.S. banks via their common exposure to asset-backed securities involving the U.S. housing market. This analysis considers another potential source of financial instability: entity-specific, idiosyncratic risk.

In the past, single-entity failures such as Continental Illinois National Bank and Trust Co. in 1984 or the near-collapse of the Long-Term Capital Management hedge fund in 1998 raised concerns about the contagion of idiosyncratic shocks and triggered policy responses. This analysis examines idiosyncratic volatility's role in shaping the bank size distribution and in increasing the risk of contagion from one entity to the other through exposure networks.

Recent academic and policy debates about "too big to fail"—the notion that some financial institutions are so large

that their failure would cause severe financial market dislocation—suggest that a review of the patterns underlying rising U.S. banking asset concentration over the decades could be useful.

Influential Entities

Empirical distributions with many small observations and a few extremely large observations are known as power laws. Power laws have been shown to characterize phenomena in both the social and natural sciences, including the distribution of wealth, firm sizes, city sizes, the popularity of websites and even the frequency of word use in English and other languages.

A novel, for example, may contain 10,000 unique words, with most occurring just a few times but a few—words such as "and," "the" and "to"—appearing hundreds or even thousands of times in the book. Analogously, based on the collection and size of assets a bank holds (with bank assets playing the role of word frequency), the largest bank holding companies are the "and," "the" and "to" of the bank size distribution. That means a handful of large entities and their behavior are particularly important for the banking system as a whole.

U.S. bank asset concentration is shaped by two statistical factors based on the relative size of individual institutions.

Chart 1
Total Share of Banking Assets
for Top 10 and Other Large Bank Holding Companies
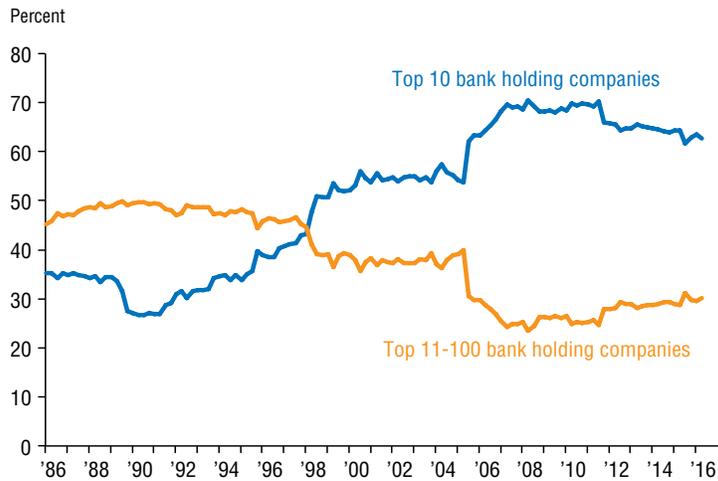
NOTE: Data reflect assets as of June each year.

SOURCES: Federal Financial Institutions Examination Coucil; authors' calculations.

> *Entity-specific shocks that might endanger the financial system through contagion have decreased.*

One factor arises from the degree to which larger banks grow more slowly than smaller banks, and smaller banks grow more rapidly than larger ones—a phenomenon known as the rate of cross-sectional mean reversion. Stronger cross-sectional mean reversion indicates a lesser concentration of assets in the largest institutions.

The other factor is idiosyncratic volatility; that is, individual banks' susceptibility to shocks specific to them. A higher degree of idiosyncratic volatility disperses the asset distribution among banks and leads to a greater concentration of assets in the biggest banks.

A key finding of an analysis based on these two factors is that as one source of systemic risk (asset concentration) has risen, another source of systemic risk via contagion (shocks specific to bank-holding companies) has fallen. That means entity-specific shocks that might endanger the financial system through contagion have decreased.

However, a fall in idiosyncratic shocks is consistent with a greater potential of systemic risk stemming from common responses to aggregate shocks. For example, a large number of banks might hold similar types of asset-backed securities and be exposed to the same macroeconomic risks, as is the case with mortgage-backed securities and exposure to national housing market risk. This would lead to common movement in response to aggregate shocks.

Banking Sector Concentration

U.S. banking sector concentration has substantially increased in recent decades. The number of banks has shrunk in the last half-century, from a peak of around 14,000 commercial institutions in the 1960s to about 5,400 today. Indeed, apart from savings and loans acquiring broader charters as banks, the number of commercial banks entering the market since the financial crisis can be counted on one hand.[1]

Not only has the number of banks fallen, the concentration of total bank assets at the largest financial institutions has substantially increased. The top 1 percent of bank holding companies account for more than 60 percent of all banking system assets.

Banking assets in the U.S. have become increasingly concentrated in the 10 largest bank holding companies (*Chart 1*). Meanwhile, the total assets of the next-largest bank holding companies—the 11th- to 100th-largest companies—have declined from half of total assets during the 1980s to roughly one-quarter during the 2000s.

Driving Consolidation

Chart 2 shows two stylized bank asset distributions. Both have the same mean—that is, the average size of a bank drawn from both distributions is the same. But

the orange distribution is substantially more concentrated in the upper tail—more banking assets are held in a few large institutions. The blue distribution is less concentrated at the top.

How do distributions, such as bank asset concentrations, transition from the blue to the orange depiction?[2]

One way is through permanent changes in cross-sectional mean reversion, operating via the natural tendency of the largest institutions to grow slower than the rest of the bank population on average over time. Another way is through permanent changes in idiosyncratic volatility. All else equal, greater idiosyncratic volatility broadens the size distribution and propels individual institutions away from the middle.

Changes in the concentration of U.S. bank assets are summarized by this identity:

Bank asset concentration = (Idiosyncratic volatility of bank assets)/ (Cross-sectional mean reversion of bank assets)

How have the two factors, cross-sectional mean reversion and idiosyncratic volatility, changed and what can we learn from such changes?

Declining Idiosyncratic Volatility

Idiosyncratic asset volatility measures the intensity of shocks specific to bank holding companies. These shocks include unanticipated changes to bank liabilities, sudden changes in loan demand, defaults on assets or other factors that are specific to individual entities and do not affect all bank holding companies at the same time.

The size-specific volatility of U.S. bank holding companies has evolved since the mid-1980s (*Chart 3*). The size rank of the 500 biggest bank holding companies from largest to smallest is depicted along the horizontal axis; the magnitude of idiosyncratic volatility (in terms of standard deviation) is shown on the vertical axis.

The blue line depicts 1986 to 1998, a period of lesser asset concentration, and shows that idiosyncratic volatility is particularly high for medium-size bank holding companies.

The orange line depicts the largest 500 bank holding companies for 1998 to 2016. Volatility for 1998 to 2014 not only


Chart 2 Two Factors Shaping the Distribution
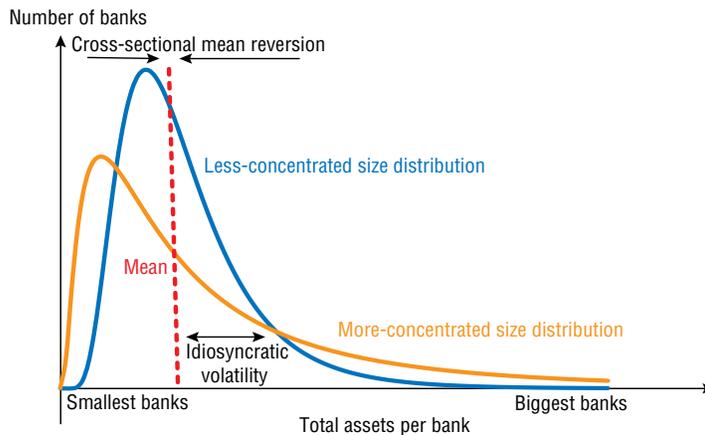
NOTE: Without entry and exit, larger entities must grow at a slower rate than smaller ones to maintain cross-sectional stability. Cross-sectional mean reversion captures the intensity of this natural and necessary growth-rate differential between small and large entities.

SOURCE: Federal Reserve Bank of Dallas.

Chart 3 Bank Idiosyncratic Volatility Declining
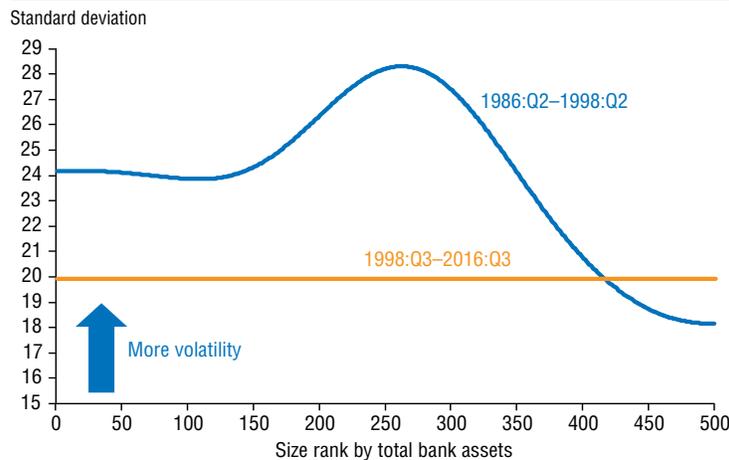
SOURCES: Federal Financial Institutions Examination Council; authors' calculations.

seems to drop throughout the bank size distribution, but also appears to be more uniform across all banks. One interpretation of this drop in idiosyncratic volatility for all bank holding companies is that aggregate shocks to banks of all sizes have become more common and the institutions have responded similarly.

Slower Relative Growth

Surprisingly, the change in idiosyncratic volatility displayed in Chart 3 would result in a less-concentrated bank asset distribution. That has not been the case; assets at the biggest bank holding companies increased.

Normally, an increase in asset concentration at the top institutions is caused by idiosyncratic volatility and decreased reversion at the same time. The decreased idiosyncratic asset volatility implies that cross-sectional mean reversion must have decreased, too, or bank assets would not have become further concentrated. This is, indeed, the case. In the periods before and after 1998, reversion rates are negative; that is, the largest entities grew slower relative to

the growth rate of overall banking assets in the economy (*Chart 4*).[3]

More negative values indicate a greater intensity of mean reversion. The blue line, for the earlier period, 1986 to 1998, shows that reversion to the mean was strong in the period. Indeed, lessening cross-sectional mean reversion from 1998 to 2016, illustrated by the orange line, more than offset declining idiosyncratic volatility and led to a rise in bank holding company asset concentration.

Future Concentration

Our estimates suggest that the distribution of bank assets is stable—idiosyncratic volatility and cross-sectional mean reversion for each bank size rank have stabilized in recent years. Unless policy or the economy substantially alters those factors, U.S. bank asset concentration should not increase in the future.

Thus, while one source of systemic risk—bank asset concentration in a few large institutions—has increased, another source of systemic risk through contagion—shocks specific to bank holding companies—has declined. This suggests that a more concentrated banking sector does not necessarily result in a riskier banking sector.

However, these estimates do not speak to other sources of systemic risk. Shocks common to all banks—nonidiosyncratic shocks—might or might not have increased.

Policymakers need to remain alert about common risk factors, which were not captured in this analysis because they affect all institutions similarly and do not have implications for cross-sectional bank asset distribution. Common risk factors include derivatives (such as credit default swaps) and asset-backed securities, products that triggered the 2008 financial market meltdown.

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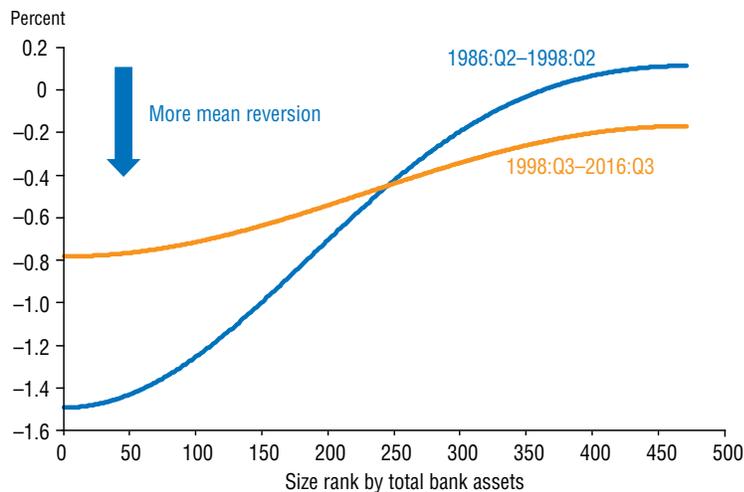
Notes

[1] See "Too Small to Succeed? Community Banks in a New Regulatory Environment," by Preston Ash, Christoffer Koch and Thomas F. Siems, Federal Reserve Bank of Dallas, *Financial Insights*, vol. 4, no. 4, 2015.
[2] For technical details and methods see, "Nonparametric Methods and Local-Time-Based Estimation for Dynamic Power Law Distributions," by Ricardo T. Fernholz, *Journal of Applied Econometrics* (forthcoming); "Why Are Big Banks Getting Bigger?" by Fernholz and Koch, Federal Reserve Bank of Dallas, Working Paper no. 1604, 2016; and "Big Banks, Idiosyncratic Volatility, and Systemic Risk," by Fernholz and Koch, *American Economic Review*, vol. 107, no. 5, 2017.
[3] Note that cross-sectional reversion rates here are negative throughout because of entry into the top 500 banks from below. See note 2, "Why Are Big Banks Getting Bigger?"

Chart 4 Cross-Sectional Mean Reversion Decreases

Percent

SOURCES: Federal Financial Institutions Examination Council; authors' calculations.