

Do Net Interest Margins and Interest Rates Move Together?

By Huberto M. Ennis, Helen Fessenden, and John R. Walter

Many market participants assume that, as the Federal Reserve tightens monetary policy, and market rates increase in response, banks will be better off because their net interest margins will also increase. As a way to understand the origins of this expectation, in this *Economic Brief* we look at the relationship between the federal funds rate and the average net interest margin for U.S. banks since the mid-1980s. We find that the relationship is not as clear-cut as one might suspect.

As economists debate whether and how far the Federal Reserve should continue to raise interest rates off of their record-low levels, there seems to be at least one widely accepted premise about the impact of monetary policy normalization: as interest rates go up, so too will banks' net interest margins—an indicator of the difference between what banks bring in and what they pay out in interest. As one headline in the *Financial Times* declared last September, higher rates are “great news” for the banking sector and could offer “redemption.” Martin Gruenberg, chairman of the Federal Deposit Insurance Corp., predicted last November that higher rates will “create opportunities for banks to increase margins and generate greater returns.” According to one estimate highlighted in the *International Business Times*, released last September before the Fed's first 25-basis-point increase, the top five banks could reap a \$10 billion windfall in one year if the federal funds rate increased by 1 percentage point.

Given how broad these claims are, one would expect that a simple plot of the average net interest margin and the fed funds rate over time would show signs of the presumed strong relationship. This *Economic Brief* will investigate this link based on data for the United States in the last 31 years.¹ Rather than exhibiting a clear relationship, a first pass at the data suggests that the statements above miss a more complicated picture. There are, in fact, cases of rate hikes that did not see a corresponding increase in the average net interest margin, and sometimes higher rates have produced shrinking net interest margins for banks. These preliminary findings suggest that more research is needed to understand the effect of monetary tightening on system-wide bank profitability and in particular net interest margins.

The Importance of Maturity Mismatch

Due to frequent confusion between bank profits and net interest margins, it is important to review

the meaning of the terms. Net interest margins are the spreads between what banks receive on their interest-earning assets and what they pay on interest-paying liabilities, divided by total interest-earning assets. Profits, by contrast, are adjusted to account for noninterest income, operational and personnel costs, as well as for effects such as losses on loans. Profits can be seen as a broader measure of a bank's financial performance, while net interest margins measure a narrower relationship describing earnings and costs based on interest rate differentials.

The pronouncements noted above reflect a widespread view that net interest margins will rise in tandem with interest rates. Historical data aside, however, there are reasons to think that this may actually not be the case. In the more traditional approach to banking, liabilities are likely to be more interest rate sensitive than assets. One main reason has to do with the difference between typical maturities of assets and liabilities, often referred to as "maturity mismatch." Some examples of bank liabilities are consumer and business deposits, which tend to have relatively short-term maturities. By contrast, bank assets—for example, business loans or consumer loans such as mortgages—often have longer-term maturities. Short-term rates track the fed funds rate more closely and are more volatile, so one would expect these yields to be the most affected by policy-driven increases in interest rates. If the policy rate increases, banks would pay out more in interest on their liabilities while the rates on their long-term loans would remain stable—effectively narrowing net interest margins.

In the 1970s and 1980s, this maturity mismatch was one important factor behind the struggles of the savings and loan (S&L) industry. A core business of S&Ls was fixed-rate mortgage loans, which have returns that do not change when short-term rates move. As interest rates increased rapidly in the early 1980s during the Fed's anti-inflation campaign, the interest rates S&Ls paid to their depositors increased fairly quickly while rates S&Ls earned on their portfolios of mortgages changed little. Instead of widening, net interest margins collapsed. This episode provides an admittedly extreme example of the fact that for

the traditional banking business of maturity transformation—with its interest-sensitive liabilities and relatively interest-insensitive assets—rising interest rates can lead to declines, rather than increases, in net interest margins.

That said, modern banking organizations are a lot more complicated than the traditional view of banking suggests. Some banks have a mix of assets and liabilities that are not as easily broken down by maturities—for example, they may offer short-term consumer loans and immediately sell any mortgage loans they make; on the liability side, they may offer longer-term consumer deposits. The critical point to understand is that the maturities of assets versus liabilities is one of the main drivers of net interest margins.

The Question of Market Power

What if banks can exert some control over their net interest margins? One argument for assuming a positive relationship between rising interest rates and growing net interest margins is that banks have enough market power to affect the interest rate spread. According to this view, in an environment of rising interest rates, banks would try to hold down the returns that they offer to deposit customers (thereby keeping their own costs down) while adjusting loan rates upward to reflect market rates more closely (thereby reaping a higher yield). To the extent that banks' depositors are fairly price insensitive, such an adjustment would not drive most of them away.

There are good reasons to think that many depositors are indeed price insensitive. In general, it takes time and effort to change banks and to research various options on banking products. Transaction costs ought to be taken into account as well. Therefore, many depositors might be inclined to reject switching and stick with a particular bank even if they could do better elsewhere. This would support the view that as the Fed raises rates, net interest margins will widen because banks will use depositors' price insensitivity to adjust the interest rate differential in their favor.

Some research supports the view of deposit "stickiness." In a 2013 paper, Federal Reserve Board of

Governors economists John C. Driscoll and Ruth A. Judson analyzed ten years of bank deposit rates and customer behavior (covering two full Fed easing and tightening cycles) to see, among other things, whether and how consumers responded to rate changes. They found that the response to shifts in deposit rates differed depending on the types of accounts, but broadly speaking, depositors were generally slow to change their banking behavior following a rate increase—implying a certain degree of insensitivity to rates.²

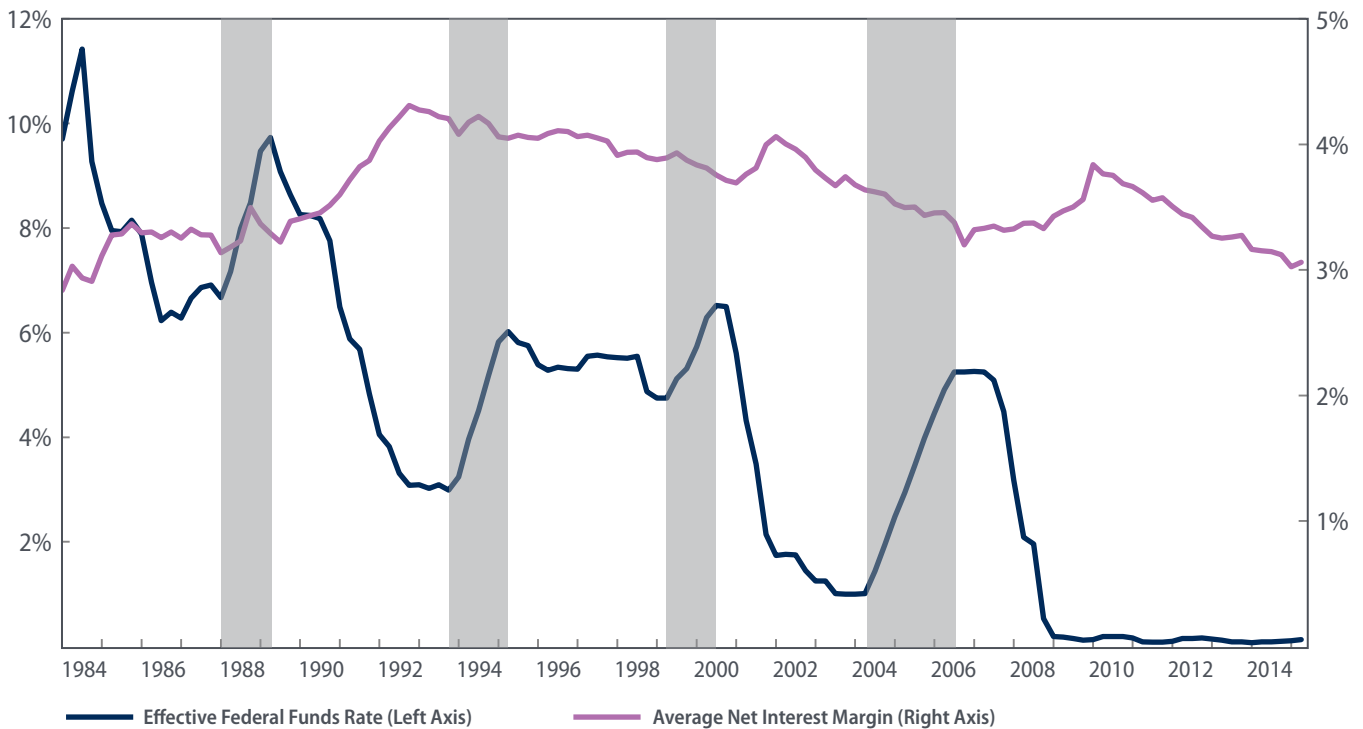
Yet another argument supports the view that rising rates may induce higher net interest margins, this time in the context of the zero lower bound on nominal interest rates. Under normal circumstances, when rates are above the zero lower bound, banks typically target a spread between rates on assets and liabilities. If the fed funds rate approaches zero, however, banks may see this differential between loan and deposit rates become compressed, because they generally cannot pay negative interest

rates on deposits. (Customers might well prefer to keep their funds in the form of cash rather than pay a bank to hold them.) In the United States, near-zero rates have been in effect since 2008, which suggests that net interest margins may well have been narrower than usual during this time because banks have not been able to push the rates they pay on deposits and other liabilities below zero. This means that as their rates on deposits effectively stay around zero, those rates are relatively closer than usual to the (higher) rates on loans. However, as the Fed pushes interest rates upward, banks may be able to return their spreads to their target levels, perhaps raising deposit rates more slowly than loan rates. Accordingly, net interest margins might widen.³

Rate Changes Across Time

So how does the course of the fed funds rate actually compare to net interest margins over time? Figure 1 plots the effective fed funds rate and the average net interest margin for all banks from 1984, around the start of the Great Moderation, until 2015. Contrary

Figure 1: Movements of the Fed Funds Rate and Average Net Interest Margin



Sources: Federal Deposit Insurance Corp. and Haver Analytics

Notes: Average net interest margin is for all FDIC-insured institutions. Shaded areas highlight periods when the federal funds rate was increasing.

to the quotes noted earlier, a rise in the net interest margins has generally not coincided with rate hikes (which are indicated in the chart by shading). In Table 1, the four major cases of tightening are contrasted with the concurrent change in the net interest margins. It shows that there is only one instance—the first quarter of 1988 through the second quarter of 1989—of an increase in the fed funds rate coinciding with an increase in the average net interest margin. In that example, the rise in interest income (1.45 percentage points) exceeded the change in interest expense (1.30 percentage points).

In many cases, however, episodes of tightening have been followed by increases in net interest margins with a lag, perhaps suggesting a delayed positive correlation. Table 2 shows a total of four episodes since the mid-1980s in which net interest margins had a delayed increase after tightening—including one, following the Fed’s rate hikes from 2004–06, that lasted well into the 2008 financial crisis and its aftermath. Importantly, though, in all four cases,

the increase in net interest margins was driven by the drop in interest expenses exceeding the drop in interest income. The fact that these margin increases were the result of bank interest income and interest expense declines suggests that they really originated from declines in market interest rates (seen in Figure 1) that occurred at the same time as these margin movements, not from the earlier increases in market rates. This suggests that it was the market rate drops that followed rate hikes, rather than the rate rises themselves, that may have accounted for these increases in the average net interest margin.

Some researchers have studied the properties of net interest margins in more detail and found a relationship to interest rate movements driven by monetary policy. For example, in a 2011 paper, economists Roger Aliaga-Díaz and María Pía Olivero looked more broadly at the cyclical nature of net interest margins, using an empirical model of the U.S. banking sector from 1979 through 2004.⁴ One of their findings was that monetary policy did have a positive marginal

Table 1: Changes in Average Net Interest Margin and Its Components When the Fed Funds Rate Was Increasing

Periods of Increasing Fed Funds Rate	Interest Expense	Percentage Point Changes In Interest Income	Net Interest Margin
Q1 1988 through Q2 1989	1.30	1.45	0.15
Q4 1993 through Q2 1995	0.86	0.70	-0.16
Q2 1999 through Q3 2000	0.92	0.78	-0.14
Q2 2004 through Q3 2006	1.96	1.70	-0.26

Table 2: Changes in Components of Average Net Interest Margin When It Was Increasing

Periods of Increasing Average NIM	Interest Expense	Percentage Point Changes In Interest Income	Net Interest Margin
Q4 1984 through Q2 1985	-0.66	-0.29	0.37
Q3 1989 through Q4 1992	-4.05	-2.96	1.09
Q1 2001 through Q1 2002	-2.07	-1.70	0.37
Q4 2008 through Q1 2010	-0.83	-0.32	0.51

Sources: Federal Deposit Insurance Corp. and Haver Analytics
 Note: Average net interest margin is for all FDIC-insured institutions.

effect on the average net interest margin in that period, based on both concurrent and lagged data.

Bank Size and Deposit Type

So far, the discussion has focused on aggregate data for all banks. In the United States, most bank assets are concentrated in large institutions, and the behavior of large banks tends to determine the salient patterns in aggregate data. But what if the correlation of interest rates and net interest margins is different for banks of different sizes?

Perhaps small banks, with higher concentrations of core deposits, such as checking or general business deposits, are more likely to induce a contemporaneous positive correlation. Large banks, by contrast, hold a greater share of wholesale deposits, which are more volatile than core deposits, reflecting more closely daily market fluctuations. These deposit accounts are primarily geared toward large investors, such as corporate money managers, who watch rates every day. If these investors find they are not getting the market rate at one institution, they will move their assets almost instantly.

Accordingly, if one splits the bank sample between large and small institutions, one could perhaps uncover that smaller banks, with “stickier” core deposits, experience increases in net interest margins when market rates increase. The data, however, seem inconclusive in this dimension as well. For smaller banks, meaning those under \$1 billion in assets, there appears to be little linkage between market rates and their net interest margins. Since the early 1990s, these banks’ margins have been on a fairly steady path with only a subtle downward trend.⁵

Up to this point, we have concentrated our attention mainly on situations when market interest rates were going up. Those are the cases that seem most relevant for thinking about the current situation in the United States. But as we suggested above, it may be that net interest margins increase when interest rates decrease. Indeed, for those instances, the correlation tends to be more apparent. Going back to Figure 1, we see four episodes of significant rate cuts since the mid-1980s that coincide with increases in

the average net interest margin: 1984–86, 1989–92, 2001–02, and 2008. Based on these aggregate data, then, we infer that, if anything, interest rate cuts tend to induce increases in net interest margins.

To conclude, the data offered here do not provide supporting evidence for the premise that higher rates will produce wider net interest margins. So why do so many market participants adhere to the idea? One reason may be that they tend to over-emphasize the extent to which banks can exploit their market power and temporarily pay less on deposits and charge more on loans as a result of depositors’ reluctance to quickly switch banking relationships. Another justification may be related to the response of banks to monetary policy when the economy is close to (or at) the zero lower bound on interest rates—the idea being that spreads compress at the lower bound, and that as monetary policy tightens, banks will adjust interest rates on assets and liabilities in a way that allows them to return their margins to their desired targets. While this last hypothesis deserves further consideration, it is difficult to address using U.S. data, since there are so few episodes when the economy has been close to or at the lower bound. The fact that many questions about this relationship remain open, however, underscores the need for caution when forecasting what might happen to bank net interest margins as the Fed tightens rates. ■

Huberto M. Ennis is group vice president for macro and financial economics, Helen Fessenden is an economics writer, and John R. Walter is a senior economist in the Research Department at the Federal Reserve Bank of Richmond.

Endnotes

- ¹ The data cover all FDIC-insured U.S. depository institutions (commercial banks and savings institutions). This article uses the simpler term “banks” rather than “FDIC-insured U.S. depository institutions.”
- ² See John C. Driscoll and Ruth A. Judson, “[Sticky Deposit Rates](#),” Federal Reserve Board of Governors *Finance and Economics Discussion Series*, October 1, 2013, pp. 7, 12.
- ³ See Stijn Claessens, Nicholas Coleman, and Michael Donnelly, “[‘Low-for-Long’ Interest Rates and Net Interest Margins of Banks in Advanced Foreign Economies](#),” Federal Reserve Board

of Governors *International Finance Discussion Papers Notes*, April 11, 2016. The authors study the behavior of net interest margins during periods of persistently low interest rates in a sample of advanced economies in the recent past. Their findings support the view that “low-for-long” interest rates tend to compress margins.

⁴ See Roger Aliaga-Díaz and María Pía Olivero, “The Cyclicity of Price-Cost Margins in Banking: An Empirical Analysis of its Determinants,” *Economic Inquiry*, January 2011, vol. 49, no. 1, pp. 26–46. Another example is the IFDP paper by Claessens et al, cited above. They use a cross-section of banks located in many different countries and try to control for other changes in conditions that may influence banks’ net interest margins.

⁵ See also Francisco B. Covas, Marcelo Rezende, and Cindy M. Vojtech, “[Why Are Net Interest Margins of Large Banks So Compressed?](#)” Federal Reserve Board of Governors *Finance and Economics Discussion Series Notes*, October 5, 2015.

This article may be photocopied or reprinted in its entirety. Please credit the authors, source, and the Federal Reserve Bank of Richmond and include the italicized statement below.

Views expressed in this article are those of the authors and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System.



Richmond ▪ Baltimore ▪ Charlotte