

U.S.

Banking Watch

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Economic Analysis

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Interest Rate Risk and the Financial System Banks' Balance Sheet Effects and Swap Usage

- In the aggregate, we foresee no major disruptions to the banking system from interest rate risk given a successful communication strategy from the Federal Reserve
- Financial entities will see tighter net interest margins from a term spread decline, but increases in volume from better economic activity will boost overall interest income
- Flow businesses will benefit from higher swap usage to hedge large holdings of MBS

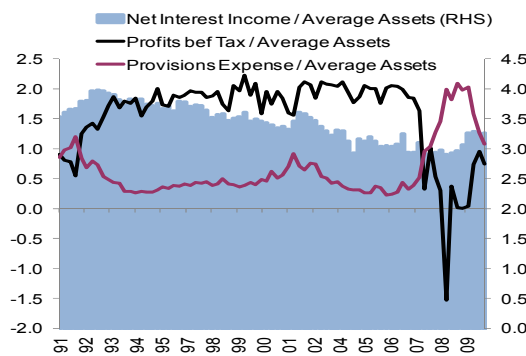
Interest rate Risk at the Aggregate Level

Banks manage their interest rate risk by matching the maturity of their liabilities with the maturity of their assets. From a very high level, credit risk is a more serious problem for banks than interest rate risk, but both are treacherous. Provisions expense will show more of an influence on net interest income than changes in the short-term interest rate or slope of the yield curve (Charts 1, 2). Part of the issue is related to increased use of interest rate derivatives. Over the past 30 years these instruments have greatly aided banks' ability to hedge their interest rate exposure. We can estimate the effects of interest rate changes in two principal ways: first, rate sensitivity analysis of banks' balance sheets, and second, econometric analysis of the response of assets to interest rates.

With regard to balance sheet indicators, it is important to note that the banking system is starting from a standpoint of pristine liquidity ratios (Chart 3). Net noncore funding and wholesale funding dependencies are at very comfortable levels. Additionally, banks hold high levels of cash, large amounts of Treasury securities, and billions on reserve at the Fed. All of these sources may be tapped for the purpose of combating interest rate risk losses. The US banking system currently holds \$5.03tr in rate sensitive assets and \$6.67tr in rate sensitive liabilities. If interest rates move 1%, then we can use the following to estimate the effects: $\Delta NII = RSA\$(\Delta i) - RSL\$(\Delta i) = GAP\$(\Delta i)$. This implies a dollar gap of \$16.3bn, something easily covered by the quarterly profitability of the banking system around \$20bn in normal times. This is a very simple ratio analysis and it excludes a number of detailed risk factors, but it provides us with an overall picture. Certainly some firms will be caught by interest rate changes, but from the aggregate level these ratios imply no serious issues.

Chart 1

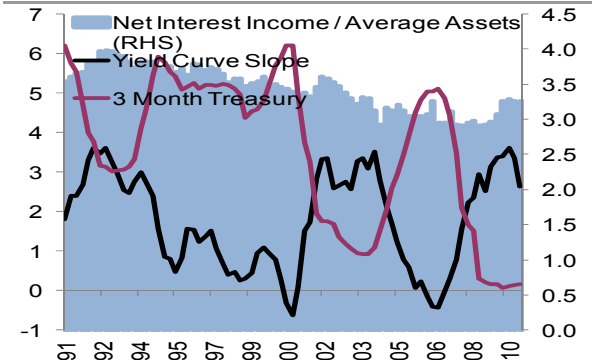
Provisions, Interest Income, and Profits



Source: SNL Financial

Chart 2

Short-term rates and net interest income



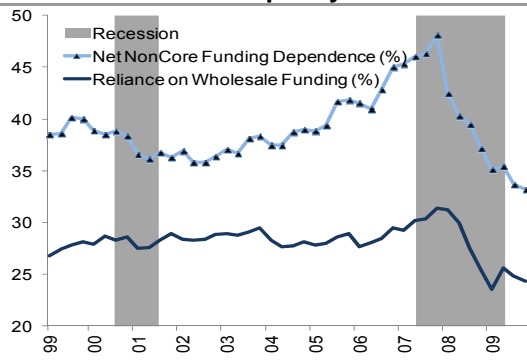
Source: Haver Analytics and SNL Financial

Secondly, balance sheet effects of interest rates are recurring cyclical phenomena: as interest rates increase, held-to-maturity (HTM) securities' value declines and triggers a binding constraint on banks, but this is counterbalanced by increased economic activity and banking profitability. Prior to 2007, these balance sheet effects were never more than $\pm\$30$ bn in a quarter, which are only partially provisioned against as they are HTM rather than available for sale (AVS) accounting (Chart 4). A more thorough analysis is through a Federal Reserve Bank of New York methodology (Adrian et al 2010), which involves the construction of a vector autoregression with a Cholesky ordering of real GDP growth, the term spread, net interest margin (NIM), financial intermediary asset growth, the 3-month Treasury bill, and the VIX index. We analyze the asset growth of two different areas of the banking system: first, shadow banks, defined as the sum of asset-backed securities (ABS) issuers, finance companies and funding corporations, and second, commercial banks. Using this method we can see the response of assets to uncertainty (VIX) and spread on loans (NIM). The NIM is affected partially by industrial concentration and other factors, but it will be primarily driven by the term structure of interest rates, and our method allows us to see the response of NIM to changes in the term spread.

The results are intuitive and instructive of what will happen in the future. Shadow banks, for example, are far more sensitive to the VIX than commercial banks, as shadow banks rely more on financial market interaction than commercial banks. For commercial banks, over the first two years, the effect of a real GDP shock on banks imparts a significant effect on banks' assets, one that is far more important than the effect of a VIX shock on banks' assets. Shadow banks' assets are more sensitive to the business cycle than commercial banks. Our estimated response of NIM to a change in the term spread is similar for both shadow banks and commercial banks: a widening of the spread is expected to increase the NIM over time, with a roughly .25% increase in NIM after 5 quarters in response to a 1% increase in the term spreads. If we expect the term spread to tighten over the next two years, the NIM should decrease, but the increase in volume from asset growth stemming from an economic recovery will make up for tighter margins. Overall, the major drivers are the economic cycle and credit conditions (See Technical Appendix).

Chart 3

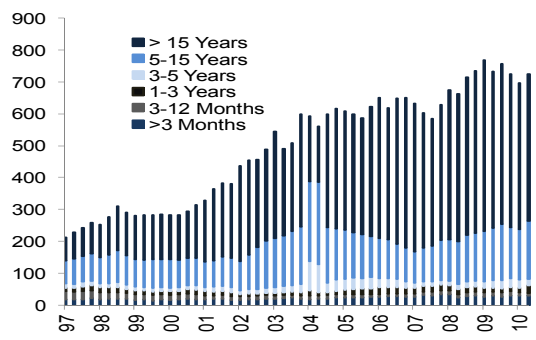
Commercial Bank Liquidity Indicators



Source: SNL Financial

Chart 5

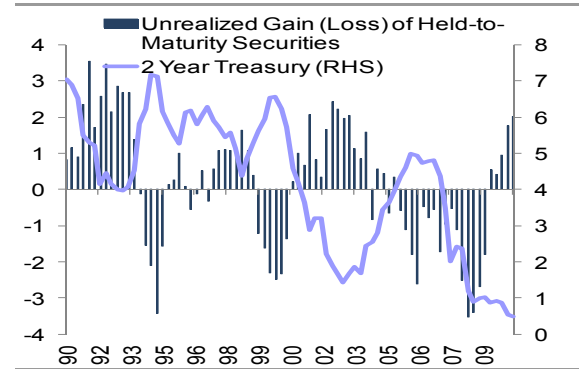
Commercial Banks' MBS Holdings, \$bn



Source: SNL Financial

Chart 4

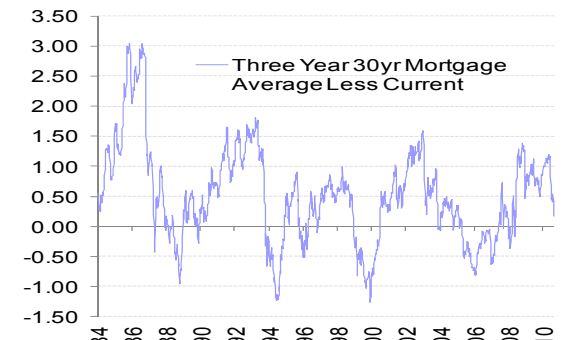
Balance Sheet Effects of Interest Rates



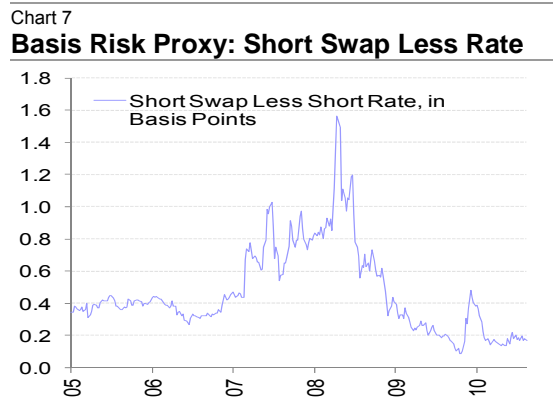
Source: BBVA Research

Chart 6

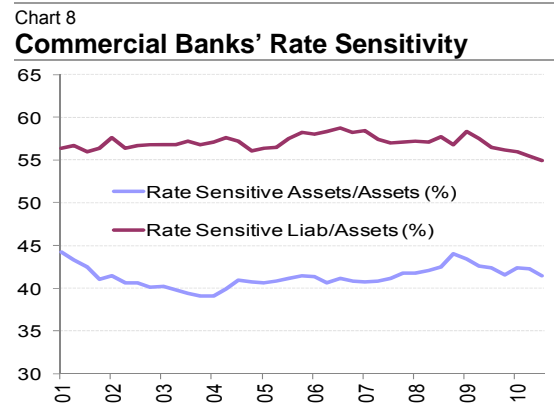
Proxy for Prepayment Risk



Source: BBVA Research



Source: BBVA Research



Source: SNL Financial

Focus on Mortgage-Backed Securities: Heightened Swap Usage in the Future

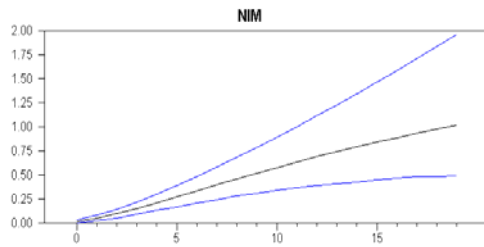
From an aggregate perspective we do not anticipate major issues with interest rate risk. However, we do expect a major area of interest rate hedging will revolve around the mortgage-backed securities (MBS) holdings of financial entities. Despite the largest mortgage crisis in American history, a lot of MBS still exists on bank balance sheets (Chart 5). Like any other bond, the value of MBS declines as interest rates rise, necessitating hedging strategies. MBS also exhibit a unique feature. Increases in interest rates trigger fewer prepayments (less mortgage refinancing) and extend the duration of MBS. We can proxy for this prepayment risk by comparing the current 30 year mortgage rate to its 3-year moving average (Chart 6). This suggests that prepayment risk is still at abnormal levels, but it will gradually reverse this abnormality. Another way to put it is that the data shows a fading trend prepayment risk. This extension risk requires additional hedging. The traditional way to hedge MBS is to sell a fixed-rate interest swap, the value of which increases as rates increase, offsetting the MBS loss of value. Another metric of risk related to hedging is basis or spread risk. We proxy basis risk through the difference between the short-term swap and the short-term rate. As Chart 7 demonstrates, basis risk has been very low in recent memory, but once the Fed begins to exit from extraordinary monetary policy, basis risk is likely to increase.

Additionally, the Federal Reserve and the government-sponsored entities (GSEs) hold considerable amounts of MBS. While the Federal Reserve may or may not be concerned about portfolio losses, the GSEs certainly are concerned and will hedge accordingly. Combined with the banking system, this suggests a higher level of swap purchasing over the time frame when the Fed is conducting its exit strategy. On the one hand, all this activity may exacerbate interest rate movements, as some studies suggest. On the other hand, this presents an opportunity for financial entities focused on flow derivatives to position themselves in front of clients' needs to manage their duration and convexity risk.

Technical Appendix

The following charts demonstrate the impulse response functions from the vector autoregression discussed above. The variable at the top of the graphic indicates that the graphic is a depiction of the response of that variable to a positive shock denoted in the bottom left corner of the graphic. For example, Chart 9 depicts the response of net interest margin to a positive shock in the term spread. The title of the chart indicates if the impulse response is for shadow banks or commercial banks. The blue lines represent 90% Monte Carlo confidence bands around the central tendency impulse response. The horizontal axis denotes the number of quarters from the occurrence of the shock. All impulse responses are accumulated.

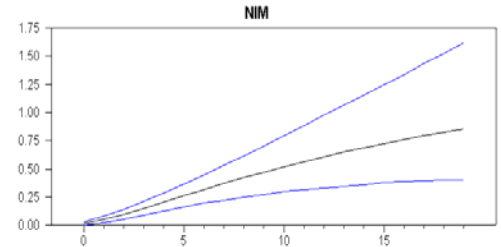
Chart 9
Shadow Banks



Responses to Shock to Spread

Source: BBVA Research

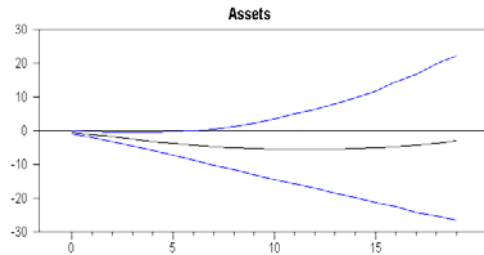
Chart 10
Commercial Banks



Responses to Shock to Spread

Source: BBVA Research

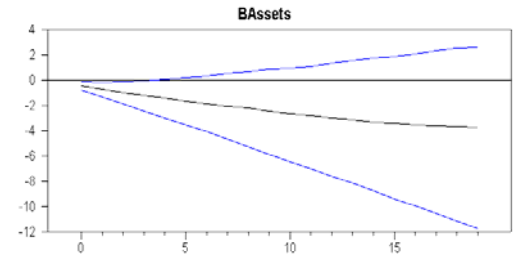
Chart 11
Shadow Banks



Responses to Shock to Spread

Source: BBVA Research

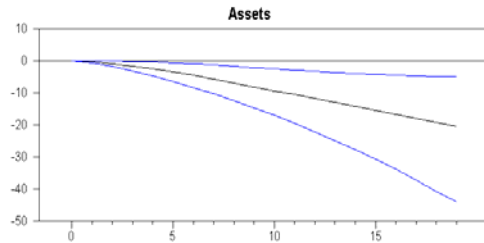
Chart 12
Commercial Banks



Responses to Shock to Spread

Source: BBVA Research

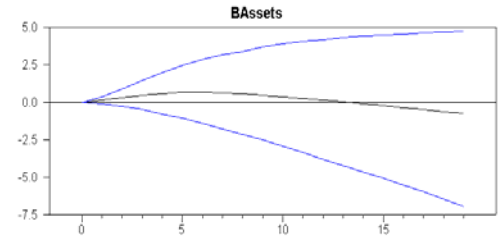
Chart 13
Shadow Banks



Responses to Shock to VIX

Source: BBVA Research

Chart 14
Commercial Banks



Responses to Shock to VIX

Source: BBVA Research

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