



RESEARCH BULLETIN NO. 55

Interest rate risk in the euro area

22 February 2019

By [Peter Hoffmann](#)^[1]

Challenging conventional wisdom, recent research shows that, collectively, euro area banks have limited exposure to interest rate risk, but that their individual exposures vary significantly from institution to institution. Differences in interest-rate setting conventions for loan contracts, especially mortgages, across euro area countries have been shown to be an important driver of this heterogeneity. This heterogeneity remains pronounced even after taking into account hedging activity in derivatives markets, suggesting that monetary policy may be transmitted through different channels in different parts of the euro area.

Interest rate risk can be broadly defined as the risk of financial instruments changing in value due to changes in interest rates. The way this risk is shared among different actors in the economy matters, for at least two reasons. First, it can affect the transmission of monetary policy, depending on whether there is more interest rate risk on the balance sheets of borrowers or of lenders. Second, high exposures in the banking sector can pose a threat to financial stability if there are sharp movements in interest rates.^[2]

Conventional wisdom

Banks are often viewed as vulnerable to interest rate risk. This is because they typically engage in “maturity transformation” – extending long-term loans financed by short-term liabilities, in particular customer deposits. Accordingly, a bank’s net worth is predicted to decline when interest rates rise (and increase when rates fall) because the present value of a bank’s assets (its loans) is more sensitive to changes in interest rates than the present value of its liabilities (its deposits).^[3] But does the conventional wisdom hold with regard to banks in the euro area? The new study outlined below suggests that, in fact, it does not.

Evidence on aggregate exposures

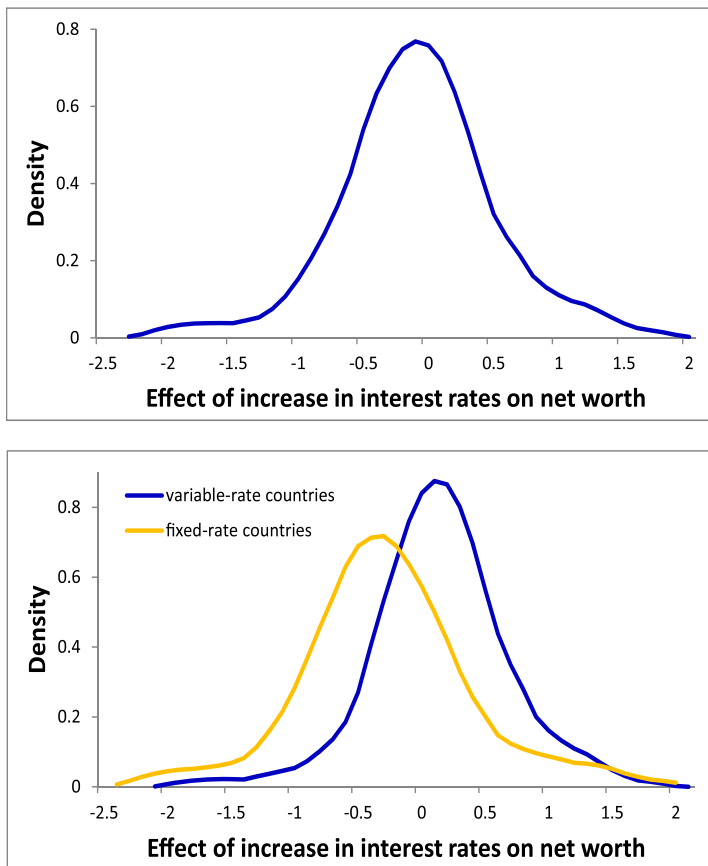
Hoffmann et al. (2018) examine the interest rate risk exposures of 104 major European banks. This analysis draws on both balance sheet data – that is, information on assets and liabilities – and detailed information concerning existing derivatives positions. The top picture of Figure 1 plots the cross-sectional distribution of the estimated change in bank net worth (relative to total assets) following an increase in interest rates of one basis point across all maturities.^[4] In contrast to conventional wisdom, the average bank is *not* exposed to interest rate risk. This surprising result is driven by two factors which greatly reduce the duration gap – the difference between the maturities of the assets and of the liabilities – compared to that of a textbook bank. First, a considerable fraction of bank loans are issued at variable interest rates. Accordingly, changes in interest rates do not have a large effect on the value of these loans, even when they are extended for long maturities. Second, customer deposits, especially from households, are rather insensitive to movements in interest rates, meaning they effectively behave like longer-term liabilities.^[5]

Heterogeneity

While the exposure of the average bank is close to zero, different banks are affected in different ways. While some banks tend to benefit from higher interest rates, others lose out as a result. Our study reveals that the differences are much larger when comparing banks in different countries, rather than banks with different business models. Also, the differences mainly originate on the asset side of banks’ balance sheets. Motivated by recent studies on mortgage design^[6], the study explores the role of different conventions for setting loan rates in explaining the observed cross-country heterogeneity. The euro area is

a perfect laboratory for doing so, as mortgage loans tend to be extended at a fixed rate in some countries, and at a variable rate in other countries. The bottom picture in Figure 1 reveals that the conventions prevailing in different mortgage markets do indeed explain a significant share of the cross-country heterogeneity. While banks in “fixed-rate” countries (yellow line) do, on average, display a maturity profile in line with the conventional wisdom, those in “variable-rate” countries (blue line) would, on average, actually benefit from an increase in interest rates. In fact, they appear to engage in “reverse maturity transformation”.

Figure 1: Banks’ exposures to interest rate risk



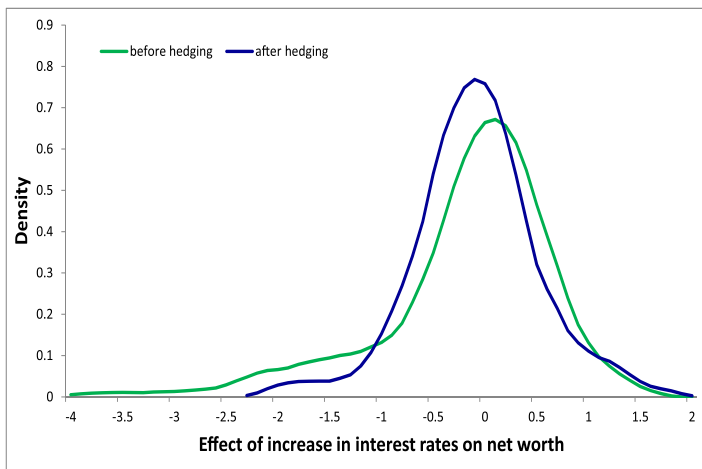
Note: This figure plots the estimated kernel density for the cross-sectional distribution of banks' exposure to interest rate risk. The top picture refers to the entire distribution, while the bottom picture splits banks into two groups depending on the location of their headquarters. The “fixed-rate countries” are Belgium, Germany, France, the Netherlands and Slovakia, with the other members of the euro area being “variable-rate countries”. Exposures are expressed in basis points relative to total assets.

Hedging

In principle, banks can protect themselves from interest rate risk that arises from granting loans and taking deposits by entering into appropriate derivative contracts – in other words, hedging. Figure 2 depicts the cross-sectional distribution of banks' exposures without (green line) and with (blue line) their positions in interest rate swaps, a widespread instrument used for managing interest rate risk.^[7] Consistent with

hedging, accounting for derivatives significantly reduces the magnitude of exposures, in particular very large ones. However, hedging is incomplete and banks fall short of fully insulating them from interest rate risk. This is to some extent surprising because diverse exposures should in principle make it easy to share risk. However, it is well known that there are frictions in derivatives markets that may prevent banks from fully hedging their risks.

Figure 2: The effects of hedging via derivatives



Note: This figure plots the estimated kernel density for the cross-sectional distribution of banks' exposures to interest rate risk before (green line) and after (blue line) accounting for hedging through derivatives. Exposures are expressed in basis points relative to total assets.

Concluding remarks

The findings presented here have some important policy implications. In particular, the differences we identified between banks from different countries suggest that monetary policy in the euro area may be transmitted through different channels in different parts of the currency union. Our results also show that not all banks are affected equally by monetary policy – a mechanism that has so far not received any attention in the literature. These findings represent promising avenues for future research.

References

- Drechsler, I., A. Savov, and P. Schnabl (2017), "The deposit channel of monetary policy," *Quarterly Journal of Economics* Vol. 132, pp. 1819–1876.
- Hannan, T. H. and A. N. Berger (1991), "The rigidity of prices: Evidence from the banking industry," *American Economic Review*, Vol. 81, pp. 938–45.
- Hoffmann, P., Langfield, S., Pierobon, F., and Vuillemy, G. (2018), "Who bears interest rate risk?," *Review of Financial Studies*, forthcoming.
- Neumark, D. and S. Sharpe (1992), "Market structure and the nature of price rigidity: Evidence from the market for consumer deposits," *Quarterly Journal of Economics* Vol. 107, pp. 657–680.
- White, L. J. (1991), "The S&L Debacle: Public Policy Lessons for Bank and Thrift Regulation," *Oxford University Press*.

[1] Disclaimer: This article was written by Peter Hoffmann (Economist, Directorate General Research, Financial Research Division). It is based on a paper entitled "Who bears interest rate risk?", by P. Hoffmann, S. Langfield, F. Pierobon, and G. Vuillemy. The author gratefully acknowledges the comments of Benjamin Klaus and Alberto Martin. The views expressed here are those of the author and do not necessarily represent the views of the European Central Bank and the Eurosystem.

[2] A well-known example of this is the savings and loan crisis of the 1980s and 1990s, which led to a large number of bank failures (see White, 1990).

[3] This follows from the fact that the present value of long-term financial instruments is more sensitive to changes in interest rates than that of short-term financial instruments.

[4] Similar results are obtained when using other measures of banks' exposures to interest rate risk, for example a projection of changes in net interest margin following the same 1 basis point increase in interest rates.

[5] This phenomenon is documented by a large body of literature, starting with Hannan and Berger (1991) and Neumark and Sharpe (1992). More recently, Drechsler, Savov and Schnabl (2017) show how the behaviour of retail deposits is linked to local concentration in banking markets, and analyse how this affects the transmission of monetary policy.

[6] See Campbell (2012) for an overview of mortgage designs across a number of advanced economies and an analysis of the potential determinants.

[7] Broadly speaking, an interest rate swap is a contract where fixed interest payments are exchanged for variable interest payments.