Measuring bank funding costs in the analysis of interest rate pass-through: Evidence from Poland[☆]

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ABSTRACT

Literature offers different explanations of the increase in lending spreads and limited impact of monetary policy on lending rates since the global financial crisis: worsened bank funding conditions, higher perceived risk and the need to improve capital position. However, the empirical assessment of their relative relevance seems still insufficient. Therefore we investigate the determinants of lending rates using bank-level panel data by including all the above factors in empirical analysis of the interest rate pass-through. In particular, to better capture a relative increase in banks' funding costs we calculate a weighted average cost of liabilities and use it instead of a money market interest rate in testing how banks set lending rates. In contrast to the money market rate – usually employed in interest rate transmission analyses – the weighted average cost of liabilities comprises interest rates on many sources of banks' funding and is sensitive to changes in structure of banks' liabilities. Our findings imply that money market interest rates may not be a sufficiently good proxy for banks' funding costs, especially in the periods of increased financial stress and for analyses of the transmission of negative interest rates. In this way the paper offers a new analytical perspective on analyzing monetary transmission mechanism in the banking sector.

1. Introduction

Banks' funding costs play an important role in the monetary policy transmission mechanism. At its beginning, a central bank sets a policy rate and conducts open market operations to keep its operating target, usually an overnight money market interest rate, close to the policy rate. Then, the money market rate is transmitted to other interest rates in an economy, which through various channels affect output and inflation. These interest rates include rates on loans. According to a marginal cost pricing model, commercial banks set them as a mark-up plus a factor proportional to a marginal cost of funding (De Bondt, 2005). It means that the policy rate affects rates on loans, and hence output and inflation through its impact on demand for loans and supply of money, to the extent that it affects banks' funding costs.

However, modelling loan rates empirically, it is not entirely clear how the marginal cost of funding should be measured. In the literature explaining loan rates usually one of the following two approaches is applied (Sander and Kleimeier, 2004). In the first one, a "monetary policy approach", the pass-through from the policy rate or from the cen-

tral bank operating target is analyzed (e.g. Gambacorta, 2008; Gambacorta et al., 2015). The second group of studies, under a "cost of funds" approach, analyzes the transmission from a market rate, either of a maturity similar to the average maturity of loans, or the most correlated with loan rates (e.g. De Bondt, 2005; Bernhofer and van Treeck, 2013; De Graeve et al., 2007). Usually a money market rate is used.

Although before the global financial crisis (GFC) there appeared to be stable relationships between policy, market and loan rates, they ceased to be so during and after the GFC. When central banks significantly lowered their policy rates, other interest rates responded less than they used to, leading to elevated interest rate spreads. It raised concerns about the effectiveness of the monetary policy transmission mechanism (e.g. ECB, 2010, 2013; Abbassi and Linzert, 2012; Paries et al., 2014). Furthermore, it challenged standard empirical approaches to modelling loan rates.

Subsequent studies proposed several explanations (Illes and Lombardi, 2013; Gambacorta et al., 2015; Paries et al., 2014; Illes et al., 2015). According to the first one, a decrease in policy rates was trans-

mitted to banks' funding costs only to a limited extent. It was because the GFC put into question the quality of bank assets, leading to higher risk premia on the money market and on the market for bonds of banks. Relative costs of other bank liabilities increased as well. In Europe these effects were amplified with the start of the euro area government debt crisis. Taking this into account, the use of money market rates as a proxy for the marginal cost of funding needed to be reconsidered. Remaining explanations imply that the mark-up is time-varying. According to the second one, not only the credit risk premium increased for bank liabilities, but also for liabilities of households and non-financial corporations, as weaker economic outlook increased their probabilities of default. Finally, banks might have raised margins to improve their capital positions to compensate for its earlier deterioration, and to comply with recommendations of financial supervision authorities.

In the present study we empirically model loan rates, focusing on the measurement of banks' funding costs, but attempting to capture the remaining two factors as well. We use bank-level panel data for Poland. In Poland, even as its economy was not at the center of the GFC and as it did not fall into recession, when the central bank lowered the policy rate, loan rates responded less than they used to. In 2016, eight years since the beginning of the GFC, spreads between loan rates and money market rates remained higher than before 2008.[1] It might suggest that money market rates do not fully reflect banks' funding costs or/and mark-ups are not time-invariant.

Therefore, for commercial banks reporting interest rates statistics we calculate a weighted average cost of liabilities (WACL), similarly as Illes et al. (2015). Compared to money market rates, it comprises interest rates on many sources of banks' funding and takes into account their time-varying shares. Therefore, it might better reflect banks' funding costs, especially that the role of the money market as a source of financing has decreased since the GFC. A graphical analysis in section 3.2 confirms that the WACL and a 3-month money market rate decoupled around September 2008.

Having an alternative measure of banks' funding costs, we estimate panel error correction models explaining loan rates. We compare results from models containing the WACL and the money market rate, both in-sample and out-of-sample. Some models are augmented with factors accounting for a time-varying mark-up – proxies for credit risk, uncertainty and bank capital positions.

We find that the advantage of using the WACL instead of the money market rate as a measure of banks' funding costs is the largest in cases of models for rates on loans for house purchases and for sole proprietors. We argue that the fundamental source of the divergence between the WACL and the money market rate, transmitted to loan rates, was increased competition between banks for retail deposits. In response to the distortions on the money market, banks attempted to adjust their structure of funding by raising deposit spreads (to attract deposits). It translated into the higher WACL and, hence, higher spreads between loan rates and the money market rate. However, higher credit risk and uncertainty, and lower capital buffers have also been at play.

Our article contributes to the literature in several ways. Firstly, we combine two approaches to improving empirical models for loan rates – one replacing money market rates with an alternative, potentially better measure of banks' funding costs, and one augmenting models with variables accounting for the time-varying mark-up. Secondly, we provide the fundamental source of the divergence between the WACL and the money market rate, which should be valid for economies with

significant shares of retail deposits in the funding of banks. In this way we stress the role of this, usually neglected, source of financing. Finally, although there are many studies attempting to explain the weaker pass-through from policy rates to loan rates in countries at the center of the GFC (the United States (US), the United Kingdom (UK), the euro area), there is little evidence for emerging economies, including Poland. Our study aims to fill this gap.

Our results have three important implications. Firstly, we argue that more attention should be paid to the transmission from policy or money market rates to rates on deposits, as they affect loan rates through banks' funding costs. Secondly, the results suggest that loan spreads may remain at elevated levels for a longer period, even if, for example, the borrower risk premium return to pre-crisis levels. This is because the increase in the WACL, relative to the money market interest rate, is related to the shift of banks towards a more sustainable model of funding. Thirdly, our results matter for the current discussion on the effects of negative interest rates, as they appear to be transmitted to deposit rates, being a major component of banks' funding costs and an important driver of rates on loans, only up to some point.

The structure of the paper is as follows. The second section contains a brief review of the literature on measuring banks' funding costs and their application in the interest rate pass-through analysis. Next, we describe data and explain the calculation of the WACL. Our main results are presented in the fourth section. We use the money market rate and the WACL to model interest rate pass-through in the error correction framework, a standard approach in the case of non-stationary time series, and then compare performance of alternative models in a forecasting exercise. The last section concludes.

2. Literature review

Until recently, for the purpose of the analysis of interest rate pass-through the banks' funding costs were successfully approximated by money market rates. The distortions of traditional relations between retail lending rates and market rates during the GFC resulted in interest in more direct measurement of banks' funding costs. A detailed survey of interest rate transmission literature, including its disturbances during the financial and sovereign debt crises, is provided by Andries and Billon (2016), therefore here we focus only on articles discussing measurement of bank funding costs. We also briefly summarize interest rate transmission in Poland.

Beau et al. (2014) decompose bank funding costs into a risk free rate, credit risk premium, liquidity premium and other costs. The risk free rate is directly shaped by the central bank, while banks' credit risk and liquidity premiums are affected by individual bank characteristics, debt instrument characteristics and macroeconomic environment. In line with this decomposition, a possible measure of marginal funding costs faced by banks is a sum of a money market rate and an average of five-year credit default swap premium of banks – an approximate price of the long-term wholesale funding (Button et al., 2010).[2] In this approach, non-market sources of funding are ignored on the grounds that it is difficult to raise deposits from the non-financial sector in a short period of time and that maturity of loans significantly exceeds maturity of retail deposits. Nevertheless, the cost of retail deposits affects lending rates through a mark-up over a marginal cost (higher deposit rates reduce the net margin on lending).

An alternative proxy of the marginal cost of funding – the weighted average cost of liabilities calculated on the basis of the liabilities structure and appropriate interest rates – was applied by Illes et al. (2015) and von Borstel et al. (2016). The WACL exploits all positions in banks' liabilities, including the retail deposits (the details on its calculation

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