



Interest rate pass-through in the euro area: Financial fragmentation, balance sheet policies and negative rates[☆]

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ABSTRACT

We examine interest rate pass-through in the euro area over the 2008–2016 period and investigate the effects of financial market fragmentation, European Central Bank balance sheet policies and negative rates on the nature of pass-through. We use heterogeneous panel cointegration methods and bank interest rates for four different loan categories: small and large firm loans, housing loans and consumer loans. We find that interest rate pass-through is complete only for small firm loans; it is thus incomplete for other loan categories. Our results suggest that while interest rate pass-through has been weakened by higher sovereign credit risk, the European Central Bank's balance sheet policies helped curb these adverse effects on pass-through. Lower financial market fragmentation translated into lower lending rates. In addition, we fail to find evidence that bank interest rates became less responsive to market rates when market rates became negative.

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1. Introduction

Monetary policy rates fell to historically low levels in the euro area during the global financial crisis, but this ultra-low interest rate environment has not been sufficient to restore macroeconomic and financial stability. To curb the adverse effects of the global financial crisis, conventional monetary policy (i.e., setting the short-term interest rate) has been accompanied by a number of non-standard measures (often called unconventional monetary

policy measures) – such as asset purchase programs, long-term refinancing operations or negative rates – to further ease monetary conditions.¹ However, bank interest rates (for non-financial firm and household loans) have not fallen sufficiently to match the decrease in policy rates, especially considering that unconventional policy measures have also been in place. Therefore, questions have arisen about whether the monetary transmission mechanism – specifically, interest rate pass-through – was impaired in the euro area during the financial crisis.

Several contributions examine interest rate pass-through in the euro area during the global financial crisis (Belke et al., 2013; Gambacorta et al., 2015; Hristov et al., 2014; Illes et al., 2015; Leroy and Lucotte, 2015, 2016; von Borstel et al., 2016). Illes et al. (2015) show that traditional interest rate pass-through models, which regress bank interest rates on policy rates (or short-term rates closely related to the censored monetary policy rate), are ill-suited to studying interest rate pass-through during the financial crisis. These authors document that while policy rates decreased substan-

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¹ Borio and Zabai (2016) classify unconventional monetary policies into (i) balance sheet policies, (ii) forward guidance and (iii) negative rates. We focus on (i) and (iii) in this paper because these measures have focused *inter alia* on easing lending conditions, while forward guidance in the original form announced in 2013 has focused on restoring macroeconomic stability via inflation expectations management.

tially, bank funding costs did not; for this reason, they estimate interest rate pass-through models in the euro area, where bank interest rates are regressed on bank funding costs. They find that interest rate pass-through in the euro area did not change substantially during the crisis once accounting for the wedge between bank funding costs and policy rates. Thus, bank funding costs and policy rates diverged. In general, this divergence stems from the poorer financial health of European banks. [Gambacorta et al. \(2015\)](#) offer an alternative approach to modeling interest rate pass-through during the crisis, and instead of using bank funding costs directly, they use short-term interest rates and various risk factors. We follow this approach in this paper because we are interested in assessing the functioning of the monetary transmission mechanism and the factors influencing its effectiveness rather than how bank funding costs propagate into bank interest rates.

Although the literature on interest rate pass-through in the euro area is growing, we still believe that we can contribute to this literature in a number of ways.

First, [Al-Eyd and Berkmen \(2013\)](#), [ECB \(2013\)](#) and [Zaghini \(2016\)](#) argue that financial market fragmentation has been among the factors impairing the proper functioning of monetary transmission in the euro area. We employ the comprehensive financial integration index, FINTEC, developed by the European Central Bank (ECB) (see [ECB, 2013](#); [Hoffmann et al., 2016](#)) and assess its role in interest rate pass-through. The index is specifically designed to assess the extent of financial market fragmentation in the euro area ([ECB, 2016](#)), and to the best of our knowledge, FINTEC has not been utilized to examine interest rate pass-through. Using FINTEC, we examine (i) whether bank interest rates are lower when financial markets are less fragmented in the euro area and (ii) whether money market shocks propagate into bank rates at a lower intensity in financially fragmented markets.

Second, our interest rate pass-through analysis explicitly accounts for the zero lower bound and the implementation of the ECB's balance sheet policies. For this reason, we develop a measure assessing the intensity of quantitative easing and other balance sheet policies at the euro area country level. Quantitative easing is ultimately reflected in increased holdings of government bonds by the central bank, while credit easing policies affect the amount of loans made to monetary financial institution (MFI), with both policies reflected on the asset side of a central bank's balance sheet. A comprehensive measure of balance sheet policies thus integrates data on holdings of securities and loans to MFI, as provided by the ECB Statistical Data Warehouse. To the best of our knowledge, this measure is novel and has not been employed in the interest rate pass-through literature to examine individual euro area countries.

Third, examining data up to late 2016 allows us to assess the effects of negative interest rates on interest rate pass-through. The Euro Overnight Index Average (EONIA) rate became negative in mid-2014; therefore, we have approximately two years of data with which to assess the effects of negative rates on the functioning of interest rate pass-through. To the best of our knowledge, no analysis of the effect of negative rates on the nature of interest rate pass-through has been conducted in the interest rate pass-through literature.

Using monthly data from 2008 to 2016 for the euro area countries and applying heterogeneous panel cointegration, our results suggest that interest rate pass-through in the euro area is complete only for the small firm loans but incomplete for other loan categories (large firm loans, household loans and consumer loans). We find that sovereign credit risk weakened interest rate pass-through, but the ECB's balance sheet policies helped curb these adverse effects on pass-through. In addition, our findings show that lower financial market fragmentation propagates into lower lending rates. Negative interest rates do not reduce bank interest rates' responsiveness to market rates.

The remainder of this paper is organized as follows. Section 2 discusses the related literature. Section 3 introduces the data. Section 4 presents the heterogeneous panel cointegration method. We provide the results in Section 5 and conclude in Section 6. Additional figures, descriptive statistics and regression results are available in the [Appendix](#).

2. Related literature

We briefly review the literature on interest rate pass-through in the euro area, focusing largely on studies examining pass-through during the financial crisis. This literature focuses mainly on understanding whether interest rate transmission changed during the crisis and, if so, the main factors behind this change. A recent survey of interest rate pass-through studies focusing on econometric aspects is available in [Andries and Billon \(2016\)](#).

[Belke et al. \(2013\)](#) investigate interest rate pass-through in a sample of 12 euro area countries with a fully harmonized dataset of interest rates for loans in two sectors – households and non-financial corporations – for the period between 2003 and 2011. They evaluate the transmission of EONIA changes to the interest rates of loans with different maturities first by conducting a cointegration test of the long-run relationship between them and then by using logistic and exponential smooth transition regression models to assess the potentially differential impacts of positive vs. negative and small vs. large changes in the EONIA rate. These authors conclude that pass-through is incomplete, with large differences between countries and between loan categories. Their findings suggest that transmission is more effective in the case of loans to non-financial corporations, especially for loans with short-term maturities. They argue that financial integration and more-intense competition may increase the degree of interest rate pass-through.

[ECB \(2013\)](#) examines interest rate pass-through in the euro area during the financial crisis. [ECB \(2013\)](#) first emphasizes that it is more appropriate to investigate the composite lending rate generated from a principal component analysis, where the weights are outstanding loan amounts or loans on new business volumes.

Second, [ECB \(2013\)](#) underlines the importance of the cost-of-borrowing indicator, which reflects the financial structure of an entity and allows the comparison of lending activity across countries. Third, [ECB \(2013\)](#) includes further explanatory variables in the regressions, especially the bank risk factors and the sovereign debt spread. The risk factors represent the supply side (expected default frequencies, capital-to-asset ratios and liquidity-to-asset ratios) and the demand side (probabilities of default by non-financial corporations and households, employment expectations and unemployment rates, and the cost of equity for financial companies and banks) of bank lending. [ECB \(2013\)](#) employs data on non-financial corporations and households from 2003 to 2013 for the four largest euro area countries (Italy, France, Germany and Spain). The results show that the dispersion of the composite lending rate for households declines from its peak in 2009 and 2010 but remains above the pre-crisis level.

The composite lending rates for non-financial corporations differ widely. The study explains heterogeneity in interest rate pass-through via financial market fragmentation, market structure and banking competition. Credit risk heterogeneity, the quality and quantity of bank capital and access to bank funding across countries motivate the weaker response of lending rates to market shocks between November 2011 and July 2012, with the response being particularly muted in Spain and Italy.

[Hristov et al. \(2014\)](#) examine pass-through in 11 euro area countries using dynamic general equilibrium models (DSGE) with financial frictions and panel vector autoregressive models with quarterly data (real GDP, GDP deflator, EONIA, interest rates of

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