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Bank Risk Aversion and the Risk-Taking Channel of Monetary Policy in the Euro Area

Summary: The financial crisis has provoked economic policy interest and academic research on the functioning and empirical verification of the risk-taking channel of monetary policy. The results of this paper demonstrate how the European Central Bank's Bank lending survey responses can be used to construct a "pure" risk aversion indicator of banks' business lending. Using panel vector autoregression econometric methodology, we find evidence that the monetary policy affects the "pure" risk aversion of banks and later affects business loans and inflation in the euro area. The results suggest that the risk-taking channel in the euro area is operational.

Key words: Bank credit standards, Monetary policy, Risk-taking channel of monetary policy transmission.

JEL: E44, E51, G21.

There is a broad consensus (Mark Jickling 2010; International Monetary Fund 2014; Brigitte Young 2014) that one of the main causes of the global financial crisis of 2007-2009 has been excessive risk-taking by banks stimulated in industrialized countries by the accommodative monetary policy that kept interest rates too low for too long of a period. A credit slowdown is one of the ramifications of the global financial crisis. According to the European Central Bank (ECB) statistics, at the end of 2014, the euro area banking sector's outstanding loans to euro area residents stood at about 7.3% lower than at the peak level of October 2008.

This paper joins the empirical literature that identifies the risk-taking channel of monetary policy by bank lending survey (BLS) responses. The ECB's BLS provides detailed information on banks' balance sheet constraint factors and the risk-related factors of credit standards. One can therefore use the ECB's BLS responses to identify the risk-taking channel of monetary policy and other monetary policy channels (Ulrike Busch, Michael Scharnagl, and Jan Scheithauer 2010; Lorenzo Cappiello et al. 2010; Matteo Ciccarelli, Angela Maddaloni, and José-Luis Peydró 2010; Hannah Sabine Hempell and Christoffer Kok Sørensen 2010; William F. Bassett et al. 2012; Luca Gambetti and Alberto Musso 2012). As there is evidence that the credit standards may be more important than the interest rates of loans for allocation of loans (Cara S. Lown and Donald P. Morgan 2006), this paper studies whether the risk-taking channel of monetary policy in the euro area operates though this instrument of loan allocation. The risk-taking channel is investigated for the business loan segment only.

Applying the panel vector autoregression (VAR) econometric methodology, we found that the monetary policy rate and risk aversion of the euro area banks move in the same direction. A low interest rate environment increases banks' risk taking, which in turn increases their loan activity, whereas monetary policy tightening provokes credit activity slowdown. The results lead us to conclude that the risk-taking channel of monetary policy in the euro area is operational.

The paper is structured as follows. Section 1 reviews the literature. Section 2 describes the methodology applied. Section 3 presents the data and the empirical results of the study on the risk aversion channel of the monetary policy in the euro area. Section 4 concludes the paper with the main findings.

1. Literature Review

The literature has identified two main ways in which the risk-taking channel operates. First, the low interest rate environment combined with the low returns of other investment classes (e.g., bonds) can lead to a reduction in bank portfolio income (Raghuram Rajan 2005) and increase banks' incentive to take on more risk for contractual, behavioral, or institutional reasons (Leonardo Gambacorta 2009). The second way in which the channel may operate is through the reduced volatility of assets returns; the latter reduces the perception of risk by banks (Claudio Borio and Haibin Zhu 2008). These two factors combined reduce the banks' risk aversion in the search for yield (Giovanni D. Dell'Ariccia, Luc Laeven, and Robert Marquez 2011; Diana Bonfim and Carla Soares 2014).

Supportive empirical evidence on the channel was provided, among others, by Vasso P. Ioannidou, Steven Ongena, and Peydró (2009), Tobias Adrian and Hyun Song Shin (2011), Angela Maddaloni and Peydró (2012), Teodora Paligorova and Jesus A. Sierra Jimenez (2012), and Valentina Bruno and Shin (2013). A review of the very recent empirical studies on the channel can be found in the study of Bonfim and Soares (2014). The risk-taking channel may operate through two instruments that banks apply to allocate loans: the credit standards and the interest rates (or margin) on loans. Lown and Morgan (2006) found that, in the United States, the credit standards of loans are much more informative about future lending than are the loan rates.

The credit standards are all the non-price terms and conditions of loans, including required collateral, loan covenants, maturity of loans granted, and volume of loans granted (Jesper Berg et al. 2005; Lown and Morgan 2006). Credit standards are a mechanism that can greatly affect loan supply in credit markets where information is asymmetric (Joseph E. Stiglitz and Andrew Weiss 1981). In a credit market where rationing is present, a borrower may not be able to borrow if he fails to meet the credit standards set by banks.

The identification of the risk-taking channel is not straightforward, as it works in confluence with other monetary policy channels: the interest rate channel, the bank lending channel, narrow credit channel, etc. (for a comprehensive description of monetary policy transmission channels, see Ben S. Bernanke and Mark Gertler 1995; Jean Boivin, Michael T. Kley, and Frederic S. Mishkin 2010; Gertler and Nobuhiro Kiyotaki 2010; Joe Peek and Eric S. Rosengren 2013).

The empirical literature on monetary policy transmission identifies the specific monetary policy transmission channels by relying predominately (or exclusively) on either microdata (Bernanke and Gertler 1995; Paolo Del Giovane, Ginette Eramo, and Andrea Nobili 2010; Barno Blaes 2011; Maddaloni and Peydró 2012; Nick Butt et al. 2014) or macrodata (Gertler and Simon Gilchrist 1994; Lown and Morgan 2006; Ciccarelli, Maddaloni, and Peydró 2010). The later strand of literature has made use of the BLS to achieve the identification of the specific channels (Lown and Morgan 2006; Busch, Scharnagl, and Schethauer 2010; Cappiello et al. 2010; Ciccarelli, Maddaloni, and Peydró 2010; Hempell and Sørensen 2010; Bassett et al. 2012; Gambetti and Musso 2012). To our knowledge, those of Gabe De Bondt et al. (2010) and Maddaloni and Peydró (2012) are the only studies that attempted to identify the risk-taking channel in the euro area by relying on the ECB's BLS. De Bondt et al. (2010) ran a simple panel regression of GDP (and volume of loans) to a set of ECB's BLS responses to disentangle the impact of various monetary policy transmission channels: the interest rate, the bank lending, the balance sheet, and the risk-taking channel. A finding of operational risk-taking channel was found also by Maddaloni and Peydró (2012). They regressed the changes in loan margins applied to riskier loans on Taylor-rule residuals (used as a proxy of a monetary policy stance) controlling for long-term interest rates, GDP, aggregate bank capital and liquidity, and changes in lending conditions due to changes in the borrowers' net worth.

Hempell and Sørensen (2010) noted that it is questionable how successfully the risk-related factors in the ECB's BLS disentangle the risk factors affecting the demand side from the risk factors affecting the supply side of banks' loan activity. Namely, one must separate the expected credit risk (a demand-side determinant) from the banks' risk aversion (a supply-side determinant). The risk factors that the ECB's BLS covers, such as expectations of the general economic activity and firm- or industry-specific outlook, are only in part the proxy for banks' risk-related supply-side behavior. Unlike the existing studies, we applied a structural model to capture the "pure" risk aversion of banks from the credit risk component in the non-price terms and conditions of loans (i.e., credit standards). This approach enabled us to investigate how the risk aversion of banks has changed in the period of 2002:Q4-2014:Q3 and whether the risk-taking channel is operational through the credit standard-setting mechanism.

2. Methodology

This paper builds on the research of Maddaloni and Peydró (2012), who suggested discerning the risk-related supply-side behavior by concentrating on banks' responses in the ECB's BLS on margin that they apply to loans given to riskier borrowers (as opposed to average borrowers) and controlling for key factors that might affect the margin. The margin on riskier loans may change because of different factors, and we assume that these factors are fully reflected in the factors affecting the credit standards that the euro area banks set. This assumption is widely shared in the recent studies that use the BLS to disentangle the demand from the supply of loans shocks and to disentangle different channels of monetary policy (Busch, Scharnagl, and Schethauer 2010; Cappiello et al. 2010; Ciccarelli, Maddaloni, and Peydró 2010; Hempell and Sørensen 2010; Bassett et al. 2012; Gambetti and Musso 2012).

The ECB's BLS, which was designed for the purpose of enhancing the understanding of bank lending behavior in the euro area, was conducted on a quarterly basis from the first quarter of 2003, and it included between 90 banks (the first surveys) and up to 140 banks (the latest surveys). The survey was addressed to senior loan officers of a representative sample of the euro area banks who answered four sets of questions (on credit standards for approving loans, credit terms and conditions, questions on credit demand, and the factors affecting it) in terms of changes over the past 3 months. The lenders in the survey responded to questions by offering answers on a five-step scale: tightened considerably, tightened somewhat, remained basically unchanged, relaxed somewhat, and relaxed considerably. The responses to questions related to credit standards (and factors) affecting them were analyzed either by the net percentage index, calculated as the difference between the share of banks reporting that credit standards (or factor affecting them) have been tightened and the share of banks reporting that they have been eased, or by a diffusion index, calculated as a weighted difference between the share of banks reporting that credit standards have been tightened and the share of banks reporting that they have been eased. A positive value of the index indicates that the credit standards have tightened in net terms (net tightening), whereas a negative value indicates that the standards have eased (net easing) from one quarter to another. For a complete description on the set-up of the survey, see Berg et al. (2005).

In this research, we prefer to use the diffusion index aggregated on a national level due to data availability. The Eurosystem's national central banks publish banks' responses aggregated on a national level, by either net percentage or diffusion index or sometimes on both measures; more publicly available data are for the diffusion index.

The ECB's BLS covers several responses on credit terms and conditions: collateral required, loan covenants, margins (on average and riskier loans), maturity of loans, size of loans, and non-interest charges. It also traces the development of several credit standards factors, including the one that pertains to banks' balance sheet constraints and borrowers' balance sheet constraints. Under the assumption that the credit standards (i.e., non-price terms and conditions of loans) are set by collateral required, loan covenants, maturity, and size of loans, we argue that credit standards can change because of three main reasons. First, they may change because the "pure" risk aversion of banks has changed. Second, they may change because the creditworthiness (credit risk) of the borrowers (enterprises) has changed (already risky loans becoming even more risky, which induces banks to raise margins). Third, credit standards may change because of other factors related to banks' constraint loan supply. To disentangle the "pure" risk aversion component of credit standard changes from other components, the following dynamic fixed-effects panel model is estimated:

$$CSTC_{it} = \beta_0 + \beta_1 CSTC_{it-1} + \beta_2 EG_{it} + \beta_3 IO_{it} + \beta_4 RCD_{it} + \beta_5 BLP_{it} + \beta_6 AMF_{it} + \\ + \beta_7 BC_{it} + \beta_8 NBC_{it} + \beta_9 BCP_{it} + \eta_i + \varepsilon_{it}, \quad (1)$$

where all right-sided variables are from the ECB's BLS. *CSTC* is the composite variable of non-price terms and conditions of loans (i.e., credit standards as defined in the introduction of this paper). The variable is a principal component obtained after performing a principal component analysis of the following ECB's BLS credit terms and conditions: "collateral requirements", "maturity of loans", "size of loans", and "loan covenants". *EG* is the diffusion index of the credit standards factor "impact of expectations regarding general economic activity", *IO* is the diffusion index of the credit standards factor "impact of industry outlook or firm-specific outlook", *RCD* is the diffusion index of the credit standards factor "impact of risk on collateral demanded", *BLP* is the diffusion index of the credit standards factor "impact of bank liquidity position", *AMF* is the diffusion index of the credit standards factor "impact of ability to access market financing", *BC* is the diffusion index of the credit standards factor "impact of bank competition", *NBC* is the diffusion index of the credit standards factor "impact of non-bank competition", and *BCP* is the diffusion index of the credit standards factor "impact of bank capital position". To capture the unobserved heterogeneity across the countries, the country dummy variables are added, η_i. The dynamics of credit standards (as proxied by the composite variable *CSTC*) is thus explained either by the factors that affect the risk of loans associated with "creditworthiness of the borrowers" (i.e., borrower balance sheet constraints; credit standards factors *EG*, *IO*, and *RCD*), factors related to banks' balance sheet constraints (factors *BLP*, *AMF*, *BC*, and *NBC*), or country-specific factors affecting credit standards (collateral requirements). The lag of *CSTC* is added to model 1 to capture the possible persistence in the non-price terms and conditions of loans. The "pure" risk aversion component of the credit standards (i.e., non-price terms and conditions) is captured by the error term of model 1, ε_{it}.

Model 1 is estimated by the least squares dummy variable (LSDV) estimator corrected for bias. The lagged dependent variable in model 1 renders the LSDV estimator inconsistent for a finite time dimension *T*, even when the cross-sectional dimension *N* gets large (Stephen J. Nickell 1981). As an alternative to LSDV, the literature lists a number of consistent instrumental variables and a generalized method of moment estimators, including the estimators of Theodore Wilbur Anderson and Cheng Hsiao (1982), Manuel Arellano and Stephen Bond (1991), or Richard Blundell and Bond (1998). These instrumental variables and GMM estimator properties hold only for a large number of cross-section units (*N*). With a small number of *N*, the estimator may still yield biased estimates of regressors (Giovanni S. F. Bruno 2005). An alternative approach to correct for the bias of the LSDV estimator (LSDVC estimator) has built on Nickell's (1981) analytical expression for the inconsistency of LSDV for $N \rightarrow \infty$, which is $O(T^{-1})$. The bias of LSDV thus is inversely proportional to *T*. Jan F. Kiviet (1995) derived a more precise LSDV small-sample bias approximation of order $(N^{-1}T^{-1})$ and Kiviet (1999) derived that of order $O(N^{-1}T^{-2})$. The approximations of Kiviet (1999) were simplified by Maurice J. G. Bun and Kiviet (2003) and extended to unbalanced panels by Bruno (2005). Bruno (2005), following Kiviet and Bun (2001), suggested a parametric bootstrap to estimate the asymptotic variance-covariance matrix of the LSDVC estimator of regression coefficients. Monte Carlo experiments performed by Bun and Kiviet (2003) and Bruno (2005) showed that the LSDVC estimator outperforms the estimators of Anderson and Hsiao (1982), Arellano and Bond (1991), or Blundell and Bond (1998). In this paper, we used the Bruno's LSDVC estimator and calculated a bootstrap variance-covariance matrix for LSDVC using 1000 repetitions. Bruno's (2005) Stata code was used to estimate model 1.

With model 1, we estimated the "pure" risk aversion of the euro area banks participating in the ECB's BLS. To assert if the risk-taking channel is operational in the euro area, we fitted a panel VAR model, which in a reduced form can be written as:

$$Z_{it} = A(L)Z_{it} + \eta_i + \varepsilon_{it}, \tag{2}$$

where i refers to country ($i = 1, \dots, N$), t refers to quarter ($t = 1, \dots, T$), Z_{it} is a vector of endogenous variables, $A(L)$ is a matrix polynomial in the lag operator, η_i is a vector of country-specific fixed-effects that capture individual heterogenity, and ε_{it} is a vector of idiosyncratic errors. The vector Z_{it} includes a typical set of endogenous variables found in the literature on monetary policy transmission channels (e.g. Bernanke and Ilian Mihov 1995; Lawrence J. Christiano, Martin Eichenbaum, and Charles L. Evans 1996; Ciccarelli, Maddaloni, and Peydró 2010) and the specific variables to test for the existence of risk-taking channel: real GDP (working day and seasonally adjusted), price index (the HICP, harmonized index of consumer prices, is used), monetary policy rate (EONIA is used as in recent studies (e.g. Ciccarelli, Maddaloni, and Peydró 2010, 2013), business loan volume (as we observed this segment of credit market), and the indicator of "pure" risk aversion as estimated by model 1. VAR was identified using Choleski's decomposition of the variance-covariance matrix of the reduced-form VAR model residuals with the variables ordered as in the description order above. The number of lags in model 2 was determined Donald W. K. Andrews and Lu Biao's (2001) minimization rule of moment condition selection (MMSC) based on Akaike's information criteria. The panel VAR model 2 was estimated by the generalized method of moments on Helmert transformed variables of model 2, whereby the fixed effects are removed from the panel VAR model. The merit of this method is that it removes the bias of the LSDV estimator. For a thorough description of the method, refer to the studies of Arellano and Olympia Bover (1995) and Inessa Love and Lea Zicchino (2006). Panel VAR model was estimated with the Stata code of Love and Zicchino (2006).

After the model is fitted, cumulative impulse response functions are drawn to gain insight on the effects of a shock in the monetary policy rate on the "pure" risk aversion indicator and the shock in the "pure" risk aversion on the volume of loans, the price index, and the GDP.

3. Data and Empirical Results

Model 1 is estimated for the 11 euro area countries: Austria, Cyprus, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Slovenia, and Spain. Other euro area countries are not included either because data are not publicly available or not available from the start of the observed period (from the first quarter of 2004). The period covered starts with the last quarter of 2002 for 9 countries (all but Slovenia and Cyprus) and ends with the third quarter of 2014. For Slovenia and Cyprus, the starting dates of observation are the first quarter of 2007 and first quarter of 2009, respectively. The panel data set is thus unbalanced. The source of credit standards factors diffusion indexes is the ECB's BLS.

Table 1 presents the descriptive statistics of the variables of model 1. Apparently, the credit standards factor "impact of expectations regarding general economic activity" (*EG*) is the most volatile credit standards factor, whereas the credit standards factor "impact of non-bank competition" (*NBC*) is the least volatile credit standards factor in the observed time period.

Table 1 Descriptive Statistics of Model (1)

Variable	Mean	SD	Minimum	Maximum
CSTC	-5.20e-17	1.8225	-4.2083	8.6851
EG	14.1845	21.7606	-40	80
IO	16.3065	19.7435	-21	90
RCD	8.5539	13.3361	-13	70
BLP	4.1013	13.0196	-30	60
AMF	6.675	14.9439	-20	80
BC	-5.0837	11.4323	-75	50
NBC	-0.2620	4.7685	-25	33
BCP	7.9670	13.1206	-17	70

Notes: SD - standard deviation.

Source: Own calculations.

The results of model 1 are presented in Table 2. For comparison purposes, we also estimated the biased estimates calculated by the LSDV estimator.

Table 2 Determinants of Credit Standards

Variable	Estimates of the parameters (LSDV)	Estimates of the parameters (LSDVC)
Lagged variable *CSTC* ($CSTC_{it-1}$)	0.2783*** (0.0325)	0.2991*** (0.0305)
CSEG	0.0163*** (0.0041)	0.0159*** (0.0042)
IO	0.0094** (0.0047)	0.0090* (0.0049)
RCD	0.0205*** (0.0056)	0.0198*** (0.0058)
BLP	0.0046 (0.0050)	0.0048 (0.0052)
AMF	0.0215*** (0.0046)	0.0216*** (0.0048)
BC	0.0129*** (0.0043)	0.0126*** (0.0044)
NBC	-0.0117 (0.0088)	-0.0113 (0.0093)

BCP	0.0101** (0.0051)	0.0096* (0.0051)
Constant	-0.7730*** (0.0684)	/
R^2(within)	0.8021	/

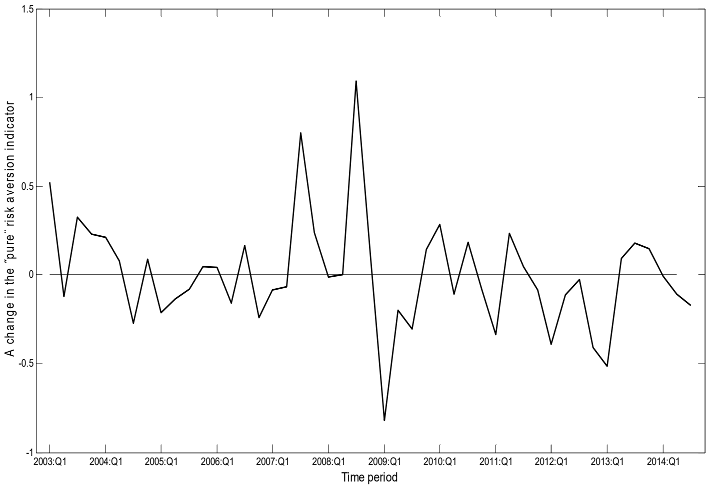
Notes: LSDV are the LSDV estimates of model 1 regressors. LSDVC estimates are obtained using the LSDVC estimator. In the brackets, standard errors (SEs) are noted. For the LSDVC estimator, the Anderson and Hsiao (1982) consistent estimator was used to initialize the bias correction. Bruno (2005) showed that the selection of a consistent estimator does not affect the LSDVC estimates. The SEs of LSDVC estimates were bootstrapped with 1000 replications. Under the regression estimated, the SEs are given in parentheses. Significance levels are denoted as follows: *10%, **5%, and ***1%.

Source: Own calculations.

The composite variable of the non-price terms and conditions of loans (credit standards) is significantly persistent. The lagged value of the non-price terms and conditions of loans has the greatest impact on the current quarter credit standards. Thus, 1 SD higher non-price terms and conditions of loans in the current quarter is likely to lead to an approximately 0.3 SD increase in the variable in the subsequent quarter. The results show that an increase in the business borrowers' balance sheet constraints and banks' balance sheet constraints increase the non-price terms and conditions of loans applied to business loans. The borrowers' balance sheet constraints are affected if expectations regarding general economic activity deteriorate (and thus the variable *EG* increases) or the risk on collateral demanded (*RCD*) increases. An increase in the diffusion index of credit standards factor *EG* ("impact of expectations regarding general economic activity") increases the composite non-price terms and conditions variable by 0.0159 (i.e., 0.087 SD), and a similar impact is observed if the diffusion index of *RCD* ("impact of risk on collateral demanded") increases for 1 unit. Banks' balance sheet constraints that significantly explain the variability of non-price terms and conditions of business loans include constraints in the access to market funding (*AMF*; i.e., "impact of ability to access market financing") and constraints induced by bank competition (*BC*; i.e., "impact of bank competition"). Increased bank balance sheet constraints induced by these two factors (i.e., reduced access to market financing and reduced bank competition) significantly increase the non-price terms and conditions.

We can also observe that the "industry outlook or firm-specific outlook" and the "bank capital position" are weakly significant (at the 10% level) and thus may affect the non-price terms and conditions of business loans. The liquidity position of banks (*BLP*) and the non-bank competition (*NBC*) do not significantly explain the variability in the non-price terms and conditions of business loans.

The error term of the estimated model 1 is used as a proxy for the "pure" risk aversion component of the non-price terms and conditions. The evolution of the cross-section averages of the "pure" risk aversion indicator throughout the period 2002:Q1-2014:Q3 is presented in Figure 1. The figure shows how the risk aversion has changed from one quarter to another. A positive value of the "pure" risk aversion indicator implies that the risk aversion has increased, whereas the negative value indicates that that it has dropped compared to the previous quarter. The "pure" risk aversion indicator measures dynamics and not the level of risk aversion. It is noticeable that the "pure" risk aversion increased the most in the second half of 2007 and the second half of 2008 (i.e., in the time of global financial crisis culmination). After the second quarter of 2011, the "pure" risk indicator shows that the euro area banks began to take on more risk again, as in most of the quarters the "pure" risk aversion decreased rather than increased.



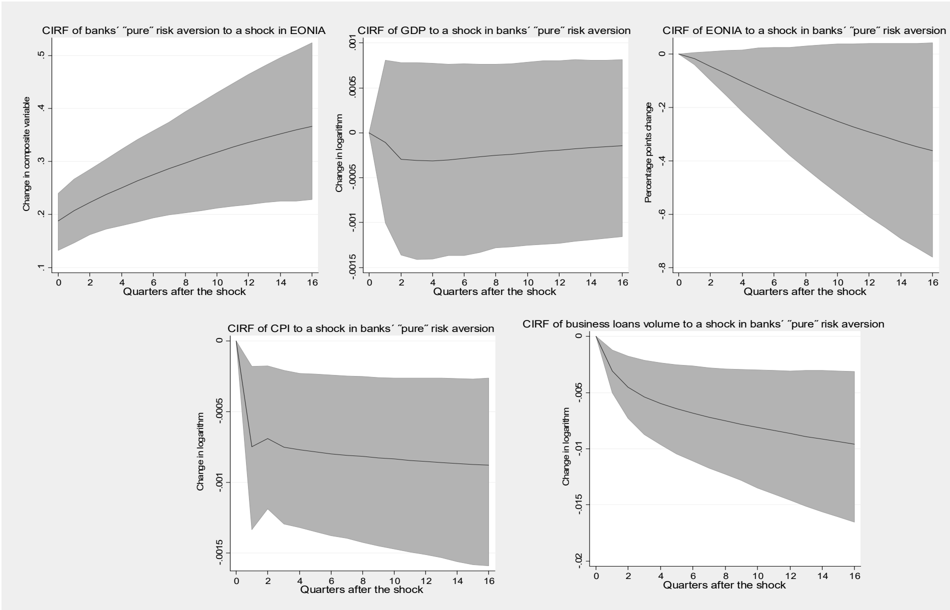
Notes: The changes in "pure" risk aversion are averaged across the sample of the euro area countries. The SD (within) of the "pure" risk aversion for the whole period is 0.74. An increase in the "pure" risk indicator of 1 corresponds to approximately a 1.5 SD increase in the risk aversion.

Figure 1 Changes in "Pure" Risk Aversion during the Period 2002:Q1-2014:Q3.

The cumulative impulse response functions were estimated after the panel VAR model 2 was fitted. They are drawn in Figure 2.

A 1 SD shock in impulse variable is assumed, and the cumulative impulse response functions (CIRF) of the endogenous variables of model 2 (GDP, inflation, business loan volume, and "pure" risk aversion of banks in their business loan activity) over the horizon of 16 quarters are drawn. Only the CIRFs that describe the risk-taking channel of monetary policy are presented. The graph in the first row left presents the CIRF of banks' "pure" risk aversion, as defined by model 1. A negative monetary policy shock (increase of the EONIA rate of 1 SD) leads to a long-run increase in banks' risk aversion. Sixteen quarters after the shock in EONIA rate, the indicator of "pure" risk aversion is approximately 0.37 points (0.5 SD) higher than before the shock.

A positive relationship between monetary policy rate and risk aversion of banks implies that the risk-taking channel is operative. A low interest rate environment thus reduces bank risk aversion, i.e., increases banks' risk taking.



Notes: The real GDP, HICP, and business loan volume variables enter the panel VAR model 2 as quarter-on-quarter log growth rates. This transformation was necessary to achieve the stationarity of the variables. No cointegration relationship could be found with Joakim Westerlund's (2007) error correction-based panel cointegration tests. The panel VAR model 2 is fitted for the time period of 2004:Q1-2014:Q3 as the data for business loan volume from start of 2004 onwards only.

Figure 2 CIRFs of Endogenous Variables of Model 2

In response to a 1 SD increase in "pure" risk aversion indicator, the volume of business loans reduces by approximately 1% 16 quarters after the shock (graph second row right). The results thus show that monetary policy tightening provokes credit activity slowdown through the risk-taking channel. Price index drops as a response to a 1 SD increase in banks' risk aversion (graph second row left), whereas no significant effect on GDP can be identified if the banks' risk aversion is shocked (graph first row in the middle). Monetary policy does not respond to increased banks' "pure" risk aversion by changing the monetary policy rate. Using a bit different methodology than the extant studies, our results support the previous findings (including those of De Bondt et al. 2010; Maddaloni and Peydró 2012; Bonfim and Soares 2014) that the risk-taking channel in the euro area is operational.

The results of this study may contribute to the debate on the nexus between the monetary policy and the macroprudential policy to meet the objectives of price stability and financial stability. Although the objectives may coincide when the economy is near the peak of the economic cycle and inflation is close or above the monetary policy targets, the objectives may be conflicting in the setting experienced before the global financial crisis with relatively low policy rates, low inflation, and high risk-taking behavior of banks (see, e.g., Dell'Ariccia, Laeven, and Gustavo Suarez 2013). Tightening policy in this setting may reduce risk taking, thus increasing financial stability but hurting the objective of price stability. This speaks for the separate (non-integrated) monetary policy and macroprudential policy. Indeed, the "monetary policy alone cannot achieve financial stability because the causes of financial instability are not always related to the degree of liquidity in the banking system" (Stijn Claessens and Fabian Velancia 2013). Macroprudential policy, by constraining borrowing in the financial system, affects not only the financial stability but also the output and the price level. The results of this paper show that the coordination of the two policies is needed. Whether this should be achieved under one authority (the central bank) or two separate authorities is a debate that exceeds the goals of this paper.

4. Conclusion

This paper uses a rich set of responses from the ECB's BLS and demonstrates how they can be used to test if the risk-taking channel in the euro area is operational. Making use of several credit standards factors and non-price terms and conditions responses from the survey, we constructed a "pure" risk aversion of bank in their business loan activity. We found that the "pure" risk aversion increased the most in the second half of 2007 and the second half of 2008 (i.e., in the time of global financial crisis culmination). After the second quarter of 2011, the banks began to take on more risk again, as the "pure" risk indicator in most quarters was reduced rather than increased. Applying the "pure" risk aversion indicator in a typical monetary policy VAR, we found that the shock in monetary policy affects the risk aversion of banks. A negative shock in "pure" risk aversion indicator negatively impacts business loan volume and reduces inflation. The results implicate that the risk-taking channel in the euro area is operational.

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