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Abstract:

This paper assesses the transmission of ECB monetary policies, conventional and unconventional, to both interest rates and lending volumes for the money market, sovereign bonds at 6-month, 5-year and 10-year horizons, loans inferior and superior to 1M€ to non-financial corporations, cash and housing loans to households, and deposits, during the financial crisis and in the four largest economies of the Euro Area. We first identify two series of ECB policy shocks at the euro area aggregated level and then include them in country-specific structural VAR. The main result is that only the pass-through from the ECB rate to interest rates has been really effective, consistently with the existing literature, while the transmission mechanism of the ECB rate to volumes and of quantitative easing (QE) operations to interest rates and volumes has been null or uneven over this sample. One argument to explain the differentiated pass-through of ECB monetary policies is that the successful pass-through from the ECB rate to interest rates, which materialized as a huge decrease in interest rates during the sample period, had a negative effect on the supply side of loans, and offset itself its potential positive effects on lending volumes.

1. Introduction

This paper aims at establishing the effect of conventional and unconventional ECB monetary policies on both interest rates and lending volumes in the four largest economies of the Eurozone during the global financial crisis. This issue is topical since Mario Draghi, chairman of the ECB, justified the latest unconventional policy tool – the Outright Monetary Transactions - by the disruption of the ECB monetary policy transmission to the real economy in some Eurozone countries.

The OMT has been created in September 2012 to put an end to the instability on sovereign-bond markets and it seems to have been effective: sovereign-bond spreads have started decreasing ever since and new deposits in peripheral European countries have started back. It may seem as if the ECB had been able to implement a new measure of financial stability though, strictly speaking, the ECB has done nothing new except communicating on the OMT as the latter has never been triggered so far.

The success of the OMT raises the issue of how to measure policies which may dampen financial instability, where financial stability represents the ability of a financial system to smoothly absorb the shocks it has to face. Financial stability is a wide concept that relates to different aspects of finance. On a micro level, it refers to market structures (a high degree of concentration reinforces the contagion risks from one bank to another) and to financial institutions themselves (depending on the fact that their business model requires high or low risk). On a macro level, it also relates to monetary stability and to the functioning of the payment system. These domains are organised and supervised by central banks, supervisory authorities and private firms that ensure the good functioning of the payment system between the financial institutions.

Via its policies, the central bank is expected to participate in this good functioning of the payment system. One way of assessing its effectiveness in achieving this objective is to study the channels of transmission: are monetary policies effective in modifying private credit conditions, i.e. private interest rates and volumes? Are they effective as well in modifying sovereign rates and the liquidity of sovereign bonds? In the following, we investigate the strength of monetary channels of transmission during the crisis. We identify policy shocks at the Euro area level, taking into consideration the possible direct reaction of the ECB towards Euro area financial instability, using the Composite Index of Systemic Stress (CISS) as a proxy. In a second step, we identify country-specific policy shocks and study the reactions of different domestic financial markets. We conclude that changes in credit supply by banks have certainly diminished the ability of the ECB to influence the real economy and to absorb shocks.

Most of the literature has focused on the transmission during the financial crisis of ECB monetary policies through the interest rate channel. We contribute to this literature in three ways. First, we assess at the same time interest rate and bank lending channels using interest rates and lending volumes for new loans. Second, we investigate the effects of both conventional and unconventional monetary policies and disentangle the effect of one from the other. In the spirit of Bachmann and Sims (2012), we artificially shut-off the effects of the quantitative easing (QE) policy when analysing the effects of the conventional one, and vice-versa. Third, the analysis is performed, over the financial crisis sample, for the four largest economies of the Eurozone: Germany, France, Italy and Spain, and at a disaggregated level encompassing money markets, sovereign bonds at 6-month, 5-year and 10-year horizons, loans inferior and superior to 1M€ to non-financial corporations, cash and housing loans to households, and deposits.

We proceed in two steps. We first identify two series of ECB policy shocks at the euro area aggregated level and orthogonal to various macroeconomic indicators. Second, we include these two estimated series of interest rate and QE policy shocks in country-specific structural VARs with 4 additional endogenous variables, namely industrial production, inflation, and interest rates and lending volumes for each market considered, as well as oil prices, a composite indicator of systemic stress (CISS) and the Euro Stoxx 50 index as exogenous variables. We impose both short-run and long-run restrictions when we artificially shut off either the effect of conventional or unconventional policies. We also use panel data estimation to control for country fixed-effects, potentially important in the policy transmission to lending markets.

The main result is that only the pass-through from the ECB rate to interest rates has been really effective, consistently with the existing literature, while the transmission mechanism of the ECB rate to volumes and of QE operations to interest rates and volumes has been null or uneven over this sample. QE operations have some sparse effects on interest rates but overall, their pass-through to credit conditions seems to be extremely weak.

One argument to explain the differentiated pass-through of ECB monetary policies is that the successful pass-through from the ECB rate to interest rates, which materialized as a huge decrease in interest rates during the sample period, had a negative effect on the supply side of loans, and offset itself its positive effects on lending volumes. The interest rate channel may be a substitute to the bank lending channel on the supply side when net interest margins deteriorate, and ever more so for larger banks which retain market power. More precisely, if banks have positive net interest-sensitive positions, lowering the central bank interest rate will lower their profitability. If average returns affect banks' marginal decisions, this will reduce net lending, (partially)

offsetting the positive stimulus stemming from the interest rate reduction. Landier, Sraer and Thesmar (2013) show that a 100 basis point decrease in the Fed funds rate leads a US bank at the 75th percentile of the income gap distribution to decrease lending by about 1.6 percentage point annually relative to a bank at the 25th percentile.

One policy implication of this result would be for central banks to target more directly non-financial corporations or households when implementing unconventional monetary policy or to constrain more effectively bank lending to ensure an operative pass-through to non-financial corporations or households.

The rest of the paper is organized as follows. Section 2 presents the related literature, section 3 the theoretical framework, section 4 data and section 5 the empirical strategy and results. Section 6 concludes.

2. Related Literature

One of the pioneering studies about the monetary transmission mechanism is Bernanke and Blinder (1992) showing that the Fed funds rate records perfectly the variations of the central bank reserves; the transmission mechanism can thus be assessed through the impact of a change in this rate on retail rates (the interest rate channel) and on volumes of loans and bank deposits (the bank lending and money channels). The articulation of these two channels matters because loans supply hinges on the speed and size of the pass-through from policy interest rates to money market rates and bank interest rates. The pass-through from the central bank interest rate to commercial bank interest rates is expected to be positive, whereas the pass-through to lending and deposits volumes is expected to be negative because of the arbitrage with bonds. Their

results highlight a positive pass-through to lending and deposit rates while banking volumes do not react.

Before the recent financial crisis, many studies have focused on the transmission mechanism in the Eurozone and have highlighted its heterogeneity. First, regarding the interest rate channel, many econometric methods have been used to estimate the pass-through between the central bank interest rate, money market rates and bank interest rates. Donnay and Degryse (2001) used a SVAR to investigate the pass-through from money market rates to several bank lending rates and government bond rates in 12 European countries; they highlighted the role played by the banking sector in the transmission process of monetary policy to the real economy *via* the interest rate channel. De Bondt (2005) used a vector error-correction model to examine the interest rate pass-through at the euro area level, focusing on the pass-through of the overnight interest rate to longer term market interest rates and retail bank interest rates; the pass-through is found incomplete on the money market and lagged on the retail banking market. Sorensen and Werner (2006) conducted a cross-country analysis of the pass-through between market interest rates and bank interest rates; using the panel unit root method and cointegration tests, the article shows a large heterogeneity between euro area countries. Sander and Kleimeier (2006) focused on the nature of the conventional monetary policy tools and their impact on the interest rate channel, differentiating between expected and unexpected monetary policy impulses. They showed how important was the kind of monetary policy for the speed and completeness of the pass-through and have paved the way for a new branch of literature studying the impact of several monetary policy tools on money market rates and retail bank interest rates. The literature on the bank lending channel is less numerous than the one on the interest rate channel; Chatelain et al. (2003) brought evidence of a credit channel in the Eurosystem: bank balance sheet characteristics play a role in the lending reaction to

monetary policy impulses, as banks that have a less liquid asset composition reduce lending by more in response to a restrictive monetary policy action than more liquid banks do; this lends support to the hypothesis that banks draw on their liquid assets to cushion the effects of monetary policy on their loan portfolio. Last, De Santis and Surico (2013) analyse in the four largest economies of the Euro Area the effect of monetary policy on bank lending according to bank characteristics.

Regarding our sample period, many articles have studied whether the worldwide financial crisis has affected the interest and credit channels of conventional monetary policy in the Eurozone[1]. Most of these studies focus on the interest rate channel. Andries and Lecarpentier-Moyal (2012) used ARDL models and cointegration methods to assess the impact of the financial crisis on the transmission mechanism to non-financial corporations' lending rates, while Blot and Labondance (2011) uses a SUR-ECM model to estimate the effect of the financial crisis on the global pass-through between market rates and bank interest rates. Both articles showed that the financial crisis has clogged up the transmission mechanism, especially for long-term rates. Belke, Beckmann and Verheyen (2012) conducted a cross-country analysis of the pass-through since the crisis in 12 countries of the European Monetary Union and allowed for non-linear patterns for short-run dynamics of loan rates. Aristei and Gallo (2012) studied the interest rate channel in five distinct markets (money market, government debt market, lending market to non-financial corporations, lending market to households, deposit market); using a Markov-Switching vector autoregressive model, they found a reduction of the pass-through during the crisis, especially in the lending market to non-financial corporations. Gigineishvili (2011) examined the financial structure as a possible cause of heterogeneity that exists within the various monetary transmission mechanisms worldwide, even within the Eurozone; macroeconomic determinants such as per capita

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[1] See appendix for a summary table of the related literature.

GDP, inflation or market volatility and financial market structure variables such as exchange rate flexibility, credit quality or overhead costs affect the interest rate pass-through. Last, Panagopoulos, Reziti and Spiliotis (2010) compare the interest rate channels during the turmoil in the Eurozone and other comparable regions (USA, UK, Canada), while Karagiannis, Panagopoulos and Vlamis (2010) compare the interest rate transmission mechanism in the Eurozone to the US and provides policy suggestions to reinforce the effectiveness of monetary policy in hard times.

During the financial crisis, implementing monetary policy became much more complex as the transmission mechanism has been severely impaired by disruptions in the financial markets; as a consequence, the ECB resorted to unconventional measures to provide additional stimulus to the economy. The literature assessing the effectiveness of such measures is large for the US[2], while it is not very abundant regarding the Eurozone yet. About the interest rate channels of unconventional tools, Cordemans and Sola Perea (2011) looked at certain unconventional monetary decisions (full liquidity allotment, longer term refinancing operations, covered bond purchases, Securities Market Programme) and their impact on Euro area and Belgium's retail bank interest rates. Abbassi and Linzert (2011) analyzed the predictability of money market rates on the basis of monetary policy expectations and the impact of extraordinary central bank measures on money market rates. Gambacorta and Marques-Ibanez (2011) focused on the bank lending channel during the crisis and measured the short-term impact of monetary policy changes on bank lending; Darracq-Paries and Santis (2013) studied the macroeconomic impact of 3-year long-term refinancing operations (LTRO) *via* the bank lending channel and the mitigation of liquidity and funding risks. Two papers have kindled our attention by tackling both interest rate and credit channels of monetary

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[2] See Bernanke, Reinhart and Sack (2004)'s indirect evidence or more recently, Fleming, Hrung and Keane (2008), Hrung and Seligman (2011), Krishnamurthy and Vissing-Jorgensen (2011), Thornton (2011), Stroebel and Taylor (2009)

transmission: Bonnacorsi di Pati and Sette (2012) studied the transmission of monetary shocks affecting Italian banks' balance sheets to the volume and cost of credit granted to non-financial corporations, while Lenza, Pill and Reichlin (2010) analyzed the response of the ECB, the Fed and the Bank of England to the financial crisis through non-standard monetary policy measures and their impact on money market spreads and real economy.

3. The Theoretical Framework

Traditional models used for the analysis of monetary policy usually pay little attention to financial frictions. Under the classical view of the transmission channel, interest rates impact economic activity by affecting relative prices in the economy (relative prices of capital, of future consumption in terms of current consumption and of domestic goods in terms of foreign goods); this constitutes the interest channel and encompasses most mechanisms that are not associated with financial frictions. The interest channel is economically significant because of the link between changes in short nominal rates and long real interest rates.[3]

To the extent that consumer and investment spending, and in the first place, durable/capital goods expenditure depends on long rather than short rates, the expectations theory of the term structure has to hold, so that short rate movements are transmitted to long rates. Nevertheless, many features of the configuration of interest rates during the financial crises are puzzling from the perspective of the expectations hypothesis.[4] Furthermore, term premia have affected the extent to which changes in short rates are translated into further changes along the yield curve by responding

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[3] Provided that the central bank affect real interest rates, the impact of monetary policy depend on the interest rate sensitivity of aggregate demand and supply, which may explain the decline of the monetary pass-through during the recent financial crisis.
[4] See Gürkaynak and Wright (2012).

systematically to offset movements in short rates, which is expected to weaken the effect of policy changes.

On the other hand, the bank lending channel explains the effects of monetary policy with movements in the supply of bank credit. The essential feature is that the central bank can affect credit supply by financial intermediaries by altering the quantity of base money, which affects the banks' balance sheet (see Equation 1):

$$L(r,i,y) = \lambda(r,i)D(1-\tau) \quad (1)$$

where $L(r, i, y)$ represents the demand for loans, which depends negatively on the interest rate on loans r and positively on the interest rate on bonds i and on GNP y (which captures the transactions demand for credit). $\lambda(r,i)$ represents the rate of return on the available assets, D bank's deposits and τ the rate of minimum reserves.

Table 1 – Expected effects of monetary policy shocks [5]

	Conventional policy	Unconventional policy
INTEREST RATES		
- Money market rates	+	-
- Government bond rates	+	-
- Lending rates to NFC	+	-
- Lending rates to households	+	-
- Deposit rates	+	-
CREDIT VOLUMES		
- Money market volumes	-	+
- Government bond volumes	-	+
- Lending volumes to NFC	-	+
- Lending volumes to households	-	+
- Deposit volumes	+	+

The monetary policy transmission through this channel may be incomplete thanks to limited liability, credit rationing, or the imperfect substitutability between retail deposits and wholesale deposits or debt on the liability side of banks' balance sheets. Bernanke and Blinder (1988) assume fixed costs of direct financial market participation and banks' incomplete/imperfect information in the market for equity and corporate debt. They show that such structures amplify the effects of monetary policy shocks. However, this amplification will depend on the size of the lending contraction for a given shock: the

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more interest inelastic is the demand for money; the lower will be this contraction. Moreover, this amplification can be reversed if *i)* the difference in income elasticities of the demand function for money and loans exceeds a threshold, *ii)* the differences in absolute elasticities of loan supply and loan demand with respect to the two interest rates (r and i) exceed some thresholds or *iii)* the interest elasticity of the money multiplier is too large, which might have been the case during the recent financial crisis.

Table 1 summarizes the theoretically-expected effective credit and interest rate channels. In the context of the global financial crisis, the pass-throughs may have vanished partly, compared to their values in normal times.

4. Data

This paper focuses on the monetary transmission mechanism since the global financial crisis. Our dataset goes from June 2007 to December 2012 with a monthly frequency so comprising 67 observations. The monetary transmission mechanism is assessed for conventional and non-conventional tools and through five distinct markets: the money market, the sovereign debt market, the lending market to non-financial corporations, the lending market to households and the deposit market.[6]

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[6] See appendix for data descriptions and descriptive statistics.

Table 2: 5 markets decomposed in 9 submarkets.

Money market rates	Money market volumes	1d (overnight)
Government bond rates	Government bond volumes	6m – 5y – 10y
Lending rates to NFC loans	Lending volumes to NFC	inf1M – sup1M
Lending rates to households	Lending volumes to households	cash – housing
Deposit rates	Deposit volumes	1d (overnight)

Conventional monetary policy is assessed through the ECB rate for main refinancing operations, whose data over the period are available from the ECB database. The amount of securities held for monetary purposes, as described in the ECB's weekly financial statements, and including Securities Market Program, 1st and 2d Covered Bond Purchase Programs amounts are used to measure non-conventional policies since the beginning of the financial crisis. For robustness tests, we use the amount of long-term refinancing operations and the size of the European Central Bank's balance sheet as well. These data are all available in ECB Statistical Data Warehouse, and are expressed as a percentage of Euro area (17 members) GDP.

For each country (France, Germany, Italy and Spain), the endogenous variables needed for estimating the monetary transmission mechanism include the specific interest rates and their corresponding volumes.

First, interest rate and lending channels are assessed in the money market. For money market rates, we use the euro area overnight rates (EONIA) over the period. As they are mostly made at the overnight maturity, interbank loans are chosen to be the

corresponding volumes[7]; they are related, for each country, to the stock of loans from domestic monetary and financial institutions to other Euro area's monetary and financial institutions (MFI[8]). These data were available over the period in national MFIs balance sheets (Banque de France, Banco de España, Banca d'Italia, Bundesbank). These interbank loans are expressed in month over month percentage change.

The monetary transmission mechanism is then assessed in the sovereign debt market. Data are available in auctions results of the corresponding countries, on national debt agencies' websites (Agence France Trésor, Banco de España, Banca d'Italia, Deutsche Finanzagentur). After compiling all auctions, we have chosen allotments and corresponding yields for bonds with 6 month, 5 year and 10 year maturity. Indeed, these maturities seem to be the most representative of monthly auction amounts[9]. These For each country, bonds from 165-day to 210-day maturity are chosen as a proxy for 6-month maturity bonds, bonds from 54-month to 72-month maturity for 5-year maturity bonds and bonds from 114-month to 132-month maturity for 10-year maturity bonds; thus, we escape the problem of disregarding close-to-reference maturity issuances (5 months and 27 days instead of 6 months for example). The allotments are expressed in percentage of euro area GDP. Last, three dummy variables (6 months, 5 years, 10 years) are used to indicate whether the country has issued bonds with the corresponding maturity over the period or not.

In order to compute the interest rate and credit channels on the market of loans to domestic non-financial corporations over the period, we take the new business volumes and their corresponding annual interest rates for loans with an amount up to 1 million €

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[7] Most interbank loans are for maturities of one week or less, the majority being overnight (80%) – see Michaud, Upper (2008).

[8] MFIs (Monetary and Financial Institutions) include the central bank, credit institutions resident in the domestic country and other resident MFIs such as Money Market Funds.

[9] Together, they represent 43% of the French sovereign debt (18% for 6-month maturity bonds, 13% for 5-year maturity bonds and 13% for 10-year bonds), 85% of the Spanish one (5% for 6-month, 38% for 5-year, 42% for 10-year), 59% of the Italian one (33% for 6-month, 13% for 5-year and 14% for 10-year), 34% of Germany's (13% for 6-month, 10% for 5-year and 11% for 10-year).

and for loans over this amount; new business volumes are then expressed as a percentage of Euro area GDP. These data were available over the period on national central bank's databases (Banque de France, Banca d'Italia, Bundesbank) or Datastream for Spain.

The lending market to households is decomposed between housing loans and cash loans. For each country, we took the new business volume of housing loans and cash loans and their corresponding annual interest rates. New business volumes are expressed as a percentage of Euro area GDP. These data were available over the period on national central bank's databases (Banque de France, Banca d'Italia) or Datastream for Spain and Germany.

Last, we have three sets of volumes and corresponding rates for the deposits market. For each country, we use the deposit rate to households and non-financial corporations on overnight new business deposits. We use the corresponding deposit stocks that are expressed in month over month percentage change. All these data are available over the period on ECB Statistical Data Warehouse.

Controls include the consumer price index, industrial production, oil prices, CISS and Euro Stoxx 50 indices. For each country, the consumer price index is available on ECB Statistical Data Warehouse, and the volume of industrial production, used as a proxy for domestic output, is available on Eurostat. Both are expressed in year over year percentage change. Oil prices, CISS and Euro Stoxx 50 indices are the same variable for all countries and correspond to Brent crude oil price in euro, expressed in month over month percentage change, to the Composite Indicator for Systemic Stress, capturing financial instability, and to the stock price index for the major 50 European firms. All three are available on ECB Statistical Data Warehouse.

5. Disentangling the Effects of Conventional and Unconventional Policies

5.1. Identifying the ECB policy shocks

Before estimating country-specific structural VAR, we first identify two series of ECB policy shocks at the euro area aggregated level and orthogonal to a wide array of macroeconomic indicators. The rationale for this step is that ECB policies are decided and executed at the aggregate level for the whole euro area. We estimate the following two equations with euro area aggregated data. The number of lags p is equal to 3 and the estimation sample period starts in December 2006 to obtain residuals on the sample period studied: June 2007 - December 2012.

$$\begin{aligned} \text{ECBrate}_t = \beta_0 &+ \sum_{i=1}^{p} \beta_{1,i} \, \text{CPI}_{t-i} + \sum_{i=1}^{p} \beta_{2,i} \, \text{IP}_{t-i} + \sum_{i=1}^{p} \beta_{3,i} \, \text{Oil}_{t-i} \\ &+ \beta_4 \text{QE}_t + \beta_5 \text{Unemp}_t + \beta_6 \text{CISS}_t + \beta_7 \text{STOXX}_t \quad (2) \\ &+ \beta_8 \text{Bonds}_t + \beta_9 \text{Credit}_t + \eta_{\text{rate},t} \end{aligned}$$

$$\begin{aligned} \text{QE}_t = \alpha_0 &+ \sum_{i=1}^{p} \alpha_{1,i} \, \text{CPI}_{t-i} + \sum_{i=1}^{p} \alpha_{2,i} \, \text{IP}_{t-i} + \sum_{i=1}^{p} \alpha_{3,i} \, \text{Oil}_{t-i} \\ &+ \alpha_4 \text{ECBrate}_t + \alpha_5 \text{Unemp}_t + \alpha_6 \text{CISS}_t + \alpha_7 \text{STOXX}_t \quad (3) \\ &+ \alpha_8 \text{Bonds}_t + \alpha_9 \text{Credit}_t + \eta_{\text{QE},t} \end{aligned}$$

From equations (2) and (3), we assume that the residuals $n_{rate,t}$ and $n_{QE,t}$ are the series of aggregated policy shocks implemented by the ECB. We then introduce these two series in the country-specific structural VAR, which enable us to derive ECB policy shocks that are exogenous to country-specific macroeconomic developments.

5.2. The Structural VAR Model

A structural VAR model is used to decompose the aggregated ECB interest rate and QE interventions into country-specific mutually orthogonal components with a structural economic interpretation. We augment a standard VAR for monetary policy analysis including industrial production (IP), inflation (CPI) with the two aggregated ECB interest rate (ECB) and QE shocks, new loans' interest rate (*_r) and volumes (*_v) for each market (*) analyzed. We include in the estimation oil prices, the CISS and STOXX as exogenous variables in the vector X_t. Let Z_t represent the (k x 1) vector that contains the k endogenous variables at date t. In the benchmark specification, Z_t = [IP, CPI, QE, ECB, *_v, *_r]'. The regression of Z_t on its own lags p produces the reduced-form VAR errors e_t:

$$Z_t = \alpha + \sum_{i=1}^{p} \beta_i Z_{t-i} + X_t + e_t \quad (4)$$

The reduced-form errors comprise the contemporaneous effects of each variable on the others and combine the exogenous innovation of a given variable to the contemporaneous responses to the other variables. The recursive identification assumption postulates that the structural errors are independent, and the identification of exogenous innovations relates reduced-form errors and structural errors through a lower triangular matrix. This means that the covariance between the reduced-form errors is attributed to the structural error of the variable ordered previously in Z_t, and that the structural error is uncorrelated to the reduced-form errors of the preceding variables. The recursive identification assumption therefore depends on the ordering of the variables in the vector Z_t.

In our benchmark VAR, we assume that shifts in industrial production and inflation result in a contemporaneous change in both policy variables, and prices and volumes on each credit market. The latter two also react contemporaneously to policy variables, while by construction policy variables would react to innovations to credit prices and volumes only with a lag. Concerning the relative position of the two policy variables, we assume that the QE interventions react with a lag to the ECB interest rate consistently with the prevalence of the conventional instrument over unconventional ones.

The structural VAR analysis is performed with 3 lags and with a small sample estimator because the number of observations is small. The variance-covariance matrix is estimated with a small-sample degrees-of-freedom adjustment: the small-sample divisor used is $1/(T-m)$ instead of the maximum likelihood divisor $1/T$, T being the sample size and m the average number of parameters in each of the equations. We checked the eigenvalue stability condition of the VAR model to interpret impulse–response functions. All the eigenvalues lie inside the unit circle, so our VAR model satisfies the stability condition.

In Figure 1, we plot the Euro Area aggregated policy shocks estimated in section 5.1. and the country- and market-specific shocks estimated with equation (4) but including ECB and QE raw variables in Z_t in order to provide comparisons between both possibilities for identifying policy shocks. Discrepancies between country- and market-specific shocks support the choice of identifying aggregate policy shocks.

5.3. Shutting-off one of the two policy variables

In order to disentangle the effect of conventional and unconventional policies, we artificially shut-off the effect of one of the two policy variables by imposing restrictions

on its coefficients in both equations for determining prices and volumes of each credit market. We then isolate the effect of the other policy variables on credit prices and volumes. A necessary condition for credit prices and volumes not to react to policy variables at any horizon is that policy variables are ordered before credit prices and volumes in Z_t so that they do not react on impact. This condition plus restricting to zero the coefficients on lagged policy variables in equations for credit prices and volumes to zero is sufficient for imposing that credit prices and volumes do not react to one of the two policy variables at any horizon. These restrictions are implemented by estimating the VAR model using seemingly unrelated regressions.

5.4. Estimates

Figure 2 plots the impulse response in interest rates to a one-S.D. innovation (a 0.10 percentage point increase) in the ECB interest rate, for Germany, France, Italy and Spain (rows) and for the money market, sovereign bonds at 6-month, 5-year and 10-year horizons, loans inferior and superior to 1M€ to non-financial corporations, cash and housing loans to households, and deposits. We expect a positive response of interest rates to the ECB interest rate. The pass-through is indeed significant and positive as expected for most of the countries and markets, except for German and French sovereign bond markets and loans to households.

Figure 3 plots the impulse response in credit volumes to a one-S.D. innovation in the ECB interest rate. We expect credit volumes to be negatively correlated to an increase in the ECB interest rate and positively for deposit volumes. Evidence rather points that there is no clear-cut pass-through over the considered sample from the ECB rate to volumes, except for money markets in Spain, loans to non-financial corporations in Italy

and Spain, cash loans to households, housing loans to households in Italy and Spain, and deposits in France and Italy.

Figure 4 presents the impulse response in interest rates to a one-S.D. innovation (a 0.25 percentage point increase of Euro Area GDP) in QE operations. We expect that quantitative easing interventions have a negative effect on interest rates since increasing the money supply. There is no evidence of this pass-through from QE to interest rates over our sample, except for sovereign bonds at the 6-month horizon and for Spain at the 5-year horizon.

Figure 5 plots the impulse response in lending volumes to a one-S.D. innovation in QE operations. We expect that quantitative easing interventions have a positive effect on credit volumes for the same reason than previously: they should increase money supply. Once again, there is no evidence of the expected pass-through from QE to lending volumes, except for money markets in France and Spain, for loans superior to 1M€ to non-financial corporations in France, and for deposits in Germany.

5.5. Panel Data Robustness

In order to assess the robustness of previous results, we estimate the equivalent empirical model (Equation 4) with explanatory variables considered contemporaneously except for the lagged endogenous variable. We also introduce directly the ECB and QE series rather than shocks identified in 5.1 as the panel estimation is performed at the aggregated level rather than at the country level. This also enables to assess the sensitivity of our results to our identification of shocks. The set-up is not dynamic, but underlines immediate static effects; is univariate rather than multivariate, and country variables are grouped together rather than analysed separately using time series

methods. This enables to control for country fixed-effects, potentially important in the transmission of monetary policy to credit markets. Moreover, the forthcoming results are independent of the identification hypotheses of the structural VAR scheme.

Hausman tests indicated that the individual effects and our explanatory variables were systematically related, so that the fixed effects estimator (FE, also called within estimator) was the most appropriate choice. The FE estimator, which allows for varying intercept terms across countries, deals efficiently with unobserved heterogeneity, as time-invariant omitted variables do not bias the regression results. This proves especially important when unobservable variables, such as financial markets and banking industry characteristics, and regulatory rules and institutions, may be important in the transmission of monetary policy. An FE estimator has the advantage of controlling for different national effects of stable unobserved variables, and over our short sample, we may assume those unobservable variables are stable. The appropriateness of our FE estimation was also confirmed by an F-test for the significance of fixed effects. Likewise, the Wooldridge test for autocorrelation in panel data indicated a first order correlation. We therefore selected the FE estimator robust to an AR(1) disturbance term because it addresses all the statistical issues of our sample, including links between individual effects and explanatory variables, and auto-correlation.

Table 3 plots estimates of the variables affecting lending interest rates and volumes for the money market, sovereign bonds at 6-month, 5-year and 10-year horizons, loans inferior and superior to 1M€ to non-financial corporations, cash and housing loans to households, and deposits. It confirms the previous results that only the pass-through from the ECB rate to interest rates has been really effective (except for sovereign bond markets and cash loans to households), while the transmission mechanism of the ECB

rate to volumes and of QE operations to interest rates and volumes has been null or uneven.

Table 4 provides estimates of the effect of the ECB rate and QE operations on lending interest rates and volumes for Germany and France on the one hand, and Italy and Spain on the other hand. We use a dummy, labelled "South", which equals 1 for Italian and Spanish observations and interact it with ECB and QE variables. The interaction term captures the difference between the two effects, the one for northern countries and the one for southern countries. The effect for Germany and France is simply the coefficient of ECB and QE variables, while the effect for Italy and Spain is the sum of the interaction coefficient and the coefficient for ECB and QE variables. In general, monetary policy transmission is similar between northern and southern countries. However, it appears that the respective pass-throughs from the ECB rate to 6-month-horizon sovereign bond interest rates, to housing loans to households and to deposits have been higher for Italy and Spain than for "northern countries". Such is also the case for the pass-through from QE to 5-year-horizon sovereign bond volumes.

6. Concluding Remarks

This paper assesses the transmission of ECB monetary policies, conventional and unconventional, to both interest rates and lending volumes for the money market, sovereign bonds at 6-month, 5-year and 10-year horizons, loans inferior and superior to 1M€ to non-financial corporations, cash and housing loans to households, and deposits, during the financial crisis and in the four largest economies of the Euro Area. The main result is that only the pass-through from the ECB rate to interest rates has been really effective, consistently with the existing literature, while the transmission mechanism of the ECB rate to volumes and of QE operations to interest rates and volumes has been

null or uneven over this sample. One argument to explain the differentiated pass-through of ECB monetary policies is that the successful pass-through from the ECB rate to interest rates, which materialized as a huge decrease in interest rates during the sample period, had a negative effect on the supply side of loans, and offset itself its positive effects on lending volumes. Exceptions to this appear on markets where very specific actions have been taken by the ECB, namely sovereign-bond markets at 5-year horizon in southern countries.

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Table 3: Panel data estimation of ECB monetary policies on interest rates and volumes

	mm		gb_6m		gb_5y		gb_10y		nfc_inf1m		nfc_sup1m		hh_c		hh_h		d_o	
	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ECB	0.33***	2.16	0.02	-0.05*	0.21	0.06	-0.14	0.02	0.23***	-0.03	0.27***	-0.37*	0.08	0.00	0.11**	-0.02	0.09***	1.00
	[0.06]	[3.41]	[0.29]	[0.03]	[0.47]	[0.04]	[0.42]	[0.04]	[0.06]	[0.07]	[0.10]	[0.21]	[0.16]	[0.01]	[0.04]	[0.04]	[0.02]	[0.75]
QE	-0.01***	0.15	-0.02	0.00	-0.03*	0.00	0.01	0.00	-0.01**	-0.01***	-0.02***	-0.01*	0.02***	-0.00**	0.00	-0.00**	0.00	0.03
	[0.00]	[0.13]	[0.01]	[0.00]	[0.02]	[0.00]	[0.02]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.03]
L.*_r	-0.04		-0.51***		-0.48***		-0.50***		0.13**		-0.30***		-0.16**		0.43***		0.28***	
	[0.06]		[0.04]		[0.04]		[0.03]		[0.06]		[0.06]		[0.06]		[0.06]		[0.06]	
L.*_v		0.88***		0.31***		-0.19***		0.24***		0.40***		0.42***		0.57***		0.48***		0.91***
		[0.03]		[0.06]		[0.05]		[0.06]		[0.05]		[0.06]		[0.05]		[0.05]		[0.02]
*_v	0.00		-0.66		0.06		1.13*		0.04		0.06**		-0.48		0.01		-0.00*	
	[0.00]		[0.66]		[0.70]		[0.63]		[0.04]		[0.03]		[0.61]		[0.06]		[0.00]	
*_r		-1.20		0.01		-0.01		0.01***		0.04		0.35***		-0.01		-0.10**		-3.19
		[3.42]		[0.01]		[0.00]		[0.00]		[0.07]		[0.12]		[0.00]		[0.05]		[2.25]
CPI	0.02	0.87	0.00	-0.01**	0.05	-0.03***	0.07	-0.02**	0.01	0.04***	0.02	0.09***	0.04**	0.00	0.01**	0.00	0.00	-0.28***
	[0.01]	[0.56]	[0.05]	[0.00]	[0.07]	[0.01]	[0.07]	[0.01]	[0.01]	[0.01]	[0.02]	[0.04]	[0.02]	[0.00]	[0.01]	[0.01]	[0.00]	[0.10]
IP	0.00	0.12	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01***	-0.01**	0.00	0.00	0.00	0.00***	0.00**	-0.05***
	[0.00]	[0.08]	[0.01]	[0.00]	[0.01]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.02]
CISS	-0.50***	4.46	-0.64	0.00	1.19**	0.02	0.24	-0.11*	-0.20**	0.33***	-0.46***	0.99***	0.08	0.05***	-0.08	0.04	-0.05**	0.22
	[0.09]	[4.78]	[0.41]	[0.04]	[0.60]	[0.07]	[0.59]	[0.06]	[0.09]	[0.11]	[0.16]	[0.32]	[0.19]	[0.02]	[0.06]	[0.05]	[0.02]	[0.85]
OP	0.00*	0.05	0.00	0.00	0.01**	0.00	0.01	0.00	-0.00*	0.00*	0.00	0.00	0.00	0.00***	0.00	0.00**	0.00	0.02**
	[0.00]	[0.04]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]
STOXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00**	0.00
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Const.	0.06**	-1.94	0.41**	0.13***	-0.15	0.31***	-0.07	0.14***	-0.01	0.24***	-0.04	0.66***	-0.08	0.04***	-0.01	0.11***	0.01	0.65
	[0.03]	[1.48]	[0.17]	[0.02]	[0.28]	[0.02]	[0.22]	[0.02]	[0.05]	[0.04]	[0.07]	[0.13]	[0.11]	[0.01]	[0.03]	[0.02]	[0.01]	[0.43]
N	256	260	256	260	256	260	256	260	256	260	256	260	256	260	256	260	256	260

Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The model is estimated with time and country fixed-effects robust to an AR(1) disturbance term.
L is the lag operator.

Table 4: Panel data estimation of ECB monetary policies on interest rates and volumes - Interacted for Southern countries (Italy and Spain)

	mm		gb_6m		gb_5y		gb_10y		nfc_inf1m		nfc_sup1m		hh_c		hh_h		d_o	
	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v	*_r	*_v
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ECB	0.33***	0.62	-0.39	-0.07*	0.32	0.02	-0.24	0.00	0.20**	-0.07	0.26*	-0.48*	0.14	0.01	0.01	-0.02	0.05**	0.54
	[0.08]	[4.34]	[0.38]	[0.04]	[0.60]	[0.05]	[0.55]	[0.06]	[0.08]	[0.09]	[0.14]	[0.27]	[0.20]	[0.02]	[0.06]	[0.05]	[0.02]	[0.90]
QE	-0.01***	0.08	0.00	0.00	-0.07***	-0.00*	0.03	0.00	-0.01**	0.00	-0.02***	-0.01	0.01	0.00	0.00	0.00	0.00	0.07*
	[0.00]	[0.18]	[0.02]	[0.00]	[0.03]	[0.00]	[0.02]	[0.00]	[0.00]	[0.00]	[0.01]	[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.04]
South*ECB	0.00	3.10	0.82*	0.04	-0.19	0.08	0.20	0.04	0.08	0.08	0.03	0.23	-0.10	0.00	0.19***	0.01	0.06**	1.04
	[0.10]	[5.36]	[0.49]	[0.05]	[0.74]	[0.07]	[0.71]	[0.07]	[0.10]	[0.12]	[0.18]	[0.35]	[0.23]	[0.02]	[0.07]	[0.06]	[0.03]	[1.06]
South*QE	0.00	0.12	-0.03	0.00	0.07*	0.01**	-0.04	-0.01	0.00	-0.01	0.00	-0.01	0.01	0.00	-0.01	0.00	0.00	-0.07
	[0.00]	[0.26]	[0.02]	[0.00]	[0.04]	[0.00]	[0.03]	[0.00]	[0.01]	[0.01]	[0.01]	[0.02]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.06]
L.*_r	-0.04		-0.50***		-0.49***		-0.50***		0.13**		-0.31***		-0.17***		0.38***		0.27***	
	[0.06]		[0.04]		[0.04]		[0.03]		[0.06]		[0.06]		[0.06]		[0.06]		[0.06]	
L.*_v		0.88***		0.31***		-0.22***		0.21***		0.40***		0.41***		0.57***		0.48***		0.91***
		[0.03]		[0.06]		[0.05]		[0.06]		[0.06]		[0.06]		[0.05]		[0.05]		[0.02]
*_v	0.00		-0.75		-0.06		1.04		0.04		0.07**		-0.48		0.02		0.00	
	[0.00]		[0.65]		[0.70]		[0.64]		[0.04]		[0.03]		[0.62]		[0.07]		[0.00]	
*_r		-1.18		0.01		-0.01		0.01**		0.04		0.35***		-0.01		-0.11**		-3.81*
		[3.43]		[0.01]		[0.00]		[0.00]		[0.07]		[0.12]		[0.00]		[0.05]		[2.28]
CPI	0.02	0.88	0.00	-0.01**	0.05	-0.03***	0.06	-0.02**	0.01	0.04***	0.02	0.09***	0.05**	0.00	0.02**	0.00	0.00	-0.28***
	[0.01]	[0.56]	[0.05]	[0.00]	[0.07]	[0.01]	[0.07]	[0.01]	[0.01]	[0.01]	[0.02]	[0.04]	[0.02]	[0.00]	[0.01]	[0.01]	[0.00]	[0.10]
IP	0.00	0.11	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01***	-0.01**	0.00	0.00	0.00	0.00***	0.00**	-0.05***
	[0.00]	[0.08]	[0.01]	[0.00]	[0.01]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.02]
CISS	-0.50***	4.41	-0.63	0.00	1.17*	0.02	0.25	-0.11*	-0.20**	0.34***	-0.46***	1.01***	0.08	0.05***	-0.10	0.03	-0.05**	0.21
	[0.09]	[4.79]	[0.40]	[0.04]	[0.60]	[0.07]	[0.59]	[0.06]	[0.09]	[0.11]	[0.16]	[0.32]	[0.20]	[0.02]	[0.06]	[0.05]	[0.02]	[0.84]
OP	0.00*	0.05	0.00	0.00	0.01**	0.00	0.01	0.00	-0.00*	0.00*	0.00	0.00	0.00	0.00***	0.00	0.00**	0.00	0.02**
	[0.00]	[0.04]	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]
STOXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00**	0.00
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Const.	0.06**	-1.95	0.44**	0.13***	-0.11	0.31***	-0.04	0.13***	-0.01	0.24***	-0.04	0.67***	-0.08	0.04***	-0.01	0.11***	0.01	0.66
	[0.03]	[1.49]	[0.17]	[0.02]	[0.27]	[0.02]	[0.23]	[0.02]	[0.05]	[0.04]	[0.07]	[0.13]	[0.11]	[0.01]	[0.03]	[0.02]	[0.01]	[0.43]
N	256	260	256	260	256	260	256	260	256	260	256	260	256	260	256	260	256	260

Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dummy South takes the value 1 for Italy and Spain. The model is estimated with time and country fixed-effects robust to an AR(1) disturbance term. L is the lag operator. The South*ECB coefficient measures the difference in the effect of northern and southern countries. The coefficient for northern countries is the ECB coeffcient, while the coefficient for southern countries is the sum of the ECB coefficient and the South*ECB coefficient.

Figure 1: Comparing Euro Area aggregated policy shocks with country- and market-specific shocks
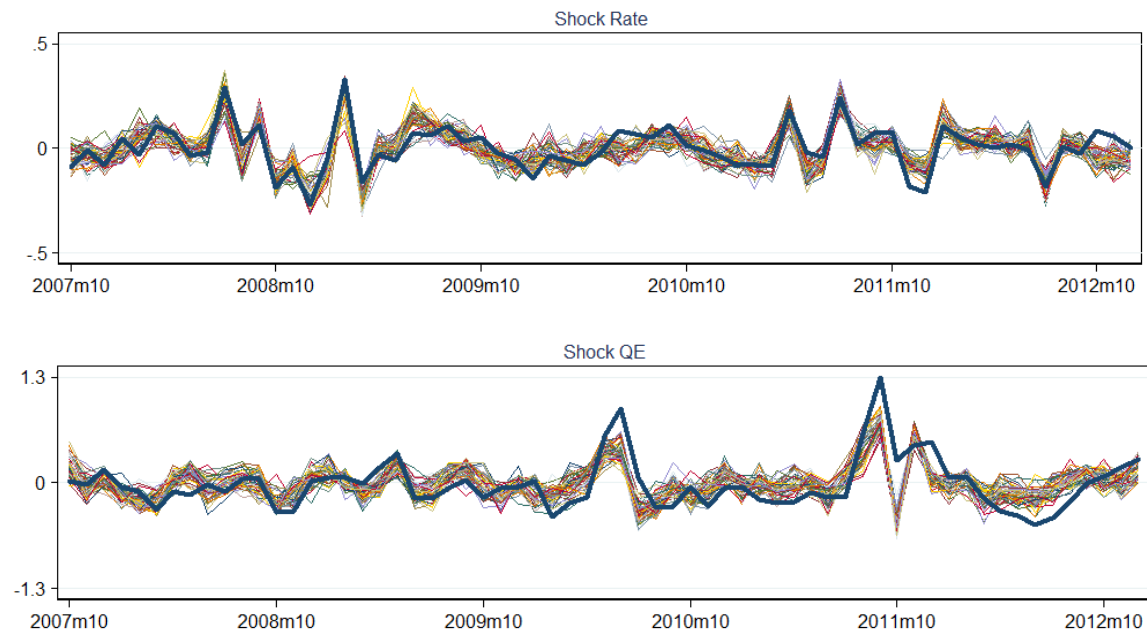
Note: Thick lines plot the Euro Area aggregated policy shocks estimated in section 5.1. while thin lines plot the country- and market-specific shocks estimated with equation (4) but including ECB and QE raw variables in the vector of endogenous variables Z_t (not the aggregated policy shocks estimated previously as done in section 5.2.). Since the analysis is performed for 4 countries and 9 markets, there are 36 series of country- and market-specific shocks plotted.

Figure 2: Impulse Response Functions of interest rates to a positive ECB interest rate shock
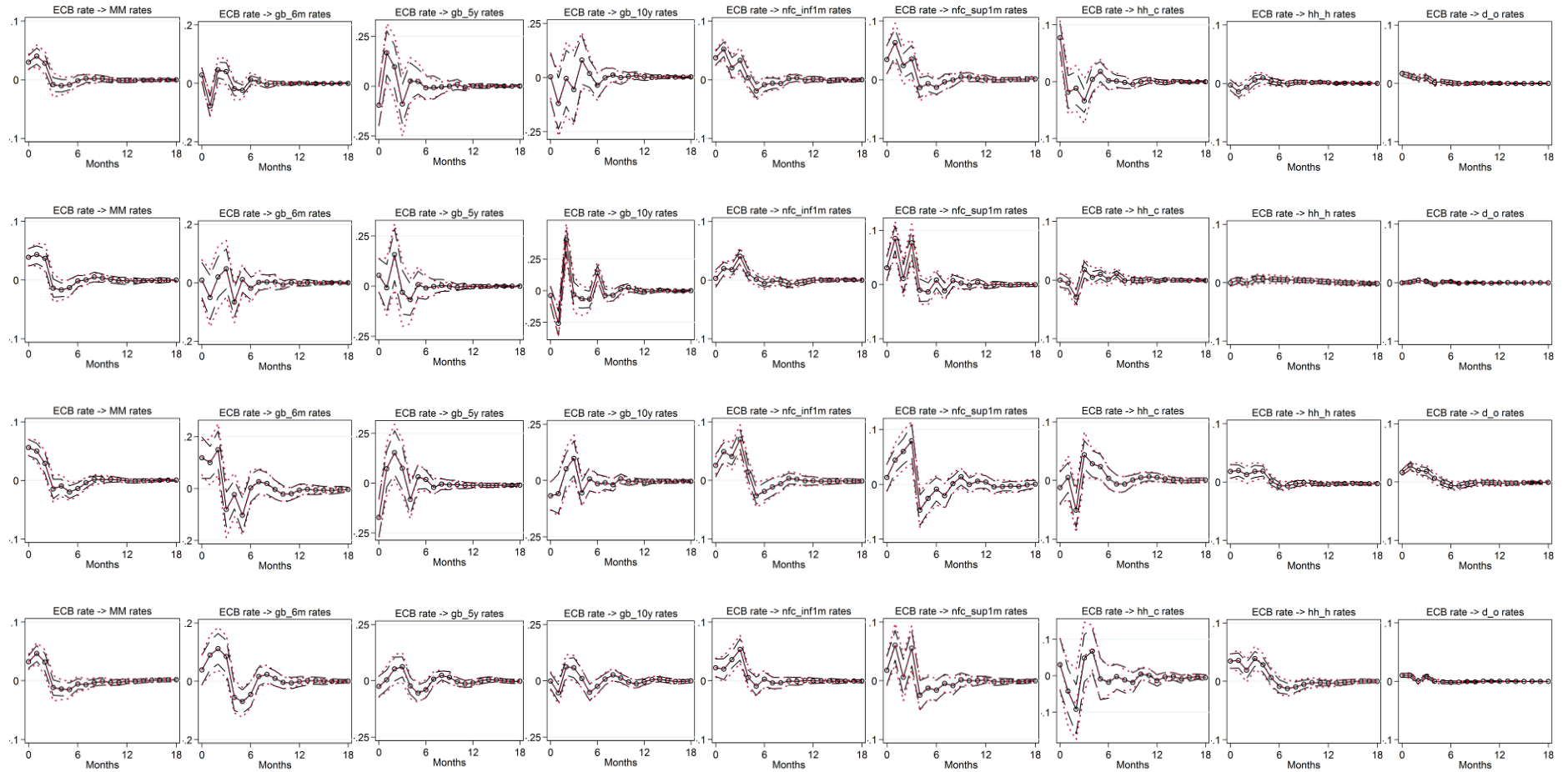
in Germany (1st row), France (2nd), Italy (3rd) & Spain (4th)

The impulse response corresponds to the percentage point change in interest rates, in response to a one-S.D. innovation in the ECB interest rate. The black circled line is from the VAR model in which QE effects are shut-off, while the red dashed line is for the unconstrained VAR model, both with 1 S.E. confidence band intervals.

Figure 3: Impulse Response Functions of volumes to a positive ECB interest rate shock

in Germany (1st row), France (2nd), Italy (3rd) & Spain (4th)

The impulse response corresponds to the percentage point change in volumes, in response to a one-S.D. innovation in the ECB interest rate. The black circled line is from the VAR model in which QE effects are shut-off, while the red dashed line is for the unconstrained VAR model, both with 1 S.E. confidence band intervals.
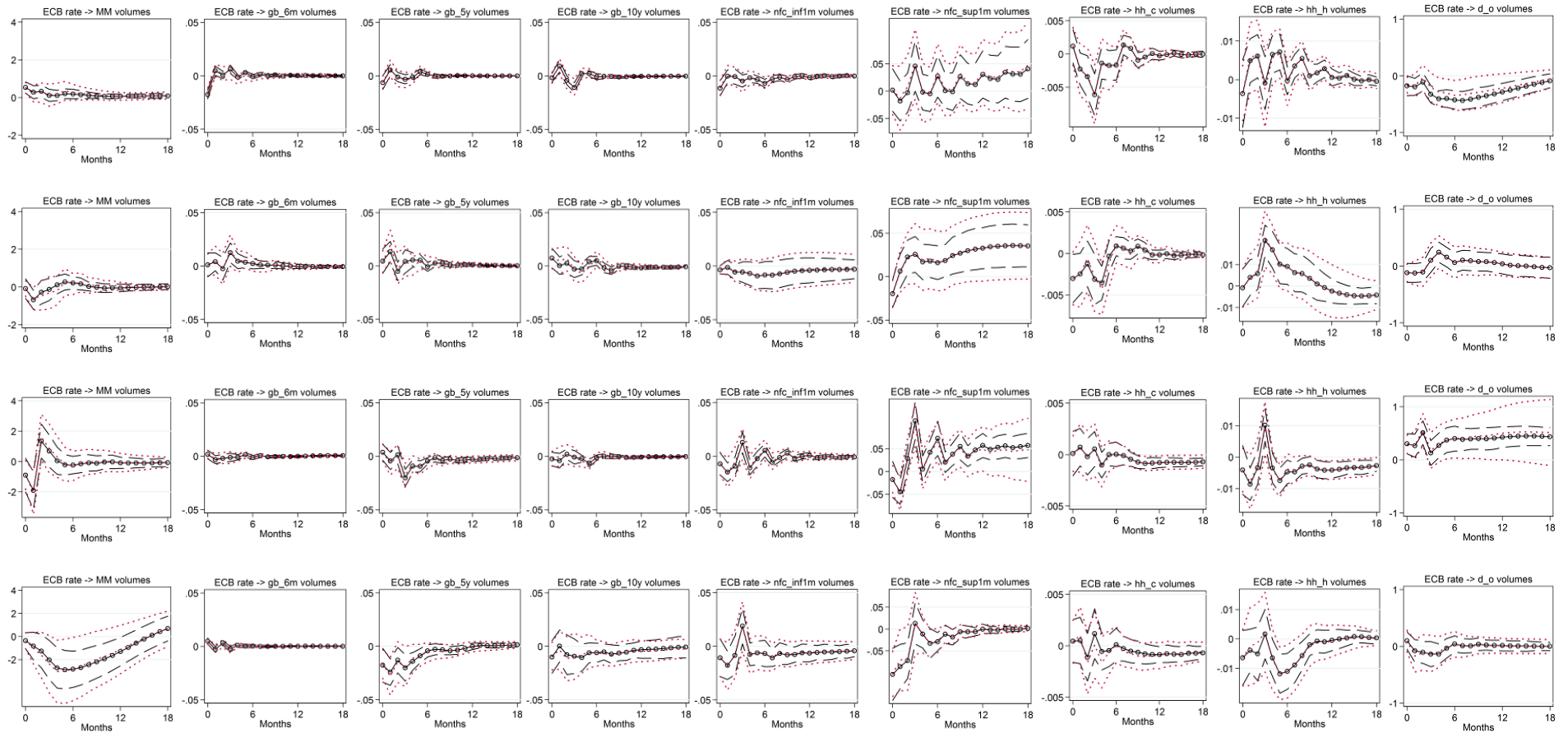
Figure 4: Impulse Response Functions of interest rates to a positive QE shock in Germany (1st row), France (2nd), Italy (3rd) & Spain (4th)
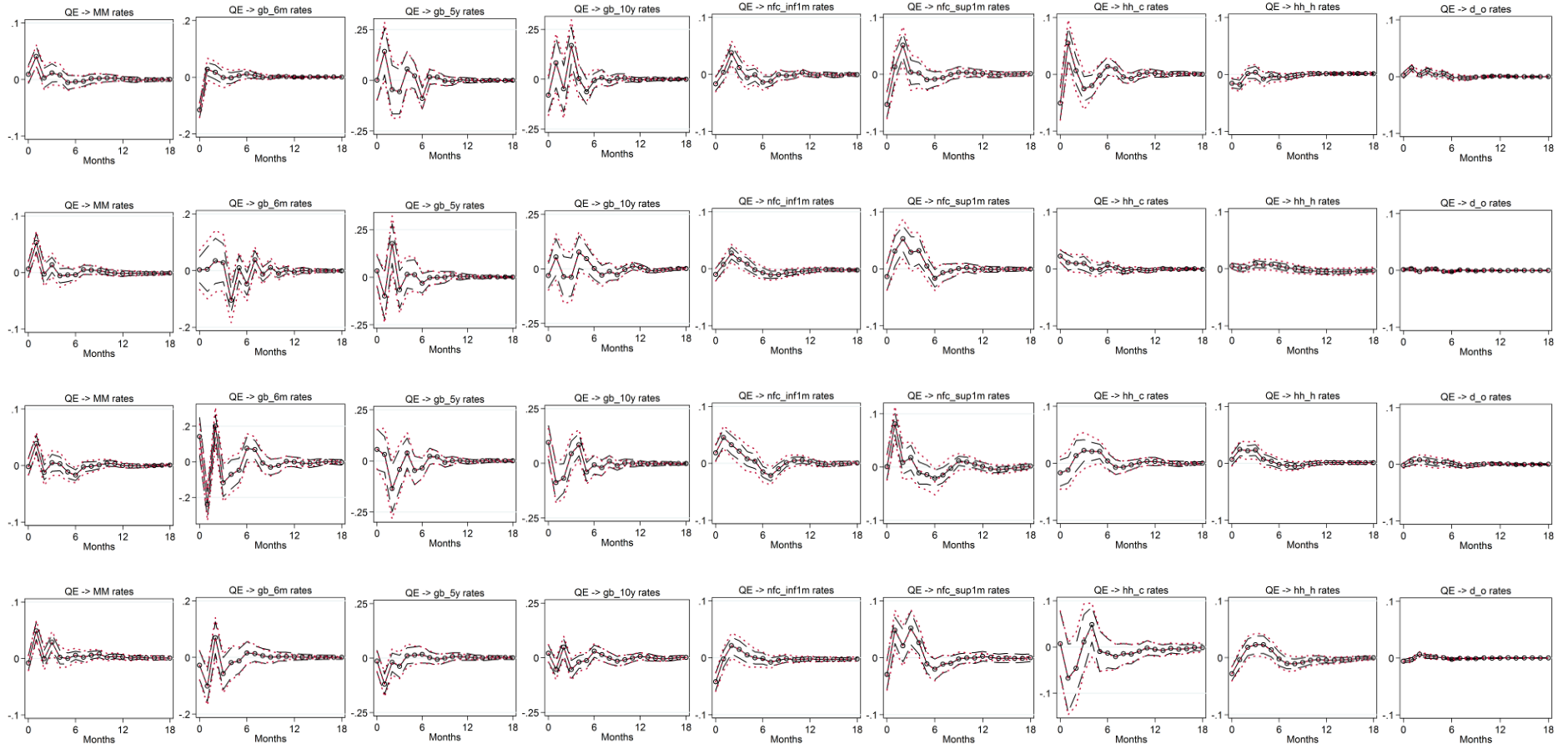
The impulse response corresponds to the percentage point change in interest rates, in response to a one-S.D. innovation in QE operations. The black circled line is from the VAR model in which ECB interest rate effects are shut-off, while the red dashed line is for the unconstrained VAR model, both with 1 S.E. confidence band intervals.

Figure 5: Impulse Response Functions of volumes to a positive QE shock
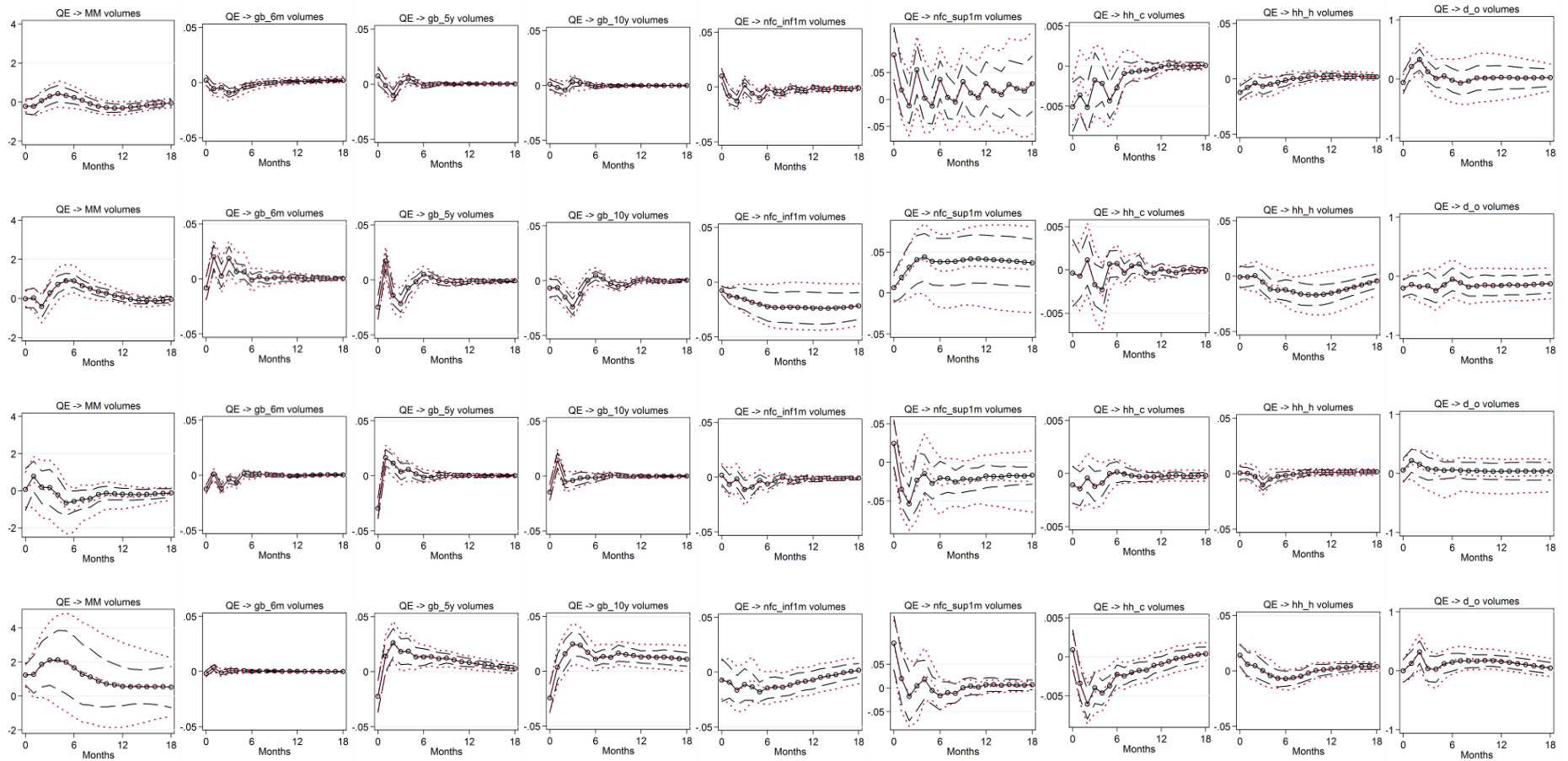
in Germany (1ˢᵗ row), France (2ⁿᵈ), Italy (3ʳᵈ) & Spain (4ᵗʰ)

The impulse response corresponds to the percentage point change in volumes, in response to a one-S.D. innovation in QE operations. The black circled line is from the VAR model in which ECB interest rate effects are shut-off, while the red dashed line is for the unconstrained VAR model, both with 1 S.E. confidence band intervals.

APPENDIX

## Descriptive Statistics

Descriptive Statistics

	Obs	Mean	Std. Dev.	Min	Max		Obs	Mean	Std. Dev.	Min	Max
g_mm_r	66	-0.06	0.19	-0.68	0.31	g_mm_v	67	0.43	7.16	-12.65	11.42
g_gb_6m_r	66	-0.06	0.53	-3.33	2.15	g_gb_6m_v	67	0.20	0.05	0.00	0.30
g_gb_5y_r	66	-0.07	1.70	-4.50	4.17	g_gb_5y_v	67	0.15	0.11	0.00	0.38
g_gb_10y_r	66	0.00	2.20	-4.36	4.66	g_gb_10y_v	67	0.16	0.10	0.00	0.34
g_nfc_inf1m_r	66	-0.04	0.17	-0.58	0.29	g_nfc_inf1m_v	67	0.53	0.09	0.38	0.73
g_nfc_sup1m_r	66	-0.05	0.22	-0.73	0.34	g_nfc_sup1m_v	67	2.86	0.70	1.89	4.62
g_hh_c_r	66	-0.02	0.23	-0.46	0.64	g_hh_c_v	67	0.28	0.05	0.18	0.46
g_hh_h_r	66	-0.04	0.09	-0.31	0.18	g_hh_h_v	67	0.62	0.07	0.47	0.80
g_d_o_r	66	-0.02	0.07	-0.25	0.09	g_d_o_v	67	10.23	8.05	0.37	28.48
f_mm_r	66	-0.06	0.19	-0.68	0.31	f_mm_v	67	9.23	8.21	-8.40	23.59
f_gb_6m_r	66	-0.06	1.24	-4.36	3.97	f_gb_6m_v	67	0.22	0.12	0.00	0.49
f_gb_5y_r	66	-0.05	1.80	-4.91	4.61	f_gb_5y_v	67	0.16	0.10	0.00	0.38
f_gb_10y_r	66	-0.03	2.14	-4.85	4.36	f_gb_10y_v	67	0.15	0.10	0.00	0.35
f_nfc_inf1m_r	66	-0.03	0.13	-0.41	0.22	f_nfc_inf1m_v	67	3.83	0.37	3.34	4.50
f_nfc_sup1m_r	66	-0.04	0.24	-1.24	0.26	f_nfc_sup1m_v	67	8.36	1.00	7.13	10.07
f_hh_c_r	66	-0.01	0.11	-0.26	0.25	f_hh_c_v	67	0.20	0.03	0.15	0.26
f_hh_h_r	66	-0.01	0.08	-0.21	0.13	f_hh_h_v	67	0.48	0.14	0.24	1.02
f_d_o_r	66	0.00	0.02	-0.10	0.09	f_d_o_v	67	4.79	3.59	-2.74	13.79
i_mm_r	66	-0.06	0.19	-0.68	0.31	i_mm_v	67	-3.86	20.12	-36.27	35.84
i_gb_6m_r	66	-0.06	0.67	-3.25	2.96	i_gb_6m_v	67	0.44	0.07	0.00	0.56
i_gb_5y_r	66	-0.02	1.69	-4.93	5.60	i_gb_5y_v	67	0.17	0.09	0.00	0.47
i_gb_10y_r	66	0.00	0.93	-4.47	4.62	i_gb_10y_v	67	0.18	0.06	0.00	0.33
i_nfc_inf1m_r	66	-0.02	0.19	-0.71	0.36	i_nfc_inf1m_v	67	0.72	0.10	0.43	0.94
i_nfc_sup1m_r	66	-0.02	0.25	-0.84	0.40	i_nfc_sup1m_v	67	1.46	0.35	0.80	2.40
i_hh_c_r	66	-0.01	0.22	-1.00	0.69	i_hh_c_v	67	0.08	0.02	0.04	0.12
i_hh_h_r	66	-0.03	0.14	-0.45	0.33	i_hh_h_v	67	0.21	0.07	0.06	0.36
i_d_o_r	66	-0.01	0.08	-0.39	0.06	i_d_o_v	67	2.88	5.82	-7.93	13.71
f_ip	67	-2.31	4.96	-15.74	5.34	f_cpi	67	1.90	1.09	-0.80	4.00
s_ip	67	-6.01	9.12	-24.20	14.38	s_cpi	67	2.37	1.60	-1.30	5.30
i_ip	67	-4.19	7.88	-23.13	7.68	i_cpi	67	2.39	1.12	-0.10	4.20
g_ip	67	1.05	9.49	-22.12	14.69	g_cpi	67	1.84	1.04	-0.70	3.50
bce	66	-0.05	0.17	-0.75	0.25	ciss	67	0.39	0.17	0.08	0.78
smp	67	4.61	5.12	0.00	13.19	op	66	0.10	12.09	-31.25	40.23
ltro	66	0.64	3.20	-6.67	11.10	stoxx	66	-27.95	161.71	-566.44	262.34
size	67	93.67	26.06	55.01	144.25						

Data description

Common variables			
BCE	Key ECB policy rate, for main refinancing operations	Annual Interest Rate	ECB Statistical Data Warehouse
SMP	Securities held for monetary pruposes (Securities Market Program, 1st Covered Bond Purchase Program, 2d Covered Bond Purchase Program)	As a percentage of euro area GDP	ECB Statistical Data Warehouse
LTRO	Longer-term refinancing operations	As a percentage of euro area GDP	ECB Statistical Data Warehouse
SIZE	Size of ECB's balance sheet (total assets / liabilities)	As a percentage of euro area GDP	ECB Statistical Data Warehouse
CISS	Composite Indicator of Systemic Stress	Index	ECB Statistical Data Warehouse
STOXX	Dow Jones Euro Stoxx 50 Price Index (Historical close, average of observations through period)	Equity/index	DataStream though ECB Statistical Data Warehouse
OP	Oil price (for commodity, brent crude oil 1 month forward) - free on board per barrel, in euro	Year over year percentage change	ECB Statistical Data Warehouse

Germany			
G_MM_R	Overnight money market interest rate (EONIA)	Annual Interest Rate	ECB Statistical Data Warehouse
G_MM_V	Domestic MFIs' loans to euro area MFIs	Year over year percentage change	Bundesbank
G_GB_6M_R	Weighted average yield of 6-month maturity bonds (from 165 to 210 days)	Annual Interest Rate	Deutsche Finanzagentur
G_GB_6M_V	Total allotment of 6-month maturity bonds (from 165 to 210 days) over the month	As a percentage of euro area GDP	Deutsche Finanzagentur
G_GB_5Y_R	Weighted average yield of 5-year maturity bonds (from 54 to 72 months)	Annual Interest Rate	Deutsche Finanzagentur
G_GB_5Y_V	Total allotment of 5-year maturity bonds (from 54 to 72 months) over the month	As a percentage of euro area GDP	Deutsche Finanzagentur
G_GB_10Y_R	Weighted average yield of 10-year maturity bonds (114 to 132 months)	Annual Interest Rate	Deutsche Finanzagentur
G_GB_10Y_V	Total allotment of 10-year maturity bonds (from 114 to 132 months) over the month	As a percentage of euro area GDP	Deutsche Finanzagentur
G_NFC_inf1m_R	Lending rate to domestic non-financial corporations (new business), for loans up to and including 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
G_NFC_inf1m_V	Loans to domestic non-financial corporations (new business), amounts up to and including 1 million €, all maturities	As a percentage of euro area GDP	Bundesbank
G_NFC_sup1m_R	Lending rate to domestic non-financial corporations (new business), for loans over 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
G_NFC_sup1m_V	Loans to domestic non-financial corporations (new business), amounts over 1 million €, all maturities	As a percentage of euro area GDP	Bundesbank
G_HH_C_R	Lending rate to domestic households (new business), for cash loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
G_HH_C_V	Loans to domestic households (new business), cash loans (all maturities, all amounts)	As a percentage of euro area GDP	Datastream
G_HH_H_R	Lending rate to domestic households (new business), for housing loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
G_HH_H_V	Loans to domestic households (new business), housing loans (all maturities, all amounts)	As a percentage of euro area GDP	Datastream
G_D_O_R	Deposit rate to domestic households and non-financial corporations (new business), for overnight deposits, all amounts	Annual Interest Rate	ECB Statistical Data Warehouse
G_D_O_V	Deposits volume from domestic households and non-financial corporations (stocks), for overnight deposits, all amounts	Year over year percentage change	ECB Statistical Data Warehouse
G_CPI	Consumer Price Index	Annual rate of change	ECB Statistical Data Warehouse
G_IP	Volume index of industrial production	Year over year percentage change	Eurostat

France			
F_MM_R	Overnight money market interest rate (EONIA)	Annual Interest Rate	ECB Statistical Data Warehouse
F_MM_V	Domestic MFIs' loans to euro area MFIs	Year over year percentage change	Banque de France
F_GB_6M_R	Weighted average yield of 6-month maturity bonds (from 165 to 210 days)	Annual Interest Rate	Agence France Trésor
F_GB_6M_V	Total allotment of 6-month maturity bonds (from 165 to 210 days) over the month	As a percentage of euro area GDP	Agence France Trésor
F_GB_5Y_R	Weighted average yield of 5-year maturity bonds (from 54 to 72 months)	Annual Interest Rate	Agence France Trésor
F_GB_5Y_V	Total allotment of 5-year maturity bonds (from 54 to 72 months) over the month	As a percentage of euro area GDP	Agence France Trésor
F_GB_10Y_R	Weighted average yield of 10-year maturity bonds (114 to 132 months)	Annual Interest Rate	Agence France Trésor
F_GB_10Y_V	Total allotment of 10-year maturity bonds (from 114 to 132 months) over the month	As a percentage of euro area GDP	Agence France Trésor
F_NFC_inf1m_R	Lending rate to domestic non-financial corporations (new business), for loans up to and including 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
F_NFC_inf1m_V	Loans to domestic non-financial corporations (new business), amounts up to and including 1 million €, all maturities	As a percentage of euro area GDP	Banque de France
F_NFC_sup1m_R	Lending rate to domestic non-financial corporations (new business), for loans over 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
F_NFC_sup1m_V	Loans to domestic non-financial corporations (new business), amounts over 1 million €, all maturities	As a percentage of euro area GDP	Banque de France
F_HH_C_R	Lending rate to domestic households (new business), for cash loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
F_HH_C_V	Loans to domestic households (new business), cash loans (all maturities, all amounts)	As a percentage of euro area GDP	Banque de France
F_HH_H_R	Lending rate to domestic households (new business), for housing loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
F_HH_H_V	Loans to domestic households (new business), housing loans (all maturities, all amounts)	As a percentage of euro area GDP	Banque de France
F_D_O_R	Deposit rate to domestic households and non-financial corporations (new business), for overnight deposits, all amounts	Annual Interest Rate	ECB Statistical Data Warehouse
F_D_O_V	Deposits volume from domestic households and non-financial corporations (stocks), for overnight deposits, all amounts	Year over year percentage change	ECB Statistical Data Warehouse
F_CPI	Consumer Price Index	Annual rate of change	ECB Statistical Data Warehouse
F_IP	Volume index of industrial production	Year over year percentage change	Eurostat

Italy

I_MM_R	Overnight money market interest rate (EONIA)	Annual Interest Rate	ECB Statistical Data Warehouse
I_MM_V	Domestic MFIs' loans to euro area MFIs	Year over year percentage change	Banca d'Italia
I_GB_6M_R	Weighted average yield of 6-month maturity bonds (from 165 to 210 days)	Annual Interest Rate	Banca d'Italia
I_GB_6M_V	Total allotment of 6-month maturity bonds (from 165 to 210 days) over the month	As a percentage of euro area GDP	Banca d'Italia
I_GB_5Y_R	Weighted average yield of 5-year maturity bonds (from 54 to 72 months)	Annual Interest Rate	Banca d'Italia
I_GB_5Y_V	Total allotment of 5-year maturity bonds (from 54 to 72 months) over the month	As a percentage of euro area GDP	Banca d'Italia
I_GB_10Y_R	Weighted average yield of 10-year maturity bonds (114 to 132 months)	Annual Interest Rate	Banca d'Italia
I_GB_10Y_V	Total allotment of 10-year maturity bonds (from 114 to 132 months) over the month	As a percentage of euro area GDP	Banca d'Italia
I_NFC_inf1m_R	Lending rate to domestic non-financial corporations (new business), for loans up to and including 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
I_NFC_inf1m_V	Loans to domestic non-financial corporations (new business), amounts up to and including 1 million €, all maturities	As a percentage of euro area GDP	Banca d'Italia
I_NFC_sup1m_R	Lending rate to domestic non-financial corporations (new business), for loans over 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
I_NFC_sup1m_V	Loans to domestic non-financial corporations (new business), amounts over 1 million €, all maturities	As a percentage of euro area GDP	Banca d'Italia
I_HH_C_R	Lending rate to domestic households (new business), for cash loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
I_HH_C_V	Loans to domestic households (new business), cash loans (all maturities, all amounts)	As a percentage of euro area GDP	Banca d'Italia
I_HH_H_R	Lending rate to domestic households (new business), for housing loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
I_HH_H_V	Loans to domestic households (new business), housing loans (all maturities, all amounts)	As a percentage of euro area GDP	Banca d'Italia
I_D_O_R	Deposit rate to domestic households and non-financial corporations (new business), for overnight deposits, all amounts	Annual Interest Rate	ECB Statistical Data Warehouse
I_D_O_V	Deposits volume from domestic households and non-financial corporations (stocks), for overnight deposits, all amounts	Year over year percentage change	ECB Statistical Data Warehouse
I_CPI	Consumer Price Index	Annual rate of change	ECB Statistical Data Warehouse
I_IP	Volume index of industrial production	Year over year percentage change	Eurostat

Spain			
S_MM_R	Overnight money market interest rate (EONIA)	Annual Interest Rate	ECB Statistical Data Warehouse
S_MM_V	Domestic MFIs' loans to euro area MFIs, monthly available using a linear interpolation on a quarterly basis	Year over year percentage change	Banco de España
S_GB_6M_R	Weighted average yield of 6-month maturity bonds (from 165 to 210 days)	Annual Interest Rate	Banco de España
S_GB_6M_V	Total allotment of 6-month maturity bonds (from 165 to 210 days) over the month	As a percentage of euro area GDP	Banco de España
S_GB_5Y_R	Weighted average yield of 5-year maturity bonds (from 54 to 72 months)	Annual Interest Rate	Banco de España
S_GB_5Y_V	Total allotment of 5-year maturity bonds (from 54 to 72 months) over the month	As a percentage of euro area GDP	Banco de España
S_GB_10Y_R	Weighted average yield of 10-year maturity bonds (114 to 132 months)	Annual Interest Rate	Banco de España
S_GB_10Y_V	Total allotment of 10-year maturity bonds (from 114 to 132 months) over the month	As a percentage of euro area GDP	Banco de España
S_NFC_inf1m_R	Lending rate to domestic non-financial corporations (new business), for loans up to and including 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
S_NFC_inf1m_V	Loans to domestic non-financial corporations (new business), amounts up to and including 1 million €, all maturities	As a percentage of euro area GDP	Datastream
S_NFC_sup1m_R	Lending rate to domestic non-financial corporations (new business), for loans over 1 million €, all maturities	Annual Interest Rate	ECB Statistical Data Warehouse
S_NFC_sup1m_V	Loans to domestic non-financial corporations (new business), amounts over 1 million €, all maturities	As a percentage of euro area GDP	Datastream
S_HH_C_R	Lending rate to domestic households (new business), for cash loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
S_HH_C_V	Loans to domestic households (new business), cash loans (all maturities, all amounts)	As a percentage of euro area GDP	Datastream
S_HH_H_R	Lending rate to domestic households (new business), for housing loans (all maturities, all amounts)	Annual Interest Rate	ECB Statistical Data Warehouse
S_HH_H_V	Loans to domestic households (new business), housing loans (all maturities, all amounts)	As a percentage of euro area GDP	Datastream
S_D_O_R	Deposit rate to domestic households and non-financial corporations (new business), for overnight deposits, all amounts	Annual Interest Rate	ECB Statistical Data Warehouse
S_D_O_V	Deposits volume from domestic households and non-financial corporations (stocks), for overnight deposits, all amounts	Year over year percentage change	ECB Statistical Data Warehouse
S_CPI	Consumer Price Index	Annual rate of change	ECB Statistical Data Warehouse
S_IP	Volume index of industrial production	Year over year percentage change	Eurostat

Related Literature

Article	Sample	Country	Policy instrument	Channel	Markets	Method	Results
Gambarcota, Marques-Ibanez (2011)	1999(Q1)-2009(Q4)	14 countries of the Euro zone, UK and USA	Conventional and unconventional policies	Bank lending	Lending market, deposit market	GMM	Positive for both policies, amplified by the financial crisis
Cordemans, Sola Perea (2011)	1997(1)-2011(2)	Euro area, especially Belgium	Conventional and unconventional policies	Interest rate	Money market, sovereign debt market, lending market to NFC and households, deposits market	VECM	Positive for both policies, relatively stable during the crisis
Panagopoulos, Reziti, Spiliotis (2010)	1994(1)-2008(1)	USA, Canada, UK, Eurozone (Germany and France)	Conventional policy	Interest rate	Lending and deposits markets, money market	ECM-GE, GETS	Positive
Lenza, Pill, Reichlin (2010)	2008(11)-2009(8)	USA, UK, Euro zone	Unconventional policies	Interest rate and bank lending	Money market, lending market to NFC and households	B-VAR	Positive and appreciable magnitude
Karagiannis, Panagopoulos, Vlamis (2010)	1994(1)-2007(9)	USA, Euro zone	Conventional policy	Interest rate	Lending and deposits markets, money market	GETS	Positive for both policies, amplified by the financial crisis
Andries, Lecarpentier-Moyal (2012)	2003(1)-2011(4)	Euro area (12 countries)	Conventional policy	Interest rate	Lending market to NFC	ARDL	Positive, inertia for long-term rates in some countries after 2008 (France, Spain, Italy, Netherlands)
Blot, Labondance (2011)	2003(1)-2010(5)	Euro area (10 countries)	Conventional policy	Interest rate	Lending market to NFC and households, deposits market	SUR-ECM	Positive, decrease since the crisis and increase in heterogeneity among Euro
Belke, Beckmann, Verheyen (2012)	2003(1)-2011(9)	Euro area (12 countries)	Conventional policy	Interest rate	Lending market to households	Johansen multivariate approach, ARDL	Positive but incomplete pass-through, heterogeneity among the sample
Ariseti, Gallo (2012)	2003(1)-2011(9)	Euro area (changing composition)	Conventional policy	Interest rate	Lending market to NFC and households	Markov-switching VAR	Positive but incomplete pass-through, higher in the long-run than in the short-run
Abbassi, Linzert (2011)	2004(3)-2009(6)	Euro area	Unconventional policies	Interest rate	Money market	OLS	Positive
Gigineishvili (2011)	2005(12)-2010(3)	European countries among a panel of 81 countries	Conventional policy	Interest rate	Money market, lending market to NFC	OLS	Positive, facilitated or impeded by several macroeconomic variables
Darracq-Paries, De Santis (2013)	2003(Q1)-2011(Q4)	Euro area (11 or 8 countries)	Unconventional policies	Bank lending	Lending market to NFC and to households	Panel VAR, GMM, Arellano-Bond estimator	Positive, seen as a credit supply shock; lowers the lending rate spread also
De Santis, Surico (2013)	1999-2011	Germany, France, Italy, Spain	Conventional policy	Bank lending	Loans growth on the supply side	QR, OLS	Negative as expected and heterogenous according to bank' characteristics
Bonaccorsi di Patti, Sette (2012)	2007(6)-2008(12)	Italy	Unconventional policies	Interest rate and bank lending	Lending market to NFC	OLS	Positive when banks where hit by the crisis

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THE ABSTRACT OF THE PROJECT IS:

The research programme will integrate diverse levels, methods and disciplinary traditions with the aim of developing a comprehensive policy agenda for changing the role of the financial system to help achieve a future which is sustainable in environmental, social and economic terms. The programme involves an integrated and balanced consortium involving partners from 14 countries that has unsurpassed experience of deploying diverse perspectives both within economics and across disciplines inclusive of economics. The programme is distinctively pluralistic, and aims to forge alliances across the social sciences, so as to understand how finance can better serve economic, social and environmental needs. The central issues addressed are the ways in which the growth and performance of economies in the last 30 years have been dependent on the characteristics of the processes of financialisation; how has financialisation impacted on the achievement of specific economic, social, and environmental objectives?; the nature of the relationship between financialisation and the sustainability of the financial system, economic development and the environment?; the lessons to be drawn from the crisis about the nature and impacts of financialisation? ; what are the requisites of a financial system able to support a process of sustainable development, broadly conceived?'

THE PARTNERS IN THE CONSORTIUM ARE:

Participant Number	Participant organisation name	Country
1 (Coordinator)	University of Leeds	UK
2	University of Siena	Italy
3	School of Oriental and African Studies	UK
4	Fondation Nationale des Sciences Politiques	France
5	Pour la Solidarite, Brussels	Belgium
6	Poznan University of Economics	Poland
7	Tallin University of Technology	Estonia
8	Berlin School of Economics and Law	Germany
9	Centre for Social Studies, University of Coimbra	Portugal
10	University of Pannonia, Veszprem	Hungary
11	National and Kapodistrian University of Athens	Greece
12	Middle East Technical University, Ankara	Turkey
13	Lund University	Sweden
14	University of Witwatersrand	South Africa
15	University of the Basque Country, Bilbao	Spain

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