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The Interactions between the Lending Rates, Deposit Rates and Money Market Rates

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Abstract

The present paper investigates the impact of the financial crisis on the interaction between the lending rates, deposit rates and money market rates through the process of retail bank interest rate pass-through in the countries of the Euro area. Among our findings is the heterogeneity of bank rate adjustments across sectors, loans and deposits. That was mainly marked during the pre-crisis period by a complete or high long-term pass-through for deposit rates and incomplete for lending rates. However, in the post-crisis period, the degree of pass-through dropped for all bank rates. In addition, we see that the bank rates have become more rigid due to market turbulence since the speed of adjustment towards equilibrium slowed down significantly. Finally, the results show that there is an interdependence of banks' decisions on lending rates as well as deposit rates. It is thus a valuable input in the transmission mechanism of monetary policy.

Keywords: Interest Rate Pass-through, Interactions, Money Market Rate, Lending Rates, Deposit Rates, Financial Crisis, Euro Area.
JEL Classification: E43, E52.

1. Introduction

The subprime crisis which was initiated in the United States, has quickly expanded because of the interdependence of financial institutions, securitization and re-pricing of risk. Indeed, the decrease in prices of risky assets in the US has affected banks in the euro area that held such assets. Hence the fall in European stock markets caused

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by the decline in demand for these assets. Therefore, and in order to help banks that could no longer finance themselves on the interbank markets because of the lack of liquidity, the central banks have defined non-conventional measures. Moreover, this crisis has been marked by existing asymmetries within the euro area countries, which deepened in 2009 by a debt crisis in Greece and then in Ireland. This is justified by the inadequacies of the European Economic and Monetary Governance, which had not formalized enough adjustment mechanisms in the event of asymmetric shocks.

Thus, the financial crisis, which intensified in the second half of 2008, led to mass depreciations and bank losses in the euro area, which in turn put substantial pressure on bank solvency ratios and caused a general loss of confidence in the banking sector and between the banks themselves. As a consequence of these changes was the breakdown in the functioning of the money market in the euro area, which was reflected by a pronounced and persistent widening of the spread between EURIBOR and the swap overnight interest rate (OIS). Since both lending rates and credit rates are set against the money market rate, the breakdown of the normally close relationship between the Euro Interbank Offered Rate (EURIBOR) and the overnight rate has potentially deteriorated the transmission of changes from monetary policy rate to lending rates and credit rates. In addition, the severity of the financial crisis that contributed to a marked slowdown in economic activity in the euro area prompted many banks to increase their credit risk premiums and tightened their norm to provide credit. This has hampered the transmission of monetary policy to bank credit rates since October 2008.

Our empirical analysis of transmission focuses on issues that have largely been ignored and that are important for policy making. We wonder if there are interactions between bank rates and interbank rates as well as interactions between deposit rates and lending rates. The interdependence of bank decisions on lending and borrowing rates will affect their adjustment to interbank rates. Hence, the understanding of the pass-through requires the modeling of these interactions, as indeed those arising from the endogeneity of interbank rates. We examine these questions, using a multivariate analysis, which contributes to a complete understanding of the pass-through, is

essential for the conduct of monetary policy.

Also, by seeking to know if there is heterogeneity of the pass-through, by analyzing whether bank rates adjust differently between market segments. We do this by using transmission, both in the long term and in the short term, and by identifying whether there are rigidities and asymmetries in the interest rate adjustment for the different banking products: Loans (for households and for non-financial corporations) and deposits. The effectiveness of monetary policy depends on how the pass-through is complete, rapid and asymmetric in the adjustment of bank rates. By asking whether the pass-through is heterogeneous - between credit rates and lending rates and between household rates and corporate rates - we can also examine whether and how monetary policy affects these segments differently and ultimately economically, which a valuable contribution to the policy is making.

We are concentrating on 8 countries in the euro area and on the European Unions a whole. This is an interesting study, as the results of our analysis reveal, as they have not been found in the previous studies. In particular, we find interactions between credit rates and lending rates with asymmetries in them, as well as adjustments in interbank rates. These results reveal that adjustments to the rates on deposits and the rates on loans are interdependent and, therefore, cannot be described separately. Thus, we observe the presence of heterogeneity between the rates since these two types of rates react quite differently.

Our results not only contribute to a deeper understanding of the transmission of interest rates and therefore the effects of monetary policy in the euro area, but also raise questions that may be extremely relevant to assess the pass-through in other countries. This knowledge is useful for future policy. Our findings will also be a valuable input to policy making in the context of the financial crisis. Since mid-2007 and especially intensified in the second half of 2008, the tensions in the money market and the policy responses that followed have marked the behavior of interbank rates in the euro area. More recently, there have also been tensions in the sovereign debt market that have involved some countries in the euro area. Our pass-through analysis will be a valuable input in assessing the effects of changes in

interbank rates resulting from the financial crisis.

Our study is as follows. Section 2 presents a theoretical and empirical review of pass-through interest rate studies and section 3 presents the empirical data and methodology. The results are presented and discussed in Section 4. The results and implications of their policy are gathered in the concluding section.

2. Literature Review

The relationship between the money market and banks is increasingly becoming more pronounced, as these financial intermediaries perceive this market as the main source of funding. Hence, we can expect a long-term relationship between bank rates (on loans and deposits) (BR) and the money market rate (MMR) (which may take the form: $BR_t = \alpha_0 + \propto_1 MMR_t$) which is widely presented in the literature.

Several factors can hinder the achievement of a complete transmission. This is the subject of an extensive literature that sought to explain the results of rigidity and asymmetry of the pass-through. Among the most frequently mentioned, we find de Bondt (2005) who shows that higher competition from banks has helped to speed up the adjustment of bank interest rates in the euro zone to changes in market rates. On the other hand, Coffinet (2005) found that the single monetary policy has generated a fast pass-through from money market rates to bank interest rates in the euro area and especially in France. Similarly, De La Serre et al. (2008) showed that the inclusion in the euro area has led to the heterogeneity of the speed and magnitude of the adjustment mechanism of bank lending rates. This result was further confirmed by Blot and Labondance (2011), Rocha (2012) and Belke et al. (2013). Another determinant of the pass-through is the interest rate risk where Gropp et al. (2007) expect that the volatility of money market rates takes the interest rate margin to a higher level since banks require a higher premium to offset the risk of interest rates. Therefore, these authors show that an increase in interest rates has a positive effect on bank spreads. In addition, there are other various factors that may influence the pass-through of the interest rate such as credit risk (Gropp et al., 2007; De Bondt, 2002), financial structures of banks (Cottarelli and Kourelis, 1994; Mojon, 2001; Gambacorta, 2004), financial innovation (Cottarelli

et al., 1995), the level of bank capital (Maudos et al., 2004) and the financial crisis (Jobst and Kwapil, 2008; Karagiannis et al., 2010). Besides Stanislawska (2014), by analyzing the influence of individual banks characteristics on the features of interest rate transmission, notice that their impact is not strong, as they affect rather the speed of adjustment than its scale in the long term. David Aristei and Manuela Gallo (2014) used a Markov-switching vector autoregressive model to analyze the interest rate pass-through between interbank and retail bank rates in the Euro area. von Borstel et al., 2016 investigated the pass-through of monetary policy to bank lending rates in the euro area during the sovereign debt crisis, in comparison to the pre-crisis period by a factor-augmented vector autoregression. Kitamura et al., (2016) estimate interest rate pass-through in the loan market using an individual bank-based panel dataset from Japan data set and their results differ from those of recent studies on European countries. Kempa and Khan (2017) indicate in their result, that positive growth shocks originating in any of the three entities spill over into higher growth rates in the other regions of the euro area, and also reduce debt levels at least transitorily in all regions. Furthermore, Muhtaseb (2017) examine the symmetric and asymmetric interest rate pass-through under the fixed exchange rate system in Lebanon. The results show that the interest rate on loans responds differently to monetary policy shocks. Grigoli and Mota (2017) find a faster transmission in the Dominican Republic to lending rates than to deposit rates and asymmetric adjustments of short-term rates.

The former empirical studies have long rested on the single equation modeling to estimate the pass-through from money market rates to bank rates, hence, the problems of endogeneity and interactions between interest rates was largely overlooked. The only exception was the study by Rocha (2012), which found that there are interactions between credit rates, deposit rates and interbank rates and asymmetries in the interactions of the pass-through to bank interest rates in Portugal. By studying the case of the Euro Zone, this work provides a thorough analysis of such interactions across the different bank rates and money market rates.

3. Empirical Analysis

Our work focuses on the pass-through from money market rates to

bank rates in the largest economies of the Euro Zone namely, Germany (DE), Greece (GR), Spain (ES), France (FR), Italy (IT), Austria (AT), Portugal (PT) and Finland (FI) and the Euro Zone[1].

Interest rates are observed on new contracts[2] in monthly frequency on a sample that starts in January 2003 and ends in August 2014[3]. This period was characterized by the financial crisis of September 15, 2008. Hence, we divide our estimates into two periods: before and during the crisis. Our sample includes both deposit as well as lending rates. Among the lending rates, we analyze the interest rate on consumer credit less than one year (CCR), the interest rates on loans to non-financial corporation's (NFCs) in less than one year for loans over 1 million Euros (NFCCR) and the interest rate on mortgage loans of less than one year (MCR). As regards deposit rates, we study the interest rate on deposits with agreed maturity from households less than 1 year (RDAH), the overnight interest rate on deposits from households (RDOH) and the overnight interest rate on deposits of NFCs (RDONFC). Reference Market rates are 3-month Euribor – Euro Interbank Offered Rate - and the EONIA rate - interbank overnight rates in the euro area - for the overnight rates.

The results of the various tests indicate that all interest rates are integrated of order 1 (we performed standard tests of Augmented Dickey Fuller (ADF) and Phillips-Perron (PP)), the results of these tests are detailed in the appendix (see Tables 1a and 1b).

The cointegration analysis and error correction model (ECM) are mainly based on the Johansen approach. Most of the empirical work

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1. The choice of countries is justified firstly by the availability of data where we have removed from the sample countries in the euro zone that have missing data and secondly, to compare our results with other studies empirical most chose the countries of the euro zone as a sample, but earlier periods than ours.
2. Bank rates used in this work are from the harmonized survey on interest rates of monetary financial institutions of the euro area (MFI Interest Rate -MIR). Data are available on a monthly basis since January 2003.This survey has replaced the RIR survey (Retail Interest Rate) which provided non harmonized bank rates statistics. As part of this analysis, we use on new business rates tounderst and their changes over time. These synthetic rates that correspond to weighted averages by outstanding rates applied by monetary and financial institutions in each country. However, the constraint for an ideal database for the empirical analysis of pass-through a cross countries is a short sample hinders econometric exercises.
3. We chose the period from January 2003 to August 2014, to study the impact of the financial crisis of15 September 2008.

rests heavily on the assumption that MMR is exogenous, hence we will proceed in this study with the following approach where there is one ECM equation for each bank rate on loans and deposits (BR):

$$\Delta BR_t = \alpha + \sum_{i=1}^{m} \beta_i \Delta BR_{t-i} + \sum_{i=0}^{n} \delta_i \Delta MMR_{t-i} + \mu ECT_{t-1} + \varepsilon_t \quad (1)$$

Here ECT denotes the deviation from the cointegrating relationship.

Next, we allow for endogeneity of two interest rates which means MMR could also be endogenous. In this scenario, the single equation estimation loses valuable information to estimating the model. Therefore, we consider the bivariate vector error correction model (VECM):

$$\Delta BR_t = \alpha_1 + \sum_{i=1}^{m} \beta_{1i} \Delta BR_{t-i} + \sum_{i=1}^{n} \delta_{1i} \Delta MMR_{t-i} + \mu_1 ECT_{t-1} + \varepsilon_{1t} \quad (2)$$

$$\Delta MMR_t = \alpha_2 + \sum_{i=1}^{o} \beta_{2i} \Delta MMR_{t-i} + \sum_{i=1}^{p} \delta_{2i} \Delta BR_{t-i} + \mu_2 ECT_{t-1} + \varepsilon_{2t} \quad (3)$$

All previous estimation were interested in the pass-through from MMR to either lending or deposit rates. However, there may be an interdependence of bank decisions on deposits and loans: the way banks adjust lending rates (CR), for example, can influence rates on deposits (DR). Hence, we model the three interest rate simultaneously using a trivariate VECM:

$$\Delta CR_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1i} \Delta CR_{t-i} + \sum_{i=1}^{i} \delta_{1i} \Delta MMR_{t-i} + \sum_{i=1}^{m} \varphi_{1i} \Delta DR_{t-i} + \mu_1 ECT1_{t-1} + \eta_1 ECT2_{t-1} + \varepsilon_{1t} \quad (4)$$

$$\Delta MMR_t = \alpha_2 + \sum_{i=1}^{n} \beta_{2i} \Delta MMR_{t-i} + \sum_{i=1}^{O} \delta_{2i} \Delta CR_{t-i} + \sum_{i=1}^{p} \varphi_{2i} \Delta DR_{t-i} + \mu_2 ECT1_{t-1} + \eta_2 ECT2_{t-1} + \varepsilon_{2t} \quad (5)$$

$$\Delta DR_t = \alpha_3 + \sum_{i=1}^{q} \beta_{3i} \Delta DR_{t-i} + \sum_{i=1}^{r} \delta_{3i} \Delta MMR_{t-i} + \sum_{i=1}^{s} \varphi_{3i} \Delta CR_{t-i} + \mu_3 ECT1_{t-1} + \eta_3 ECT2_{t-1} + \varepsilon_{3t} \quad (6)$$

where ECT1 and ECT2 denote the deviations from the cointegrating relationships.

4. Estimation Results

4.1 Long-term Analysis

There is a stable long-term relationship between MMR and each bank rate. The existence of a cointegrating relationship means either that cointegrated variables have similar behavior in time or that they cannot diverge permanently. To test cointegration, the Johansen test is set up where we get the statistics of the trace and the maximum eigen value statistic for two periods before and after the crisis.

As for the pre-crisis period, cointegration is not present in all countries because for every bank rate, cointegration is accepted in some countries and rejected by others. While comparing lending rates and deposit rates, we note that the first rates apply for most countries in which cointegration is accepted and more specifically the interest rate on loans to NFCs (table 2a) for which cointegration is only rejected in two countries (Greece and Portugal). As for deposit rates (table 2b)[1], they are slightly cointegrated with MMR, given the small number of countries for which cointegration is present.

Regarding the post-crisis period, it is hard to say that all lending rates become more cointegrated, for the reason that in respect of interest rates on loans to NFCs, cointegration is accepted only for Germany, Austria, Finland and the Euro Zone. However, the interest rate on mortgage loans (table 2c) has a cointegration with MMR in most countries. By cons, deposit rates become more cointegrated after the crisis and even more than lending rates (contrary to what is observed in the pre-crisis period) given that, for the overnight interest rate on deposits of NFCs (table 2d), cointegration is present in all countries.

Generally speaking, in the pre-crisis period, the presence of

1. The other results are available on request.

cointegration for lending rates in some countries more than deposit rates indicates that interest rates on loans are more rigid than deposit rates. Right after the crisis, these results are reversed and deposit rates become more rigid. For instance decline in the MMR for instance is not transmitted to deposit rates in the same way as lending rates. These results imply that changes in MMR have a distinct impact on the two types of bank rates. In addition, the effects of monetary policy differ across sectors - as the presence and absence of cointegration differs across household, NFCs and housing sectors - and across countries because in the rate itself, we find a difference from one country to another. In other words, there is heterogeneity between the two types of rates (credit and debit), between sectors and between countries in the euro area.

To measure the degree of long term (LT) transmission, we proceed with the identification of the LT relationship in case cointegration exists. For this, while implementing the Johansen approach, we estimate the cointegrating parameters and while adopting a restricted cointegration analysis, we test the hypothesis that the LT pass-through coefficient is: firstly, results (Table 1) indicate that the LT pass-through coefficients are predictably positive for lending and deposit rates, except for Greece where the degree of LT pass-through was negative for rates on consumer loans in pre-crisis. This is justified on the ground that Greek households are relatively underleveraged, which explains the rigidity of the rates on loans and in some cases, in order to encourage customers for example in case of a falling MMR situation, banks will increase their rates.

Secondly, for lending rates in pre-crisis, the degree of LT pass-through was less than 1, however, for deposit rates was close to 1 (the interest rate on deposits with agreed maturity from households) and even higher than 1 (the overnight interest rate on deposits of NFCs). These results suggest that, although there is a complete or high LT transmission for most deposit rates, the LT pass-through to lending rates is incomplete. So after the crisis, be it debit or credit rates, LT transmission is incomplete or even very low. Indeed, right after the financial crisis and the ensuing bank failures, we start to notice on the one hand, a lack of confidence on the part of clients savings and on the other hand a decline in demand for credit. Hence, even if there is a

change in the MMR, banks will not follow this variation to stimulate customers and they will accept lower margins.

4.2 Short-term Analysis

The estimation of equation (1) shows that δ_0 (tables 3.a and 3.b), which estimates the immediate effect of MMR changes on bank rate, is not significantly different from zero for the consumer credit rates and it is significantly different from zero in some countries for the credit rates to NFCs and the rate on mortgage loans. However, as for deposit rates, we find that the coefficient is significant for almost all countries in the case of the interest rate on deposits with agreed maturity from households and for other rates, the significance was present only for a limited number of countries. Same findings for the post-crisis period (tables 3.c and 3.d). For all rates, whether before or after the financial crisis, δ_0 is less than 1, which indicates that the immediate pass-through from MMR to bank rates is incomplete, except for the case of Finland (for the interest rate on deposits with agreed maturity from households) and France (for the overnight rate on household deposits), which had a complete immediate pass-through in the pre-crisis period.

Regarding the adjustment speed of bank rates to equilibrium (μ), it is very low before the crisis for all deposit rates and for rates on mortgage loans, while it is higher for the credit rates to NFCs and in some countries for the rate on consumer loans. Because of the financial crisis, this speed has witnessed a sharp drop to become very low. This result shows that bank rates have become more rigid.

We now consider the endogeneity of MMR, as discussed above. When we employ the Johansen analysis approach, we test the weak exogeneity of MMR and this hypothesis is rejected in all cases (tables 1a and 1b). Hence, we estimate the system composed by the equation (2) and (3) through a VECM with a common lag structure. The lag structure was widely perceived as the Johansen approach. The results (tables 4.a and 4.b) show that during the pre-crisis period, significant estimation for μ_2 which confirms that the MMR adjusts to the disequilibrium, and this appears in the case of lending rates and especially of interest rates on mortgage loans. For deposit rates, μ_2 is significant only for some countries. However, after the crisis,

regarding lending rates (Table 4.c) most countries displayed a significant coefficient μ whereas for deposit rates (Table 4.d), the significance is absent for most countries. In addition, the estimated values of μ_2 suggest that MMR adjusts more rapidly during the period preceding September 15, 2008 and they adjust more quickly to the disequilibrium of credit rates than deposit rates. These results prove that banks adjust their rates based on the expectations of monetary policy actions. However, what is more important for our purpose is that significant interactions seem to exist and the failure to take account of them entails a loss of information for the estimation model.

4.3 Analysis of the Separability between Deposit and Lending Rates

The purpose of this section is to consider interactions between MMR, lending rates and deposit rates, contributing to a more in-depth comparison of pass-through. While employing the Johansen approach on the trivariate system MMR, lending rates and deposit rates, in case cointegration is accepted. There exists only one cointegration vector and this cointegrating relationship is more pronounced after the crisis when the statistical trace and maximum eigenvalue reject the hypothesis of zero cointegrating vector and accept that of a single vector cointegration for most countries bank rates. In addition, the bivariate system test shows that there is cointegration between lending and deposit rates in the second period (table 5b) that this finding is found for some countries during the first period (table 5a)[1].

Based on these results and the cointegration relationships previously found, we identify two cointegrating vectors in each trivariate system:

(1) between lending rates and the MMR (CI1) and

(2) between deposit rates and the MMR (CI2).

We then estimate VECM trivariate compound by equations (4), (5) and (6) with ECT1 and ECT2 are deviations CI1 and CI2 respectively.

These trivariate systems reveal the dynamic interactions between lending and deposit rates, and more specifically, lending rates respond to deviations from the equilibrium of MMR on deposits and deposit rates respond to deviations from the equilibrium of TMM on loans. In

1. The other results are available on request.

order to understand the transmission process one must take into account all these interactions.

Examining the period preceding the financial crisis (Table 6.a), on testing the relationship of interest rates on consumer loans with the different deposit rates in our sample, we notice that this relationship is stronger with the overnight deposit rate to NFCs. Indeed, in the CCR–RDAH system, the MMR-deposit rate ECT coefficient (μ) is significant and negative only for Greece, Spain, France, Austria and Finland. This may be reflected in the result of an increase in the 3-month Euribor, which makes it very high in relation to the deposit rate (RDAH). The weakness of the latter may entail an increased difficulty in banks' ability to raise funds through deposits to fund their credit business. This generates a higher lending rate (CCR) due to the shortage of deposit funds. This finding may also be noticed in other systems (CCR-RDOH and CCR-RDONFC).

For the deposit-MMR ECT coefficient (η) in the lending rate equations in the CCR-RDAH, CCR-RDOH and CCR-RDONFC systems, this coefficient is significant and negative in most countries of the Euro Zone, i.e. the lending rate (CCR) responds negatively to a deposit rate-3-month Euribor disequilibrium gap.

Regarding the interest rates on mortgage loans in the MCR-RDAH system, the MMR-deposit rate ECT coefficient (η) in the lending rate equation is significant and negative in all countries of the Euro Zone and in the Euro area as a whole and it is higher in the case of Spain, i.e. .the MCR to Spain responds negatively and more rapidly to the deviation of disequilibrium between the 3-month Euribor and RDAH. The negative sign of the η coefficient is also noticed in other systems MCR-RDOH and MCR-RDONFC, except for Portugal and Finland in the MCR-RDOH system where the MMR-deposit rate ECT coefficient (η) in the lending rate equation is significant and positive so the MCR responds positively to the disequilibrium deviation MMR-deposits. This result indicates that for example following an increase in the MMR, i.e. a higher deviation compared to the deposit rate, the lending rate (MCR) will decrease rather than increase because the bank will prefer to endure the decline in margins on lending rates than increase the MCR and attract riskier clients.

For the rate on loans to NFCs, we note that its coefficients μ and η

are higher than other rates (CCR and MCR). This means that the lending rate responds quickly to deviations from MMR equilibrium. In addition, between the 3 systems NFCCR-RDAH, NFCCR-RDOH and NFCCR–RDONFC, the coefficients μ and η are higher in the latter system and they maintain their negative sign as in other systems.

As for the second sub-sample of our study that spans the post-crisis period (table 6.b), in the CCR-RDAH system the MMR-deposit rate ECT coefficient (η) in the lending rate equation is significant and negative for most countries. For the impact of the crisis, we end up with a CCR which responds negatively and more rapidly to the disequilibrium deviation MMR-deposits, while the other two systems (CCR-RDOH and CCR-RDONFC) do not have for all countries an accelerated effect on the CCR response.

As for mortgage loans, we find that the MMR-deposits ECT coefficient (η) in the lending rate equation remains significant and negative to the MMR-deposits disequilibrium gap in most countries. However, in systems MCR-RDAH and MCR-RDOH, the response has increased in some countries and decreased in others. In the MCR-RDONFC system, the lending rate response becomes slower after the financial crisis since the coefficient η declined in all countries. This can be explained by the fact that for example following a decline in MMR, the deposit rate becomes really high compared to the 3-month Euribor rate which will be reflected in a tendency among investors in real estate to save rather than invest. Hence the rates on mortgage loans (MCR) in this case will fall and this action will not be done by banks quickly and in a proportional manner to the MMR fall due to the many financial difficulties that all banks are facing.

Regarding the rate on loans to NFCs, the coefficients μ and η keep their sign as expected in most countries except for Germany in the NFCCR-RDONFC system where the MMR-credit rate ECT coefficient (μ) in the deposit rate equation was negative before the crisis and became positive after it. This may well reflect the result of a reduction in MMR which makes the NFCCR very high compared to the 3-month Euribor, thus generating higher incomes than the normal rates on loans. That encourages German banks to pay more deposits through higher deposit rates, where deposits become more attractive and banks will be reinvigorated to raise more funds to their credit

business.

5. Conclusion

The interest rate is a very important channel in the transmission of monetary policy. This article investigates a number of issues with the aim of understanding the pass-through process: whether the pass-through degree is complete or incomplete, whether its speed is fast or slow, whether there are interactions between bank rates and whether there are heterogeneities across the deposit market and the credit market, between the household sector and the corporate sector and across the countries of the Euro Zone.

Our results show that before September 15th, 2008, the degree of LT pass-through to lending rates is incomplete yet it is close to 1 and even complete for deposit rates. This degree fell after the crisis either for lending rates or deposit rates. This implies that bank rates have become more rigid. Consequently, the monetary policy actions will be transmitted slowly through bank rates and their effects on aggregate demand and prices will be very low.

In addition, the speed of adjustment of bank rates to equilibrium is very slow before the crisis for all deposit rates and for the rate on mortgage loans, while it is higher for the rate on loans to NFCs and for some countries for the rate on consumer credit. Because of the financial crisis, this speed has dropped dramatically to become very low. These results confirm the presence of heterogeneity between lending and deposit rates, between the household sector and the corporate sector and between countries in the Euro Zone.

Finally, while accounting for the interactions between money market rate, lending rates and deposit rates, we find that before the crisis, by setting rates on consumer credit, banks take into account changes in deposit rates following changes in money market rates. The same applies to the rate on mortgage loans which responds positively to the disequilibrium deviation away from money market rate-deposits. For example, following an increase in the MMR, i.e. a higher deviation compared to the deposit rate, the lending rate will decrease instead of increasing as, and the bank will prefer to endure the decline in margins on lending rates rather than increase the rate on consumer credit and attract riskier clients. In addition, compared to

other lending rates, the rate on loans to NFCs responds quickly to deviations from the equilibrium of MMR.

As for the post-crisis period, we end up with a rate on consumer credit which responds negatively and more rapidly to MMR- interest rate on deposits with agreed maturity from households' disequilibrium gap. As for mortgage credit, we find that the response of interest rates on mortgage loans to variations in interest rate on deposits with agreed maturity from households and the overnight interest rate on deposits from households increased in some countries and declined in others. Yet its response to the variations in overnight deposit rates to NFCs becomes slower after the financial crisis. As for loans to NFCs, similarly the other lending rates, there is a significant interaction of this rate with MMR and deposit rates. That is to say, changes in the latter affect the rate on loans to NFCs.

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Appendix

Table 1.a: Results of the Stationarity Tests ADF and PP of Lending Rates Series in First Difference

	Consumption credit rate			Credit rate of NFC			Mortgagecredit rate		
	ADF	PP	order of intégration	ADF	PP	order of intégration	ADF	PP	order of intégration
ZEURO	-14.941	-15.261	1	-5.405	-9.014	1	-4.892	-4.856	1
DE	-14.981	-14.986	1	-4.681	-11.980	1	-3.432	-11.096	1
GR	-12.255	-16.096	1	-14.835	-14.764	1	-8.350	-8.474	1
ES	-14.092	-14.995	1	-12.760	-12.747	1	-4.205	-6.492	1
FR	-13.956	-13.866	1	-4.426	-11.672	1	-4.901	-9.387	1
IT	-14.028	-13.889	1	-11.393	-11.810	1	-3.372	-5.614	1
AT	-15.705	-15.391	1	-4.321	-11.551	1	-2.900	-12.919	1
PT	-10.854	-11.026	1	-13.342	-13.254	1	-5.924	-6.168	1
FI	-9.105	-9.330	1	-13.849	-13.794	1	-5.050	-5.131	1
MMR	-4.703	-4.670	1	-4.703	-4.670	1	-4.703	-4.670	1

Note: This table offers results of ADF and PP stationarity tests for each lending rate. We find the absence of unit root when the critical value (-1.94) is less than t-stat.

Table 1.b: Results of the Stationarity Tests ADF and PP of Deposit Rates Series in First Difference

	Deposit rate with agreed maturity of household			Overnight deposit rate of household			Overnight deposit rate of NFC		
	ADF	PP	order of intégration	ADF	PP	order of intégration	ADF	PP	order of intégration
ZEURO	-3.697	-10.983	1	-3.585	-6.076	1	-3.104	-5.393	1
DE	-10.491	-10.845	1	-3.366	-6.412	1	-2.920	-7.862	1
GR	-3.785	-5.343	1	-3.730	-10.643	1	-13.891	-13.756	1
ES	-7.686	-7.885	1	-11.305	-11.600	1	-3.081	-11.709	1
FR	-4.624	-11.234	1	-11.066	-17.954	1	-13.916	-13.732	1
IT	-5.091	-7.809	1	-3.208	-5.918	1	-3.380	-5.059	1
AT	-3.793	-6.242	1	-3.152	-9.642	1	-2.477	-7.091	1
PT	-3.510	-9.037	1	-15.029	-14.775	1	-3.899	-12.511	1
FI	-4.808	-8.343	1	-7.461	-7.544	1	-3.491	-8.321	1
MMR	-4.703	-4.670	1	-6.967	-7.157	1	-6.967	-7.157	1

Note: This table offers results of ADF and PP stationarity tests for each deposit rate. We find the absence of unit root when the critical value (-1.94) is less than t-stat.

Table 2.a: Johansen Cointegration Analysis for the Bivariate NFCCR-MMR System during the Pre-crisis Period

	Maximal Eignvalue test		Trace test		Long-run pass-through coefficient[a]	Test long-run coefficient= 1[b]	Exogeneity of MMR[c]	
	H:r=0	H: r ≤ 1	H:r=0	H: r ≤ 1				
Euro Area	28.27	2.51	30.78	2.51	0.69	0.00	1430.48	[0.0000]*
Germany	23.54	3.95	27.49	3.95	0.62	0.00	1076.93	[0.0000]*
Greece	13.61	3.08	16.69	3.08				
Spain	20.52	2.29	22.81	2.29	0.77	0.00	827.56	[0.0000]*
France	16.02	2.45	18.47	2.45	0.77	0.00	117.39	[0.0000]*
Italy	19.24	3.21	22.45	3.21	0.65	0.00	606.09	[0.0000]*
Austria	27.05	8.55	35.60	8.55	0.68	0.00	454.70	[0.0000]*
Portugal	9.74	2.41	12.15	2.41				
Finland	20.95	2.60	23.54	2.60	0.67	0.00	386.93	[0.0000]*

Note: [a] From the cointegrating vectors normalized on the bank rate.

[b] Likelihood-ratio (LR) test p-value.

[c] LR test : reported χ^2 statistic [p-value in brackets].

* Indicates significance at 1%.

Table 2.b: Johansen Cointegration Analysis for the Bivariate RDAH-MMR System during the Pre-crisis Period

	Maximal Eignvalue test		Trace test		Long-run pass-through coefficient[a]	Test long-run coefficient= 1[b]	Exogeneity of MMR[c]	
	H:r=0	H: r ≤ 1	H:r=0	H: r ≤ 1				
Euro Area	18.38	3.90	22.28	3.90	0.99	0.17	1.92	[0.1655]
Germany	26.48	2.93	29.41	2.93	0.96	0.01	8.31	[0.0039]*
Greece	23.28	3.05	26.33	3.05	0.84	0.00	82.65	[0.0000]*
Spain	7.55	3.86	11.41	3.86				
France	18.59	4.13	22.72	4.13	0.85	0.00	97.05	[0.0000]*
Italy	20.58	3.11	23.69	3.11	0.83	0.00	94.41	[0.0000]*
Austria	14.64	3.76	18.40	3.76				
Portugal	15.18	1.51	16.69	1.51				
Finland	10.51	7.87	18.38	7.87				

Note: [a] From the cointegrating vectors normalized on the bank rate.

[b] Likelihood-ratio (LR) test p-value.

[c] LR test : reported χ^2 statistic [p-value in brackets].

* Indicates significance at 1%.

Table 2.c: Johansen Cointegration Analysis for the Bivariate MCR-MMR System during the Post-crisis Period

	Maximal Eignvalue test		Trace test		Long-run pass-through coefficient[a]	Test long-run coefficient= 1[b]	Exogeneity of MMR[c]	
	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1				
Euro Area	25.43	1.08	26.51	1.08	0.15	0.00	2703.02	[0.0000]*
Germany	30.30	1.68	31.98	1.68	0.21	0.00	5682.41	[0.0000]*
Greece	8.08	2.23	10.31	2.23				
Spain	18.92	1.13	20.05	1.13	0.15	0.00	1411.39	[0.0000]*
France	16.76	3.04	19.80	3.04	0.19	0.00	4839.64	[0.0000]*
Italy	17.73	1.19	18.91	1.19	0.04	0.00	1025.80	[0.0000]*
Austria	39.61	1.61	41.22	1.61	0.23	0.00	1830.37	[0.0000]*
Portugal	15.42	1.91	17.33	1.91				
Finland	29.50	1.71	31.21	1.71	0.22	0.00	1592.16	[0.0000]*

Note: [a] From the cointegrating vectors normalized on the bank rate.

[b] Likelihood-ratio (LR) test p-value.

[c] LR test : reported χ^2 statistic [p-value in brackets].

* Indicates significance at 1%.

Table 2.d: Johansen Cointegration Analysis for the Bivariate RDONFC-MMR System during the Post-crisis Period

	Maximal Eignvalue test		Trace test		Long-run pass-through coefficient[a]	Test long-run coefficient= 1[b]	Exogeneity of MMR[c]	
	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1				
Euro Area	29.62	3.91	33.53	3.91	0.48	0.00	1727.37	[0.0000]*
Germany	25.18	9.85	35.03	9.85	0.59	0.00	742.61	[0.0000]*
Greece	31.87	3.32	35.20	3.32	0.19	0.00	3782.41	[0.0000]*
Spain	32.09	8.13	40.22	8.13	0.47	0.00	1221.31	[0.0000]*
France	26.77	2.54	29.31	2.54	0.09	0.00	29947.24	[0.0000]*
Italy	27.56	1.43	28.99	1.43	0.58	0.00	85.86	[0.0000]*
Austria	36.61	7.34	43.96	7.34	0.74	0.00	131.96	[0.0000]*
Portugal	31.23	3.94	35.18	3.94	0.33	0.00	4024.48	[0.0000]*
Finland	60.20	7.01	67.21	7.01	0.61	0.00	1862.35	[0.0000]*

Note: [a] From the cointegrating vectors normalized on the bank rate.

[b] Likelihood-ratio (LR) test p-value.

[c] LR test : reported χ^2 statistic [p-value in brackets].

* Indicates significance at 1%.

Table 3.a: Single Equation Short-run of Lending Rates during the Pre-crisis Period

	Consumptioncredit rate		Credit rate of NFC		Mortgagecredit rate	
	δ0	μ	δ0	μ	δ0	μ
Euro Area	0.012	-0.440***	0.318**	-0.786***	0.167***	-0.084**
Germany	-0.325	-0.500***	0.133	-0.794***	0.337***	-0.224***
Greece	-0.281	-0.176***	0.072	-0.624***	-0.026	-0.241***
Spain	0.268	-0.777***	0.312**	-0.680***	0.167***	-0.136***
France	0.020	-0.286***	0.204	-0.497***	0.073	-0.102***
Italy	0.010	-0.534***	0.346*	-0.667***	0.103	-0.309***
Austria	0.088	-0.160***	0.228	-0.664***	0.113	-0.135***
Portugal	0.102	-0.101*	0.498***	-0.323***	0.326***	-0.149***
Finland	0.083	-0.074*	-0.203	-0.729***	-0.168	-0.267***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 3.b: Single Equation Short-run of Deposit Rates during the Pre-crisis Period

	Deposit rate with agreed maturity of household		Overnight deposit rate of household		Overnight deposit rate of NFC	
	δ0	μ	δ0	μ	δ0	μ
Euro Area	0.434***	-0.406***	0.223*	-0.111***	0.177	-0.062
Germany	0.109	-0.586***	0.291***	-0.065***	0.564***	0.031
Greece	0.390***	-0.239***	-0.180	-0.386***	0.265	-0.197
Spain	0.446***	-0.135	-0.110	-0.105**	0.609***	-0.114***
France	0.287	-0.596***	1.064***	-0.247***	-0.378	-0.109
Italy	0.163	-0.352***	0.107	-0.109***	0.313*	-0.070***
Austria	0.423***	-0.466***	0.049	-0.029	0.178	0.006
Portugal	0.381***	-0.330***	-0.480	-0.182***	0.218	-0.417***
Finland	1.381***	0.021	-0.036	-0.126***	0.518***	0.042

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 3.c: Single Equation Short-run of Lending Rates during the Post-crisis Period

	Consumption credit rate		Credit rate of NFC		Mortgage credit rate	
	δ0	μ	δ0	μ	δ0	μ
Euro Area	-0.056	-0.085***	0.042	-0.197***	0.070**	-0.124***
Germany	0.018	-0.077**	0.136	-0.428***	0.129***	-0.289***
Greece	0.176**	-0.121	0.230**	-0.040	-0.050	-0.133***
Spain	-0.172	-0.120**	0.164	-0.188***	0.122***	-0.080***
France	-0.028	-0.090***	0.183*	-0.185***	0.010	-0.174***
Italy	-0.118*	-0.053***	0.092	-0.077**	0.088**	-0.037***
Austria	0.029	-0.239***	0.229***	-0.307***	-0.029	-0.255***
Portugal	0.108***	-0.048**	0.228**	-0.005	0.177***	-0.041***
Finland	-0.057	-0.189***	-0.089	-0.370***	0.043	-0.173***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 3.d: Single Equation Short-run of Deposit Rates during the Post-crisis Period

	Deposit rate with agreed maturity of household		Overnight deposit rate of household		Overnight deposit rate of NFC	
	δ0	μ	δ0	μ	δ0	μ
Euro Area	0.057	-0.035	0.030**	-0.091***	-0.015	-0.142***
Germany	0.260*	-0.204***	0.052***	-0.054***	-0.045	-0.084*
Greece	-0.089	-0.024*	0.039	-0.066***	-0.004	-0.164***
Spain	0.055	-0.023	-0.015	-0.198***	0.004	-0.329***
France	0.140	-0.191***	0.048	-0.141***	0.020	-0.105***
Italy	0.323***	-0.026	0.028	-0.104***	0.049*	-0.053***
Austria	0.121	-0.171***	-0.032	-0.226***	0.008	-0.181***
Portugal	0.271***	-0.011	0.146*	-0.202***	0.081	-0.138***
Finland	0.326***	-0.236***	-0.068***	-0.232***	-0.113*	-0.261***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 4.a: Bivariate VECM of Lending Rates during the Pre-crisis Period

	Consumption credit rate		Credit rate of NFC		Mortgage credit rate	
	μ1	μ2	μ1	μ2	μ1	μ2
Euro Area	-0.440***	-0.110	-0.786***	-0.569***	-0.084**	-0.341***
Germany	-0.500***	-0.051	-0.794***	-0.457***	-0.224***	-0.439***
Greece	-0.176***	-0.121***	-0.624***	-0.194**	-0.241***	-0.215***
Spain	-0.777***	0.008	-0.680***	-0.255	-0.136***	-0.258*
France	-0.286***	-0.145***	-0.497***	-0.114	-0.102***	-0.324***
Italy	-0.534***	-0.023	-0.667***	-0.158	-0.309***	-0.328
Austria	-0.160***	-0.249***	-0.664***	-0.409***	-0.135***	-0.251***
Portugal	-0.101*	-0.161***	-0.323***	-0.182	-0.149***	-0.390***
Finland	-0.074*	-0.123***	-0.729***	-0.300***	-0.267***	-0.269***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 4.b: Bivariate VECM of Deposit Rates during the Pre-crisis Period

	Deposit rate with agreed maturity of household		Overnight deposit rate of household		Overnight deposit rate of NFC	
	μ1	μ2	μ1	μ2	μ1	μ2
Euro Area	-0.406***	-0.023	-0.111***	-0.083	-0.062	0.083
Germany	-0.586***	-0.197	-0.065***	0.010	0.031	0.269***
Greece	-0.239***	-0.159***	-0.386***	-0.131	-0.197	0.181*
Spain	-0.135	0.102	-0.105**	-0.106***	-0.114***	0.053
France	-0.596***	-0.301***	-0.247***	0.085***	-0.109	0.107***
Italy	-0.352***	-0.299***	-0.109***	-0.002	-0.070***	0.009
Austria	-0.466***	0.001	-0.029	0.132**	0.006	0.144***
Portugal	-0.330***	-0.155	-0.182***	-0.068***	-0.417***	-0.016
Finland	0.021	0.363	-0.126***	0.000	0.042	0.178***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 4.c: Bivariate VECM of Lending Rates during the Post-crisis Period

	Consumptioncredit rate		Credit rate of NFC		Mortgagecredit rate	
	μ1	μ2	μ1	μ2	μ1	μ2
Euro Area	-0.085***	-0.086*	-0.197***	-0.181**	-0.124***	-0.257***
Germany	-0.077**	-0.087**	-0.428***	-0.168	-0.289***	-0.083
Greece	-0.121	0.438***	-0.040	-0.085***	-0.133***	-0.124
Spain	-0.120**	-0.053	-0.188***	-0.120***	-0.080***	-0.182***
France	-0.090***	-0.184*	-0.185***	-0.115*	-0.174***	-0.216
Italy	-0.053***	-0.045	-0.077**	-0.101***	-0.037***	-0.175***
Austria	-0.239***	-0.281**	-0.307***	-0.178***	-0.255***	-0.159*
Portugal	-0.048**	-0.144***	-0.005	-0.116***	-0.041***	-0.120***
Finland	-0.189***	-0.196***	-0.370***	-0.112*	-0.173***	-0.173*

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 4.d: Bivariate VECM of Deposit Rates during the Post-crisis Period

	Deposit rate with agreed maturity of household		Overnight deposit rate of household		Overnight deposit rate of NFC	
	μ1	μ2	μ1	μ2	μ1	μ2
Euro Area	-0.035	-0.063**	-0.091***	0.136	-0.142***	0.105
Germany	-0.204***	-0.105*	-0.054***	0.207	-0.084*	0.282**
Greece	-0.024*	-0.072***	-0.066***	-0.074	-0.164***	-0.156
Spain	-0.023	0.049**	-0.198***	-0.127	-0.329***	-0.121
France	-0.191***	-0.103*	-0.141***	-0.185	-0.105***	-0.352**
Italy	-0.026	-0.081***	-0.104***	-0.128	-0.053***	-0.095
Austria	-0.171***	-0.096	-0.226***	-0.050	-0.181***	0.071
Portugal	-0.011	-0.048***	-0.202***	-0.139	-0.138***	-0.100
Finland	-0.236***	-0.072	-0.232***	0.056	-0.261***	0.160

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table5.a: Johansen Cointegration Analysis for Systems with Lending and Deposit Rates during the Pre-crisis Period

	Bivariate CCR-RDAH system				Trivariate CCR-RDAH-MMR system							
	Maximal Eignvalue test		Trace test		Maximal Eignvalue test			Trace test			Pass-through coefficient	
	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1	H: r ≤ 2	H: r =0	H: r ≤ 1	H: r ≤ 2	CI1	CI2
Euro Area	13,029	3,974	17,002	3,974	17,349	12,282	2,371	32,002	14,653	2,371	-0,293	-1,026
Germany	15,199	2,602	17,800	2,602	**28,799**	**15,488**	**2,058**	**46,345**	**17,546**	**2,058**	**-0,246**	**-1,000**
Greece	**19,548**	**7,688**	**27,237**	**7,688**	21,111	11,389	5,611	**38,111**	**17,000**	**5,611**	**0,015**	**-0,951**
Spain	**16,167**	**3,758**	19,925	3,758	16,584	5,915	4,151	26,650	10,066	4,151	-0,343	-1,024
France	5,352	1,197	6,548	1,197	**28,358**	**6,290**	**1,758**	**36,407**	**8,049**	**1,758**	**-0,587**	**-0,884**
Italy	**18,118**	**3,957**	**22,075**	**3,957**	24,037	19,039	2,408	45,484	21,447	2,408	-0,046	-0,895
Austria	10,649	5,796	16,446	5,796	17,948	10,963	6,032	34,943	16,995	6,032	-0,411	-0,990
Portugal	15,880	3,570	19,450	3,570	22,210	7,444	3,259	32,913	10,703	3,259	-0,172	-1,013
Finland	12,448	2,265	14,713	2,265	14,573	12,377	1,593	28,543	13,970	1,593	-0,357	-1,057

Note: the values in bold indicate the presence of cointegration.

Table 5.b: Johansen Cointegration Analysis for Systems with Lending and Deposit Rates during the Post-crisis Period

	Bivariate CCR-RDAH system				TrivariateCCR-RDAH-MMR system							
	Maximal Eignvalue test		Trace test		Maximal Eignvalue test			Trace test			Pass-through coefficient	
	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1	H: r =0	H: r ≤ 1	H: r ≤ 2	H: r =0	H: r ≤ 1	H: r ≤ 2	CI1	CI2
Euro Area	**24,410**	**2,593**	**27,004**	**2,593**	**25,181**	**6,146**	**3,038**	34,364	9,184	3,038	**0,086**	**-0,442**
Germany	**28,436**	**0,949**	**29,385**	**0,949**	**26,554**	**7,752**	**2,236**	**36,541**	**9,988**	**2,236**	**0,364**	**-0,530**
Greece	8,994	1,736	10,731	1,736	**23,078**	**4,899**	**1,610**	29,588	6,509	1,610	**-0,145**	**-0,026**
Spain	6,999	1,799	8,798	1,799	8,157	5,056	1,907	15,119	6,963	1,907	-0,067	-0,740
France	**29,384**	**4,640**	**34,024**	**4,640**	**37,319**	**5,376**	**3,020**	**45,716**	**8,396**	**3,020**	**-0,040**	**-0,099**
Italy	**24,096**	**6,672**	**30,768**	**6,672**	**26,869**	**7,601**	**6,054**	**40,524**	**13,656**	**6,054**	**-0,128**	**0,179**
Austria	**20,912**	**1,600**	**22,513**	**1,600**	**29,629**	**9,184**	**1,922**	**40,734**	**11,106**	**1,922**	**-0,015**	**-0,547**
Portugal	5,634	1,217	6,851	1,217	**23,530**	**5,531**	**1,799**	30,860	7,331	1,799	**0,204**	**0,108**
Finland	**30,344**	**1,053**	**31,397**	**1,053**	**30,410**	**9,647**	**1,645**	**41,701**	**11,291**	**1,645**	**0,088**	**-0,306**

Note: the values in bold indicate the presence of cointegration.

Table 6.a: Trivariate VECM during the Pre-crisis Period

	CCR and RDAH		CCR and RDOH		CCR and RDONFC	
	μ	η	μ	η	μ	η
Euro Area						
Lending rate equation	0.003	0.070***	-0.034	0.220***	-0.418***	-0.225***
Money market rate equation	0.018	0.432***	-0.016	0.104***	0.410***	0.221***
Deposit rate equation	-0.019	-0.442***	0.038	-0.240***	-0.280***	-0.151***
Germany						
Lending rate equation	0.006	-0.042***	-0.478***	-0.224***	-0.659***	-0.518***
Money market rate equation	-0.077	0.580***	0.221***	0.103***	0.139***	0.109***
Deposit rate equation	0.076	-0.570***	-0.169***	-0.079***	0.010***	0.008***
Greece						
Lending rate equation	-0.067*	-0.081***	-0.148***	-0.117***	-0.167***	-0.304***
Money market rate equation	0.083*	0.101***	0.086***	0.068***	0.039***	0.071***
Deposit rate equation	-0.088*	-0.107***	-0.211***	-0.167***	-0.066***	-0.120***
Spain						
Lending rate equation	-0.779***	0.038	-0.097	0.152	-0.516***	-0.238***
Money market rate equation	0.116***	-0.006	0.014	-0.022	0.321***	0.148***
Deposit rate equation	0.148***	-0.007	0.052	-0.081	-0.086***	-0.040***
France						
Lending rate equation	-0.163***	-0.120***	-0.002	0.008***	-0.557***	-0.612*
Money market rate equation	0.651***	0.477***	-0.007	0.040***	0.554***	0.609*
Deposit rate equation	-0.628***	-0.460***	0.032	-0.170***	-0.235***	-0.258*
Italy						
Lending rate equation	-0.110	0.179***	-0.033	-0.111***	-0.274***	-0.168***
Money market rate equation	-0.149	0.241***	0.137	0.452***	0.297***	0.182***
Deposit rate equation	0.172	-0.278***	-0.131	-0.432***	-0.221***	-0.135***

	CCR and RDAH		CCR and RDOH		CCR and RDONFC	
	μ	η	μ	η	μ	η
Austria						
Lending rate equation	-0.046*	-0.128***	-0.138	-0.183***	-0.213***	-0.141
Money market rate equation	0.175*	0.490***	0.174	0.231***	0.190***	0.127
Deposit rate equation	-0.158*	-0.442***	-0.121	-0.161***	-0.104***	-0.069
Portugal						
Lending rate equation	-0.013	-0.189***	-0.016	-0.103*	0.007	-0.323***
Money market rate equation	0.026	0.383***	0.010	0.065*	-0.019	0.907***
Deposit rate equation	-0.024	-0.346***	-0.015	-0.095*	0.015	-0.704***
Finland						
Lending rate equation	-0.084***	-0.053*	0.007	0.084***	-0.013	-0.011
Money market rate equation	1.162***	0.735*	0.018	0.231***	0.204	0.183
Deposit rate equation	-1.071***	-0.677*	-0.013	-0.170***	-0.140	-0.125

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.

Table 6.b: Trivariate VECM during the Post-crisis Period

	CCR and RDAH		CCR and RDOH		CCR and RDONFC	
	μ	η	μ	η	μ	η
Euro Area						
Lending rate equation	-0.142***	-0.172***	-0.114***	-0.087***	-0.099***	-0.177***
Money market rate equation	0.006***	0.007***	0.019***	0.014***	0.023***	0.041***
Deposit rate equation	-0.040***	-0.049***	-0.057***	-0.044***	-0.068***	-0.121***
Germany						
Lending rate equation	-0.055	-0.211***	-0.160***	-0.056***	-0.120***	-0.158***
Money market rate equation	0.009	0.036***	-0.002***	-0.001***	0.030***	0.040***
Deposit rate equation	-0.056	-0.213***	-0.058***	-0.020***	-0.071***	-0.094***
Greece						
Lending rate equation	-0.097	0.171***	-0.137	0.230***	-0.085	0.490***
Money market rate equation	0.014	-0.024***	0.017	-0.029***	0.012	-0.071***
Deposit rate equation	0.016	-0.029***	0.010	-0.018***	0.010	-0.058***
Spain						
Lending rate equation	-0.138**	-0.015	-0.014	-0.039***	-0.004	-0.017***
Money market rate equation	0.013**	0.001	0.013	0.036***	0.015	0.061***
Deposit rate equation	-0.006**	-0.001	-0.053	-0.145***	-0.063	-0.262***
France						
Lending rate equation	-0.080***	-0.566***	-0.055***	-0.185***	-0.077	-0.537***
Money market rate equation	0.007***	0.051***	0.005***	0.018***	0.006	0.041***
Deposit rate equation	-0.041***	-0.288***	-0.018***	-0.059***	-0.029	-0.206***
Italy						
Lending rate equation	-0.027	-0.176***	-0.041	-0.144***	-0.016	-0.084***
Money market rate equation	0.001	0.005***	0.005	0.019***	0.002	0.013***
Deposit rate equation	-0.015	-0.098***	-0.032	-0.111***	-0.016	-0.084***
Austria						
Lending rate equation	-0.158***	-0.427***	-0.093*	-0.286***	-0.132***	-0.344***

	CCR and RDAH		CCR and RDOH		CCR and RDONFC	
	μ	**η**	**μ**	**η**	**μ**	**η**
Money market rate equation	0.028***	0.076***	0.019*	0.059***	0.034***	0.089***
Deposit rate equation	-0.047***	-0.126***	-0.047*	-0.144***	-0.054***	-0.141***
Portugal						
Lending rate equation	-0.236***	0.077	0.024	0.503***	0.087	1.235***
Money market rate equation	-0.038***	0.012	0.004	0.085***	0.023	0.328***
Deposit rate equation	0.091***	-0.030	-0.018	-0.369***	-0.037	-0.528***
Finland						
Lending rate equation	-0.135***	-0.268***	-0.105***	-0.278***	-0.091***	-0.212***
Money market rate equation	0.001***	0.001***	0.016***	0.041***	0.046***	0.107***
Deposit rate equation	-0.041***	-0.081***	-0.082***	-0.217***	-0.085***	-0.198***

Note: (***)(**) and(*) indicate, respectively, significance at the 1%, 5% and 10%.