Money Market Uncertainty and Retail Interest Rate Fluctuations: A Cross-Country Comparison

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Abstract

This paper analyzes empirically the relationship between money market uncertainty and unexpected deviations in retail interest rates in a sample of 10 OECD countries. We find that, with the exception of the US, money market uncertainty has only a modest impact on the conditional volatility of retail interest rates. Even for the US we find that the effects of money market uncertainty are spread out over time. Our results are consistent with the hypothesis that banking relationships include implicit insurance arrangements and thereby reduce uncertainty.

Keywords: Interest Rate Pass-Through, Relationship Banking, Conditional Volatility

JEL codes: E43, G21

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1 Introduction

Retail interest rates are an important determinant of the saving and investment decisions of households and firms in most economies. Bank lending rates are a key indicator of the marginal cost of short-term external funding for firms (Borio and Fritz, 1995). In addition the interest rate pass-through process is a pivotal element of the monetary transmission mechanism, since it determines how strongly policy-induced variations in money market rates are transmitted to lending and deposit rates and ultimately to saving and investment. Hence, retail interest rates play an important role for macroeconomic fluctuations and also for the transmission of monetary policy.

Retail interest rates and the pricing behavior of banks have been the focus of several studies (see e.g. Sander and Kleimeier, 2006, 2004; De Bondt and Mojon, 2005; De Bondt, 2005; Mojon, 2000; Cottarelli and Kourelis, 1994). This research concentrates on the first moment properties of the interest rate pass-through process. A typical finding is that retail interest rates adjust sluggishly to changes in market interest rates. Here we go one step further and investigate the second moment relationship between market and retail interest rates. More precisely, we address the question to what extent uncertainty concerning money market interest rates impacts upon unexpected retail rate fluctuations.

The relationship banking literature (see e.g. Allen and Gale, 2000) provides a theoretical basis for a second moment link between market and retail interest rates. In addition to solving asymmetric information problems, long-term relationships can give rise to implicit interest rate insurance. Basically, banks which have long-term relationships with their customers tend to offer relatively stable retail interest rates despite the occurrence of shocks that give rise to volatile market interest rates. Sticky retail interest rates may therefore result from an implicit contract between banks and their risk averse customers. This role of the banking sector as a shock absorber may have implications for the volatility of business cycles as emphasized by Issing (2002). Berger and Udell (1992) are among the first to interpret the relatively smooth behavior of retail rates as an indication for risk-sharing agreements between banks and borrowers (for an alternative explanation of retail rate stickiness based on adjustment costs see for instance Hofmann and Mizen, 2004). Hence, if long-term relationships with implicit insurance against liquidity shocks characterize a banking system, we should observe smooth expected retail rates that do not immediately adjust to changes in money market interest rates. Moreover, the correlation between measures of money market uncertainty and unexpected changes in retail rates should be low due to the insurance element of the implicit contract. If insurance against money market uncertainty is complete there should be no relationship between unexpected retail rate deviations and money market uncertainty at all. Thus, our analysis represents a test of the hypothesis that an implicit insurance against liquidity shocks is a source of limited pass-through.

Our study includes Australia, Belgium, Canada, Germany, Italy, Netherlands, Portugal, Spain, UK and the US. We find that money market uncertainty does not substantially influence the conditional volatility of retail interest rates. Our empirical results suggest that banks partially absorb liquidity shocks. Put differently, banks not only smooth retail interest rates and thereby reduce the unconditional volatility faced by their customers, they also reduce the conditional volatility to a significant extent in almost all countries in our sample. Hence, our findings are consistent with the hypothesis that bank-customer relationships include explicit or implicit risk-sharing arrangements.

The remainder of the paper is structured as follows: We describe our empirical strategy in Section 2, discuss our main findings in Section 3 and conclude in Section 4.

2 Methodology

Our strategy for assessing the link between uncertainty in the money market and retail interest rates consists of three steps: We first quantify the extent to which realized retail rates deviate from their expected value. To this end we estimate a regression relationship between market interest rates and retail rates for each country. The absolute values of the regression residuals measure the size of unexpected retail rate deviations. Next we fit a GARCH model (Bollerslev, 1986) to short-term money market rates to obtain a measure for money market uncertainty. Here we assume that the conditional standard deviation of the short-term money market interest rate is a useful indicator for the degree of uncertainty in the money market. Finally, we estimate a relationship between unexpected retail rate deviations and our measure of money market uncertainty.

Let us look at the individual steps in more detail. In the first step we estimate a standard 'interest rate pass-through' equation (Cottarelli and Kourelis, 1994; De Bondt and Mojon, 2005)

$$\Delta R_t = \beta_0 + \sum_{i=0}^{3} \alpha_i \Delta R^m_{t-i} + \sum_{i=1}^{3} \beta_i \Delta R_{t-i} + \sum_{i=0}^{3} \gamma_i \Delta R^b_{t-i} + \epsilon_t, \qquad (1)$$

where R_t denotes the retail interest rate, R^m_t is the short-term money market rate, R^b_t is the long-term government bond yield and Δ is the difference operator. We use first differences because nominal interest rates are frequently found to be integrated. Following De Bondt and Mojon (2005) we include the long-term bond yield in addition to the short-term money market rate to capture term structure considerations. We estimate equation (1) with current short and long term interest rates, three lags of them and three lags of the retail rate to cover any first moment dynamics in retail rates.

If market and retail rates are cointegrated, then (1) may be extended to an error-correction model by adding an error-correction term. However, the empirical evidence on cointegration between market rates and retail rates is mixed. De Bondt (2005) finds evidence for cointegration between aggregated euro area retail rates and money market rates, while Kwapil and Scharler (2006) reject the null hypothesis of cointegration. Sander and Kleimeier (2006) analyze retail rates from individual euro area countries and find some evidence for asymmetric error-correction for some types of retail rates. Our data cover about 15 years and are therefore rather short for a meaningful analysis of long-run relationships. Hence, we proceed by estimating (1) without an error-correction term. However, as a robustness check we reestimate equation (1) augmented with an error-correction term. Our empirical results turn out to be robust with respect to this modification.

We apply a standard GARCH model to the short-term money market rate to quantify money market uncertainty. More precisely, we estimate a specification of the form

$$\Delta R_t^m = \delta_0 + \delta_1 \Delta R_{t-1}^m + ... + \delta_j \Delta R_{t-j}^m + \nu_t \tag{2}$$

$$h_t^2 = \theta_0 + \sum_{i=1}^{m} \theta_i \nu_{t-i}^2 + \sum_{i=1}^{n} \omega_i h_{t-i,}^2 \tag{3}$$

where money market rate changes ΔR_t^m are modelled as an autoregressive process with time varying conditional variance h_t^2. We choose the number of lags j, m and n in (2) and (3) individually for each country on the basis of statistically significant model coefficients and diagnostic checks of the residuals in (2). In particular, we check whether the standardized residuals in (2) are uncorrelated and homoscedastic. The conditional volatility of short-term market rates should mirror the liquidity situation for short term funds. However, we remain agnostic with respect to the ultimate source of changes in in interest rates. Changes could be due to monetary policy actions or more generally due to any other type of shock impacting upon the level of liquidity and bank reserves.

Our main focus is on the relationship between unexpected retail rate deviations and money market uncertainty as reflected by the conditional standard deviation h_t. Hence, we estimate the equation

$$|\hat{\epsilon}_t| = \lambda_0 + \lambda_1 h_t + \lambda_2 |\hat{\epsilon}_{t-1}| + \zeta_t. \tag{4}$$

If banks provide insurance against interest rate shocks, then they should shield their customers from uncertainty associated with market interest rates. Thus, if implicit risk sharing agreements are a special feature of banking relationships, we would expect h_t to have only a small effect on $|\hat{\epsilon}_t|$. Thus, $\lambda_1 < 1$ indicates that banks provide insurance and $\lambda_1 = 0$ implies that banks completely eliminate interest rate uncertainty for their customers. Note that we proxy retail interest rate uncertainty by the absolute value of $\hat{\epsilon}_t$. Using $\hat{\epsilon}_t^2$ instead of the absolute deviation leaves our conclusions unchanged.

3 Empirical Results

We use monthly IFS data on deposit and lending retail interest rates, money market interest rates and long-term government bond yields over the period 1990:1 to 2005:9 to estimate equations (1), (2) and (3). The sample sizes differ somewhat due to limited data availability for some countries. Table 1 shows the estimates of immediate and final pass-through. The coefficient α_0 in (1) measures the immediate pass-through. Based on (1) the long-run pass-through is

$$\alpha_l = \frac{\sum_{i=0}^{3} \alpha_i}{1 - \sum_{i=1}^{3} \beta_i}, \tag{5}$$

which we calculate based on the estimated coefficients.

The left bloc in Table 1 shows the results for deposit rates. Immediate pass-through varies from around zero in the Netherlands and Portugal to 0.75 in Australia and the final pass-through ranges from 0.01 in Portugal to 0.90 in the US. The null hypothesis of complete final pass-through can be rejected for all countries except the US at standard significance levels. The null of a zero long-run pass-through cannot be rejected for the Netherlands and Portugal. The results reported in the right bloc of Table 1 indicate that the final pass-through tends to be higher in the case of lending rates. For the US and the Netherlands we cannot reject the null hypothesis of complete long-run pass-through.

INSERT TABLE 1 ABOUT HERE

Let us now turn to the second moment linkage of market interest rates and retail rates. To conserve space we do not report the estimation results for equations (2) and (3) from which we generate our measure of money market uncertainty (the results are of course available upon request). It is worth noting, however, that a standard GARCH(1,1) specification captures the volatility dynamics in the market rate of Australia, Belgium, Canada, the UK and the US. The even simpler ARCH (1) model is sufficient for Germany, Italy and the Netherlands. Only Portugal and Spain require GARCH(1,2) and ARCH(3) specifications respectively, to adequately describe the second moment dynamics in the money market interest rate.

Table 2 presents the results from the estimation of (4), the equation we are mainly interested in. As we can see from the left bloc of the table, the point estimate for λ_1 is positive and statistically significant for Australia, Canada, Germany, Italy and the US. Hence, money market uncertainty significantly affects the conditional volatility of the bank deposit rate in these countries. Moreover, for Germany, Italy, Spain and the UK we find that λ_2 is significant, which indicates that deposit rate volatility exhibits some persistence in these countries. However, the point estimates for λ_2 are typically small. Hence, most of the impact of money market uncertainty occurs contemporaneously. The results for lending rate uncertainty in the right bloc of Table 2 show a significant pass-through of money market uncertainty for Australia, Canada, Italy, Spain and the US. Significant persistence in the volatility of the lending rate is found for Australia, Italy, Spain, UK and the US.

INSERT TABLE 2 ABOUT HERE

Semenov (2006) reports that arms-length lending is characteristic for Australia, Canada, Italy, the Netherlands, Spain, the UK and the US. Hence, one would expect to find a higher impact on lending rate volatility in these countries which is consistent with our results. The noteworthy exception is the UK, where our results indicate that banks provide substantial insurance against money market fluctuations. We also find that λ_2 is not significantly different from zero for the lending rate in the Netherlands. However, the point estimate is relatively large in an economic sense, although estimated rather imprecisely. In fact, we cannot reject the null hypothesis that the long run impact of money market uncertainty is complete for the Netherlands ($H_0 : \lambda_1 + \lambda_2$=1), which is in line with arms-length lending and also true for the US. In contrast, we find an economically small and statistically insignificant coefficient for Germany, where lending relationships are particularly close (Semenov, 2006).

In short, we find that in most of the countries in our sample, banks provide substantial insurance against money market uncertainty. The exception is the US, where we cannot reject the hypothesis that money market uncertainty is fully reflected in unexpected deviations in retail rates in the long run. In contrast, money market uncertainty is not passed on to the conditional volatility of retail rates in the European countries included in our sample, except for Italy. Hence, in these countries, the banking sectors fully insure their customers against money market uncertainty. While the banking sectors in Australia, Canada and Italy also provide a substantial amount of insurance, money market uncertainty is not completely eliminated. This result is in line with the view that banking relationships are more widespread in Europe.

Overall, our results are in favor of the hypothesis that banks provide a high degree of insurance against liquidity fluctuations as argued in Allen and Gale (2000) among others. Thus, we may conclude that banking relationships include implicit or explicit risk-sharing in most countries in our sample.

4 Summary

In this paper we analyze the relationship between money market uncertainty and unexpected deviations in retail interest rates. We find that for the countries in our sample, the influence of money market uncertainty on the conditional volatility of retail interest rates is rather limited. The only exception is the US, where money market uncertainty is fully passed through to unexpected deviations of deposit and lending rates in the long run. However, even for the US we find that the effects of money market uncertainty are spread out over time.

Our results are consistent with the hypothesis that banking relationships indeed provide a substantial amount of insurance against unexpected fluctuations in money market rates. Put differently, banks absorb or at least smooth shocks, which would otherwise affect retail interest rates, and thereby impact upon saving and investment decisions of households and firms. Thus, in this sense banking relationships may contribute to financial and macroeconomic stability.

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Table 1: Impact and Long-Run Pass-Through

	Deposit Rates				Lending Rates			
	α_0	α_l	$\bar{R}^2$	obs.	α_0	α_l	$\bar{R}^2$	obs.
Australia	0.75	0.74	0.56	188	0.82	0.79	0.75	189
	(0.10)	(0.07)			(0.08)	(0.05)		
Belgium	0.52	0.60	0.54	108	0.77	0.77	0.67	129
	(0.06)	(0.11)			(0.10)	(0.07)		
Canada	0.45	0.70	0.53	189	0.62	0.85	0.6	189
	(0.05)	(0.08)			(0.07)	(0.07)		
Germany	0.34	0.73	0.7	162	0.21	0.57	0.38	162
	(0.04)	(0.05)			(0.04)	(0.09)		
Italy	0.01	0.39	0.46	170	0.20	0.81	0.84	170
	(0.03)	(0.07)			(0.02)	(0.06)		
Netherlands	-0.04	0.05	0.01	189	0.35	0.85	0.15	189
	(0.07)	(0.14)			(0.20)	(0.21)		
Portugal	-0.01	0.01	0.28	118	0.08	0.21	0.14	118
	(0.02)	(0.25)			(0.05)	(0.30)		
Spain	0.15	0.49	0.44	159	0.50	0.72	0.46	159
	(0.04)	(0.08)			(0.16)	(0.08)		
UK	0.17	0.62	0.17	109	0.16	0.55	0.27	188
	(0.07)	(0.20)			(0.05)	(0.17)		
US	0.59	0.90	0.68	189	0.72	0.95	0.82	189
	(0.10)	(0.06)			(0.04)	(0.04)		

Notes: Standard errors in parenthesis. Standard errors for α_l are calculated with the delta method.

Table 2: Volatility Linkages

	Deposit Rates						Lending Rates					
	λ_1		λ_2		$\bar{R}^2$	obs	λ_1		λ_2		$\bar{R}^2$	obs
Australia	0.18	**	0.08		0.04	187	0.33	***	0.22	**	0.24	188
	(0.08)		(0.06)				(0.08)		(0.08)			
Belgium	-0.02		0.14		0.00	107	0.06		0.10		0.01	128
	(0.05)		(0.10)				(0.06)		(0.09)			
Canada	0.24	***	0.12		0.15	188	0.43	**	0.12		0.32	188
	(0.06)		(0.08)				(0.06)		(0.07)			
Germany	0.23	**	0.19	**	0.07	161	0.00		-0.05		-0.01	161
	(0.09)		(0.08)				(0.17)		(0.08)			
Italy	0.08	***	0.16	**	0.11	169	0.07	***	0.22	***	0.17	169
	(0.02)		(0.08)				(0.02)		(0.07)			
Netherlands	-0.08		0.03		-0.01	188	0.57		0.09		0.02	188
	(0.24)		(0.07)				(0.34)		(0.07)			
Portugal	0.17	**	-0.10		0.07	56	0.38		0.00		0.02	56
	(0.07)		(0.13)				(0.23)		(0.14)			
Spain	-0.02		0.20	**	0.03	158	0.27	***	0.32	***	0.20	158
	(0.03)		(0.08)				(0.09)		(0.08)			
UK	-0.02		0.44	***	0.10	108	0.03		0.28	***	0.08	187
	(0.07)		(0.12)				(0.04)		(0.07)			
US	0.87	**	0.07		0.04	188	0.56	***	0.20	***	0.09	188
	(0.32)		(0.08)				(0.23)		(0.08)			

Notes: Standard errors in parenthesis. ***(**)[*] stands for 1% (5%) [10%] significant.