Economic Modelling 26 (2009) 40–46

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/econbase

Financial systems and the cost channel transmission of monetary policy shocks ☆

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ARTICLE INFO

Article history:
Accepted 16 May 2008

JEL classification:
E40
E50

Keywords:
Financial systems
Interest rate pass-through
Cost channel

ABSTRACT

We study the role of financial systems for the cost channel transmission of monetary policy in a calibrated business cycle model. We characterize financial systems by the share of bank-dependent firms and by the degree of the pass-through from policy to bank lending rates, for which we provide empirical estimates for the euro area and the US. For plausible calibrations of the dynamics of the lending rate we find that the cost effects directly related to interest rate movements have only a limited effect on the transmission mechanism.

1. Introduction

According to the cost channel transmission of monetary policy, firms have to borrow working capital to finance production (see Barth and Ramey, 2001). As a consequence, the nominal interest rate enters the cost function of the firm and influences production plans, price-setting behavior, and ultimately, output and the inflation rate at an aggregate level. Thus, in addition to the traditional aggregate demand channel monetary policy exerts an effect on the economy via the cost-side. Although a monetary contraction, for instance, lowers the inflation rate through a reduction in aggregate demand, borrowing costs increase due to higher interest rates. Since firms take the increase in borrowing costs into account when setting prices, a counteracting effect on the inflation rate is introduced. It follows that the price response is dampened by the presence of a cost channel and the real effects of monetary policy are amplified. Ravenna and Walsh (2006) argue that the presence of a cost channel has important consequences for optimal monetary policy. If a cost channel exists, any shock to the economy generates a trade-off for the monetary authority. Thus, the scope for macroeconomic stabilization policy appears to be relatively limited in the presence of sizeable cost channel effects.

Empirical evidence for the cost channel is mixed. Gaiotti and Secchi (2006) and Dedola and Lippi (2005) report evidence in favor of cost channel effects based on firm and industry-level data. Using aggregate data, Tillmann (2006) finds that the cost channel adds to the explanation of inflation dynamics, especially during high inflation episodes. Rabanal (2003), in contrast, does not find a significant cost channel neither in the euro area nor in the US.

In this paper we use a calibrated sticky price model to analyze the role of financial system characteristics for the cost channel transmission of monetary policy shocks. We capture differences in financial systems by varying the share of firms which depend on banks to obtain finance for working capital and by varying the degree of the pass-through from policy to retail interest rates, i.e. the degree of interest rate smoothing.

Several studies document, that retail interest rates evolve relatively smoothly as compared to market interest rates (see e.g. De Bondt and Mojon, 2005; Sander and Kleimeier, 2004; De Bondt, 2005; Mojon, 2000; Cottarelli and Kourelis, 1994). Put differently, the pass-through from market interest rates to retail interest rates is limited. A potential explanation for this empirical result is that banks with close ties to their customers may offer implicit interest rate insurance (Berger and Udell, 1992). That is, banks charge relatively low rates during periods of a monetary tightening, or periods of high market rates more generally, and vice versa. Moreover, since this type of liquidity smoothing is typical for bank-based financial systems, in which close customer relationships develop over time (see Allen and Gale, 2000), it appears conceivable that the degree of interest rate pass-through and hence the strength of the cost channel vary across financial systems. Our contribution is to assess the role of the cost channel in a model that incorporates this limited interest rate pass-through documented in the literature.

As a first step in our analysis, we estimate the interest rate pass-through in the euro area and the US and find that the pass-through from money market to corporate lending rates is indeed faster and more complete in the US. Hence, we confirm the conventional wisdom

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doi:10.1016/j.econmod.2008.05.002

Table 1
Interest rate pass through (τ_0) and persistence of the lending rates (τ_1)

	BE	DE	ES	FI	FR	IR	IT	NL	PT	EA low	EA high	US
τ_0	0.75	0.31	0.70	0.26	0.27	0.56	0.60	0.72	0.19	0.24	0.66	0.95
	(0.04)	(0.06)	(0.10)	(0.02)	(0.03)	(0.02)	(0.06)	(0.13)	(0.08)	(0.07)	(0.06)	(0.04)
τ_1	0.11	0.47	0.24	0.51	0.14	0.18	0.45	0.22	0.27	0.34	0.29	0.03
	(0.04)	(0.08)	(0.09)	(0.05)	(0.08)	(0.04)	(0.07)	(0.11)	(0.14)	(0.09)	(0.06)	(0.04)
τ_2	0.02	−0.01	−0.03	0.00	0.05	−0.01	−0.11	0.02	0.25	0.05	−0.02	−0.06
	(0.03)	(0.03)	(0.06)	(0.01)	(0.05)	(0.04)	(0.07)	(0.07)	(0.15)	(0.04)	(0.04)	(0.03)
Adj R^2	0.88	0.56	0.60	0.85	0.54	0.91	0.75	0.74	0.20	0.37	0.70	0.94
Obs	61	54	53	53	59	53	56	36	41	207	206	61

Notes: Coefficients obtained from OLS and panel regressions of the change in the lending rate on the change in the money market rate and the lagged change in the lending rate. Standard errors in brackets. The columns labeled EA low (Finland, France, Germany, Portugal) and EA high (Belgium, Italy, Netherlands, Spain) show the results of panel regressions. For the panel regressions, White standard errors are reported.

that the degree of interest rate pass-through differs between bank-based and market-based financial systems. In the second step of our analysis, we use the model to investigate whether these differences in the pass-through processes give rise to sizeable differences in the strength of the cost channel. To do so, we calibrate the model according to the empirical estimates. Our simulations indicate that cost effects associated with monetary policy shocks play a relatively small role in the transmission mechanism once we take financial system characteristics into account. The aggregate demand channel turns out to be substantially more relevant. Moreover, we also find that cost effects should be largely symmetric across financial systems.

In our analysis we isolate the direct cost effects associated with changes in market and retail interest rates. Nevertheless, additional non-interest cost effects might be at work. If, for instance, banks ration the amount of credit they provide by tightening lending standards in response to a monetary contraction, then the lending rate may not fully reflect the cost of working capital. In such a case, monetary policy may exert additional supply side effects beyond those present in our model. This point is also emphasized in Chowdhury et al. (2006) who present empirical estimates based on New Keynesian Phillips Curves for the G7 countries. They argue that their estimated coefficients are summary measures for financial frictions in a broad sense. In our analysis, we explicitly link the cost channel to interest rate pass-through and the relative importance of the banking sector.

Our paper is closely related to Hülsewig et al. (2006) who analyze the implications of a monopolistically competitive banking sector in the context of the cost channel. They find that banks mitigate the strength of the cost channel by sheltering firms from monetary policy which is consistent with our results.

The remainder of the paper is organized as follows. Section 2 describes the setup of the model. Empirical estimates of the interest rate pass-through are provided in Section 3. Section 4 discusses the calibration of the model and presents the simulation results. In Section 5 we relate our results to the existing literature. Section 6 summarizes and concludes the paper.

2. Model

Our analysis is based on a modified version of the standard New Keynesian business cycle model which currently is the workhorse model for the evaluation of monetary policy (see e.g., Woodford, 2003). Hence, the description will be brief.

2.1. Households

Households maximize their expected lifetime utility $E_0\sum_{t=0}^{\infty}\beta^t\left(\frac{C_t^{1-\sigma}}{1-\sigma}-\frac{L_t^{1+\eta}}{1+\eta}\right)$, where β is a discount factor, C_t is consumption of a composite good in period t, L_t denotes labor supply in period t. The composite consumption good, C_t, is a CES aggregate of the quantities of differentiated goods, $C_t(i)$, where $i\in(0,1): C_t = \left(\int_0^1 C_t(i)^{\frac{\epsilon-1}{\epsilon}}di\right)^{\frac{\epsilon}{\epsilon-1}}$. The associated aggregate price index is $P_t = \left(\int_0^1 P_t(i)^{1-\epsilon}di\right)^{\frac{1}{\epsilon-1}}$, where $P_t(i)$ denotes the price of good i.

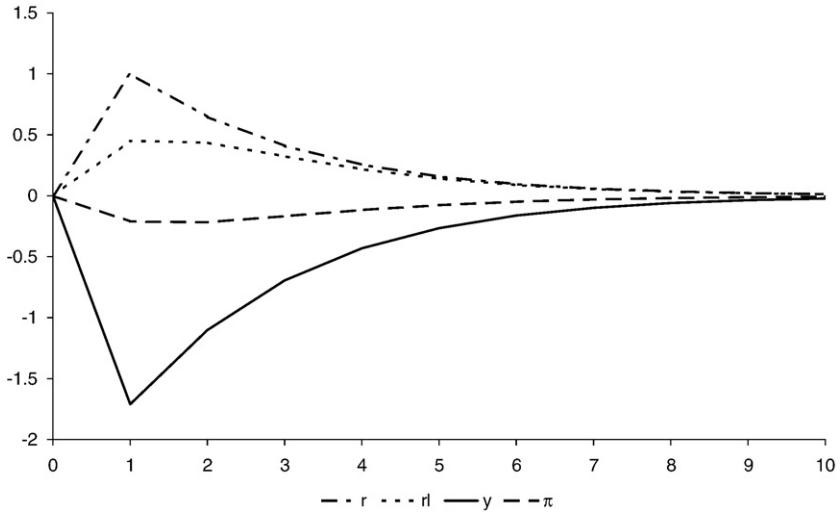

Fig. 1. Impulse responses generated by the model calibrated to match euro area financial system characteristics.