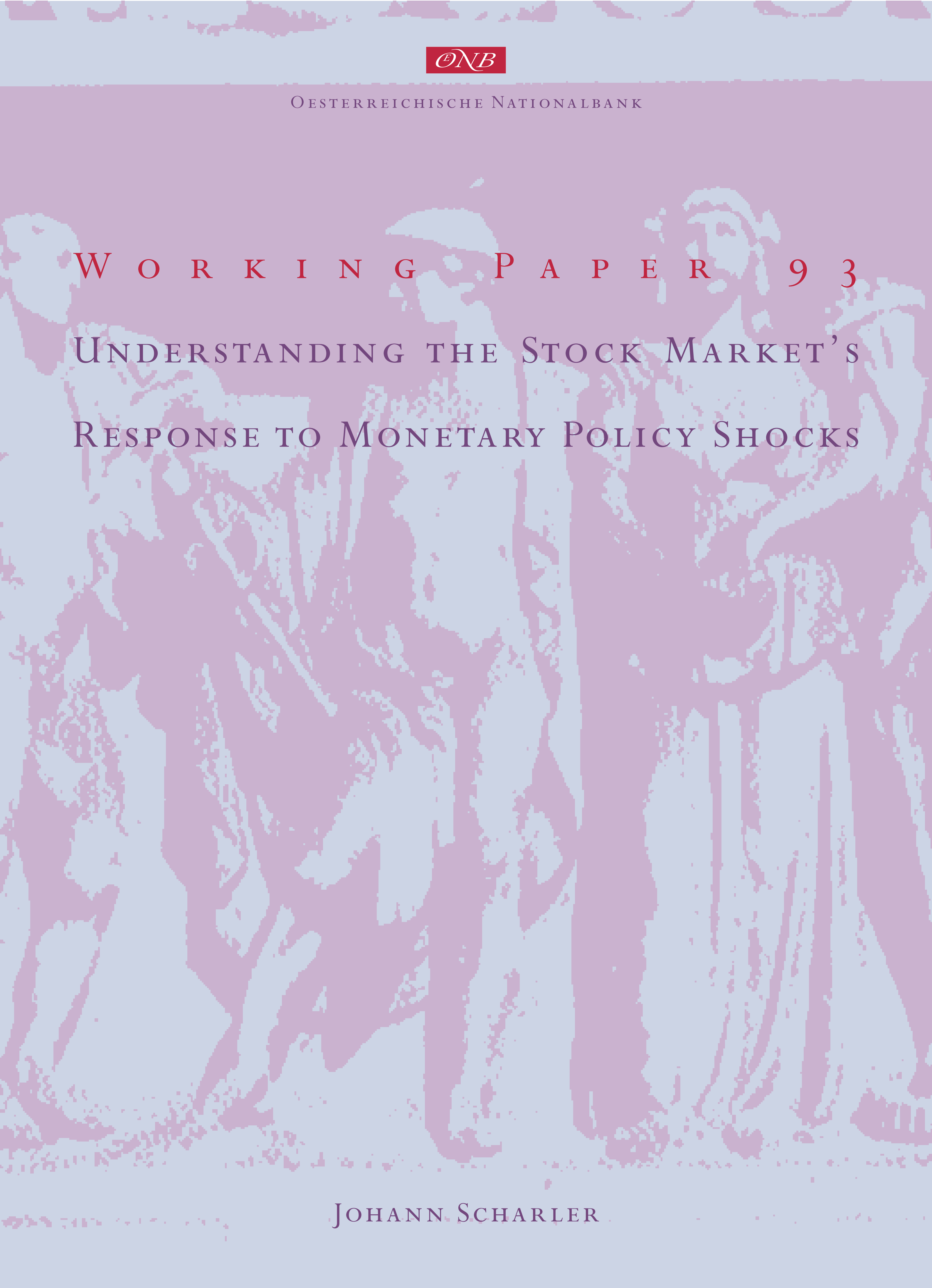

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Understanding the Stock Market's Response to Monetary Policy Shocks

Johann Scharler

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Editorial

In this paper, the author explores whether a limited participation model of the monetary transmission mechanism can account for the observed response of stock market returns to monetary policy shocks. It is found that the model generates responses that broadly match the empirical counterparts, although the magnitudes are somewhat too small. Moreover, the results suggest that the increased exposure of bank-dependent firms to liquidity shocks cannot fully account for the heterogenous responses of returns that are observed across firms.

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Understanding the Stock Market's Response to Monetary Policy Shocks*

Johann Scharler†

November 2004

Abstract

This paper explores whether a limited participation model of the monetary transmission mechanism can account for the observed response of stock market returns to monetary policy shocks. It is found that the model generates responses that broadly match the empirical counterparts, although the magnitudes are somewhat too small. Moreover, the results suggest that the increased exposure of bank-dependent firms to liquidity shocks cannot fully account for the heterogenous responses of returns that are observed across firms.

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1 Introduction

Although not without controversy, empirical evidence suggests that monetary policy influences real economic activity and asset prices in a systematic manner.[1] However, the theoretical links are not well understood. The purpose of this paper is to study the transmission of monetary policy shocks into stock market returns in a dynamic general equilibrium model. In particular, a variant of the limited participation model in Christiano et al. (1997) is analyzed to answer two questions: First, can the friction introduced via the limited participation assumption and the resulting monetary non-neutrality generate responses of stock market returns to monetary policy shocks that are consistent with the data. And second, can the model replicate the heterogenous responses of the returns on small and large firms documented in the empirical literature, where firm size is usually interpreted as a proxy for financial market access.

Gertler and Gilchrist (1994) argue that small firms are more strongly affected by monetary policy shocks since they are likely to be relatively more constrained in financial markets. Ehrmann and Fratzscher (2004), Perez-Quiros and Timmermann (2000) and Thorbecke (1997) show that monetary policy exerts a more important effect on the returns of small firms. These results are interpreted as evidence in favor of the hypothesis that financial market imperfections and in particular the access to credit are important elements of the monetary transmission mechanism.

Macroeconomic theory offers basically two complementary views on how financial factors influence the business cycle, namely the bank lending channel and the credit channel. The credit channel emphasizes borrower's balance

[1]See among others, Bernanke and Kuttner (2004), Rigobon and Sack (2002), Lastrapes (1998) and Thorbecke (1997).

sheet positions and net worth, whereas the bank lending channel focuses on the special role of the banking sector. A distinction that has implications for the monetary transmission mechanism.[2] However, empirically it has proven hard to distinguish between the credit view and the bank lending view as the relevant financial friction.

This paper studies whether the bank-lending view can account for the observed heterogeneity of the responses to policy shocks across firms. For this purpose the model in Christiano et al. (1997) is modified such that it is consistent with the main characteristics of the bank lending channel as emphasized by Kashyap and Stein (1994): Some firms in the economy are dependent on bank loans as a source of external finance, banks cannot easily compensate policy induced variations in reserves and money is non-neutral.

Hence, the simulations conducted in this paper can help to shed some light on the issue of whether the bank lending channel alone plays a relevant role for the variation in the responses of returns across firms.

The class of limited participation models appears to be a promising starting point since these models can be rather easily augmented to include the main features of the bank lending channel. Furthermore, as shown by Christiano et al. (1997) this class of models is in general rather successful in matching the results of the large empirical literature on the effects of monetary policy shocks.[3] In addition, limited participation models have been successfully used as a framework for the study of asset prices by Evans and Marshall (1998) and Jordá and Salyer (2003). Both these papers analyze the term structure of nominal interest rates.

In this paper, it is found that the asset pricing implications of the limited

[2]For a more detailed discussion, see Kashyap and Stein (1994).

[3]See Leeper et al. (1996) and Christiano et al. (1999) for extensive surveys of the empirical literature.

participation model studied here are fairly consistent with empirical regularities. However, the model generates stock return responses that are smaller in magnitude than their empirical counterparts. Moreover, it turns out that although the fact that some firms depend on bank loans as a source of external finance plays a substantial role, it cannot fully account for the heterogenous responses of returns across firms that are observed in the data.

The remainder of the paper is structured as follows: Section 2 describes the setup of the model. Section 3 discusses the calibration of the model and presents the results. Section 4 concludes the paper.

2 The model

This section presents a variant of the limited participation model in Christiano et al. (1997) modified to include the main features of the bank lending channel. In particular it is assumed that due to informational asymmetries the business sector of the model economy partly depends on bank loans. Moreover, an asset market is introduced, on which claims to the dividends of the firms are traded. As it is standard in the class of limited participation models, households must make a portfolio decision before the state of the world is revealed. The timing of events is as follows: At the beginning of the period households deposit funds at the financial intermediaries. After the monetary policy shock is realized and the state of the world is revealed, all other decisions are made. In particular, firms hire workers and households supply labor and consume. Furthermore, households can rebalance their portfolios by using the funds deposited at the intermediaries to buy stocks. It is important to note that funds that have been deposited at the beginning of the period can only be exchanged for stocks and not for consumption goods in the current period. Therefore the rigidity that is necessary for the liquidity effect is still in place, although households can adjust their asset holdings. At the end of the period, firms repay loans to the financial intermediaries and distribute profits in the form of dividends. Financial intermediaries repay deposits and make interest payments to the households.

2.1 Firms

The business sector of the economy consists of a continuum of firms normalized to have unit mass. The firms produce a homogenous consumption good and are of two types, depending on whether their output is subject to idiosyncratic shocks. Each firm i hires labor, H_{it}, and produces output according to:

$$Y_{it} = \theta_i H_{it}^{1-\alpha}, \tag{1}$$

were $\alpha \in (0,1)$. The parameter θ_i represents an idiosyncratic shock, in particular

$$\theta_i = \begin{cases} 1 & \text{with probability} \quad \pi \\ 0 & \text{with probability} \quad 1-\pi \end{cases}$$

for $i \in [0,\lambda]$ and $\theta_i = 1$ for $i \in [\lambda, 1]$. Hence, firms in the interval $[0,\lambda]$ can only repay their debt with probability π. In case of default, firms can walk away from their obligations. Moreover, the realizations of θ_i are not publicly observable for $i \in [0,\lambda]$. In this setup only the financial intermediaries have access to a monitoring technology that allows verification of the realizations of θ_i. Due to the assumption that labor is paid in advance of production, firms have to borrow working capital in order to finance the wage bill. In principle, each firm has two sources of credit. They can either issue nominal bonds which are sold directly to the households and are redeemed at the end of the period, or they can enter into debt contracts with a financial intermediary. However, since the realizations of the idiosyncratic shocks are not public knowledge, firms in the interval $[0, \lambda]$ have an incentive to misreport their output and default on bonds owned by households. Consequently, these firms will not be able to issue bonds in the first place and will be forced to borrow from the financial intermediaries instead. Let R_t^L denote the interest rate charged on bank loans. Since all borrowing and hiring decisions are made after the monetary shock has occurred, optimality requires:

$$R_t^L \frac{W_t}{P_t} = (1-\alpha) H_{it}^{-\alpha}, \tag{2}$$

for $i \in [0, \lambda]$, where W_t is the nominal wage and P_t denotes the price level.

For firms in the interval $i \in [\lambda, 1]$, the fact that $\theta_i = 1$ is common knowledge, therefore debt contracts do not involve any default risk. Hence, these firms are able to sell bonds directly to the households without the need for a financial intermediary. The interest rate on directly placed debt is denoted by R_t^B. Assuming that $R_t^L > R_t^B$, the optimal amount of bonds to be issued is determined by

$$R_t^B \frac{W_t}{P_t} = (1-\alpha) H_{it}^{-\alpha}, \tag{3}$$

for $i \in [\lambda, 1]$.[4] At the end of the period loans and bonds are repaid and profits are distributed to the households, conditional on the realization of the idiosyncratic shock.

2.2 Households

Households maximize their expected lifetime utility

$$E_0 \sum_{t=0}^{\infty} \beta^t u(C_t, L_t), \tag{4}$$

where β is a discount factor, C_t is consumption in period t, L_t denotes labor supply in period t, and

$$u(C_t, L_t) = \log \left[C_t - \frac{\psi_0}{1+\psi} L_t^{1+\psi} \right], \tag{5}$$

[4]Note that $R_t^L > R_t^B$ will always be satisfied in equilibrium.

$\psi, \psi_0 > 0$. This specification of the period utility function has the property that the household's labor supply function has a constant real wage elasticity of $1/\psi$.

At the beginning of each period households hold the entire stock of money, M_{t-1}, and must decide how much money to use for consumption in the current period, for deposits at the financial intermediaries, A_t, and for purchases of bonds, B_t, issued by firms. Deposits yield a gross interest rate of R_t^D. Interest rates are determined after the state of the world is revealed. Households supply L_t units of labor at a nominal wage of W_t. Labor income, $L_t W_t$, can be used for contemporaneous purchases in the goods market. Hence, the households face the following cash-in-advance constraint:

$$P_t C_t \leq M_{t-1} - A_t - B_t + W_t L_t. \tag{6}$$

After the state of the world is revealed, households can adjust their portfolio by using the funds deposited at the beginning of the period to buy stocks. They face the following constraint in the asset market:

$$S_{1t} q_{1t} + S_{2t} q_{2t} + A_t = N_t + S_{1t-1} q_{1t} + S_{2t-1} q_{2t}, \tag{7}$$

where S_{it-1}, $i = 1, 2$ are stock holdings of bank-dependent ($i = 1$) and bond-financed ($i = 2$) firms, carried over from period $t-1$ and q_{it} denote stock prices in nominal terms. Note that since households can not verify the realizations of the idiosyncratic shocks, households can not enforce dividend payments. Hence, it is assumed that the stock portfolios are managed by financial intermediaries on behave of the households, since the financial intermediaries can monitor the firms and enforce payments. Funds that are left with the financial intermediary are denoted by N_t. The amount of money the households carry over into the next period is

$$M_t = W_t L_t + M_{t-1} - N_t - B_t - P_t C_t + R_t^A (N_t + X_t) + R_t^B B_t +$$

$$+q_{1t}(S_{1t-1} - S_{1t}) + S_{1t}D_{1t} + q_{2t}(S_{2t-1} - S_{2t}) + S_{2t}D_{2t}, \qquad (8)$$

where D_{it} are current period profits distributed as dividends at the end of period t and X_t represents a cash injection by the central bank.

The household solves the dynamic programming problem:

$$V\left(\frac{M_{t-1}}{P_t}, S_{it-1}\right) = \max_{A_t} E_{t-1}\left\{\max_{C_t,L_t,N_t,M_t,S_{it}} \left[u(C_t, L_t) + \beta E_t V\left(\frac{M_t}{P_{t+1}}, S_{it}\right)\right]\right\} \qquad (9)$$

subject to (6), (7) and (8). The optimal solution to this maximization problem must satisfy the transversality condition:

$$\lim_{k\to\infty} u_{c,t+k} q_{it+k} S_{it+k} = 0, \qquad (10)$$

for $i = 1, 2$. Moreover, the necessary conditions associated with this maximization problem are:

$$\beta E_{t-1}\left(R_t^A \frac{u_{c,t+1}}{P_{t+1}}\right) = E_{t-1}\left(\frac{u_{c,t}}{P_t}\right), \qquad (11)$$

$$\beta E_{t-1}\left(R_t^B \frac{u_{c,t+1}}{P_{t+1}}\right) = E_{t-1}\left(\frac{u_{c,t}}{P_t}\right), \qquad (12)$$

$$\frac{W_t}{P_t} = \frac{u_{L,t}}{u_{c,t}}, \qquad (13)$$

$$\beta E_t\left(\frac{u_{c,t+2}}{P_{t+2}} q_{it+1} R_{t+1}^A\right) = E_t\left(\frac{u_{c,t+1}}{P_{t+1}}\right)(q_{it}R_t^A - D_{it}). \qquad (14)$$

Equations (11) and (12) determine optimal deposits and bond holdings. Note that these decisions are made prior to the realization of the period t money growth rate therefore the expectations are taken with respect to information available in period $t-1$. According to (13) households equate their marginal rates of substitution between labor and leisure to the real wage when making their labor supply decisions. In contrast to (11) and (12), the expectation in

(14) is taken with respect to period t information since the stock market is assumed to open after the period t shock has been realized. The right hand side of (14) shows the utility cost of increasing stock holdings in period t. Buying one additional stock reduces the amount of money that can be used for consumption in $t+1$ by $R_t^A q_t$. However, since dividends are paid at the end of the period, they can be used for consumption in the next period and are therefore subtracted. If the additional shares purchased in t are sold in $t+1$ the funds can be deposited and will earn interest. Thus consumption in $t+2$ is increased by $q_{it+1}R_{t+1}^A/P_{t+2}$. It follows that the stock price is affected by four factors: current and expected dividends, the deposit rate, which influences the opportunity cost of buying shares, the expected inflation rate and the marginal utility of consumption.

2.3 Financial Intermediaries

The financial intermediaries can eliminate idiosyncratic default risk by lending to an infinite number of borrowers.[5] At the beginning of the period, financial intermediaries receive deposits from the households and cash injections from the monetary authority. The total amount of loanable funds, $N_t + X_t$, is used to provide loans to firms which cannot borrow from households directly. In contrast to households, financial intermediaries can observe the realization of idiosyncratic shocks and are therefore able to enforce debt contracts. For simplicity, it is assumed that financial intermediation and monitoring are costless and competitive. At the end of the period, the financial intermediaries receive payments from their solvent borrowers and return deposits with interest to the household. The remaining profits are paid to the households as dividends.

[5] See Diamond (1984).

The objective of the financial intermediary is to choose the optimal amount of loans such that the expected present value of the dividend stream is maximized. The dividend is given by

$$F_t = \pi(N_t + X_t)R_t^L - (N_t + X_t)R_t^A. \tag{15}$$

Free entry into the banking sector ensures that $R_t^A = \pi R_t^L$ and that $F_t = R_t^A X_t$ will be paid to the households in form of dividends.

2.4 Monetary Authority

The monetary authority provides liquidity to the financial sector of the economy. The monetary growth rate is defined as: $x_t = \frac{X_t}{M_{t-1}}$. The money supply process is assumed to be exogenous and the monetary growth rate follows a three-state Markov process. In particular, let $x_t \in \{\mu + \sigma, \mu, \mu - \sigma\}$ and let $\delta_{ij} = Prob(x_{t+1} = x_j | x_t = x_i)$ where $\delta_{ij} = \bar{\delta}$ for $i = j$ and $\delta_{ij} = (1 - \bar{\delta})/2$ for $i \neq j$. This specification implies that $E(x_t) = \mu$, $Var(x_t) = \frac{2}{3}\sigma^2$ and the first order autocorrelation of the money growth process is given by $Corr(x_t, x_{t-1}) = (3\bar{\delta} - 1)/2$.

2.5 Equilibrium

A stationary competitive equilibrium for the model economy is characterized by stochastic sequences of allocations $\{C_t, H_{it}, M_t, N_t, B_t, S_{it}\}_{t=0}^{\infty}$, $i = 1, 2$, prices $\{R_t^D, R_t^L, R_t^B, q_{it}, P_t, W_t\}_{t=0}^{\infty}$, $i = 1, 2$, and monetary growth rates $\{x_t\}_{t=0}^{\infty}$ such that: (i) The household's necessary conditions (11), (12), (13), the constraints (6), (8) and the transversality conditions in (10) are satisfied. (ii) The necessary conditions that determine optimal borrowing for bank-dependent firms (2), and for bond-issuing firms (3) hold. (iii) The markets for labor, goods, loans, bonds and stocks clear:

$$L_t = \int_0^1 H_{it} di, \quad C_t = \int_0^1 H_{it}^{1-\alpha} di,$$

$$N_t + X_t = W_t \int_0^{\lambda} H_{it} di, \quad B_t = W_t \int_{\lambda}^{1} H_{it} di,$$

$$S_{1t} = S_1, \quad S_{2t} = S_2.$$

Note that the number of shares is assumed to be constant at S_1 and S_2.

3 Calibration and Results

3.1 Parameter values

The model is calibrated to monthly US data to facilitate comparability with the empirical literature. As it is standard in the literature, the discount factor is set to $\beta = (1.03)^{-1/12}$. For the labor supply elasticity, $1/\psi$, a value of unity is chosen and ψ_0 is set to 1.5 which implies that labor supply is equal to unity in the steady state as in Christiano et al. (1997). The parameter α in the production function is set to 0.36. Cecchetti (2001) reports that bank loans account for 21 percent of a forms of finance in the US. Hence, λ is set to 0.21.[6] The default probability, $1-\pi$, is set to one percent which is close to the values chosen by Cooley and Nam (1998) and by Carlstrom and Fuerst (1997) who set this parameter to 2 percent and 0.974 percent respectively.

Monetary policy is parameterized according to Evans and Marshall (1998). The unconditional monetary growth rate is set to $\mu = 0.00667$ and for σ the value 0.0015 is chosen, which implies that an unanticipated decline in the monetary growth rate from μ to $\mu - \sigma$, is equivalent to a one standard deviation shock in the monetary growth process estimated by Evans and Marshall (1998). The first order autocorrelation of the process is set to zero. The calibration of the model is summarized in Table 1.

[6] Note that the fraction of bank-dependent firms does not necessarily correspond exactly to bank loans as a fraction of all finance. However, in the model, the difference is quantitatively negligible.

3.2 Results

All results are reported as the impact response of the variable under consideration to a reduction in the monetary growth rate from μ to $\mu - \sigma$. For the macroeconomic variables in the model the responses are reported as percentage changes and for returns as percentage point changes, where returns are calculated as $ret_{it} = (q_{it} + D_{it})/q_{it-1}$, $i = 1, 2$. The return on the market as a whole is calculated as a weighted average of ret_{1t} and ret_{2t}. Real returns are obtained by subtracting the ex-post inflation rate from nominal returns.

Results for macroeconomic variables are reported in Table 2. A monetary contraction induces an increase in the bank lending rate due to the liquidity effect and also a slight increase in the bond yield. The higher interest rates lead to an increase in the cost of working capital and consequently firms reduce the amount of labor they hire. Thus output declines by 0.04 percent. Moreover, the price level declines by around 0.1 percent. Overall these responses are similar to those reported in the literature.[7]

Table 3 shows the responses of financial variables in the model. The nominal returns on the stocks of bank-dependent and bond-financed firms decline by 0.58 and 0.52 percentage points in response to a monetary contraction. The return on the overall market declines by 0.53 percentage points.

Intuitively, the monetary shock leads to a higher lending rate which makes working capital more costly for bank-dependent firms, implying a lower dividend. The bond yield increases only marginally therefore the shock has only a small effect on bond-financed firms. Furthermore, the higher deposit rate increases the opportunity cost of holding stocks for the households. In sum, these effects have a negative impact on the price of a stock. However, it turns out that changes in the deposit rate are rather large in this model,

[7] See for instance Christiano et al. (1997) or Evans and Marshall (1998).

since liquidity shocks have to be absorbed by a relatively small fraction of the business sector of the economy. Hence, the deposit rate along with the corporate lending rate has to react substantially. However, changes in the deposit rate affect the stock prices of bank-dependent and bond-financed firms symmetrically, therefore the higher variability in the dividend stream of bank-financed firms does not add much in terms of the relative response of bank-dependent firms.

Ultimately, the goal of the paper is to determine whether monetary shocks affect stock returns in accordance with the empirical evidence. Thorbecke (1997) presents evidence from a structural VAR and finds that monthly stock returns decline by 0.8 percentage points on average in response to a monetary policy shock. Moreover, results for size portfolios indicate that monetary policy has a more pronounced effect on the return on small firms, whereas for large firms, the effect is smaller. In particular, the impact of a monetary policy shock on the returns on the smallest firms is about 30 to 60 percent stronger than for larger firms in the sample. Similarly, Ehrmann and Fratzscher (2004) report that financially constrained firms react by approximately 60 percent stronger to monetary policy shocks than unconstrained firms.

Comparing these empirical findings to the results in Table 3 shows that the model generates responses which are similar to the empirical counterparts, although the magnitudes are somewhat too small. However, it has proved hard for monetary and non-monetary asset pricing models to account for the observed high variability of stock returns. The limited participation model considered here manages to generate responses with magnitudes that are substantially closer to what is observed in the data than other models.[8]

[8] For instance, Marshall (1992) finds that the response of real returns to a money shock in his model is about ten times smaller than in the data.

The model also suggests that bank-dependent firms react by more than bond-financed firms to policy shocks. In the model, the return on stocks of bank-dependent firms reacts about 11 percent stronger than the return on the stocks of bond-financed firms which is smaller than what Thorbecke (1997) and Ehrmann and Fratzscher (2004) find in the data. Thus, it appears that the bank lending channel can only account for part of the variation of stock returns observed in the data.

Some additional insights can be gained by comparing the impact responses for different financial structure parameters. Table 4 displays the impact responses of nominal returns for different values of λ. Clearly, increasing the fraction of bank-dependent firms results in larger relative responses. This occurs because a higher fraction of bank-dependent firms implies that a larger part of the economy is subject to liquidity shocks. Hence, liquidity shocks become relatively less important at the level of the individual firm which also means that the lending rate does not have to react by as much as in the benchmark case. Thus, the response of dividends becomes a more important determinant of the return responses. And since the dividends of bank-dependent firms are more closely related to policy shocks, the relative impact on the return on bank-dependent firms increases. However, at the same time the response of the overall return on stocks declines with an increase in λ.

Another interesting result concerns the correlation of real stock returns and inflation. As can be seen from Tables 2 and 3 that the short run dynamics of the price level and real stock returns are in opposite directions. Hence, the model suggests that stocks are a hedge against inflation. This result is in contrast to the negative correlation between ex-post real stock returns and inflation that is documented in the empirical literature.[9] One conclusion that can be drawn from this result is that the observed negative correlation is due to the price level effects of real shocks and cannot be attributed to monetary shocks.

4 Concluding Remarks

This paper investigates the reaction of stock market returns to monetary shocks in a general equilibrium model. In the model, the transmission of monetary policy shocks into stock prices works primarily through changes in current and expected interest rates and dividends. A monetary contraction leads to higher nominal interest rates, which in turn increase the opportunity cost of holding stocks and at the same time decreases dividend payments since firms have to borrow working capital. Both these effects put downward pressure on stock prices.

In the model, monetary policy shocks have a substantial impact on the stock market. However, the responses generated by the model are somewhat smaller than in the data. Hence, the limited participation assumption does not generate enough monetary non-neutrality to fully account for the response of stock returns that is observed empirically.

The model also suggests that the returns on bank-dependent firms react stronger to policy induced liquidity shocks, which is consistent with empirical evidence. Nevertheless, the relative impact on the return on the stocks of bank-dependent firms as compared to bond-financed firms is smaller than in the data. Hence, additional financial frictions are likely to play a role in this context. This appears to be an interesting result since empirically it has proven hard to isolate the effects of the bank lending channel as opposed

[9] See Giovannini and Labadie (1991) and the references therein.

to the credit channel. However, the analysis presented in this paper points towards a non-negligible role for frictions beyond the bank lending channel. Thus, exploring the link between monetary policy shocks and asset prices in models that contain a credit channel appears to be an interesting topic for future research.

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Table 1: Calibration

Preferences and Technology			
β	ψ	ψ_0	α
$(1.03)^{-(1/12)}$	1	1.5	0.36
Financial Structure			
λ		π	
0.2		0.99	
Monetary Policy			
μ	σ	$\bar{\delta}$	
0.00667	0.0015	0	

Table 2: Impact Responses of macroeconomic variables to a monetary contraction

dc	dp	drl	drb
-0.041	-0.108	0.446	0.002

Notes to Table 2: Impact responses are reported as $dz = log(z'/z) * 100$, where z' denotes the value of a variable in state $(\mu, \mu - \sigma)$ and z denotes the value in state (μ, μ). Interest rate responses are reported as percentage point changes.

Table 3: Impact Responses of financial variables to a monetary contraction

Nominal Returns			
$\mathrm{d}ret_1$	$\mathrm{d}ret_2$	$\mathrm{d}ret$	$dret_1/dret_2$
-0.569	-0.510	-0.522	1.116

Real Returns			
$\mathrm{d}ret_1$	$\mathrm{d}ret_2$	$\mathrm{d}ret$	$dret_1/dret_2$
-0.461	-0.401	-0.413	1.147

Notes to Table 3: Impact responses are reported as percentage point differences. Real returns are calculated by subtracting the ex-post inflation rate from the nominal return.

Table 4: Impact Responses of nominal returns for different financial structures

λ	$dret_1$	$dret_2$	$dret$	$dret_1/dret_2$
0.3	-0.428	-0.355	-0.377	1.203
0.4	-0.361	-0.273	-0.308	1.321
0.5	-0.326	-0.220	-0.273	1.482
0.6	-0.309	-0.181	-0.258	1.708

Notes to Table 4: Impact responses of returns are reported as percentage point differences.

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1) vergriffen (out of print)
2) In abgeänderter Form erschienen in Berichte und Studien Nr. 4/1990, S 74 ff
3) In abgeänderter Form erschienen in Berichte und Studien Nr. 4/1991, S 44 ff
4) In abgeänderter Form erschienen in Berichte und Studien Nr. 3/1991, S 39 ff
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