Monetary Policy Transmission in Transition Economies: The Bank Lending Channel*

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Abstract

In this paper we analyze the bank lending channel in ten Central and Eastern European countries. We provide a brief overview of the theory and the empirical approaches used to investigate the existence of bank lending channel. From the existing methods, we use the generally applied approach suggested by Kashyap and Stein (1995), which relies on discovering asymmetries in changes in the amount of loans due to monetary actions, in order to isolate supply and demand effects. We estimate the model by the Generalized Method of Moments, the asymmetric effects being captured by interaction-terms. We find significant asymmetric ajustement of loan quantities along certain bank characteristics. The existence of bank lending channel can explain these asymmetries. Based on our results, we can not, however, conclude for the existence of a bank lending channel in all the analyzed countries.

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1 Introduction

Understanding monetary policy is crucial. It provides answers to several policy questions: What is the appropriate monetary policy in different business cycle episodes? What should be the appropriate rule for monetary policy? What is the best instrument in order to attain the monetary policy goals?

On 1st May 2004, ten new member states joined the European Union: eight Central and Eastern European Countries (CEECs) (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia), along with Cyprus and Malta. Bulgaria and Romania became EU members in 2007. After joining the EU, new members must abide by the *acquis communautaire*, i.e. the same EU laws and rules that apply to the older members. The single currency project is part of these regulations. New EU member countries are expected to adopt the euro at some future date; some of them have already expressed their willingness to join the euro area as soon as possible. While Slovenia joined the euro area on 1st of January 2007, most of the new member states still fight to conform with the admission conditions concerning inflation, budget deficit, exchange rate stabilisation and legal compatibility. They have all postponed their entry into the euro area; Slovak Republic preserves its deadline - 2009; the demand of Lithuania has been rejected, as its inflation rate is too dubious; Estonia and Latvia postponed their plan of adopting the euro for the same reasons; the Baltic countries admitted the reduced probability of adopting the single currency before 2010. The remaining countries do not intend to adopt the euro before 2010-2012.

Various observers warn that the enlargement of the euro area may hamper the policies of the European Central Bank (ECB). Three conditions must be met for a common monetary policy to succeed, without causing frictions among the members of the monetary union (Guiso et al., 1999). First, members must agree on the ultimate goals of the common monetary policy; this was achieved by the Maastricht Treaty, which outlined price stability as the primary objective of the ECB. Second, a common monetary policy would be easier to implement if the business cycles of member states are aligned and if their inflation rates are similar; if several countries do not have synchronized business cycles or inflation rates, it is difficult to settle the appropriate monetary policy stance. Despite all this, reality shows that euro area countries present different inflation rates and output gaps. Third, monetary policy transmission mechanisms should operate in a similar fashion across members of the monetary union; differences in transmission mechanisms could make the appropriate size and timing of monetary policy decisions difficult to asses.

Considerable differences in the transmission mechanism exist among EMU

countries, mainly in intensity, but also in timing (Ehrmann, 1998). Many authors argue that monetary policy transmission differs substantially across EMU countries, due to differences in their financial structure. Cecchetti (1999) shows that monetary transmission mechanisms vary across eleven EU countries: the size, the concentration and the health of their banking systems are different. The future enlargement of the monetary union increases the heterogeneity of the financial structures in the euro area, so that ECB decisions in terms of monetary policy are likely to have a different impact across countries.

We consider all these aspects and we proceed to the analysis of monetary policy transmission mechanisms in transition economies. The large majority of studies in this area focus on the interest and exchange rate channel analysis, while little attention is paid to the bank lending channel. The main explanation is that financial innovation over the last decades casts doubt over the importance of the bank lending channel, as banks play a less important role in the credit markets. This aspect is valid in the context of developed economies, but it does not apply for transition countries where financial systems are mainly bank-based and borrowers do not have viable alternatives to bank loans as sources of financing. "Transition countries are over banked, but under serviced" (Hainz, 2004). We examine the bank lending channel of the monetary policy transmission. The existence of a lending channel depends on the existence of a connection between monetary shocks and bank loans as well as a connection between bank loans and real output (Driscoll, 2004).

The analysis of the differences in the monetary transmission in CEECs -both in the context of the forthcoming full euro-area participation of countries that have entered the EU in May 2004 (e.g. Slovenia - member of the euro area starting 2007) and in the context of the existing gap in the financial sector development relative to the euro area- is considered to be very important. Over the last decade, in CEECs, the banking sectors have undergone massive transformation processes, marked by numerous bank failures and the accumulation of huge amounts of non-performing loans (in the early phase of economic transition). They have witnessed, at the same time, the privatisation of a large number of state-owned banks, which contributed to the increasing efficiency of their banking sectors (Bonin and Wachtel, 2002; Weill, 2003).

In the present study we examine the existence of the bank lending channel in ten transition countries from Central and Eastern Europe. The bank lending channel theory emphasises the behaviour of financial intermediaries in affecting the quantity of loans; this, in essence, affects the real economy. It relies on discovering asymmetries in the behaviour of banks following a restrictive monetary policy.

We follow an approach similar to that of Kashyap and Stein (1995), according to which smaller/less capitalised/less liquid banks react strongly to monetary policy changes i.e. the lending of small/less capitalised/less liquid banks is more sensitive to monetary policy. We use disaggregated micro-level bank data on 242 commercial banks from Central and Eastern Europe, over the period of 1999 to 2005. A separate analysis, compiled for each country, does not lead to significant results. The period of analysis is short and the commercial banks of the sample might be heterogeneous. We form three groups of countries according to their progress in the banking reform. Afterwards, we proceed to an analysis of the banks in each group; this will help us to identify the possible differences in the behaviour of banks inside each group, following a restrictive monetary policy. We equally consider the fact that certain features, which are particular to each country, may have a potential influence on the behaviour of the banks. The results show little evidence concerning the existence of the bank lending channel in the entire sample of countries.

We make several contributions to the empirical literature. First, we proceed to an analysis that covers ten CEECs, whereas most previous research consists of country-specific studies (Wróbel and Pawlowska, 2002; Juks, 2004; Pruteanu, 2004; Havrylchyk and Jurzyk, 2005; Horváth, Kréko and Naszódi, 2006). To our knowledge, a similar analysis for these ten CEECs does not already exist. Second, we control for the cross-country heterogeneities and we obtain results that are consistent with the previous studies. Size turns out to play no role in the lending behaviour of banks. Liquidity and capitalisation explain in a standard manner (larger and more capitalised banks react less) bank lending behaviour following a monetary policy change in Poland and Estonia (for liquidity) and Latvia (for capitalisation). Our results for Poland, in terms of liquidity, are similar to those of Havrylchyk and Jurzyk (2005). At the same time, we find some counterintuitive results for liquidity in Latvia and for capitalisation in Romania and Poland. We explain them by the fact that higher liquidity and capitalisation might be an endogenous response from smaller banks to counterbalance their financing difficulties resulting from higher asymmetric information.

The remainder of the paper is organized as follows. In the next section we present the monetary framework of transition economies. Next, we present an overview of the debate on the lending view, both generally and in the context of transition economies; we will use this in order to emphasise our focus on the behaviour of different types of banks. The following section describes the theoretical and econometric model, as well as data used in the empirical work and the one after presents our empirical results. The final section concludes.

2 Monetary conditions in transition economies

In order to get an overall picture of the bank lending channel in the analysed countries, we present several stylised facts about their financial systems. We intend to show the existing differences in the monetary transmission mechanisms and the gap in the development of their financial sectors, compared to that of the euro area.

The financial sector role under socialism consisted in the fulfillment of the investment plan and financial requirements of the state enterprises and government budget, included in the credit plan. The central credit plan operated like a global directed credit scheme; interest rates were not a factor in the mobilisation and allocation of resources and much less in managing aggregate demand. Money was not a policy instrument, and therefore, most instruments of monetary policy found in market economies were not used (De Melo and Denizer, 1997). However, money and credit were important. The objective of price stability supposed the need to ensure a balance between money supply and output. This implies a split of the system into cash and non-cash sectors. Non-cash transactions between enterprises were accounting entries within the financial system, without any effect on money supply. Cash transactions were undertaken by households who received their wages in cash. A key condition for the equilibrium of the system was the equality between the wage bill and consumption goods, valued at administratively-fixed prices. If wages paid by the authorities exceeded expenditures on goods sold by state-owned enterprises, money was printed to finance the gap, which resulted in inflationary pressures.

The financial assets of households and enterprises were kept separately. Financial assets and liabilities of enterprises were held by commercial and sectoral banks, while household deposits were directed to Savings Bank. Financial institutions that implemented the central bank's credit plan were passive; they had no role in credit allocation. The basic legal, accounting and regulatory systems were not in place. These initial conditions explain the slow improvements in resource allocation from financial intermediation, in transition economies.

Even though the transition economies under analysis are different in starting conditions and details of the adopted policies, there are important similarities in their approach to stabilisation and disinflation. They all begin the transition process with distorted domestic prices, unrealistic exchange rates and open or repressed inflation. The initial objectives of the macroeconomic policies were to control inflation, a result of the freeing of their domestic prices. The nominal exchange rates were set at rates well below purchasing power parity, in order to make stabilisation credible; to facilitate reorientation of trade to the West; and

to support a liberal trade regime. Policymakers expected that domestic inflation would cause real exchange rate appreciation and lead to a more realistic exchange rate, as these countries came closer to joining the EU.

At the outset of transition, the collapse of Council for Mutual Economic Assistance (CMEA) trade determined a decline in production in all these countries. Fiscal policy suffered a serious burden, as tax revenues declined and the need for social safety due to the increased number of unemployed increased. Investment in plant and equipment decreased as excess capacity emerged in many industries, and this complicated the monetary policy. Many firms failed to respond to the new environment by reducing or altering their output; they accumulated large stocks of inventories and related debts that threatened their liquidity and that of their suppliers and newly created commercial banks.

Based on the speed of their policy response to the break from socialist central planning, transition countries can be classified in two groups: the "fast response" group that consists of most CEE countries (except Romania) and the Baltics; and the "slower response" group, formed by Romania and the non-Baltic FSU countries (De Melo and Denizer, 1997).

Countries from the first group developed a monetary policy framework relatively quickly as part of their strategy to transform their economy. Monetary or exchange rate targets were put in place within the first two years of transition, with the declared objective of price stability. Money and credit targets were designed, along with the imposition of hard budget constraints and enterprise reforms. Even though the objectives of this group were similar, the design of monetary polices differed (as indicated by the choice of a nominal anchor). Czech Republic, Poland and Estonia adopted stabilisation programs backed by IMF stand-by arrangements, based on fixed exchange rate regimes after large devaluations. Other CEE countries chose money as the main nominal anchor for their stabilisation programs; the maintenance of the fixed exchange rate would have been hard without rapid economic liberalisation and fiscal adjustment. The three Baltic countries moved to a monetary policy framework within the context of a fixed exchange rate regime. Estonia adopted a currency board-type arrangement. Latvia initially adopted a money-based stabilisation strategy and pegged its currency to the SDR from early 1994. In 1994, Lithuania adopted a currency board arrangement, pegging its exchange rate to the dollar.

The slow response of the 2nd group of countries was the consequence of institutional arrangements following the break-up of the FSU. Traditional monetary policy objectives were adopted only in 1993 and 1994. Many of these countries were slow reformers, attempting to maintain employment and production arrangements

with directed credits to unreformed industrial and agricultural enterprises. The introduction of a new currency to aid in stabilisation would have required a hard budget constraint on enterprises. The overall strategy of transition determined the evolution of their monetary policy.

What about their monetary policy framework today? The large majority of the considered economies adopted the monetary policy framework known as *inflation targeting* (Czech Republic, Hungary since 2001, Poland since 1999, Romania since 2005, Slovakia since 2005)[1]. Central banks of Bulgaria, Estonia, Latvia, Lithuania and Slovenia have not formally adopted the framework of inflation targeting but have been clearly influenced by this approach; in these countries, the primary objective announced by the central banks consists of price stability.

How did the banking sector development evolve in transition economies? They all made progresses, creating a banking system that corresponds to the need of a developed market economy; central banks have considerable independence from government influence to control inflation and maintain the international value of their currency. At the same time, the commercial banking sector remains relatively fragile, with reduced loans made in the past and questionable lending policies. When comparing the average of domestic credit to the private sector (in % of GDP) for CEECs with the euro area average, the last one is three times larger in 2005 (see Table (1)).

The weakness of the commercial banking sector and its reduced contribution in financing the investment activity of the corporate sector limit the policies that central banks may follow and may distort the transmission of monetary policy impulses to the economy.

The fragility of the commercial banking sector is deepened by the underdevelopment of other components of the capital market. Even though each of these countries has a stock exchange, share markets are thin and stock markets perform poorly. Insurance companies and mortgage lending are underdeveloped. The relative underdevelopment of their capital markets is obvious when comparing the market capitalisation of listed companies (in % of GDP) with the euro-area average (see Table (1)).

[1]Such a monetary policy framework has the advantage that its transparency can provide a boost to the credibility of macro policy. Moreover, it targets an important convergence criterion, whose value needs to be close to EU levels for a country to qualify for EMU membership (Masson, 1999).

Table 1: Financial development and inflation figures, in 2005.

	Domestic credit to private sector (% GDP)	Market capitalisation of listed companies (% GDP)	Inflation rate (% change)
Bulgaria	43.62	19.08	5.04
Czech Republic	43.69	31.34	1.85
Estonia	67.95	26.67	4.09
Hungary	62.88	29.84	3.55
Latvia	72.83	16.02	6.76
Lithuania	42.24	32.10	2.66
Poland	32.64	31.38	2.11
Romania	21.15	20.88	8.99
Slovak Republic	48.53	9.46	2.71
Slovenia	64.82	23.21	2.48
CEECs average	50.04	24	4.02
8-CEECs average*	54.45	25	3.27
Euro-area average	**148.22**	**65.83**	**2.19**

Source: International Financial Statistics (IMF) and WDI (World Bank).
* excluding Romania and Bulgaria.

What about inflation? Over time, output recovered and inflation declined; however, the decline of inflation did not bring it to levels close to that of Western European economies, as we can see in Table (1) above. The moderate levels of inflation in these countries have been reduced to low single-digit levels in order to prepare their entry in the EU; the achievement of such a disinflation is crucial for joining the EMU. Still, tight monetary policy will hamper the ability of firms to undertake the investments in new equipment and technology, which is necessary in order to compete within the EU markets.

Whether these countries can continue with the process of disinflation and achieve the West European rates of CPI growth during the next years depends on several factors, such as: the international climate; the appropriate fiscal policy that should support the monetary policy ; and, the question of the effectiveness of the new approach of monetary policy based on inflation targeting.

We will further continue with the analysis of the bank lending channel in transition countries, wondering if there are any similarities among them in the transmission of the monetary policy. The large majority of studies in this area focus on the analysis of the interest and exchange rate channels, while little attention is paid to the bank lending channel. The main explanation is that financial innovation over the last few decades has cast doubt over the importance of the bank lending channel, as banks play a less important role in credit markets. This affirmation holds in the context of developed economies, but it does not apply for transition countries, where financial systems are mainly bank-based and borrowers do not have viable alternatives to bank loans as sources of finance. Consequently, we examine the bank lending channel of monetary policy transmission; the main

reason for choosing this channel of monetary policy transmission is the availability of data, firm-level data is poor informed in transition countries.

The following section presents a brief overview of the debate on the lending view.

3 Debate on the lending view

We first present an overview of the general debate on the lending view. Then, follows an overview of the existing studies based on transition economies. The aim of this section is to show what empirical methods have been used in the related studies on the lending view and highlight our motivation for the approach applied in this chapter.

3.1 Definition of the lending view

The hypothesis of 'bank lending channel' postulates the existence of a channel of monetary policy transmission through the bank credit. This channel is independent of the traditional 'money channel', which takes into consideration the effects of changes in the real interest rate on economic activity.

The bank lending channel theory ascribes a special role to banks in the monetary transmission mechanisms. It stipulates that the tightening of the monetary policy can affect not only the demand for loans (through the interest rate channel), but also the supply of loans, which in turn, further influences investment and consumption. In other words, monetary policy affects not only borrowers, but also banks. The theoretical underlying mechanism is as follows: the contraction of the monetary policy shrinks the banks' reserves and, furthermore, the banks' deposits. Deposits are an important source of financing the lending; the theory stipulates that, in the aftermath of a tightening of the monetary policy, the responses of banks might not be the same in terms of lending.

Two hypotheses are crucial for the bank lending channel theory:

- The imperfect substitutability between credits and other assets in banks' balance sheet; and
- The imperfect substitutability between bank credits and other forms of financing on firms' balance sheet.

These forms of imperfect substitutability cause monetary policy to impact on economic activity on two stages.

First, the imperfect substitutability in bank assets determines a contraction in the banks' credit supply when there is a tightening of the monetary policy (`first stage`). When facing a decrease in liquidity, banks decrease their supply of credit instead of selling bonds that they possess in their portfolios. Alternatively, rather than decreasing credit, banks could issue bonds or collect deposits from households or the corporate sector. Financial market imperfections, such as adverse selection and moral hazard (imperfect substitutability between credits and bonds on the asset side and between bonds and deposits on the liability side), limit the ability of some banks to borrow from the financial markets.

Once credit supply has decreased (due to the imperfect substitutability between bank credit and other forms of external funding on the firm's balance sheets), the investment spending decreases, as well as the economic activity (`second stage`).

Several empirical approaches have been used to investigate the existence and the functioning of the bank lending channel. Earlier papers tried to analyse the bank lending channel based on aggregate data. However, more recently the identification relies on asymmetries in the loan supplies of individual banks. Our analysis belongs to the latter category; that of studies based on bank-level data. We will further present some illustrative studies both in the general context and in the case of transition economies.

3.2 Tests using aggregate data

The response of aggregate bank balance sheet variables to changes in the stance of monetary policy (approximated by changes in Fed funds rate) is analysed using monthly data over the period of 1959 to 1989. The results of the analysis show that a monetary tightening is followed by an immediate drop in bank deposits and bank holdings of securities. Bank loans respond with a lag, presenting a decline. Finally, the aggregate output responds to monetary impulses with a similar lag, declining contemporaneously with bank loans. These findings are consistent with the view that monetary policy works, at least in part, through "credit" (i.e., bank loans), as well as through "money" (i.e., bank deposits) (Bernanke and Blinder, 1992).

A fluctuation in the growth rate of loans might be caused by the demand for, or the supply of, loans; consequently, an identification problem occurs.

New evidence is brought for a clear econometric identification of the lending channel of monetary policy transmission, by using the relative fluctuations in bank loans and commercial papers -an important substitute for bank finance- over the period of 1964 to 1989. The results show that a tighter monetary policy determines a sharp rise in commercial papers issuance, while bank loans fall. This way, the contractionary monetary policy reduces loan supply (Kashyap, Stein and Wilcox, 1993).

The results of Kashyap, Stein and Wilcox (1993) are not accepted as being decisive. In an economy with heterogeneous agents, the aggregate results must be treated with caution. The next natural step consists of using disaggregated data to explore the cross-section implications of the lending view (Oliner and Rudebusch, 1995).

3.3 Tests Using Disaggregated Data

According to the lending view, a tight monetary policy should pose more problems for small firms (which rely mainly on banks) than for larger firms (which have a greater access to non-bank sources of external finance). Evidence in this sense is provided by some recent studies, which show that, with a contractionary monetary policy, liquidity constraints become more pronounced for smaller firms (Oliner and Rudebusch, 1995).

The question is whether changes in the liabilities of deposit banks affect their lending. In order to answer this question, it is necessary to analyse the way banking firms respond to the changes in the stance of monetary policy.

A disaggregated version of Bernanke and Blinder (1992) model is developed, analysing the way bank deposits, securities holdings and loans respond to shocks in monetary policy. The focus is on the cross-sectional differences in these responses across banks of different sizes. The overall message of the model is that loans and security portfolios of large and small banks respond differentially to a contraction in the monetary policy: the lending volume of small banks declines more rapidly in response to a given contraction in deposits than the lending volume of large banks; however, the securities holdings of small banks decline more slowly in response to a given contraction in deposits than the securities holdings of large banks (Kashyap and Stein, 1995).

The model specification of Kashyap and Stein (1995) is further adopted in a large number of recent studies (De Bondt, 1998; Cecchetti, 1999; Kashyap and Stein, 2000; Kishan and Opiela, 2000; Ehrmann, Gambacorta, Martinez-Pagés,

Sevestre and Worms, 2001; Altunbas, Fazylov and Molyneux, 2002; Driscoll, 2004; Adams and Amel, 2005; Gambacorta, 2005).

There are benefits and disadvantages with the disaggregate approach. The benefit is the fact that it is the most precise way to test for the existence of credit channels. However, the disadvantage is that these data are not appropriate to evaluate the aggregate importance of credit channels (Kashyap and Stein, 1995; De Bondt, 1998).

3.4 Lending view in transition economies

The nature of monetary transmission mechanisms in market economy is difficult to ascertain. It is even more difficult to identify these mechanisms in transition economies (Wróbel and Pawlowska, 2002; Golinelli and Rovelli, 2005). During the planned-economy era and the early-transition period, a market type economy monetary transmission mechanism did not exist in the formerly centrally planned, now transition, economies because of the underdevelopment of financial institutions and markets. Nor could such a mechanism be measured, since the data generation and collection process did not exist. By the middle of the 1990s, institutions and financial markets developed sufficiently for policy-makers to begin employing traditional monetary transmission mechanisms, monetary policy tools, resulting in consistent and purposeful monetary policy. Data availability still limits policy analysts' ability to carry out quantitative analyses (Gavin and Kemme, 2004).

The study of the monetary policy transmission mechanisms in transition economies is very important. It allows a precise understanding of the way in which a change in a central bank's interest rate instrument affects inflation; this is at the centre of interest of inflation targeting[2].

Recent advances in empirical studies of the monetary transmission mechanisms in Central and Eastern Europe (which present the functioning of the separate channels, the possible interrelations between different channels and their impact on prices and real economy), are surveyed. The empirical evidence for CEECs is classified into two categories: evidence from VAR-based studies and evidence from micro bank-level data (Corricelli, Égert and MacDonald, 2006; Égert and MacDonald, 2006).

In our analysis we proceed with the same classification of evidence on the bank lending channel, as it follows.

[2] A large number of transition countries use inflation targeting as a monetary policy framework.

3.4.1 Aggregate evidence, VAR-based studies

The Vector Auto-regression (VAR) approach is the main tool used in the area of research on monetary transmission mechanisms. By using a VAR, it is possible to determine a monetary policy shock and then to examine the response of endogenous variables to a monetary impulse. Analysis of the monetary policy shocks' impact (or unexpected changes) provides useful information on the transmission mechanism. However, a necessary condition for a VAR model to produce consistent monetary shocks is that the monetary policy regime does not change within the period under consideration; this condition is difficult to fulfil by the economies in transition. This makes VAR analyses difficult and leads to the need of shortening the sample, skipping the period up to the end of 1994 in order to ensure a reasonable mix of sample homogeneity and length.

A study compiled over the period of 1995 to 2000 for Poland, shows that a shock in short-term interest rates causes real credit to drop in the short-run and stabilise at a lower level afterwards. This analysis uses the method of a structural VAR (SVAR), with a relatively modest set of variables: the consumer price index, the credit to non-financial sector (in real terms) and the National Bank of Poland intervention rate as a policy instrument; the credit growth is used as an indicator of the domestic demand pressure (Klos and Wróbel, 2001).

An update of the evidence on the monetary policy transmission mechanisms for the three large new EU members (Czech Republic, Hungary and Poland) is produced by using a structural VAR with short-term restrictions, over the period of 1993 to 2004. In these three countries, following a positive shock on interest rate, prices increase instead of decreasing, due to the immediate depreciation of the nominal exchange rate. None of the 3 channels (the interest rate, the exchange rate and the credit channel) is strong for the monetary policy transmission in these countries. Nevertheless, the exchange rate and the interest rate channels play a growing role in Poland. A monetary policy shock determines an initial decrease in credit in Poland, while in Czech Republic and Hungary; the results indicate a short-term rise in the credit series (Creel and Levasseur, 2005).

The transmission of the monetary policy in the three new member states of the EU (Poland, Czech Republic and Hungary) is studied with structural time-varying coefficient VARs, using quarterly data over the period of 1993 to 2004. The results are compared with the monetary policy transmission in euro area, showing that some parameters change significantly and alter the shape of the impulse response functions. Monetary policy is more powerful in Poland and comparable in strength with that in the euro area, but it is less powerful in Hungary; the strength of the monetary policy in Czech Republic lies in between. These differences are explained

by the credibility of the monetary policy and the openness of these economies (Darvas, 2005).

The relationship between monetary policy transmission and the financial structure is examined over the period of 1993 to 2004, using the SVAR methodology, on ten accession countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). Substantial differences in the monetary transmission are found amongst the countries, regarding both inflation and output. Based on the lending view, the indicators of the financial structure are grouped into three categories: indicators of size, of banking system' health and of the importance of alternative sources of external finance. Rank correlation coefficients are computed for the estimated impact of monetary policy decisions on each indicator of financial structure. The results do not show convincing evidence that the financial structure indicators are associated with monetary policy shocks in the considered countries (Elbourne and de Haan, 2006).

Another analysis was compiled on the eight CEECs, recently integrated to the EU, over the period of 1995 to 2004. By using different VAR estimations for each country, the analysis shows the existence of similarities within the euro area and an ongoing homogenisation process, concluding on the relevance of a close integration of these countries into the euro area. The estimations include money and domestic credit aggregates on one hand, and industrial production and rebuilt series of the GDP, on the other hand (Héricourt, 2006).

We can conclude that the aggregate evidence is weak regarding the bank lending channel. One of the most precise ways to test for credit channels is by using disaggregated data (De Bondt, 1998), so that we further present the bank-level data studies.

3.4.2 Bank-level Data Evidence

Empirical analyses with disaggregated data on banking firms are scarce. The literature on micro data-based evidence applies the generally used approach of Kashyap and Stein (1995, 2000), which relies on discovering asymmetric movements of loans quantities, with respect to certain bank characteristics.

An analysis of the bank lending channel for Poland was realized for 48 commercial banks, from 1995 to 2002. The main findings are that the long-run effect of an increase in the interest rate on bank lending is smaller for a bigger bank. In terms of liquidity the results are counterintuitive, as the long-run coefficient is significant but negative; one explanation is the persistent surplus of liquidity in the

banking sector. For capitalisation, the long-run effect of an increase in the interest rate on bank lending is the smaller, the more capitalised bank is. Credit channel appears to operate mainly through small, poorly capitalised banks (Wróbel and Pawlowska, 2002).

The bank-lending channel is analysed for Estonia, using quarterly data from 1996 to 2004. The empirical analysis provides evidence in favour of the bank-lending channel. First, well-capitalised banks seem to experience a smaller outflow of deposits after a monetary contraction. As a consequence, a monetary policy shock that leads to a drain of deposits from the banking sector has the highest effect on deposits of less capitalised and more risky banks. Second, the liquidity position of banks seems to be an important determinant of loan supply, suggesting that more liquid banks are able to maintain their loan portfolios; yet, less liquid banks must reduce their loan supply after monetary policy contraction (Juks, 2004).

In Czech Republic, the overall effect of the monetary policy changes on the growth rate of loans and the characteristics of the supply of loans are analysed using quarterly data, from 1996 to 2001. Changes in monetary policy alter the growth rate of loans with stronger magnitude in the period of 1999-2001 than in the period of 1996-1998. For the period of1996-1998, the cross-sectional differences in the lending reactions to monetary policy shocks are due to the degree of capitalisation and liquidity. For the subsequent period of 1999 to 2001, the distributive effects of the monetary policy are due to the size of the bank as well as the bank's proportion of classified loans (Pruteanu, 2004).

A second analysis on the existence of the bank lending channel in Poland covers the period of 1997-2002 and concerns 67 banks (commercial banks and a few biggest cooperative banks). When the usual specific characteristics (size, liquidity and capitalisation) are considered, there is no evidence on bank lending channel of the monetary policy transmission. The inclusion of a variable which accounts for the ownership structure changes the results. In the latter case, small, less liquid banks expand their loan portfolios faster, while capitalisation becomes less important (as foreign banks are much better capitalised) (Havrylchyk and Jurzyk, 2005).

The existence of the bank lending channel is examined for Hungary using quarterly data, from 1995 to 2004. Besides the usual bank specific variables (size, liquidity and capitalisation), it equally considers the foreign ownership. The novelty of this study is that it tests whether demand of loans can be considered homogenous across banks with respect to some bank-characteristics; the empirical evidence show that demand of loans can be considered reasonably homogenous across banks with respect to the share of foreign ownership and the size of banks. The main findings in terms of bank lending channel are that an increase in the policy rate

induces a larger increase in the average cost of funding for smaller, less capitalised banks and for banks with a higher domestic share (Horváth, Krekó and Naszódi, 2006).

As mentioned above, the present study is a micro bank-level data analysis. Our contribution to this category of empirical studies consists in analysing the commercial banks from ten CEECs with the control of cross-country heterogeneities. Most previous research consists of country-specific studies; to our knowledge, no other similar analysis for these ten CEECs exists.

In the following section we describe the model applied, as well as data used.

4 Model and data

4.1 Theoretical Model

Our analysis of the bank lending is based on a simple version of Bernanke and Blinder (1988) model. As in Ehrmann et al. (2001), the model of the deposit market is restricted to a relationship of equilibrium; deposits (D) are assumed to equal money (M) and both depend on the policy interest rate i, as follows:

$$M = D = -\gamma i + \epsilon \tag{1}$$

The demand for loans (L_k^d) faced by a bank k is assumed to depend on real GDP (x), the price level (π) and the interest rate on loans (i_l):

$$L_k^d = \phi_1 x + \phi_2 \pi - \phi_3 i_l \tag{2}$$

The supply of loans of a bank (L_k^s) depends on the available amount of money (or deposits) (D_k), the interest rate on loans (i_l) and the monetary policy rate (i) directly. The direct effect of the monetary policy rate arises in the presence of opportunity costs for the bank, when banks use the interbank market to finance their loans or in the case of mark-up pricing by banks, which pass on increases in deposit rates to lending rates. The supply of loans is thus modelled as:

$$L_k^s = \mu_k D_k + \phi_4 i_l - \phi_5 i \tag{3}$$

We assume that not all banks are equally dependent on deposits. Consequently, we consider the impact of deposit changes to be lower, the higher the bank char-

acteristics (size, liquidity or capitalisation) (z_k):

$$\mu_k = \mu_0 - \mu_1 z_k \tag{4}$$

The clearing of the loan market[3], together with equations (1) and (4), leads to the reduced form of the model:

$$L_k = \frac{\phi_1\phi_4 x + \phi_2\phi_4\pi - (\phi_5 + \mu_0\gamma)\phi_3 i + \mu_1\gamma\phi_3 i z_k + \mu_0\phi_3\epsilon - \mu_1\phi_3\epsilon z_k}{\phi_3 + \phi_4} \tag{5}$$

This can be simplified to:

$$L_k = ax + b\pi - c_0 i + c_1 i z_k + dz_k + const \tag{6}$$

The coefficient $c_1 = \frac{\mu_1\gamma\phi_3}{\phi_3+\phi_4}$ relates the reaction of bank lending to monetary policy to the bank characteristic. A significant parameter for c_1 implies that monetary policy affects loan supply. This requires, in particular, that the interest elasticity of loan demand (faced by a bank) to be independent of its characteristic z_k, i.e. ϕ_3 is the same across all banks.

This assumption of a homogeneous reaction of loan demand across banks is crucial for the identification of loan supply effects of monetary policy. It excludes cases where, for example, large or small bank customers are more interest rate sensitive. Given that bank loans are the main source of financing for firms in transition economies, and readily available substitutes in times of monetary tightening are very limited even for relatively large firms, we see this theoretical model as a reasonable benchmark for most countries.

For the purpose of the empirical estimations we use the model of Ehrmann et al. (2001) rewritten in first differences.

4.2 Econometric Model

As in the majority of studies using bank-level data, our empirical specification is based on Kashyap and Stein (1995), designed to test whether banks react differently to monetary policy shocks. The model is given by the equation (6) in first differences:

$$\Delta \ln y_{it} = \sum_{j=1}^{l} \alpha_j \Delta \ln y_{i(t-j)} + \sum_{j=0}^{l} \beta_j \Delta MP_{t-j} + \gamma z_{i(t-1)} + \sum_{j=0}^{l} \delta_j \left[\Delta MP_{t-j} z_{i(t-1)}\right] +$$

[3] We determine the interest rate on loans, i_l, starting from the equation (2) and we replace it in the equation (3).

$$+\sum_{j=0}^{l}\varphi_j\pi_{t-j}+\sum_{j=0}^{l}\eta_j\Delta\ln x_{t-j}+\mu_i+\varepsilon_{it} \tag{7}$$

with: $i = 1, ..., N$ and $t = 1, ..., T$, where N denotes the number of banks and l the number of lags (in our case $l = 1, 2$); y_{it} - total loans of bank i to clients, in year t; MP_t - monetary policy indicator: the change in money market rate; x_{it} - real GDP; π_{it} - inflation rate; z - bank characteristics: size, capitalisation and liquidity; μ_i - individual bank effects; ε_{it} - error term; $\alpha, \beta, \delta, \gamma, \varphi, \eta$ - parameters to be estimated.

We use the growth rate of GDP and inflation to control for demand shocks. The introduction of these two variables allows us to capture the cyclical movements and serves to isolate the monetary policy component of the interest rate changes.

To test for the existence of distributional effects of monetary policy among banks, we use the following indicators for the bank characteristics (z): bank size, capitalisation and liquidity. These indicators are used by the large majority of studies in this area.

Due to asymmetric information problem, small banks can have more difficulties in raising non-deposit funds to offset monetary policy tightening and keep the supply of loans at a desired level. In other words, after monetary policy tightening, small banks reduce lending more than larger banks (Kashyap and Stein, 1995).

More liquid banks can easier shield their loan portfolio than less liquid banks and offset monetary policy tightening. Specifically, after an increase in the central bank interest rate, they can reduce their portfolio of liquid assets (e.g. bonds) to avoid cutting loans. The rationale for such buffer-stock behaviour of banks is the existence of credit lines, protecting the credit relationship with the client and the lack of a secondary market for the intermediated loans (Bernanke and Blinder, 1992; Kashyap and Stein, 2000).

Poorly capitalised banks have a more limited access to non-deposit financing and therefore reduce lending more than the better capitalised ones (Peek and Rosengren, 1995).

$$Size_{it} = \log A_{it} - \frac{\sum_{i=1}^{N}\log A_{it}}{N_t}$$

$$Liquidity_{it} = \frac{L_{it}}{A_{it}} - \left(\sum_{t=1}^{T} \frac{\sum_{i=1}^{N} L_{it}/A_{it}}{N_t} \right) \Big/ T$$

$$Capitalisation_{it} = \frac{E_{it}}{A_{it}} - \left(\sum_{t=1}^{T} \frac{\sum_{i=1}^{N} E_{it}/A_{it}}{N_t} \right) \Big/ T$$

'Size' is measured by the log of total assets, A_{it}. 'Liquidity' is defined as the ratio of liquid assets L_{it} (cash, interbank lending and securities) to total assets, and 'capitalisation' is given by the ratio of equity, E_{it}, to total assets[4]. These characteristics are normalized with respect to their mean across all banks in the sample, in order to get indicators that sum to zero over all observations. This means that for the regression model (7), the mean of the interaction terms ($\Delta MP_{t-j} z_{i(t-1)}$) is also zero, and the parameters β_j are directly interpretable as the average effect of the monetary policy on loans.

The definition of a large bank may differ with changing market conditions, as banks which are considered to be small on a market with a deeper financial sector, might be regarded as medium or large in a smaller market. Consequently, 'size' is a variable that captures the possible bank-specific asymmetries as deviations from each period's mean. This removes the upward trend which can be observed in banks assets.

For 'liquidity' and 'capitalisation', we remove the overall sample mean (across banks and over time) from each observation. Contrary to size, liquidity and capitalisation are less relative measures. We make use of the variability of these characteristics not only across banks, but also over time. This way, we obtain the interpretability of parameters β_j, but we do not remove the trend from a possibly changing financial market. This approach is used for the two indicators, as we assume that general trends of decreasing liquidity and capitalisation might be relevant from the point of view of the transmission.

The model allows for bank-specific effects (μ_i). The parameters of interest are those in front of the monetary policy indicator (β_j), which capture the direct overall

[4]Capitalisation is usually defined as the ratio of capital and reserves to total assets. We make use of an alternative measure of capital ratio - *the equity to total assets ratio* - as data on capital and reserves are poorly informed for more than a half of the sample.

impact of the monetary policy changes on the growth of bank lending, and the coefficients in front of the interaction terms (δ_j); the latter serves to asses whether the considered bank characteristic makes any difference in the way banks react to monetary policy changes. *A positive and significant parameter δ_j is equivalent with the assumption that smaller/less capitalised/less liquid banks react more strongly to monetary policy changes.* The coefficient in front of the bank characteristic (γ) has an illustrative role; it describes whether there is a linear relationship between the growth rate of loans and the bank characteristic.

4.3 Data

We use the BankScope data set for banks' balance sheet[5] and the International Financial Statistics (IMF) data for real GDP, the inflation and interest rate. See Table (11) in Appendix for a description of data. The sample covers the period 1999-2005 and contains annual data. The analysis does not go before 1999 because of data unavailability on the banks' balance sheets.

Our analysis covers commercial banks from ten CEECs: Bulgaria, with 26 banks; Czech Republic, with 26 banks; Estonia, with 7 banks; Hungary, with 30 banks; Latvia, with 26 banks; Lithuania, with 10 banks; Poland, with 53 banks; Romania, with 28 banks; Slovak Republic, with 17 banks; and Slovenia, with 19 banks. An analysis performed separately for each country does not lead to robust results.

Because of the reduced span of time and the heterogeneity in the commercial banks sample, we have to think to a manner of grouping together these banks in order to obtain robust estimation results. Consequently, we choose the banking reform criteria, as we believe pertinent the analysis of banks situated on the same pace of the reform. For this, we take the EBRD banking reform index (see Table (12) in the Appendix of this chapter) and we compute a simple mean of this indicator for the period of 1989 to 2005; by using this time span we take into account both the initial conditions and the entire evolution of banking reform. This way, we form three groups of countries: the first one, of the least advanced, is made up of Bulgaria, Lithuania and Romania (economies where the average index of banking reform is situated between 2.24 and 2.55); the second group, the intermediary one, is made of Latvia, Poland, Slovenia and Slovakia (which have

[5]BankScope is a publicly available database provided by Bureau Van Dijk, that covers balance sheet data on banks in all Eastern European countries, although not the full population in each. It has been used in the majority of the published papers for the euro area that are based on micro data on bank so far.

an average banking reform index situated between 2.74 and 2.93) and the third group, the advanced one, is made of Czech Republic, Estonia and Hungary (with an average index of the banking reform between 3 and 3.22).

In the following section, we present the estimation method and the results.

5 Estimation method and results

5.1 Estimation method

The reduced span of time constricts us to estimate the equation (7) for the current period without using lags. Hence, the estimated equation is:

$$\Delta \ln y_{it} = \alpha_1 \Delta \ln y_{i(t-1)} + \beta_1 \Delta MP_t + \gamma z_{it} + \delta_1 \left[\Delta MP_t * z_{it}\right] + \varphi_1 \pi_t + \eta_1 \Delta \ln x_t + \mu_i + \varepsilon_{it} \tag{8}$$

We will first estimate a 'benchmark model', which does not include the bank characteristic (z) and the interaction between the bank characteristic and the monetary policy indicator ($\Delta MP_t z_{it}$). This will give us a preliminary insight into whether the growth rate of client loans responds to monetary policy shocks and to macroeconomic conditions. The full model, given by the equation (8) will be referred to as the 'extended model'.

Our sample follows commercial banks over 7 years (1999-2005). The estimation of both 'benchmark' and 'extended' models is realised separately, for each group of banks; this will help us to observe the existing differences in banks behaviour inside each group, in the aftermath of a monetary policy tightening.

Both the 'benchmark' and the 'extended' model are estimated by the Generalized Method of Moments (GMM), as designed by Arellano and Bond (1991). The use of this method is due to the inclusion of lagged dependent variable as an explanatory variable; the presence of a lagged dependent variable among the regressors in a specification, which considers the individual effect as well, brings about the correlation between the error term and a right-hand regressor. In such a case, the OLS estimation would be inconsistent and biased. The GMM methodology also accounts for the possible endogeneity of some variables, as is probably the case with bank characteristics. The Arellano and Bond' methodology first differences the autoregressive model to eliminate the individual effect and 'optimally exploits' the moment conditions using the lagged values dated t-2 and earlier of the dependent variable and the lagged values of the predetermined variables as instruments. This ensures efficiency and consistency and provides that the model

is not subject to serial correlation in ε_{it} and that the instrument variables are valid (the Sargan and Hansen tests). The Arellano and Bond design both 1-step estimation and a 2-step estimation. The difference between them consists in the specification of an individual specific weighting matrix. The 2-step estimation uses the 1-step's residuals, so it is more efficient. Therefore, we will further proceed with this estimation in two steps.

5.2 Estimation Results

The tables below summarise the results of the estimation of the 'benchmark' and the 'extended' models for total loans to clients. We proceed with two estimations - one at the aggregate level and, the other, on single countries in a pooled regression; in the two cases, the estimations are realised separately, for each group of countries. The reported figures represent the long-run elasticities of the models[6]. These have been estimated using the GMM estimator suggested by Arellano and Bond (1991), which ensures efficiency and consistency, provided that the models are not subject to serial correlation of order two and that the instruments are valid (which is tested by the Hansen test). In the GMM estimations, the instruments are the second and further lags of the dependent variable and the bank specific characteristics included in each equation. Inflation, GDP growth rate and the monetary policy indicator are considered as exogenous variables.

5.2.1 Evidence on the Aggregate Level for Each Group of Banks

To asses the role of banks in the monetary policy transmission, we will first estimate the equation (8) including (within each group), the observations regarding the banks in all the countries, without discriminating for national parameters.

A. Benchmark model

The estimation results of the 'benchmark model' reveal differences between the three groups of countries.

[6]The long-term coefficient of a variable is computed as the sum of its coefficients (of its lags and current values, where applicable) divided by one minus the sum of the coefficients of the lags of the dependent variable. For instance, the long-run elasticity of the dependent variable with respect to monetary policy for the average bank is given by $\sum \beta_j/(1-\sum \alpha_j)$.

Table 2: 'Benchmark model' (equation (8)) (long term coefficients).

Dependent variable:	**Growth rate of total loans to clients**		
Specifications :	(**1st group**)	(**2nd group**)	(**3rd group**)
Monetary Policy	-0.035***	-0.012*	0.006
	(0.008)	(0.007)	(0.046)
GDP growth	4.90***	2.15***	3.32***
	(0.685)	(0.558)	(1.38)
Inflation	-0.399***	-0.054	-0.368
	(0.110)	(0.088)	(0.243)
p-value Hansen	0.361	0.052	0.056
p-value AR1/AR2	0.903/0.163	0.598/0.192	0.123/0.383
No. obs./ No. banks	245/59	365/95	223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Concerning the monetary policy effects on the growth rate of total loans to clients, changes in the policy-induced interest rate have a negative and significant impact in the 1st and the 2nd group of countries, however the impact is not significant for the 3rd group. Thus, the theory of bank lending channel is confirmed only for the first two groups: loans fall after a monetary policy tightening. With regards to the impact of macroeconomic conditions, the influence of GDP growth is positive and significant in all the groups. Inflation impacts negatively only in the case of banks from the 1st group.

B. Extended Model

We focus on the significance of the linear relationship between the growth rate of the total loans to clients and the bank characteristics - the coefficient γ in equation (8) - and of the distributive effects of monetary policy on the growth rate of loans due to these bank characteristics - the interaction coefficients δ_1 in equation (8). We realize this for the entire banking sector of the three groups of countries (see Tables (3), (4) and (5)).

Size as Bank Characteristic

The estimations reveal a significant linear negative relationship between bank size and the growth rate of total loans to clients for the 1st and the 3rd group of countries. This signifies that small banks enjoy higher loan growth rates. The interaction term between monetary policy and bank size presents a non-significant coefficient for all the groups. This means that size, as a bank characteristic, does not influence the growth rate of total loans to clients in the aftermath of a monetary policy tightening for none of these banks.

Table 3: 'Extended model' (equation(8)) (long term coefficients) (a).

Dependent variable:	**Growth rate of total loans to clients**		
Specifications :	(**1st group**)	(**2nd group**)	(**3rd group**)
Control variable: **Size (S)**			
Monetary Policy	-0.039***	-0.011	-0.010
	(0.007)	(0.010)	(0.026)
S	-0.785***	-0.102	-0.559*
	(0.232)	(0.243)	(0.308)
Monetary policy*S	0.005	0.006	-0.007
	(0.005)	(0.010)	(0.017)
GDP growth	4.78***	2.33***	4.52***
	(0.599)	(0.496)	(0.849)
Inflation	-0.354***	-0.065	-0.533***
	(0.086)	(0.101)	(0.153)
p-value Hansen	0.316	0.059	0.330
p-value AR1/AR2	0.087/0.657	0.352/0.623	0.034/0.253
No. obs./ No. banks	245/59	365/95	223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Liquidity as Bank Characteristic

The estimations show an overall positive and significant linear effect of liquidity on the growth rate of total loans to clients for the 1st and the 3rd group of countries, which means that liquid banks enjoy higher loan growth rates. With regards to the distributive effects of the monetary policy, the overall analysis reveals an insignificant coefficient for all the groups. This means that liquidity does not influence the growth rate of total loans in the aftermath of a monetary policy change.

Table 4: 'Extended model' (equation (8)) (long term coefficients) (b).

Dependent variable:	**Growth rate of total loans to clients**		
Specifications :	(**1st group**)	(**2nd group**)	(**3rd group**)
Control variable: **Liquidity (L)**			
Monetary Policy	-0.034***	-0.012	-0.016
	(0.008)	(0.009)	(0.017)
L	0.065*	-0.002	0.042**
	(0.037)	(0.018)	(0.018)
Monetary policy*L	-0.0007	-0.0001	-0.002
	(0.0008)	(0.0006)	(0.001)
GDP growth	4.56***	2.27***	3.55***
	(0.471)	(0.422)	(0.851)
Inflation	-0.323***	-0.075	-0.310*
	(0.079)	(0.067)	(0.159)
p-value Hansen	0.129	0.143	0.323
p-value AR1/AR2	0.975/0.129	0.362/0.453	0.027/0.353
No. obs./ No. banks	245/59	365/95	223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Capitalisation as Bank Characteristic

Table 5: 'Extended model' (equation(8)) (long term coefficients) (c).

Dependent variable:	**Growth rate of total loans to clients**		
Specifications :	(**1st group**)	(**2nd group**)	(**3rd group**)
Control variable: **capitalisation (C)**			
Monetary Policy	-0.052***	-0.014	-0.009
	(0.008)	(0.011)	(0.013)
C	0.064*	0.105	-0.034
	(0.037)	(0.083)	(0.026)
Monetary policy*C	-0.003***	-0.0009	0.001
	(0.001)	(0.001)	(0.001)
GDP growth	4.54***	2.52***	4.15***
	(0.949)	(0.484)	(0.629)
Inflation	-0.334**	-0.067	-0.463***
	(0.139)	(0.078)	(0.104)
p-value Hansen	0.184	0.217	0.368
p-value AR1/AR2	0.017/0.828	0.346/0.665	0.043/0.867
No. obs./ No. banks	245/59	365/95	223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Capitalisation presents an overall positive and significant linear effect for the 1st group and a non-significant linear effect on the growth rate of total loans to clients for the 2nd and the 3rd group. This means that well-capitalised banks from the 1st group enjoy higher loan growth rates. The overall analysis reveals a negative and significant coefficient for the interaction term between capitalisation and the monetary policy for the least advanced banks (1st group), meaning that the more capitalised banks from this group are more affected by the monetary policy conditions; this result is counterintuitive. For the other two groups, the coefficient is not significant; thus, for these groups of banks, capitalisation does not influence the growth rate of total loans to clients in the aftermath of a monetary policy change.

In conclusion, the analysis at the aggregate level for each group of countries does not show significant results in terms of bank characteristics. The explanation could come from the existing heterogeneity among banks, inside each group. Consequently, it would be more appropriate to examine the impact of bank characteristics on the growth rate of loans to total clients by the means of an analysis on single countries in a pooled regression for each group.

5.2.2 Evidence on Single Countries in a Pooled Regression for Each Group

In the subsection above, we have treated all banks the same way, by restricting all coefficients to be the same inside each group. In order to highlight the cross-country differences among each group, we extend our model. The parameters of interest, i.e. those of the monetary policy indicator and the interaction between banks characteristics and the monetary policy indicator are allowed to vary across countries, through the introduction of country specific dummies. By proceeding this way, we assume that loan demand elasticities with respect to GDP and inflation are homogeneous across banks inside each group. Consequently, the estimated model is the following:

$$\Delta \ln y_{it} = \alpha_1 \Delta \ln y_{i(t-1)} + \beta_1 \Delta MP_t * dcountry + \gamma z_{it} + \delta_1 \left[\Delta MP_t * dcountry * z_{it}\right] + \varphi_1 \pi_t + \\ + \eta_1 \Delta \ln x_t + \mu_i + \varepsilon_{it} \tag{9}$$

We continue to distinguish between the three group of countries, as there are differences between them in terms of demand factors (GDP and inflation). We proceed as before, by estimating the 'benchmark model' and 'extended model' respectively, for total loans to clients.

A. Benchmark Model

Table 6: 'Benchmark model' (equation(9)) (long term coefficients).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Monetary Policy					
Bulgaria	-0.086***	Latvia	-0.012	Czech R.	-0.066
	(0.019)		(0.013)		(0.053)
Lithuania	-0.031	Poland	-0.020*	Estonia	-0.107
	(0.021)		(0.011)		(0.096)
Romania	-0.006	Slovakia	-0.018	Hungary	0.098
	(0.014)		(0.012)		(0.136)
		Slovenia	0.009		
			(0.009)		
GDP growth	4.39***		2.19***		1.29
	(0.921)		(0.541)		(2.55)
Inflation	-0.31**		-0.067		0.034
	(0.138)		(0.085)		(0.09)
p-value Hansen	0.274		0.072		0.188
p-value AR1/AR2	0.674/0.181		0.545/0.188		0.107/0.296
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

The estimation of the 'benchmark model' reveals differences between the results for three groups of countries, both in terms of magnitude and significance.

Concerning the effects of monetary policy on the growth rate of total loans to clients, changes in the policy-induced interest rate have a negative and significant impact in Bulgaria (1st group) and Poland (2nd group). This confirms the bank lending channel theory: loans fall after a monetary policy tightening. For the rest of countries the impact is not significant. These results represent the average impact of the monetary policy across all banks; all the banks are considered to have the same weight, they do not have a ponder given by their market share or characteristics. Consequently, these estimates cannot be used to quantify the effect of a certain change in the monetary policy.

As regards the difference in macroeconomic conditions' impact, the influence of GDP growth is positive and significant for the 1st and the 2nd group, while it is not significant in the 3rd group. Inflation, which is meant to account for demand factors, impacts negatively only in the case of banks from the 1st group.

B. Extended Model

The features of the supply of loans are revealed by the estimation of the 'extended model' (equation (9)). We focus on the significance of the linear relationship between the growth rate of total loans to clients and the bank characteristics - the coefficient γ in equation (9) - and the distributive effects of monetary policy on the growth rate of loans due to these bank characteristics - the interaction coefficients δ_1 in equation (9). We realise this for the entire banking sector of the three groups of countries (see Tables (7), (8) and (9)).

Size as Bank Characteristic

The estimations reveal a significant linear negative relationship between bank size and the growth rate of total loans to clients in the case of the 1st group of banks, as small banks from this group enjoy higher loan growth rates. The distributive effect of monetary policy changes due to bank size is shown by the interaction term between the monetary policy and bank size. Its coefficient is not significant for all the groups, meaning that size, as a bank characteristic, does not influence the growth rate of total loans to clients in the aftermath of a monetary policy change for neither of these banks.

Table 7: 'Extended model' (equation (9)) (long term coefficients) (a).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variable: **Size (S)**					
Monetary Policy					
Bulgaria	-0.086***	Latvia	-0.001	Czech R.	-0.089**
	(0.015)		(0.007)		(0.043)
Lithuania	-0.055**	Poland	-0.023	Estonia	-0.055**
	(0.025)		(0.015)		(0.024)
Romania	-0.013	Slovakia	-0.013	Hungary	0.035
	(0.010)		(0.015)		(0.024)
		Slovenia	0.006		
			(0.010)		
S	-0.844***		-0.29		-0.357
	(0.212)		(0.235)		(0.278)
Monetary policy*S					
Bulgaria	-0.005	Latvia	0.016	Czech R.	0.030
	(0.015)		(0.026)		(0.027)
Lithuania	0.013	Poland	0.006	Estonia	-0.012
	(0.011)		(0.009)		(0.015)
Romania	0.005	Slovakia	-0.015	Hungary	-0.015
	(0.006)		(0.014)		(0.014)
		Slovenia	0.0009		
			(0.007)		
GDP growth	4.56***		2.37***		2.87***
	(0.656)		(0.374)		(0.768)
Inflation	-0.315***		-0.062		-0.206
	(0.098)		(0.072)		(0.144)
p-value Hansen	0.709		0.455		0.962
p-value AR1/AR2	0.129/0.281		0.331/0.499		0.027/0.186
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Liquidity as Bank Characteristic

The estimations show evidence of an overall positive and significant linear effect of liquidity on the growth rate of total loans to clients for the 3rd group of countries; liquid banks from this group have a higher loan growth rate. In relation to the distributive effects of the monetary policy, the overall analysis reveals an insignificant coefficient for the 1st group of countries. This means that liquidity does not influence the growth rate of total loans in the aftermath of a monetary policy change, in the case of banks which are not advanced in their reform. In the case of the 2nd group, the estimation results are counterintuitive, showing a negative and significant coefficient of the interaction term in Latvia - meaning that the more liquid banks are more affected in Latvia by the monetary policy conditions; this is contrary to the bank lending channel theory. Meanwhile, the coefficient of the interaction term is positive and significant for Poland, confirming the theory: less liquid banks are strongly affected by the monetary policy conditions. In the case of the 3rd group, we found a positive and significant coefficient for Estonian

banks, which is a reconfirmation of the enounced theory.

Table 8: 'Extended model' (equation (9)) (long term coefficients) (b).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variable: **Liquidity (L)**					
Monetary Policy					
Bulgaria	-0.076***	Latvia	-0.024	Czech R.	-0.051**
	(0.024)		(0.022)		(0.020)
Lithuania	-0.033*	Poland	-0.019*	Estonia	-0.063**
	(0.017)		(0.010)		(0.023)
Romania	-0.010	Slovakia	-0.021*	Hungary	0.023
	(0.010)		(0.011)		(0.029)
		Slovenia	0.047		
			(0.030)		
L	0.052		-0.001		0.054***
	(0.042)		(0.014)		(0.017)
Monetary policy*L					
Bulgaria	-0.0009	Latvia	-0.002**	Czech R.	-0.001
	(0.002)		(0.001)		(0.001)
Lithuania	0.002	Poland	0.002**	Estonia	0.002**
	(0.001)		(0.0008)		(0.001)
Romania	0.0002	Slovakia	-0.0004	Hungary	-0.0005
	(0.001)		(0.0009)		(0.001)
		Slovenia	0.004		
			(0.003)		
GDP growth	4.80***		2.25***		1.94*
	(0.715)		(0.458)		(0.995)
Inflation	-0.336**		-0.060		-0.0008
	(0.117)		(0.079)		(0.185)
p-value Hansen	0.676		0.580		0.997
p-value AR1/AR2	0.818/0.156		0.351/0.609		0.022/0.320
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Capitalisation as Bank Characteristic

Based on our results, capitalisation presents an overall insignificant linear effect on the growth rate of total loans to clients in all the groups. For the distributive effects of the monetary policy, the overall analysis reveals, in the case of the least advanced banks (1st group), a negative and significant coefficient for the interaction term between capitalisation and the monetary policy in Romania, which is counterintuitive i.e. the more capitalised banks from Romania are more affected by the monetary policy conditions. The same counterintuitive result - a negative and significant coefficient for the interaction term - is obtained within intermediary group of banks for Poland. However the coefficient is positive and significant for Latvian banks, confirming the theory: less capitalised banks are more affected by the monetary policy conditions. As for the group of advanced banks (3rd group),

the coefficient of the interaction term is not significant, meaning that capitalisation, as a bank characteristic, does not influence the growth rate of total loans to clients in the aftermath of a monetary policy change.

Table 9: 'Extended model' (equation (9)) (long term coefficients) (c).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variable: **Capitalisation (C)**					
Monetary Policy					
Bulgaria	-0.097***	Latvia	-0.010	Czech R.	-0.051*
	(0.018)		(0.027)		(0.027)
Lithuania	-0.082**	Poland	-0.021**	Estonia	-0.075
	(0.031)		(0.009)		(0.052)
Romania	-0.035**	Slovakia	0.011*	Hungary	0.025*
	(0.015)		(0.025)		(0.015)
		Slovenia	0.018**		
			(0.008)		
C	0.042		-0.036		-0.035
	(0.036)		(0.057)		(0.034)
Monetary policy*C					
Bulgaria	-0.001	Latvia	0.002*	Czech R.	0.002
	(0.001)		(0.001)		(0.004)
Lithuania	-0.003	Poland	-0.007***	Estonia	-0.003
	(0.005)		(0.001)		(0.002)
Romania	-0.007***	Slovakia	0.009	Hungary	-0.0005
	(0.002)		(0.006)		(0.001)
		Slovenia	0.0006		
			(0.002)		
GDP growth	4.21***		2.65***		2.83***
	(0.870)		(0.476)		(0.586)
Inflation	-0.284**		-0.123		-0.212*
	(0.134)		(0.081)		(0.110)
p-value Hansen	0.849		0.645		0.944
p-value AR1/AR2	0.009/0.695		0.315/0.430		0.024/0.565
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

The different bank-characteristics may be correlated with each other. A number of authors include simultaneously all bank-specific characteristics in the estimations (Pruteanu, 2004; Havrylchyk and Jurzyk, 2005) or only two at the same time (Horváth, Krekó and Naszódi, 2006). In order to disentangle the asymmetric effects with respect to each other, we control for two of such characteristics at the same time. The results of these regressions are presented in the Appendix of this chapter, Tables (13), (14) and (15).

- when we include **size** and **liquidity** as interaction terms, the estimation results are similar to those obtained for a separate analysis: 'size' presents an overall negative and significant linear effect on the growth rate of loans for the 1st group; the interaction term between 'size' and monetary policy is

not significant for all the banks; 'liquidity' presents an overall positive and significant linear effect on the growth rate of loans for the third group of countries and the interaction term between monetary policy and liquidity shows a negative and significant coefficient in Latvia;

- when we include **size** and **capitalisation** as interaction terms, the estimation results are the following: 'size' presents an overall negative and significant linear effect on the growth rate of loans for the 1st and the 3rd groups of countries; the interaction term between 'size' and monetary policy is not significant for banks from the first and the second group, but, within the 3rd group, the coefficient of this interaction term is positive and significant in the case of commercial banks from Czech Republic, confirming the theory: smaller banks are more affected by a monetary policy change; 'capitalisation' presents an overall negative and significant linear effect on the growth rate of loans for the second and third group of countries and the interaction term between monetary policy and 'capitalisation' shows a negative and significant coefficient in Romania (1st group) and Poland (2nd group);

- when we include **liquidity** and **capitalisation** as interaction terms, the estimation results are the following: 'liquidity' presents an overall negative and significant linear effect on the growth rate of loans for the 3rd groups of countries; the interaction term between 'liquidity' and monetary policy is non-significant for the banks from the 1st and the 3rd group; however, within the 2nd group, the coefficient of this interaction term is negative and significant in Latvia and positive and significant in the case of commercial banks from Poland, confirming the theory of the bank lending channel: less liquid banks are more affected by a monetary policy change; 'capitalisation' presents an overall non-significant linear effect on the growth rate of loans for all the groups of countries and the interaction term between monetary policy and capitalisation shows a negative and significant coefficient in Romania (1st group) and Poland (2nd group).

What can be the explanations for the counterintuitive results relating to the bank lending channel theory? We are talking here about the negative and significant coefficients obtained for the interaction term between 'liquidity' and the monetary policy indicator (the case of Latvia) and the interaction term between 'capitalisation' and the monetary policy indicator (the case of Romania and Poland).

According to Kashyap and Stein (2000), higher liquidity and capitalisation might be an endogenous response of smaller banks in order to counterbalance their financing difficulties resulting from higher asymmetric information problems.

Bank characteristics used in this analysis (size, liquidity and capitalisation) are not independent from each other. The bank lending channel theory suggests that banks facing asymmetric information problems to a greater extent for instance smaller banks, have large difficulties accessing cheap funds. Consequently, these banks are inclined to be better capitalised and hold more liquid assets. Kashyap and Stein (2000) show that data on American banks support this hypothesis.

We further analyse the validity of the enounced hypothesis in the case of commercial banks from the three countries where results are contrary to the theory: Latvia, Poland and Romania. In order to do this, we proceed to a classification in each country of the commercial banks in accordance to their size. As in studies like that of Gambacorta (2005), a bank that has the average size below the third quartile is considered "small" and a bank that has the average size above the 95th percentile is considered "big". Banks with an average size between the third quartile and the 95th percentile are considered "medium". Once we distinguish these three categories (small, medium and large banks), we determine the average liquidity and capitalisation for each of them (see Table (10)).

Table 10: Selected indicators of banks by size (average 1999-2005).

Banks		(**Small**)	(**Medium**)	(**Large**)
Country	**Indicator**			
Latvia	Liquid assets/total assets	**14.9**	**13.77**	**11.93**
	Equity/total assets	13.72	12.38	8.48
Poland	Liquid assets/total assets	9.95	12.44	17.22
	Equity/total assets	**15.52**	**14.32**	**11.49**
Romania	Liquid assets/total assets	11.62	10.85	16.41
	Equity/total assets	**20.85**	**18.70**	**18.25**

Source: Author calculation based on BankScope data.

As the data shows, the banking sectors of Latvia, Poland and Romania underpin the hypothesis that smaller banks tend to have higher liquidity and capitalisation than larger banks. In Latvia, the small commercial banks have an average ratio of liquid assets to total assets of 14.9%; whilste the large commercial banks have a ratio of liquid assets to total assets of only 11.93%. For capitalisation, in the case of Poland, the small commercial banks have a ratio of equity to total assets of 15.52%, bigger than that of the large commercial banks (of 11.49%). In Romania, we have the similar situation - the small commercial bank are better capitalised that the large ones (20.85% compared to 18.25%). All these aspects can explain the opposed sign of our estimated coefficients.

6 Conclusions

In this paper we investigate the working of the bank lending channel in the case of ten CEECs, from 1999 to 2005. We classify the commercial banks of these countries in three groups according to the banking reform criteria. Afterwards, by using a panel of annual time series for commercial banks of each group, we analyse: (i) whether monetary conditions impact on bank lending; (ii) whether there are linear relationships between some particular bank characteristics (size, liquidity and capitalisation) and the growth rate of total loans to clients; and (iii) we characterise the effectiveness of the credit channel, by looking whether there are distributional effects due to the bank's characteristics in the impact of monetary policy on bank lending.

Our analysis focuses on the fluctuations in total loans to clients over the period of 1999 to 2005. We find differences between the results in each group of countries.

The results of the estimations show that total loans to clients react to monetary policy impulses with stronger intensity in Bulgaria (1st group) and Poland (2nd group). The coefficient of the monetary policy indicator is, in both countries, negative and significant. The development of the banking sector and the recovery of the demand after the 1998 crisis could explain the stronger impact of the monetary policy on the growth rate of total loans to clients.

We find some significant linear effects of all bank characteristics on the growth rate of loans to clients. Small, liquid, well-capitalized banks enjoy higher loan growth rates.

Concerning the distributive effects of monetary policy on the growth rate of loans due to such bank characteristics, the results are as follows:

- 'size', as a bank characteristic, does not seem to influence the growth rate of total loans in the aftermath of a monetary policy change. When estimating the model with two interaction term (more exactly with 'size' and 'capitalisation'), the coefficient of the variable 'size' interacted with the monetary policy is positive and significant in the case of Czech Republic, confirming the theory: smaller banks are more affected by a monetary policy tightening. This result is in line with the findings of Pruteanu (2004).

- for 'liquidity', the estimation shows a positive and significant coefficient for Poland (2nd group), as less liquid banks are stronger affected by a monetary policy tightening. This result is in line with the findings of Havrylchyk and Jurzyk (2005) but, it is contrary to those of Wróbel and Pawlowska

(2002). We equally find a negative and significant coefficient for commercial banks from Latvia. We may suppose that this counterintuitive result can be explained by the over-liquidity of the Latvian banking sector.

- concerning the 'capitalisation', the estimation results show a positive and significant coefficient in Latvia, which confirms the theory; but these results are counterintuitive (negative and significant coefficients in Romania (1st group) and Poland (2nd group)). The result obtained for Poland can be compared to those of previous studies; Wróbel and Pawlowska (2002) show that a better capitalisation position enables banks to insulate loans from monetary policy actions; whilste Havrylchyk and Jurzyk (2005) show that bank capitalisation does not play any role in the lending behaviour of banks.
  We explain the counterintuitive findings by showing that (in Latvia, Poland and Romania), the smaller banks tend to have higher liquidity and capitalisation ratios than large banks; and this, in order to counterbalance their difficulties in financing, which result from higher asymmetric information problems.

According to these findings, we cannot assert the existence of the bank lending channel in the entire sample of countries. This may be due to the short period of analysis. We do not expect the bank dependency of borrowers to decline, as the analysed economies integrate more and become similar to the European economy. The continuously diminishment of excess liquidity in the banking systems and the decreasing capitalisation, due to the increasing efficiency, outlines the possibility of strengthening of the bank-lending channel in the future, in CEECs.

We expect that if we further disaggregate the data, this will increase the precision of the estimates. We can use quarterly data to perform the regressions. We plan to attempt this in future work.

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A Appendix

Appendix 1

Table 11: Variables definition.

Variable	Definition and Source
Loans	total loans to clients (th. USD), BankScope
Monetary Policy Indicator	money market rate (annual data), IFS
GDP	the growth rate of real GDP (annual data), own calculation, IFS
Inflation	CPI % changes (annual data), IFS
Size	the total assets (th. USD), BankScope
Liquidity	the ratio of liquid assets to total assets (%), own calculation, BankScope
Capitalisation	the ratio of equity to total assets (%), BankScope

Appendix 2

Table 12: Banking reform and interest rate liberalization evolution- EBRD (2006).

	'89	**'90**	**'91**	**'92**	**'93**	**'94**	**'95**	**'96**	**'97**	**'98**	**'99**	**'00**	**'01**	**'02**	**'03**	**'04**	**'05**
BU	1	1	1	1,67	2	2	2	2	2,67	2,67	2,67	3	3	3,33	3,33	3,67	3,67
CZ	1	1	2	3	3	3	3	3	3	3	3,33	3,33	3,67	3,67	3,67	3,67	4
ES	1	1	1	2	3	3	3	3	3,33	3,33	3,67	3,67	3,67	3,67	3,67	4	4
HU	1	1	2	2	3	3	3	3	4	4	4	4	4	4	4	4	4
LA	1	1	1	2	2	3	3	3	3	2,67	3	3	3,33	3,67	3,67	3,67	3,67
LI	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3,33	3,33	3,67
PO	1	2	2	2	3	3	3	3	3	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,67
RO	1	1	1	1	1	2	3	3	2,67	2,33	2,67	2,67	2,67	2,67	2,67	3	3
SK	1	1	2	2,67	2,67	2,67	2,67	2,67	2,67	2,67	2,67	3	3,33	3,33	3,33	3,67	3,67
SL	1	1	1	2	3	3	3	3	3	3	3,33	3,33	3,33	3,33	3,33	3,33	3,33

1: little progress beyond establishment of a two-tier system.
2: significant liberalisation of interest rates and credit allocation, limited use of directed credit or interest rate ceilings.
3: substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation: full interest rate liberalisation with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.
4: significant movement of bank laws and regulations towards BIS standards; welle-functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.

Appendix 3: "Extended model" with two asymmetric effects

Table 13: 'Extended model' (equation (9)) (long term coefficients) (d).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variables: **Size (S)** & **Liquidity (L)**					
Monetary Policy					
Bulgaria	-0.083***	Latvia	-0.005	Czech R.	-0.067**
	(0.030)		(0.102)		(0.030)
Lithuania	-0.070***	Poland	-0.023	Estonia	-0.117
	(0.023)		(0.015)		(0.211)
Romania	-0.020*	Slovakia	-0.015	Hungary	-0.005
	(0.011)		(0.020)		(0.045)
		Slovenia	0.006		
			(0.022)		
S	-0.646***		-0.206		-0.275
	(0.184)		(0.218)		(0.282)
Monetary policy*S					
Bulgaria	-0.008	Latvia	0.016	Czech R.	0.025
	(0.012)		(0.016)		(0.020)
Lithuania	0.023	Poland	0.003	Estonia	-0.080
	(0.015)		(0.010)		(0.186)
Romania	0.004	Slovakia	-0.008	Hungary	-0.021
	(0.007)		(0.013)		(0.017)
		Slovenia	-0.002		
			(0.005)		
L	0.026		-0.005		0.035*
	(0.026)		(0.014)		(0.020)
Monetary policy*L					
Bulgaria	-0.0006	Latvia	-0.002*	Czech R.	-0.0003
	(0.002)		(0.001)		(0.001)
Lithuania	0.0004	Poland	0.001	Estonia	-0.0002
	(0.0008)		(0.0007)		(0.007)
Romania	0.0006	Slovakia	-0.0003	Hungary	-0.003
	(0.001)		(0.001)		(0.004)
		Slovenia	0.0001		
			(0.003)		
GDP growth	4.39***		2.03***		3.16***
	(0.573)		(0.433)		(1.14)
Inflation	-0.291***		-0.017		-0.201
	(0.081)		(0.080)		(0.200)
p-value Hansen	1		1		1
p-value AR1/AR2	0.049/0.497		0.324/0.372		0.023/0.285
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Table 14: 'Extended model' (equation (9)) (long term coefficients) (e).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variables: **Size (S)** & **Capitalisation (C)**					
Monetary Policy					
Bulgaria	-0.094***	Latvia	0.02	Czech R.	-0.058**
	(0.014)		(0.016)		(0.024)
Lithuania	-0.059	Poland	-0.02*	Estonia	-0.351
	(0.023)		(0.011)		(0.956)
Romania	-0.030**	Slovakia	-0.0008	Hungary	0.025
	(0.013)		(0.024)		(0.016)
		Slovenia	0.004		
			(0.009)		
S	-0.763***		-0.366		-0.490*
	(0.214)		(0.229)		(0.284)
Monetary policy*S					
Bulgaria	-0.013	Latvia	0.030	Czech R.	0.045*
	(0.016)		(0.035)		(0.025)
Lithuania	0.025	Poland	-0.008	Estonia	-0.082
	(0.018)		(0.008)		(0.184)
Romania	-0.008	Slovakia	-0.008	Hungary	-0.016
	(0.008)		(0.013)		(0.013)
		Slovenia	-0.0001		
			(0.007)		
C	-0.018		-0.107*		-0.071*
	(0.038)		(0.056)		(0.036)
Monetary policy*C					
Bulgaria	-0.0013	Latvia	-0.006	Czech R.	0.007
	(0.0012)		(0.005)		(0.005)
Lithuania	0.001	Poland	-0.008***	Estonia	-0.005
	(0.007)		(0.002)		(0.003)
Romania	-0.005**	Slovakia	0.002	Hungary	-0.001
	(0.002)		(0.003)		(0.002)
		Slovenia	-0.001		
			(0.001)		
GDP growth	4.10***		2.19***		3.10***
	(0.757)		(0.479)		(0.695)
Inflation	-0.264**		-0.042		-0.253**
	(0.111)		(0.094)		(0.102)
p-value Hansen	1		1		1
p-value AR1/AR2	0.016/0.512		0.326/0.529		0.016/0.481
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.

Table 15: 'Extended model' (equation (9)) (long term coefficients) (f).

Dependent variable:	**Growth rate of total loans to clients**				
Specifications :	(**1st group**)		(**2nd group**)		(**3rd group**)
Control variables: **Liquidity (L)** & **Capitalisation (C)**					
Monetary Policy					
Bulgaria	-0.094***	Latvia	-0.019	Czech R.	-0.025
	(0.024)		(0.024)		(0.021)
Lithuania	-0.027	Poland	-0.018*	Estonia	0.068
	(0.103)		(0.010)		(0.092)
Romania	-0.024	Slovakia	-0.009	Hungary	-0.007
	(0.015)		(0.029)		(0.031)
		Slovenia	0.016		
			(0.023)		
L	0.054		0.003		0.030*
	(0.037)		(0.010)		(0.015)
Monetary policy*L					
Bulgaria	0.0005	Latvia	-0.003**	Czech R.	-0.001
	(0.002)		(0.001)		(0.001)
Lithuania	0.002	Poland	0.001***	Estonia	0.006
	(0.002)		(0.0006)		(0.008)
Romania	0.0009	Slovakia	-0.00004	Hungary	-0.003
	(0.001)		(0.001)		(0.002)
		Slovenia	0.001		
			(0.002)		
C	0.054		-0.073		-0.028
	(0.039)		(0.053)		(0.031)
Monetary policy*C					
Bulgaria	-0.001	Latvia	0.001	Czech R.	0.004
	(0.001)		(0.001)		(0.004)
Lithuania	0.0024	Poland	-0.007***	Estonia	-0.005
	(0.010)		(0.001)		(0.003)
Romania	-0.004**	Slovakia	0.001	Hungary	-0.0008
	(0.001)		(0.006)		(0.001)
		Slovenia	-0.001		
			(0.002)		
GDP growth	4.63***		2.02***		2.74***
	(0.842)		(0.466)		(0.806)
Inflation	-3.08**		-0.065		-0.168
	(0.130)		(0.077)		(0.146)
p-value Hansen	1		1		1
p-value AR1/AR2	0.016/0.430		0.317/0.369		0.023/0.400
No. obs./ No. banks	245/59		365/95		223/52

Note: Standard errors in parentheses.
*,**,*** denotes significance at 10%, 5%, 1% level.