STRUCTURAL FACTORS IN MODERN THEORIES OF THE MONETARY TRANSMISSION MECHANISM [#]

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1. To analyse the monetary transmission mechanism it is necessary to consider at least several kinds of structural conditions. The first group, which is of particular importance for less developed countries with a shorter history of market economy and less mature market institutions, is connected with the broadest definition of an economic structure, i.e. the extent of monetization of the economy (understood as the relation of money supply to GDP). The second group of structural factors concerns more detailed conditions of the monetary transmission mechanism itself. The most important among them is arguably the GDP structure (the structure of domestic demand). It is clear that various types of expenditures, for example capital expenditures of enterprises, the consumer spending or households' housing expenditures exhibit different degree of sensitivity to interest rate changes. Other important factors are the degree of openness of the economy and its characteristics, which jointly exert a significant influence on the ways and extent to which the exchange rate affects economic activity and inflation. Another significant factor in this category is the financial structure of the economy: the relation of the internal and external sources of financing for enterprises and households, as well as the role of bank and financial market financing in the external source of funds. The structure of the banking sector is the final structural element that is crucial for the transmission process. It is a factor that exercises a significant influence on the process of the central bank interest rate transmission into interest rates on deposits and loans set by commercial banks.

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2. Some references – rather scarce – to the first problem on the list can only be found in the literature concerning developing countries. The authors usually assume, however, that a low level of monetization affects the transmission mechanism primarily because it is a characteristic feature of countries with tightly regulated official financial markets which co-exist with well-developed unofficial (illegal) credit and deposit markets[1]. Thus the suggested way of modelling the monetary transmission mechanism assumes a low level of monetization in an indirect way, by explicitly incorporating unofficial financial markets and administrative tools of monetary policy into the modelling exercise[2]. Due to these assumptions the approach cannot be utilized in the analyses of the Polish economy. There are nevertheless some interesting conclusions coming from this type of analysis. Namely, in low monetization countries the transmission (measured in a traditional way) is weaker than in developed countries and the banking system plays a crucial role in the transmission process.

Table 1. Monetization in the Euro zone, the United States, the United Kingdom and in Poland in 2001.

	Euro zone	**USA**	**UK**	**Poland**
M2/GDP	68.6%	53.8%	95.1%*	43.8%
M3/GDP	79.7%	79.0%		44.0%

* - in the case of the United Kingdom monetary aggregate M4 was used

Source: International Financial Statistics.

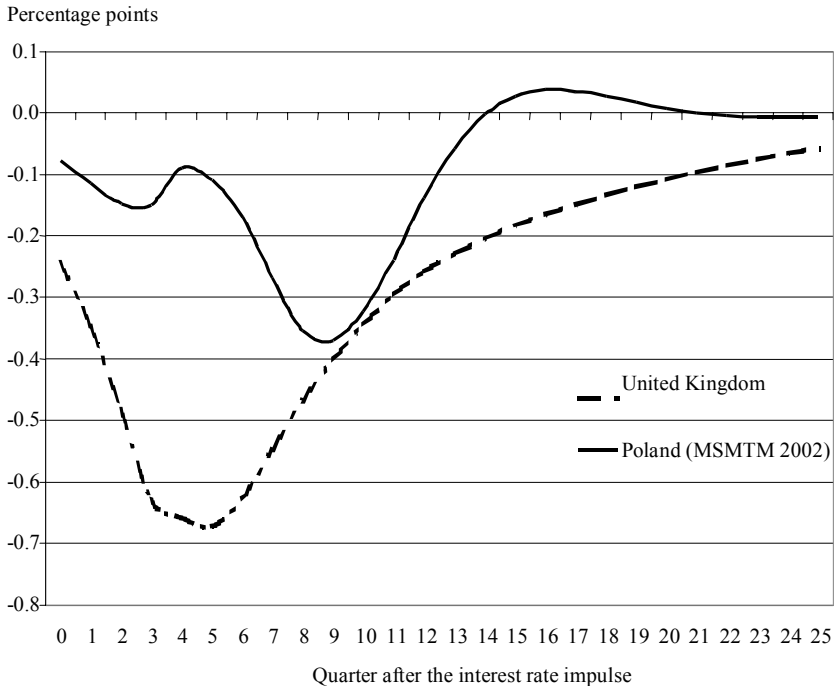
A relatively low level of monetization in Poland (table 1) could be one of the reasons why in our empirical exercises the main variables of our economy react weakly to monetary policy impulses. Although there is a gradual increase in the effectiveness of the monetary policy, the monetary transmission mechanism itself seems relatively weak and has considerable time-lags. Simulations conducted on the small structural model of monetary transmission mechanism in Poland (MSMTM) show that, compared with the British model by Batini and Haldane (1999), the reaction of the price dynamics to the

[1] See for example Agénor and Montiel (1996), p. 23 ff.

[2] This type of models have been presented by Peter Montiel in partial studies, the summary is to be found in Agénor and Montiel (1996), paragraph 5.4.

interest rate impulse[3] in Poland is two times weaker and reaches its peak with a delay that is twice that long (see chart 1).

Chart 1. The reaction of (annual) inflation to the interest rate impulse in Poland and the United Kingdom



Source: Authors` estimates study on the basis of: Mahadeva and Sinclair (2001), Kokoszczyński et al. (2002).

3. The structure of domestic demand is an important issue in the transmission mechanism studies. There are theoretical premises, which support the hypothesis that interest rate shocks affect investment, consumption (especially with respect to the housing expenditures and durables consumption of households) and net export in a different way. Differences in the response of individual subcategories of aggregate demand to interest rate changes have already found their way into a textbook discussion of the monetary transmission mechanism (see for example Mishkin (2001), p. 648 ff.). In the literature, however, there is still some controversy about how strongly interest

[3] An increase of nominal interest rate by 1 percentage point for four quarters

rates affect individual demand components. The controversy results partly from theoretical differences and partly from different empirical results[4].

The relationship between interest rates and the two most important demand components, i.e.: consumption and investment has been presented comprehensively in Mahadeva and Sinclair (2001). Their conclusion based on microeconomic foundations is that after an increase in nominal interest rate consumption decelerates, while low real interest rates in the past accelerate consumption growth. This hypothesis, verified on the cross-section time series estimates for many countries seems to offer an adequate description of consumer behaviour in the US, Japan and the United Kingdom. In other countries this kind of relationship explains consumption changes only partially or not at all. It is worth noting, however, that the results discussed here did not take into account the breakdown of consumer spending into durable and non-durable goods and the degree to which consumer spending is financed by credit. Other studies, which address this problem explicitly (in particular Erceg and Levin (2002) for USA) show that monetary policy can affect consumption of durables much stronger than consumption of non-durables. Similar conclusions can be drawn from the studies by Peersman and Smets (2002). They show that in seven European countries[5] the branches of industry, which produce durable goods, are nearly three times more sensitive to monetary policy impulses than others. While interpreting such results it has to be borne in mind, however, that interest rates changes themselves are almost always the reaction of monetary policy to economic events. In empirical tests it is therefore impossible to separate clearly the influence of monetary policy on consumption from the influence of factors contributing to changes of the monetary policy itself.

In the case of investment the problem of interest rates' impact is even more complex. Now, the key element is the user cost of capital. It depends, however, not only on the cost of funds which is directly affected by interest rates, but also on depreciation, taxes and the ratio of the price of capital to production. Secondly, the interest rate often changes in reaction to investment demand growth, which makes it extremely difficult to distinguish between the influences on investment exerted by growing investment demand and by growing interest rates. Thirdly, some investment components (shares,

[4] In Guiso et al. (2000) the authors compare monetary policy impulse propagation in various European countries and construct a series of structural indicators on the basis of which it is possible to evaluate the effectiveness of individual transmission channels.
[5] Austria, Belgium, France, Spain, the Netherlands, Germany and Italy in the years 1980 -1998.

machinery and equipment) are to a large extent traded internationally, which means that they are affected additionally by the exchange rate and foreign prices (thus by monetary policy as well, but in the exporting country). All those factors make it difficult to formulate an unequivocal formula of interdependence between investment and interest rates, which could become a direct basis for empirical tests (see Mahadeva and Sinclair (2001), 54-64, Guiso et al. (2002), 3-7). The results of empirical studies based on aggregated statistical data have shown a relatively weak direct influence of interest rates on total investment. Therefore competing approaches started gaining popularity. In one of them the interest rates' influence is tested separately for individual investment components – estimates of this kind usually show a strong influence of interest rates on housing construction and slightly weaker on corporate investments (see Erceg and Levin (2002), and Kuttner and Mosser (2002)). Another approach uses microeconomic data on investment of individual companies. This makes it possible to obtain more detailed estimates of the user cost of capital and the reaction of investment to interest rates' changes than in the studies based on aggregated data (see Guiso et al. (2002)).

Thus, transmission mechanism studies should take account of the domestic demand structure. Ideally, they should be conducted on such a level of disaggregation that enables to analyse the transmission process separately for each of the basic demand components.

4. So far we did not consider directly the interdependencies resulting from the relationship of the economy with foreign markets. Openness of the economy introduces into the transmission mechanism analyses the issue of the influence exerted by the exchange rate on inflation. The simplest approach to this problem is based on the definition of the degree of the openness of the economy as the share of imported goods in total consumption. Their prices are included directly in the consumer price index and their weight depends on the degree of the openness of the economy. Also, in the case of the open economy there are specific factors affecting domestic production and the output gap, namely the external demand and the exchange rate (see Gali and Monacelli (2001)). Further theoretical analysis depends primarily on the assumed exchange rate regime. In the case of a fixed exchange rate and the assumption of a free movement of capital the domestic and the foreign interest rate are practically the same. The above assumptions lead to the transmission mechanism, which is not qualitatively different

from the case of a closed economy, the only difference being that the degree of the openness of the economy and foreign demand pressure exert a quantitative influence on the domestic production and inflation. If, however, we exclude the assumption of the fixed exchange rate, then this additional transmission channel has to be taken explicitly into consideration. Changes in the nominal exchange rate are usually explained within the framework of the uncovered interest rate parity (UIP) principle (see Kokoszczyński et al. (2002) para 3.2). Their influence on the output gap and inflation consists of several elements. The first one is the direct effect of the exchange rate movements on the consumer price index, mentioned above. It depends on the share of tradable consumer goods and the degree of substitution between foreign and domestic goods. However, if import is dominated by producer goods, the exchange rate influences primarily the domestic output gap and only then inflation. Moreover, the mechanism is highly dependent on the pricing methods used by foreign exporters. If they set prices in local currency of the importing country (as it is often the case in developed countries) the exchange rate changes will affect first of all the domestic exporters' profit margin (if domestic exporters set prices of their products in foreign currency). In such cases other channels through which the exchange rate can influence domestic production and inflation are no longer that important and the case is not much different from the fixed exchange rate.

Thus, recent theoretical studies suggest that to draw more precise conclusions about the transmission mechanism in an open economy it is necessary not only to analyse the degree of its openness and the nature of the exchange rate regime, but also the details of market organization[6].

5. The role of financial structure in the monetary policy transmission mechanism is twofold. Firstly, when we look at the traditional interest rate channel, the financial system structure exerts a significant influence on the transmission process of the central bank interest rates into bank loan and deposit interest rates and into the prices of other financial assets. The simplest theoretical approach to the analysis of the first phenomenon is the oligopolistic competition model on the deposit and loan market proposed by Monti and Klein[7]. They show that the sensitivity of the deposit and loan

[6] An excellent and concise review of the topic is to be found in Obstfeld (2002).
[7] A detailed description of the model can be found in Freixas and Rochet (1997), chapter 3.

interest rates to changes in the money market interest rates (influenced by the central bank) depends on the number of banks, which is the simplest proxy of competition intensity. The impact of the central bank interest rates on the price of other financial assets is usually treated as a process of portfolio adjustments. They are deeply influenced by the institutional characteristics of the financial markets, the degree to which they are regulated, and the available range of financial instruments (see Kneeshaw (1995), Sellon (2002)). The financial system structure is a vital factor determining the existence and importance of the credit channel in the transmission mechanism.

6. The credit channel consists of the bank lending channel and the balance sheet channel. The operation of the balance sheet channel depends on structural factors, because it is conditional on the share of debt in net capital. In countries where this proportion is relatively low, a contractionary impulse of monetary policy, which exerts a negative impact on the net capital value, should limit the enterprises' borrowing capacity in a relatively smaller degree than in the economies, where this ratio is higher. Thus, the bigger the financial leverage, with other things equal, the lower the effectiveness of the balance sheet channel in the monetary transmission mechanism. Another indicator of the balance sheet channel mentioned by Guiso et al. (2000) is the average size of the enterprise. Due to the information asymmetry, banks require more collateral from smaller companies. Therefore the monetary policy tightening affects those companies more than others: financial sources to which they can gain access are relatively more limited than in the case of larger companies. By the same token, the ratio of the households` debt to the disposable income is important for the operation of the balance sheet channel. Namely, a bigger share of households` debt means that a drop in the disposable income, caused by tighter monetary policy, will result in a relatively bigger decrease of the household borrowing capacity. An important role in the functioning of the balance sheet channel is played by the credit contract enforcement procedures, applied in the event of default. This applies for example to the number of months required to change the ownership title of the pledged security or the costs of seizing the pledged real estate by the bank as a proportion of its value. The countries, in

which such procedures are relatively more costly or last longer, are relatively more likely to experience credit rationing[8].

7. A necessary condition for the bank lending channel to operate is that monetary policy influences commercial banks balance sheets and that market players cannot make their consumption and investment demand fully independent of the bank credit[9]. On the basis of the latter assumption it can be expected that enterprises, which have a relationship with one bank exclusively, are more vulnerable to the negative effects of the bank's limiting its loans supply. Enterprises which diversify their external sources of financing and co-operate with more than one bank minimize the risk of a sudden reduction of available funds. Another structural feature, which characterises the importance of the bank lending channel in the transmission mechanism of monetary policy is the size of the capital market, which gives an idea of the availability of external sources of funds other than bank loans. Empirical studies conducted in the United States prove that the impact of monetary policy on the bank credit supply is stronger in the case of smaller banks. On this basis one can formulate the third criterion applied in the assessment of the bank lending channel operation, i.e. the average bank size, measured by the sum of the total assets. Using analogous criteria Cecchetti (1999) shows that those European countries with less developed capital markets, in which enterprises are more dependent on bank financing and whose banking system is dominated by small institutions, are more sensitive to the interest rates changes than other European economies [10].

The effectiveness of the bank lending channel depends also on the commercial bank asset structure. If they comprise large portfolios of highly liquid assets, the bank lending channel's operation is weakened: due to special types of relationships with the borrowers, the banks may wish to continue lending at the price of necessary adjustments in the portfolio of liquid assets. In the literature this phenomenon is called buffer-stock behaviour[11]. Its presence in European economies seems to be confirmed by the studies conducted by Ehrmann et al. (2001). They show that the credit supply's reaction to a

[8] The problem is analyzed in greater detail by Cecchetti (1999).
[9] See N. Watson (1999), p. 9; V. Ramey (1993), p.3.
[10] In the same publication Cecchetti argues that financial structure is determined by the features of a country's legal system.
[11] For example H. Garretsen, J. Swank (1998).

monetary policy impulse depends on a degree of liquidity of a bank: banks with lower liquidity react stronger than more liquid institutions.

It is worth noting that the buffer-stock behaviour phenomenon influences not only the bank lending channel, but also the interest rate channel. Altimari et al. (1997) argue, that portfolios of Treasury bonds kept in the past by Italian banks played the role of "secondary liquidity", which enabled the banks to offset the potential effects of a tight monetary policy and limited the reaction of loan interest rates to changes in the policy.

8. Many elements of the structural conditions of the transmission mechanism presented above have been reflected in the methodology of empirical studies. The analysis of structural features by Guiso et al. (2000) highlights significant differences in the monetary transmission mechanism between European countries. Those differences refer both to the impact of monetary policy impulses on the economic activity and inflation as well as to the relative importance of individual transmission channels. For example, the Italian economy seems to be particularly vulnerable to interest rate impulses. Its characteristic features are: significant stock of real capital, low contract enforcement, dominance of small companies, rigid labour market and financial intermediation structure dominated by banks, most of which are small. In contrast, the British economy seems to be least sensitive to the monetary policy. The share of real capital in GDP in the United Kingdom is small, the labour market is relatively flexible, and the legal system is more rigorous in contract enforcement. Moreover, due to their size, British enterprises can benefit from non-bank sources of external financing[12]. Other countries seem to be in between those two extremes and their structural characteristics, which describe the importance of individual transmission channels, suggest greater or smaller vulnerability to monetary policy impulses. In Germany the effectiveness of monetary policy is weakened by the dominance of large enterprises and legal provisions facilitating efficient contract execution. On the other hand, a relatively large share of investment and export to the countries outside the European Union in GDP and a relatively rigid labour market amplify the monetary policy impulse propagation. Although the French commercial banking sector consists of larger institutions than in Germany and the stock exchange is more developed, a low financial and household

leverage ratio, as well as high costs of contract enforcement suggest that monetary policy transmission in France is less effective.

9. The most advanced among empirical studies of the transmission mechanism for Poland are those concerning the role of the financial structure. Despite a gradual development of the capital market in Poland, banks remain the most important financial intermediaries. The corporate bond market is practically non-existing, while the commercial paper market is relatively shallow. The capital market is available to a relatively limited group of companies and does not play a pivotal role as a source of funds. Although loans rank high among external financing sources for Polish enterprises, according to surveys in the last three years firms intended to self-finance more than 40% of investment projects[13]. All these phenomena limit significantly the effectiveness of the interest rate policy.

Table 2. Financial market structure in the Economic and Monetary Union, USA and Poland (as % of GDP) in 1999

	Euro Zone	**USA**	**Poland**
Bank assets	181	99	73.3
Commercial loans	45.2	12.6	23.6
Commercial papers	3.6	25.7	1.8
Stock exchange capitalization	90	193	20

Source: R. Kokoszczyński et al. (2002).

Selected features of the banking sector merit special attention when one considers structural factors, which weaken the monetary policy transmission mechanism in Poland. First macroeconomic studies in this area concerned the role of the ownership

[12] L. Guiso et al. (2000), p. 26.
[13] See NBP (National Bank of Poland) (2002), p. 25

structure and regulatory privileges awarded to state banks in weakening the bank lending channel and the interest rate channel[14].

The results of these studies seem to confirm the observation of Cecchetti and Kraus (2001), who argue that the increase of monetary policy effectiveness in some developed and emerging economies in the eighties and nineties, was closely linked to a reduction of the state ownership in the commercial banking sector and to the introduction of the deposit guarantees.

The asset structure of commercial banks is another factor, which weakens the effectiveness of the transmission of monetary policy impulses in Poland. As shown by Łyziak (2000), relatively large portfolios of highly liquid assets, such as Treasury bonds and bills and the National Bank of Poland bills, which in 1995-1999 accounted on average for 19.7% of the commercial banking sector assets, enabled banks to follow the buffer-stock behaviour and thus to offset monetary policy tightening. The estimates suggested that during the first few months after an unexpected change of the central bank's interest rate the reaction of liquid assets was much stronger than the reaction of credit supply.

Consolidation in the Polish banking system can lessen the importance of the bank lending channel[15]. Panel research on the monetary transmission mechanism in the banking system[16] shows, that the bank lending channel operates primarily through small

[14] All Polish commercial banks are covered by a partial deposit guarantee scheme, which results from the mandatory membership of the banks in the Banking Guarantee Fund. Until the end of 1999 three out of four largest state banks (PKO BP, Pekao S.A., BGŻ) were covered by full explicit state guarantees. State guarantees served to protect the institutions in the period of enhancing their competitiveness in relation to other Polish and foreign banks. In the years 1994 –1998 the banks covered by full explicit state guarantees accounted for 20% of the capital and 35% of the total assets in the banking system. Other state banks had a kind of implicit guarantee due to their state status. Opiela (1999) argues that deposit interest rate in state banks covered by the guarantees was lower than in private banks, in the case of which the depositors required as if a higher risk premium. Moreover, as shown by Nikiel and Opiela (1998), term deposits' sensitivity to interest rate changes in the state banks with full guarantees was lower than in private banks in the situation when the interest rate was reduced and higher than in private banks when the interest rate was increased. It means that for state banks covered by full guarantees it was relatively easier to acquire term deposits, which until 1999 were subject to lower mandatory reserve requirements than current deposits. Thus, when monetary policy became tighter the banks with full explicit guarantees of the State Treasury were able to obtain funds and lend more easily than private banks. Factors such as the state banks' soft budgetary constraints, regulatory privileges, a large number of branches, established relationships with households and favourable public perception as institutions "too state owned to fail" (a variation of the well-known doctrine "too big too fail") reduced their vulnerability to the central bank policy even further.

[15] Although international experiences concerning the impact of consolidation processes on the monetary transmission mechanism are not unequivocal, it is generally believed that they can significantly limit the importance of credit channels. See Group of Ten (2001), p. 244.

[16] See E. Wróbel, M. Pawłowska (2002).

banks with limited capital. It is worth noting that this conclusion is consistent with the results of studies conducted in the US (Kashyap, Stein (1995), Kishan, Opiela (2000)). On the other hand analogous study for the eurozone countries (Ehrmann et al. (2001)) showed that monetary policy influences the bank less liquid banks.

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