Monetary Transmission Research in Europe: Lessons for Ukraine

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1. Introduction

The term 'transmission mechanism of the monetary policy' is applied to the whole process in which central bank's monetary policy actions affect macroeconomic variables such as economic activity and price developments. Given the perceived rising importance of monetary policy in promoting sustainable growth and stability of economies (Mishkin, 1996) the recent years saw an intensification of efforts to understand, describe and draw policy relevant lessons from the nature of monetary transmission processes.

This effort has clearly resulted in better understanding of the broad features of the monetary transmission, though it should be stressed that complexity of the process, differences between countries and instability of the relationships over time all result in there being no unique and undisputed view of all the aspects involved (ECB, 2004).

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This paper aims at providing an overview of recent monetary transmission research in Europe that is then used to pose some open questions concerning the future of related work on Ukrainian economy. Section two sketches the analytical framework that is most commonly used in the analysis of monetary transmission process. Next section discusses some institutional features that affect the nature of the transmission process itself and analytical approaches to it. A quick guide to empirical strategies and the typical results they produce in other countries can be found in section four. Concluding section offers a view on the research agenda for Ukraine that draws from the experience of earlier work on other European economies and from specific features of the Ukrainian economy.

2. Steps and channels of monetary transmission

Since the interactions between monetary policy decisions and the behaviour of various macroeconomic variables are very complex, it is useful to organise the discussion by introducing some classifications and structure. For simplicity of the exposition we assume here that a major tool of the monetary policy is the possibility to set official interest rates (which is true in countries following floating exchange rates; in an environment of the fixed exchange rate regime monetary authorities cannot control interest rates which are normally determined by the developments in an economy using a currency that serves as an anchor of the peg). One important classification (cf. Bank of England, 1999a) distinguishes two steps in which the monetary policy operates:

- from a change in official interest rates to financial and assets markets
- from financial markets to the spending behaviour of firms and households

Another popular classification distinguishes the following mechanisms (‘channels’) of impact of monetary policy (one should keep in mind that there are obvious interrelationships between them):

- The interest rate channel. The most straightforward effect is that changes of official interest rates directly impact other short-term interest rates and consequently also costs of borrowing along the yield curve. This clearly has an impact on the savings / investment / consumption decisions and thus on short-term output growth rate. Also, changes in the

yield curve affect wealth of economic agents (e.g. via stock and real estate prices). Furthermore, these changes in the demand affect the supply demand equilibrium and thus also feed to prices. A standard relationship is that an increase in official interest rates dampens output and (possibly with a longer lag) reduces inflationary pressures.

- The exchange rate channel. Interest rate changes may impact on the nominal and/or real exchange rate, which in turn directly impacts on prices in the economy. Also it may impact on relative demand/supply of domestically produced versus foreign goods and thirdly it may affect the wealth of economic agents.

- The expectations channel. Surprise monetary policy decisions may impact on economic agents' expectations about future price and output developments and thus also on agents' behaviour.

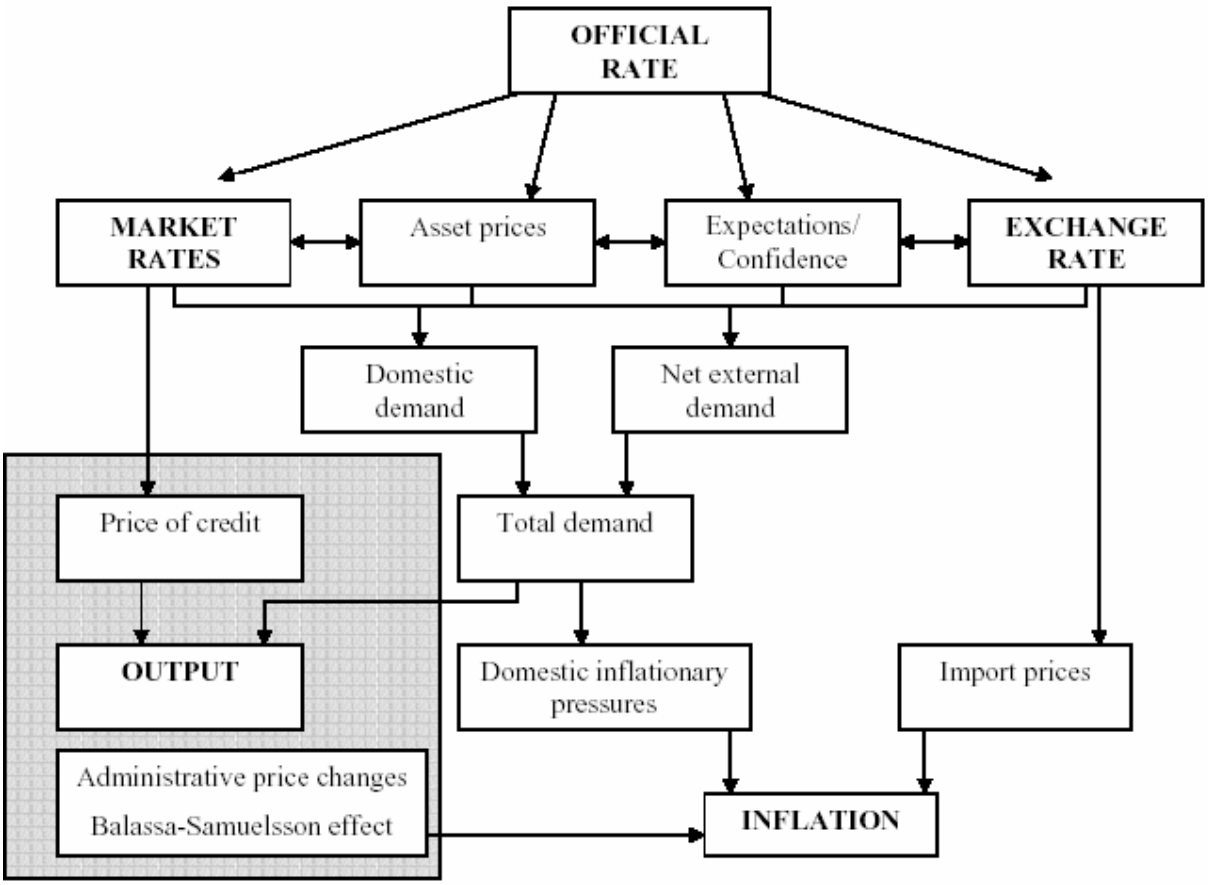
- The credit channel. Banks propensity to provide capital may be altered by monetary policy decisions beyond the simple augmentation of the interest rates. This is because, in some cases, interest rates moves may not clear the market so that quantity of credit may matter on top of the prices of credit. Monetary tightening may make some banks facing capital constraints thus forcing them to adjust lending more sharply than it would otherwise be needed. On the other hand, some firms may find it harder to obtain credit after monetary tightening due to balance sheet effects – e.g. change in cash flows and changes in prices of assets that can be used as collateral.

While such classifications (the one given above is not unique – e.g. 'expectation channel' is not always treated separately, some authors also distinguish the 'asset prices channel' with regard to assets ranging from currencies to bonds, real estate, stocks, etc.) are useful in organising the discussion it is often difficult to clearly distinguish between channels and it is usually even more difficult to asses relative importance of channels.

The traditional treatment of the interest rate channel usually abstracts from the effects of interest rate changes on agents' expectations and also on the price on currencies and other assets. The underlying theory is based on the assumptions that central banks have some influence on the real interest rates and not only nominal rates and secondly, that components of aggregate demand are interest sensitive (Juks, 2004).

While the manipulation of monetary policy instruments (such as official interest rates) clearly is the major tool of conducting monetary policy and most empirical studies concentrate on the analysis of their impact, there are also other less formalised methods of exerting impact on financial markets and consequently possibly also on investment and consumption decisions. The most important of these is probably manipulation of information, i.e. issuing news to market participants that impact on their expectations of future policy actions (including the possibility of the change or modification in the monetary policy regime). Examples of such news include any central bankers' comments on the expected/intended ERM II accession dates in non-euro EU member states, comments on the exchange rate trends (in countries where central banks occasionally intervene in the forex market), comments on inflation forecasts (in countries where central banks are focused on price developments).

Figure 1. The transmission mechanism of monetary policy – a simplified view



Note: Only the most important interactions between variables are shown.
Source: Excerpted from Ganev et al (2001). The original source is Bank of England (1999). Compare also ECB (2004).

3. Monetary policy regimes, institutional arrangements and the scope for monetary policy

Clearly, the nature of the transmission mechanism is crucially affected by the monetary policy regime (Mayes, 2004b). Central banks can basically either control the price of money (interest rates) or the quantities of money provided, or some combinations thereof. In a (credible) fixed exchange rate regime with full convertibility of the currency the central bank effectively looses the control on interest rates. Since domestic and anchor currencies are fully exchangeable, domestic interest rates should follow the rates in the anchor currency with some (possibly time varying) risk premium. However, one should keep in mind that even in a floating exchange rate system, the ability of small open economies to set interest rates fully independently is limited by the impact of external factors (Dąbrowski, 2002) and it is not a coincidence that we typically observe co-movements in interest rates by world economies. Indeed, as noted by Mayes (2004a): 'Inside or outside a monetary union small countries simply have to accept the monetary decisions that relate to the needs of the larger countries and work out a strategy for adapting to them with a minimum of real cost to their citizens. The scope for running a divergent monetary policy despite different domestic shocks and requirements is small.' An interesting piece of empirical evidence supporting this view is provided by Frankel et al. (2002). They study the behaviour of interest rates in the large sample of developing and industrialised economies during the three decades. The conclusion is that in the long run there is almost full transmission of international interest rates to local rates, perhaps with the exception of the largest industrialised economies (US, Japan, Germany) who are thus the only ones able to possibly adopt independent monetary policy. In the short run, exchange rate regimes appear to matter with the intuitive result that countries adopting more flexible regimes have more room of manoeuvre for (temporary) independent policy since local rates adjust slower to movements in international rates. Clearly, the situation would look different for countries with efficient capital controls. Still, in the long run efficiency of capital control can be debatable.

The structure of the banking system and institutional arrangements surrounding it are another important elements impacting heavily on the nature of the monetary transmission process. This remains true also for highly developed economies with well developed banking and financial sectors such as EMU countries. Indeed, in their study on the euro-zone, Ehrmann et al. (2003) list four aspects could matter for monetary transmission process: the importance of

state influences in determining credit flows, the prevalence of relationship lending, the size of deposit insurance guarantees, and the extent of bank networks. It is no surprise that such issues matter even more in countries with less developed financial architecture, where the importance of the 'credit channel' of transmission is usually stronger. Also, institutional arrangements turn out important in influencing the first stage of monetary transmission, i.e. from official interest rates to money market rates. In the context of the euro-zone Moschitz (2004) observes that 'the behaviour of the overnight rate depends on reserve supply, but equally important on the institutional framework for the reserve market'.

4. Empirical approaches to monetary transmission

There is a multiplicity of empirical to monetary transmission. One could classify them into the following broad categories:

- less formalised studies using narrative, graphical and comparative arguments to make inference about the factors at play and their relative importance
- studies using vector autoregressive (VAR) framework with relatively low data requirements and imposing relatively mild theoretical assumptions
- studies based on small-scale structural macroeconomic models
- studies based on large-scale structural macroeconomic models
- studies based on microeconomic evidence on the behaviour of non-financial enterprises
- studies based on microeconomic evidence on banks behaviour.

4.1 Brief review of empirical literature

Rather unsurprisingly, there is a vast literature looking at the effects of the monetary policy in the US. These analyses benefit from the availability of long time series data. Also, many advances in theoretical models behind monetary transmission analyses as well as empirical approaches were pioneered by researchers based in US universities. Classical references to articles reviewing the large body of monetary transmission research on the US include Leeper, Sims and Zha (1998) and Christiano, Eichenbaum and Evans (2000).

The emergence of the European Central Bank and the introduction of the euro have boosted demand for better understanding of monetary transmission mechanism in the EU12. In 1999, Monetary Transmission Network was created involving ECB and euro-area central banks' economists to comprehensively study the transmission of the monetary policy in the euro-area[1]. The outcome of this work was published in the ECB working paper series (no. 91-114) and subsequently in Angeloni, Kashyap and Mojon (2003). A summary of results can also be found in Angeloni et al. (2003).

Ganev et al (2001) contain a fairly extensive survey of papers dealing with monetary transmission in Central and Easter Europe. Some more recent results and references to other interesting work can be found in Garbuza (2003), Schmitz (2004) and EFN (2004). A review of the work on three Baltic States can be found in Bank of Estonia (2004).

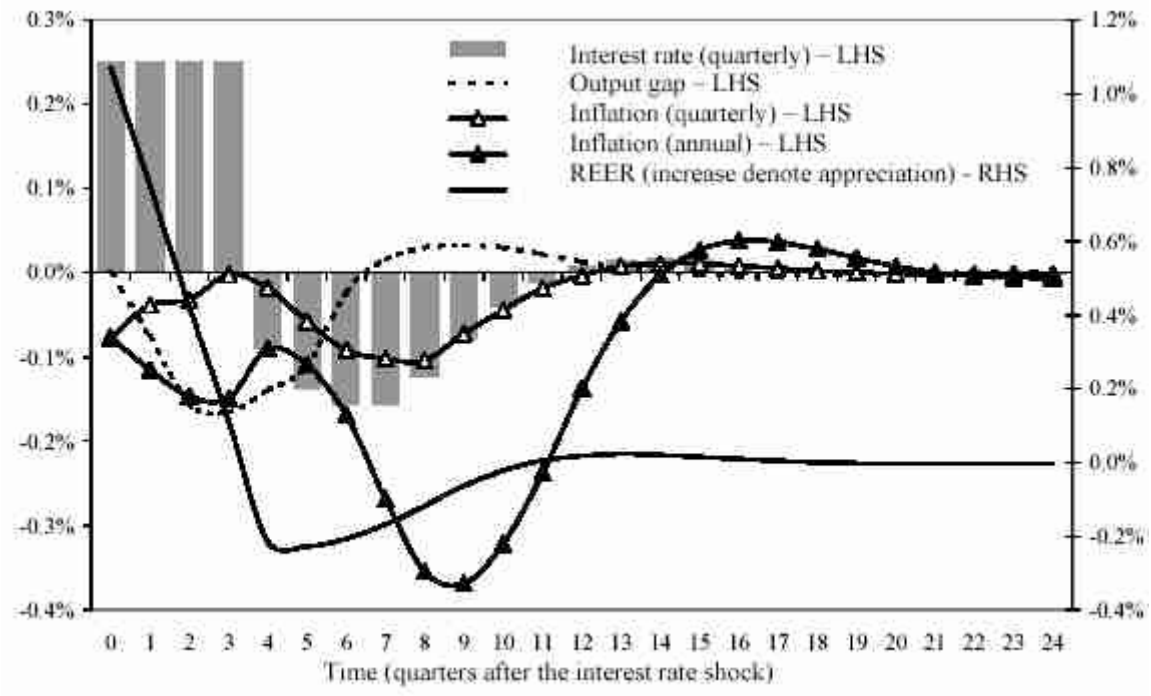
4.2 Results for Poland

This section reviews some of the results on monetary transmission in Poland and discusses the issues involved in various approaches. It is intended to give an overview of results from various strands of literature in a country where data availability is an issue. It is worth bearing in mind that throughout the analysed period Polish monetary policy regime was gradually moving towards increased exchange rate flexibility with direct inflation targeting introduced in 1999. Recent years also saw a no-interventions policy of the central bank that did not try to affect the exchange rate of the zloty by entering the forex market.

Kokoszczyński et al. (2002) review results pertaining to monetary policy transmission in the Polish economy using the variety of approaches. One set of results (see also Łyziak, 2002) is based on the small structural model motivated by the framework of Clarida, Gali and Gertler (1999). Impulse response analysis (Figure 2) reveals a rather typical pattern. Output gap falls with a strongest impact felt 3 quarters after the initial monetary policy tightening. The strongest impact on inflation materialises after some 7-9 quarters.

[1] For more information on Monetary Transmission Network see http://www.ecb.int/home/html/researcher_mtn.en.html.

Figure 2. Impulse responses to a shock defined as an interest rate increase by 1 percentage point for one year derived using the version of National Bank of Poland's small structural model



Source: Excerpted from Kokoszczyński et al. (2002).

While these results appear realistic and in line with some evidence pertaining to other countries they should be cautiously treated as providing just a rough approximation of monetary transmission in Poland in the period up to 2001 (1994-2001 data were used to estimate the underlying model). Kokoszczyński et al. (2002) note significant changes in impulse responses to monetary policy shocks depending on the version of the model used and a data sample used to estimate the model equations. This should not be surprising given the substantial changes in the whole monetary policy framework in Poland during the last 15 years (from various forms of pegged exchange rate regime to a free float), and anyway short data samples used to estimate models (implying large error margins) and simplicity of the model.

Another set of results comes from analysis based on identified vector autoregressions (VARs). Such an approach requires a selection of variables included in the analysis and a selection of identification schemes (to be able to simulate orthogonal shocks in one variable – interest rate). Kokoszczyński et al. (2002) and Wróbel and Pawłowska (2002) report the results for a three and five variables VARs with identification based on Choleski decomposition motivated by the sequencing of information available to market participants and a set of a-priori

assumptions on which variables can impact the other when. Given the very short sample period for this analysis it is not surprising that some of the results appear to be consistent with the 'consensus view' on monetary transmission (e.g. Leeper, Sims and Zha (1998) and Christiano, Eichenbaum and Evans (2000)) while the other appear to contradict the common wisdom. Some surprises in the results of VAR analyses are not typical for Poland only. For instance there is a substantial variation in the results for individual euro area countries as reported by Peersman and Smets (2001).

Kokoszczyński et al. (2002) as well as Wróbel and Pawłowska (2002) also report some results concerning the first step of monetary policy transmission as defined in this paper, i.e. the reaction of commercial banks' interest rates in response to central bank's rates changes. The analysis based on error correction model (ECM) using aggregate data reveal that nearly all deposit rates adjust to official rates within around 3-4 months and credit rates appear to adjust very quickly (up to 4 months – visibly faster than in the euro area). Short and quite specific sample that covered mostly a period of interest rate declines did not allow for making any more robust inference about asymmetry of reactions, i.e. different patterns of banks' responses to tightening and loosening monetary policy. The analysis based on panel data on individual banks reveals that credit adjustment is stronger in the case of small banks with low capital. It also produces a result of stronger adjustment in credit provision among more liquid banks (which is the opposite of what one usually finds in studies e.g. for the euro area). One should, however, be aware that the whole banking system was over-liquid throughout the period under investigation and that most of the period was characterised by monetary easing.

4.3 Selected results from other countries

This section provides an overview of empirical work in some other economies that appear to be potentially relevant for the future work on Ukraine. This selection is not based on any strictly defined rules and is certainly not extensive. It should be treated as a brief introduction to a much wider and much more detailed analysis.

Results on monetary transmission in the Baltic States could be interesting from the Ukrainian perspective. The major difference with the Polish case is that three Baltic States are much smaller and more open to trade economies and that they have followed the fixed exchange

rate regime for the last few years in an environment of liberalised capital account. An implication of this is that there has been very limited scope for discretionary monetary policy on the side of central banks. In practice their actions can be confined to controlling the reserve/liquidity requirements and possibly playing the role of the lender-of-last-resort. For example Vetlov (2004) describe the experience of the Bank of Lithuania that in an environment of the currency board regime was experimenting with carrying open market operations in the 1997-1999 period. These actions were firstly motivated by plans to gradually abandon the currency board arrangements. However, after the decision was made than in view of external shocks (Asian and Russian crises) the original exchange rate arrangement should be maintained, the Bank soon realised that there was little need for open market operations, little guidance as to what the optimal interest rate strategy should be and that continuing with carrying of such operations could send unwanted signals to market participants. Consequently, open market operations were abandoned.

Bank of Estonia (2004) reviews the results for the three Baltic States generated using small scale structural models developed at the respective central banks. One difficulty in modelling is how to incorporate monetary policy shocks in a way that would be consistent with the overall monetary system (e.g. interest rates are not under the control of central bank). The results are generally in line with those obtained for European advanced economies and specific features of reaction functions appear to be very much model dependant, thus their detailed description is skipped here.

EFN (2004) provide a set of results from VAR analyses using relatively recent data for a number of EU new member states[2].

5. Research agenda for Ukraine[3]

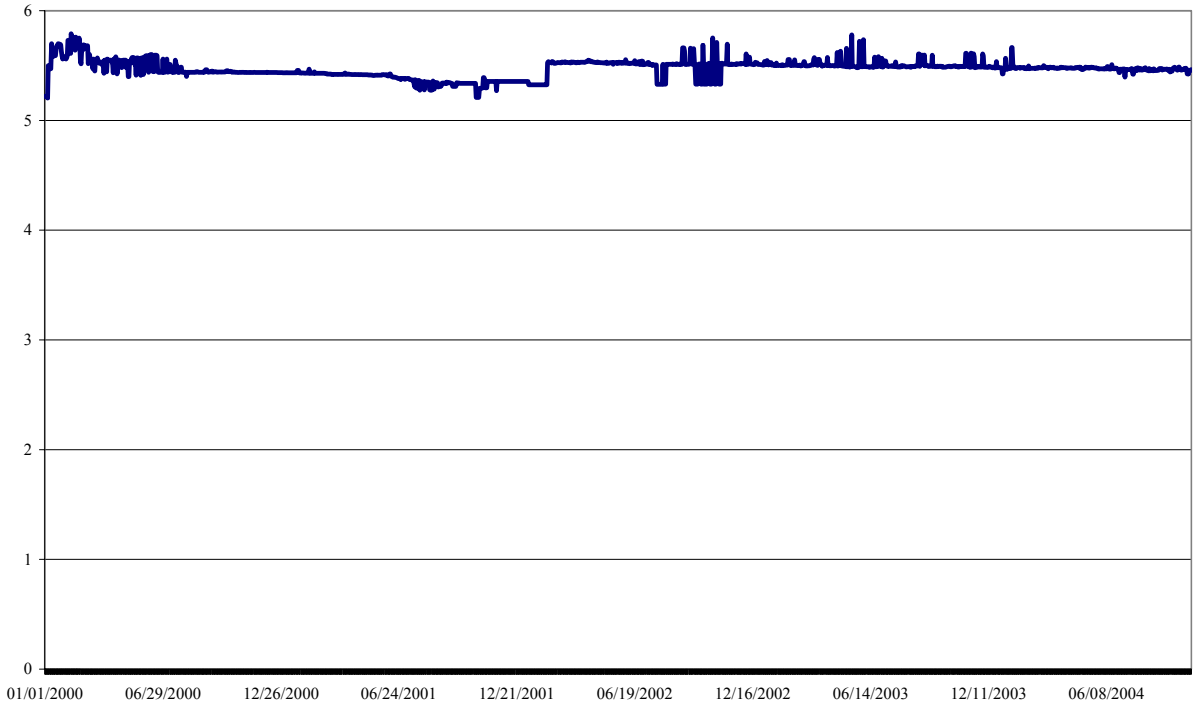
The period from the turn of 1999/2000 was characterised by *de facto* exchange rate targeting with monetary authorities aiming at stabilising the hryvnia – dollar rate. (See Graph 3. For a discussion of *de jure* monetary regime see Novoseletska, 2004.) This period was also characterised by somewhat limited and changing over time openness to capital mobility. Also,

[2] This section will be expanded with more detailed discussion in the final version of the paper.

[3] The current version of this section should be seen as an invitation to a wider discussion rather than as providing a final assessment of the situation. Any comments are particularly welcome.

as discussed in Novoseletska (2004) Ukrainian financial sector remains underdeveloped along several dimensions. All these factors have had a significant impact on the monetary transmission in Ukraine. The National Bank of Ukraine has carried the active interest rate policy (which so far did not hamper the exchange rate objective due to limited capital openness), though there was no discount interest rate change since end-2002 till end-2004, despite major swings in money market rates and CPI inflation during that period.

Figure 3. Hryvnia exchange rate against the US dollar, January 2000- October 2004



Note: The average exchange over the period was 5.47. Standard deviation was 0.08. Maximum and minimum rates were within +/-6% from the average rate.
Source: Oanda.com

Along the expected gradual liberalisation of capital account and increasing financial integration of Ukraine with rest of the world one can expect that the whole monetary policy system will need some modifications. Broadly speaking one can expect either an evolution towards a more coherent form of fixed exchange rate system or a move towards greater currency flexibility that would allow for monetary policy being provided other objectives, notably price stability. The discussion of the pros and cons of both options and involved issues lies beyond the scope of this paper. The discussion of the potential switch to direct inflation targeting strategy can be found in Dąbrowski (forthcoming).

An interesting question arises as to what specific challenges to monetary transmission research would be associated with each of the above described options. Clearly, once the monetary policy regime has been decided, pursuing the policy aiming at price stability (including, prominently, the direct inflation targeting) would require much more information on the lags, strengths and interactions associated with particular channels of transmission. In fact, the success of such a monetary strategy is dependant on the proper understanding of monetary transmission (unless one wants to hope for pure luck to help in hitting, say, the inflation target due to a combination of messy domestic policies and external shocks). Only after monetary authorities get a detailed understanding of monetary transmission processes, they can hope to be able to run efficient monetary policy. In contrast, fixed exchange rate system (such as e.g. currency board) radically limits the scope for independent monetary policy and thus somewhat limits the need for building a comprehensive picture of monetary policy transmission. However, Ukraine currently finds itself at the stage when its future monetary policy framework is yet to be decided. For this decision to be taken the following information could turn out important:

- as precise as possible knowledge of monetary transmission processes in Ukraine under various institutional arrangements in the past
- realistic assessment of how accurate the information discussed in the previous bullet point can be
- experience of other countries that decided on their monetary policy strategies in the past having at their disposal limited empirical evidence on monetary policy effectiveness (e.g. Polish and Czech experience with direct inflation targeting, Bulgarian experience with currency board, etc.).

Ultimately, the Ukrainian monetary authorities will need a well specified structural model (or a class of models) of the economy to guide further work on monetary transmission and to provide policy relevant insights into everyday actions. Given the limited data availability and the recent history of major structural changes in the economy at the early stage efforts should perhaps concentrate on building simple small scale models able to capture the most important features of Ukrainian economy. In this work, the most natural and appropriate source of expertise should be other central banks. Bank of Estonia (2004) provides an interesting overview and discussion of the models used developed in the three Baltic States. This experience of alternative modelling approaches and ensuing differences in model behaviour might be worth looking at given the otherwise similar characteristics of the countries. Another

potentially interesting lessons can be drawn from the analysis of small scale models such as Bank of Finland's EDGE model for the euro area (Kortelainen, 2002), FPS model for the New Zealand (Black et al., 1997), small structural model of the National Bank of Poland (Łyziak, 2002), some of the (very well documented) models used at the Bank of England (Bank of England, 1999b) and several other.

Clearly, the historical record provides a far-from-perfect data source for elaboration of empirical specifications. As noted by van Aarle et al. (2004) 'the monetary transmissions are still subject to uncertainties as witness e.g. volatile velocity and money multipliers, making econometric testing difficult'. Thus, in learning about monetary transmission mechanism it appears that the best approach is of extracting all possible information from existing data on Ukraine and at the same time closely monitoring the results obtained for other countries that share some important characteristics with Ukraine. Institutional aspects surrounding the financial sector as a whole and *de facto* monetary policy framework are important elements that should not be overlooked in the analysis.

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