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Transmission of monetary policy in Europe before and after EMU: Any lessons for Hungary?

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Abstract

Based on the structural features of the Hungarian economy and the experience of participating countries we find that once Hungary has adopted the euro there is a fairly limited risk of a divergent macroeconomic performance of the economy due to asymmetries in the monetary transmission mechanism. In addition, although convergence of features affecting MTM has not been overwhelming in the euro area so far, Hungary being at a lower stage of real and financial development, such structural changes may take place more rapidly, reducing the risks of asymmetric transmission of the single monetary policy to the Hungarian economy.

[1] We thank Réka Cserny for valuable research assistance.

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1 Introduction

The decision to establish the single currency area in Europe inspired a number of research projects on its consequences for the transmission mechanism of monetary policy (hereafter abbreviated as MTM). The first comprehensive volumes on the subject were already published in 1994 and 1995 by the BIS[2]. These strands of research aimed at describing the main features of the MTM in participating countries before and after the establishment of EMU.

The most important motivation for the research of monetary transmission in the euro area was to find out whether it is possible to detect asymmetries within the monetary union which may make the single monetary policy significantly less than optimal for economic stability and growth in certain Member States or disruptive for the EMU as a whole. Prior to the launch of EMU, expectations and concerns of asymmetries in MTM causing divergences and sustaining asymmetries in macroeconomic performance were broadly shared. If these concerns are justified, then the enlargement of EMU by including countries with potentially very different MTM's could be costly on the one hand and disrupt the functioning of the ECB by provoking disagreement among decision-makers on the other. Moreover, the issue may be raised whether it is in the interest of the new Member States to become full participants of EMU sooner rather than later.

Our ultimate goal in this study is to characterise the Hungarian MTM after Hungary's full participation in EMU to find out whether the single monetary policy could be potentially suboptimal for the Hungarian economy. To this end we review the euro area monetary transmission literature and stylised facts from the euro area. Our methodology is as follows: we first compare the structural features affecting MTM in Hungary with those in the current euro zone members. Then, drawing on the experience of the current members of the euro zone with euro-triggered structural changes affecting MTM, we formulate expectations on the changes in the Hungarian MTM after Hungary has adopted the euro.

In the next section we report the results from a model simulation in order to give a first impression of the direct impact, the loss of the exchange rate channel, on the Hungarian monetary transmission. The third, main part of the paper looks at those features of the economy and the financial sector which theory and intuition suggests should affect the impact of monetary policy on the real economy. In each subsection we update the analysis on the structural features of the euro area affecting MTM and try to uncover the structural changes that were triggered or fostered by the creation of the euro zone. We compare these structural features with those of Hungary and formulate expectations on the direction of future structural changes in the Hungarian economy. The last section draws lessons with regard to the risk of negative macroeconomic repercussions for Hungary due to the existing asymmetries in MTM between Hungary and the euro area.

[2] Bank for International Settlements (1994) and (1995).

2 Results from a simulation exercise

The most direct implication of Hungary's prospective euro adoption on the monetary transmission mechanism is that the euro-forint exchange rate channel will be cut off. In this section we present results from a simulation exercise showing the impact of a standard monetary policy shock under two scenarios: with and without the euro-forint exchange rate channel. This, however, can only give us a very rough idea of the changes that the euro is expected to bring about in the Hungarian MTM, because it does not take into account the structural transformation that will accompany full EMU-participation. We therefore go on to refine our analysis in the next section by looking at structural features of the Hungarian economy and elaborate on their expected development by drawing lessons from the experience of eurozone members.

We have employed the Quarterly Projection Model[3] developed and used by the Magyar Nemzeti Bank for policy analysis and forecasting to simulate the responses of key Hungarian macroeconomic variables to a monetary policy shock under the assumptions that 1. Hungary has independent monetary policy and 2. Hungary is a full participant of EMU. In the first scenario we examined the responses to a 100bps shock in the 3-month interest rate sustained for one year simultaneously in Hungary and the euro area. In the second case we simulated a similar interest rate shock in the euro area with Hungary inside EMU.[4] Comparing the impulse responses obtained from these two simulations, summarised in Table 1. below, we may get an idea of the changes in the monetary transmission mechanism after euro adoption (as captured by the model).

Hungary being a small and open economy, the level of output is strongly affected by foreign demand, which in turn is dampened to the same extent in both cases by the interest rate rise in the euro area.[5] Foreign demand being the most important factor in driving GDP, the deviations of GDP from baseline do not differ much between the two scenarios.

Both the reaction of CPI and its variance are stronger in the scenario where Hungary runs an independent monetary policy. This has to do with tighter monetary conditions in scenario 1 than in scenario 2, because in the former case the short term interest rate differential with the euro area is positive in the five years following the shock. Consistently with the uncovered interest parity condition, after a sudden appreciation the exchange rate of the forint falls as long as the positive interest differential (reflected also in long term rates) prevails. In the second (EMU-) scenario Hungarian short term interest rates are

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[3] The simulations were carried out in cooperation with Zoltán M. Jakab and Szilárd Benk. For a brief description of the MNB's Quarterly Projection Model see Jakab *et al.* (2004).

[4] The first simulation was carried out using a forward-looking Taylor-rule as the monetary policy rule for Hungary with a 0.1 interest rate smoothing parameter, a 3.86 "equilibrium real interest rate", a 0.96 weight on forecasted inflation and a 0.13 weight on the current output gap (see Benk – Jakab 2004). We used a forward-looking equation for the long-run interest rate and a forward UIP condition. For the second simulation we fixed euro-forint exchange rates and set Hungarian interest rates equal to euro area rates. For both simulations we used a Taylor-rule with NiGEM's default parameters for the euro area and fiscal solvency is assumed for Hungary. The effective exchange rate was allowed to change in both cases, taking into account the EUR/USD cross-parity multiplied by the share of the US in Hungarian trade.

[5] The responses of euro area variables to the monetary restriction by the ECB were simulated by the authors using NiGEM.

identical with euro area rates and the exchange rate disappears. Due to the positive interest differential and the appreciation of the forint in the first scenario, the drop in CPI (a result of the fall in foreign prices *and* tighter monetary conditions) is more pronounced when Hungary is outside the euro area.

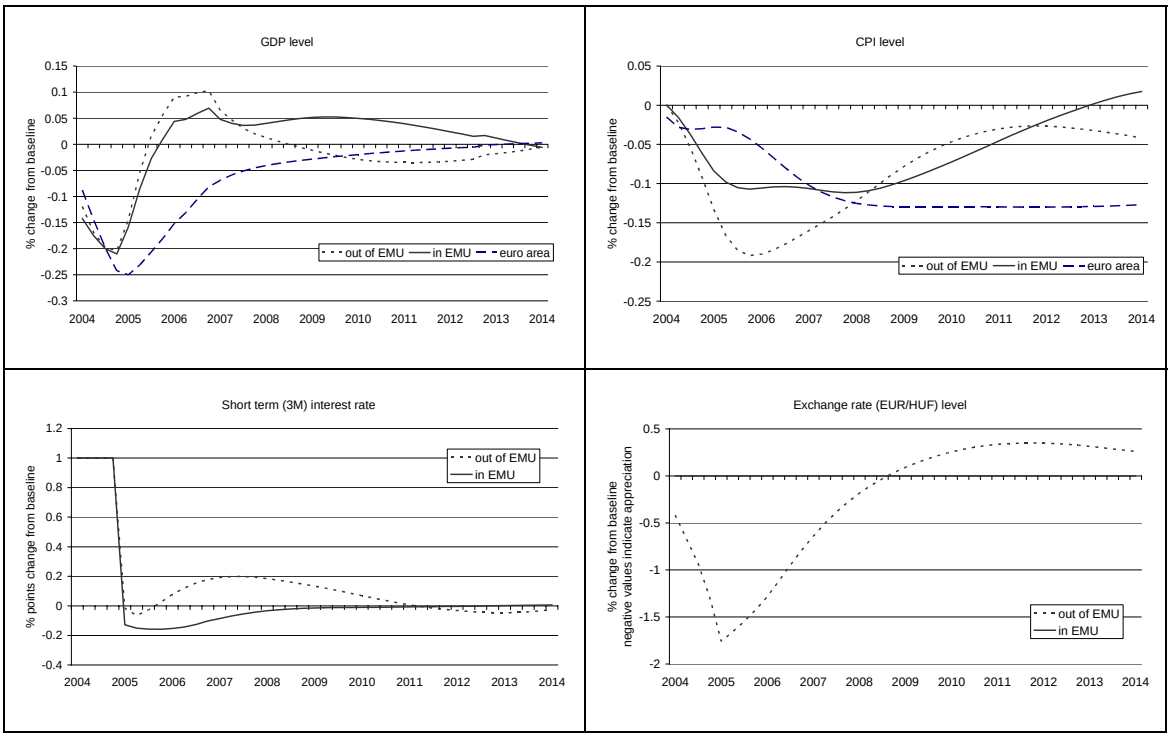
Table 1.: Impulse responses of key Hungarian macroeconomic variables under two scenarios (Hungary in EMU: right column, yearly averages)

Averages	GDP		CPI		SR		LR		RX	
1st year	-0.17	-0.18	-0.04	-0.03	1	1	0.23	0.02	-0.83	0
2nd year	-0.03	-0.07	-0.17	-0.10	-0.02	-0.15	0.12	-0.03	-1.60	0
3rd year	0.10	0.06	-0.18	-0.10	0.13	-0.13	0.12	-0.02	-1.04	0
4th year	0.04	0.04	-0.15	-0.11	0.20	-0.06	0.08	-0.01	-0.45	0
5th year	0.00	0.05	-0.11	-0.11	0.17	-0.02	0.04	0.00	-0.07	0

GDP, CPI and RX (EUR/HUF exchange rate): deviations from baseline in %

SR and LR (Short and long term interest rates): deviations from baseline in % points

Figure 1.: Impulse responses of key Hungarian macroeconomic variables under two scenarios



3 The structural indicators approach

In this section we report the results of various studies and present evidence from stylised facts in order to answer the following questions: how did the creation of the eurozone affect the MTM's of participating countries? How different is the Hungarian economy from countries of the euro area in terms of the structural features affecting MTM? Finally, how is euro adoption going to affect these features in Hungary?

The method applied here can be described as a "feature by feature" approach, because it considers all the characteristics of the economy which have been found relevant for MTM without providing a straightforward framework in which their relative importance for the economy as a whole could be assessed. As a result, this line of the literature, as well as the following analysis, was unable to come up with an unambiguous ranking of countries in terms of the impact of monetary policy actions. The line of research looking at structural indicators tried to assess the strength of three main transmission channels identified in the MTM literature[6]: the interest rate, the exchange rate and the credit channels.

We chose to look at structural features as opposed to carrying out econometrical estimations to assess the impact of the euro on the MTM of participating countries, because empirical models have so far shown scarce evidence of euro-triggered changes in participating countries' MTM's. Canova and Ciccarelli (2000) developed an empirical method which allows for time-varying parameters and Ciccarelli and Rebucci (2002) were among the first to apply this approach to analyse a group of euro area economies to find out whether the transmission mechanism had changed in the run-up to EMU. They find very small differences in the impact of monetary policy among the large euro area countries over the medium term. They also find that the mechanism changed over time during the convergence period, but not to become homogeneous, which may have been because convergence took place earlier on. To check whether a structural break occurred prior to the establishment of EMU, Clausen and Hayo (2002) perform out-of-sample evaluations of their model using Chow-tests. The results provide no evidence for a structural break in the transmission mechanisms of euro area countries ahead of the start of EMU, either. These results support the view that changes in the structural features affecting the transmission mechanisms as a result of euro adoption are likely take longer to become detectable through macro-econometric investigations.

3. 1 Interest rate channel

The strength of the interest rate channel is determined by the strength and speed of the pass-through of the interest rate into bank lending and deposit rates, the composition of output, the importance of nominal rigidities and the relative weight of income and wealth effects. A more powerful interest rate pass-through, a higher share of interest-sensitive industrial sectors (sectors producing durable goods or highly capital-intensive sectors) implies stronger transmission of monetary policy shocks. Similarly, a higher level of household's indebtedness and shorter duration of financial contracts are conducive to more powerful MTM. In the following we discuss these features one by one.

[6] For an overview see for example Mishkin (1996).

3. 1. 1 Interest rate pass-through

Interest rate pass-through refers to the first phase of MTM, namely the effect of policy rate on banks' lending and deposit rates and on long-term bond rates via money market interest rates. Although this channel seems to be the least controversial and most researched one, the various tests conducted on pre-EMU data were unable to provide unequivocal evidence in terms of the relative sensitivities of the participating countries. In one study Germany seems to belong to the most interest-sensitive group of countries, while in others the case is exactly the opposite.[7]

Mojon (2000) reports significant heterogeneity among countries in terms of the speed of the pass-through of money market rates into bank lending and deposit rates in the euro zone. German, Italian and Spanish retail bank rates are influenced by the short-term money market rates to a much lesser extent than French or Dutch bank rates, not to mention the UK. The weaker short-term interest rate pass-through in continental Europe is usually attributed to the weaker competition in the banking sector and the stronger ties between borrowers and banks. These factors enable and make banks more inclined to pass the money market rates on to their customers with a delay. De Bondt (2002) studies the pass-through on aggregate euro area data and finds that whereas in the long run changes in money market rates are 100% reflected in the short term bank lending rates, in the short run the pass-through is at most 50%.

The introduction of the euro was expected to reinforce interest rate pass-through by increasing the competition in the market for financial services, as a result of the integration of financial markets and the ongoing process of disintermediation, which should make the transmission process faster. Interest rate pass-through is virtually the only area, where some preliminary results for the period after the launch of the common currency are available: a few studies have already investigated this hypothesis, see Mojon (2000), De Bondt (2002), HM Treasury (2003) and Angeloni *et al.* (2003a). In the study by the HM Treasury (2003a) an empirical investigation is reported, in which the methodology of Mojon (2000) has been followed to estimate the interest rate pass-through for the period between 1995-2002. The short-run value estimated for the UK is again close to 100%, but a stronger pass-through is reported for the euro area countries than reported in Mojon (2000), who carried out the same estimation for the period 1980 to 1998. Similarly to the findings of De Bondt (2002), this study suggests that the pass-through has become more powerful after 1999. Finally, Angeloni *et al.* (2003b) find that the transmission of money market rates to bank lending and deposit rates has become significantly more homogenous, (stronger, though not faster) across countries in the euro zone. Similarly, they found that co-movements of yields have become stronger, which they interpreted as an evidence for the interest rate pass-through becoming more homogenous. As this process had already started before 1999, it could not be directly linked to the single currency.

The pass-through of the Hungarian money market rate into bank deposit and lending rates is remarkably strong in comparison to the larger countries of the euro zone. According to Table 2 below, interest paid on Hungarian households' deposits rises 66 basis points in three months after a 1 percentage point increase in the money market rate (3 months BUBOR), which is somewhat higher than the euro zone average. The adjustment of

[7] See for example Table 16 in OECD (1999) p. 66, which compares the result of various pre-EMU tests, or the paper by Schmidt and Goodhart's comment in Deutsche Bundesbank (1997), p. 241-246.

corporate rates is even stronger: they increase by 92 basis points in three months as opposed to 61 bps in the euro zone.

Table 2.: Pass-through of money market rates into bank lending and deposit rates

	BE[1]	DE[1]	ES[1]	FR[1]	IT[1]	NL[1]	Euro[1]	HU[2]
Short term corporate loans	100	36	55	71	62	112	61	93
Long term corporate loans	61		18	42			37	
Savings deposits	27	9	13			6	11	
Time deposits	94	82	15		63	83	65	66

Source: [1] Mojon (2000), [2] Horváth *et al.* (2004).

The strong pass-through in the case of corporate loans is attributable to the fierce competition in this market segment[8] and the pattern of bank-firm relationships. Financial market integration, which is likely to gain momentum after the introduction of the euro, is expected to reinforce the interest rate pass-through. An opposite effect is expected to work after the adoption of the euro since the ensuing monetary stability should increase the share of long-term, fixed rate financial contracts between banks and non-financial corporations. If this effect proves significant, it may to some extent offset the other effects of the euro (increasing integration of financial markets and increased disintermediation) on interest rate pass-through. Thus, in principle the final effect is uncertain, but the likely result is an interest rate pass-through not significantly different from the EMU-average.

In the household segment, however, based on the experience of the countries in the euro area, we can expect more powerful adjustment in lending and deposit rates as a result of the expansion of the market, triggered by the convergence process and euro adoption. Here the banks still use wide interest rate margins to cover expected losses, thus interest rate movements are reflected more in banks' interest rate margins and profits, than in the fast pass-though to deposit and borrowing rates. Still, bank behaviour is asymmetric in the sense that they are quicker in adjusting to upwards movements in market rates than to downward movements. The stronger pass-through in the household segment after joining EMU is likely to play an important role in making the overall transmission mechanism more effective. However, as the households' role has been more muted in the MTM in EMU than in the US, we do not see the present gap in transmission in Hungary attributable to the weaker role of households to be a very important source of asymmetric MTM.

3. 1. 2 The composition of GDP

The empirical work by Dedola and Lippi (2000, 2003) gives an estimate of the impact of an unanticipated monetary policy shock on 21 industrial sectors of 5 OECD countries using a VAR which contains industrial production, commodity prices, the price level, the money stock and the short-term interest rate. Their results confirm the hypothesis that the

[8] See Móré – Nagy (2004) for an analysis of the competition in the Hungarian banking sector.

machinery and equipment and the motor vehicles industries (these together constitute the production of durable goods) are considerably more sensitive to interest rate movements than the average sensitivity of manufacturing to monetary policy. This finding has been confirmed by Peersman and Smets (2002). The data reported in Dedola and Lippi (2000) show that among the larger countries of the euro zone, Germany is relatively more specialized in durable goods and that manufacturing in general has a greater weight in Germany's and Italy's output. The update by Dedola and Lippi (2003), however, finds much smaller heterogeneity at country level than at the level of industrial sectors as regards the impact of the single monetary policy.

These estimates were carried out for the period before the launch of the euro, and it is not straightforward from a theoretical point of view how the introduction of the euro changes this setting. The monetary union is expected to give an impetus to the deepening of economic integration between participating countries, which may affect the composition of their output. In this respect two rival views have been voiced. One of them – put forward by Krugman (1993) – argues that this type of structural asymmetry should be amplified with increasing geographical specialization following the adoption of the single currency, or, in other words, increasing specialization leads to geographical agglomeration. Based on the example of the US, Krugman expects the European economy to show signs of agglomeration and as a result divergence in the weights of industrial sectors in participating countries. In contrast, the European Commission and some economists[9] argue that Krugman's expectations are not warranted, or at least not in those dynamically evolving industrial sectors that are now gaining increasing weight in modern economies. In such sectors the factors of business location are very different from traditional mass-producing industries, and the incentives for geographical agglomeration are less important. It is also argued that even if we accept that the traditional factors of business location behind Krugman's argument do play a role, it does not immediately follow that agglomeration causes economic structures to diverge at country level. In many cases agglomeration occurs in regions stretching across country borders, thus the euro zone should not become less homogenous despite the building-up of agglomeration. Others point out, that the majority of shocks hit at the level of sectors and industries not of countries; about which monetary policy cannot do anything. Most recently a study by the OECD (2004a) using Krugman's index of specialization found no empirical evidence that the degree of specialization have increased in EMU. Evidence of a slow tendency for specialisation have been found in manufacturing industry in since the inception of EMU by a few studies[10] looked at country level, but not looking from the point of view of spatial location of industries. However, a growing share of output in EMU-participant countries consists of the output of services, which tend to remain spatially deconcentrated.[11] A recent report by the ECB (2004) concludes that "the production structures of euro area countries appear to be relatively similar and have been fairly stable over time, [so] misalignments in the business cycles of euro area economies, which could hinder the smooth conduct of the single monetary policy, are not quantitatively important." The European Commission's (2004) review states

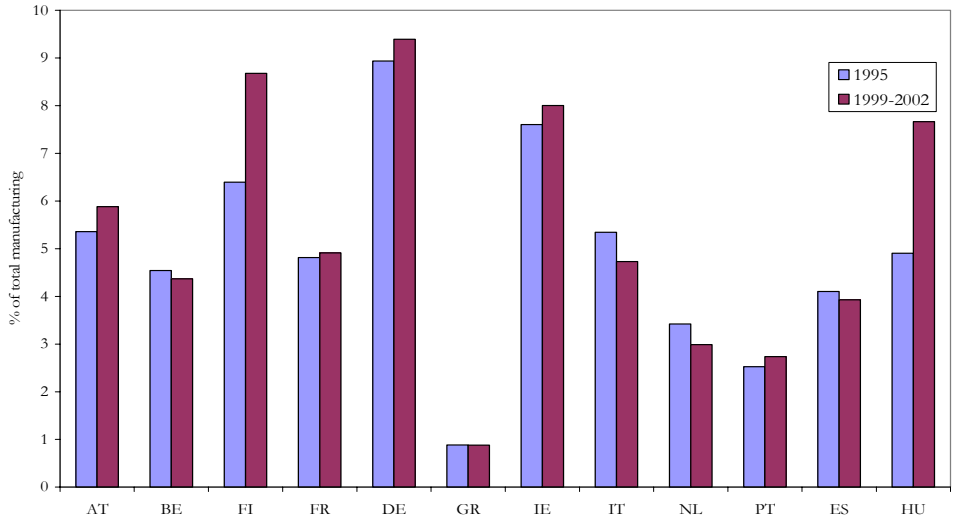
[9] See e. g. Hallett (2000), Midelfart-Knarvik et al. (2000), Mongelli (2002) and Midelfart et. al. (2003).

[10] See summary of these studies in Midelfart et. al. (2003), pp 850-856.

[11] Hallett (2000), although it is said that service sector statistics tend to be more aggregated and the result is a statistical artefact. (See Midelfart et. al. (2003), p. 854.).

that changes in business locations in the European economy during the 1980's and 1990's have been "at most very slow".

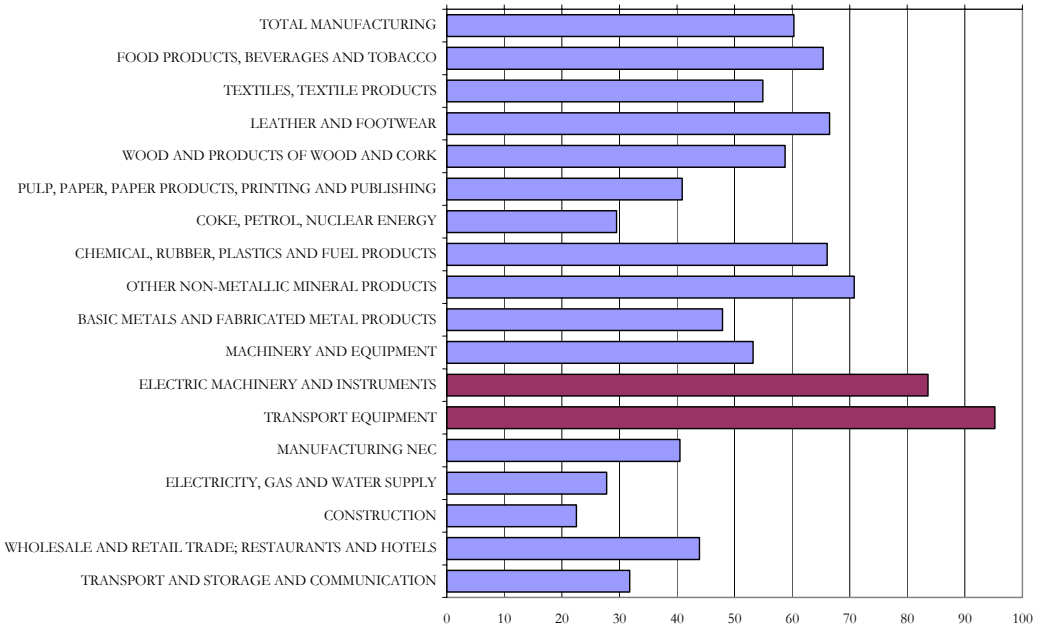
Figure 2.: The share of interest rate sensitive sectors (machinery and equipment, motor vehicles)



Source: OECD-STAN database

As for Hungary, Figure 2. shows that those industrial branches that are found in the literature to be particularly interest rate sensitive have a fairly high share in Hungarian manufacturing. Nonetheless, Hungary is certainly not an outlier, because Finland, Ireland and Germany have similar Figures. These countries have shown very different performance in the EMU so far, which makes it difficult to make direct inference from this characteristic to macroeconomic performance. Moreover, in Hungary the large share of interest rate sensitive industries is largely attributable to the composition of FDI (see Figure 3.), so it does not follow that these sectors are actually sensitive to *Hungarian monetary policy*. In terms of cost of capital, they may be influenced by monetary policy measures of the home country, as affiliates of foreign enterprises can and do choose between financial markets between the two countries when it comes to raise capital. This observation must also be made for Ireland, where the stock of FDI, especially, FDI coming from the US, is high. Furthermore, the goods and services produced by the affiliates of non-resident firms are mostly sold in export markets, so the demand for these goods is not sensitive to domestic monetary policy, but the monetary policy of the destination country, mostly, but not exclusively in the euro area. A significant portion of Hungarian exports consists of intermediate goods to be re-exported by final exporters, mostly German ones. Accordingly, the expansion of world import demand and the German export performance both have an important role in Hungarian output and inflation also indirectly. All these additional considerations point towards a more muted interest rate effect of domestic monetary policy to the supposedly interest rate sensitive industries.

Figure 3.: The share of FDI as a % of total equity, 2001



Source: Hungarian Central Statistical Office

This state of affairs implies that this transmission channel of Hungarian monetary policy may not be any more effective than the transmission of the ECB's policy measures in countries of the euro area where the share of interest sensitive industries is smaller. The industrial composition of manufacturing being typically a slowly-evolving feature of an economy, we do not expect the share of interest sensitive industries to change significantly with the adoption of the euro. In the first years of transition the extremely high level of FDI inflow caused a dramatic change in the structure and export-orientation of the economy. Another reorientation on the same scale is unlikely to happen in the future to Hungary's economy, although the ongoing deepening of EU-integration and the presently experienced outsourcing from high-labour cost countries to the new EU Member States can still have significant effects, reinforcing the increasing share of interest rate sensitive industries. It is very hard to assess the potential of structural change of the above kind, and even harder to assess its likely consequences. This is because as a result of this kind of change, the share of intermediaries in Hungarian output would become even higher, thus dependent on the demand on the market for the final goods and services. Nonetheless, after euro adoption, the monetary policy of the ECB will be transmitted more strongly than in most other countries. Despite of this, the increasingly tight economic connections with the core EMU-participating countries, this would not result in significant asymmetry for Hungary.

3. 1. 3 The expectation channel of MTM: nominal wage developments, labour market regulation and wage-setting institutions

The development of wages is one of the most important factors determining the price level and inflation. This is because wages are not only an important part of the aggregate demand, but also constitute an important input cost of the production of goods and

services. In this double role nominal wages affect the competitive position of a participating country within the monetary union as well.[12] The terms and lengths of wage contracts are crucial for the adjustment of the economy to various shocks. Wage bargaining partners always take into consideration the future price developments and the central bank's expected reactions to price and wage developments. In this section we discuss these characteristics of wage developments from the point of view of the MTM and its determinants in terms of expectations and wage setting institutions. Based on experiences of present EMU-participant countries, we have found that the credibility of macroeconomic policies is crucial to wage developments being compatible with performance and the maintenance of price stability. Bargaining institutions do not seem to play an independent and decisive role in this: they can either provide help or hindrance depending on other factors like credibility.

The importance of the expectation channel in EMU

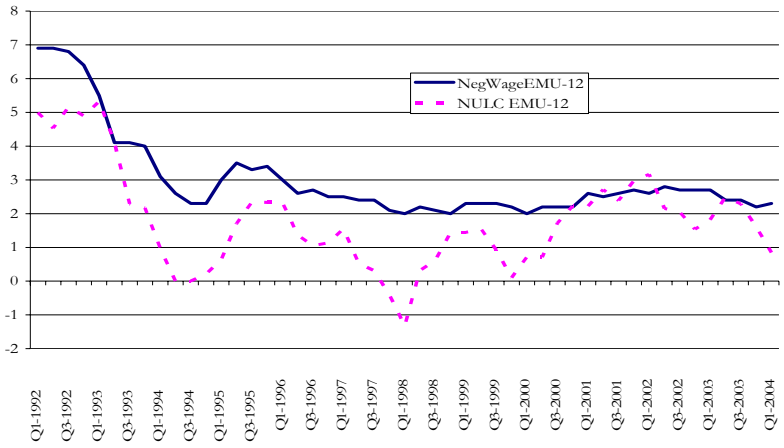
EMU has brought about an economic environment characterized by credible monetary stability. This is ensured by the convergence criteria, which require that only those countries should be allowed to join the monetary union which had already achieved lasting price stability. The institutional set-up of the monetary union with the independent central bank is also intended to reinforce the credibility of price stability. Thus, wage bargaining parties should be governed by expectations based on lasting price stability and the negotiated nominal wages should be in accordance with it. As a first approximation, a simple rule of thumb can be applied: a nominal wage increase equal to the sum of expected inflation and rate of productivity growth is neutral for inflation. In this way nominal unit labour costs remain unchanged.[13] Figure 4. shows the development of negotiated wages in the euro area as a whole. It can be seen that in wage bargaining the parties took into account the promise of the low inflation environment, which would be prevalent in EMU well before the inception of the common currency in 1999. It is also interesting to see that negotiated wages are more stable than nominal unit labour costs. This latter has changed mostly as a result of (largely) unexpected changes of output. A little increase of negotiated wages can be detected from the year 2000 as a compensation of earlier higher then expected inflation in EMU, but it has been quickly reversed as it became clear that the recession would last longer than previously thought. Thus negotiated wages and – to a lesser extent – nominal unit labour costs helped to stabilise wage inflation close to the price stability of the ECB both in boom and bust times. Although the former has been

[12] Nominal wage developments are so important that some economists see it as the most important factor to provide an answer to the puzzle as to despite of limited knowledge about monetary policy, MTM seems to work in an approximately predictable way in an important group of countries. See for example Bofinger (2001), p. 114.

[13] The above is really a rule of thumb, because it does not take into accord many factors which affect cost and demand conditions in a country. In many cases, actual wage developments diverge from the negotiated wages thanks to various bonuses in case of unexpectedly strong productivity growth or promotions ("wage drift", see ECB (2002), Box 5. on p 37. Wage contracts in most of the European countries include compensation for higher than expected inflation rates (see European Commission (2003), Table 2. on page 215. In open economies exchange rates and commodity prices are also important. On the demand side saving and investment balance, indebtedness, the government expenditures, while on the supply side taxes and the economy's cyclical position are very important for inflation. Finally, this simple formula does not take into account whether the initial level of wages had been appropriate and deviation from the rule of thumb would be justified to correct past developments.

welcomed by European policymakers, the latter is blamed as one of the sources of inflation inertia in EMU.[14]

Figure 4.: Negotiated wages, nominal compensation and nominal unit labour cost in EMU as a whole (monthly data).



Source: ECB Monthly Bulletin, Statistical Appendix, internet.

This new environment of price stability inside EMU constitutes a significant change for those participating countries that have reached price stability not long before the adoption of the euro, in some cases only barely fulfilling the convergence criteria on time. The question arises as to what extent price and wage setting agents have adapted to this new situation. If they became disciplined only temporarily as a means to achieve convergence and loosened up again as euro adoption had taken place, disregarding the changes in the monetary environment, then returning to a higher price and wage growth could jeopardize the competitiveness of their firms and – at the aggregate level – their national economies as a whole.[15] Because exchange rate policy is no longer available for individual countries to restore the competitive position of their economies, a longer period of adjustment is needed with usually significant welfare losses as a consequence of slow growth.

Before the start of EMU wage contracts typically have been concluded with higher inflationary expectations in mind in the countries with higher inflation rates. Thus, inflation has been characterized by a high degree of inertia. Moreover, as higher rates of inflation tend to be also more volatile, wage contracts typically had shorter durations and/or included more or less automatic compensation clauses for the cases of higher than expected inflation. This was less the case in countries with low inflation: in those countries wage contracts are more rigid and tend to have a longer duration. Based on this experience, it is expected that nominally fixed wage contracts with longer durations will be more

[14] There are some economists who look at nominal wage inflexibility as a welcome feature of an economy at least up to a point. In the present context for example, in their view nominal downward inflexibility prevented deflation in core continental countries like in Germany. See for example Schulten (2004), p. 10 and the paper referred to in footnote 9.

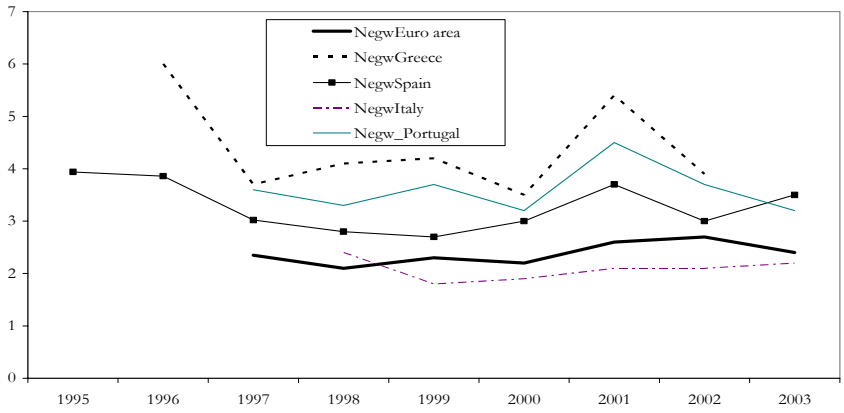
[15] Depending on the size of the economy, this would also affect the general price level and inflation in the euro area.

prevalent in the participating countries after joining the EMU.[16] This effect however can be wholly or partially offset by the fact, that increased competition (itself due to the disappearance of foreign exchange risk and consequences of the Single Market legislation) increases the demand for more flexible labour contracts, including nominally more flexible wage contracts.

Actual developments of negotiated wages and nominal unit labour costs in EMU

We choose to look first at the negotiated wages, because this informs us about the extent to which negotiating partners internalised the new, low inflation environment. As a second reason, it is common practice in all European countries to negotiate wages for at least a one or two year period based on the expected increase of productivity and inflation. Nominal wage contracts generally limit the inflationary and disinflationary effect of wages. The reason is that inflationary effects of wages are summarised by nominal unit labour costs, itself a ratio of nominal wage increase and labour productivity. Thus, once nominal wages are fixed, only the realised productivity growth affects the pressure on prices arising from wages. As in normal times in developed countries the measured productivity changes only moderately from one year to another, negotiated nominal wages roughly limit the scope for both inflation and disinflation in a country. After having looked at the negotiated wages, we discuss nominal unit labour costs as a resulting inflationary pressure and its determinants.

Figure 5.: Negotiated wages in the euro area and in Greece, Portugal, Spain and Italy (%)



Source: EIRO

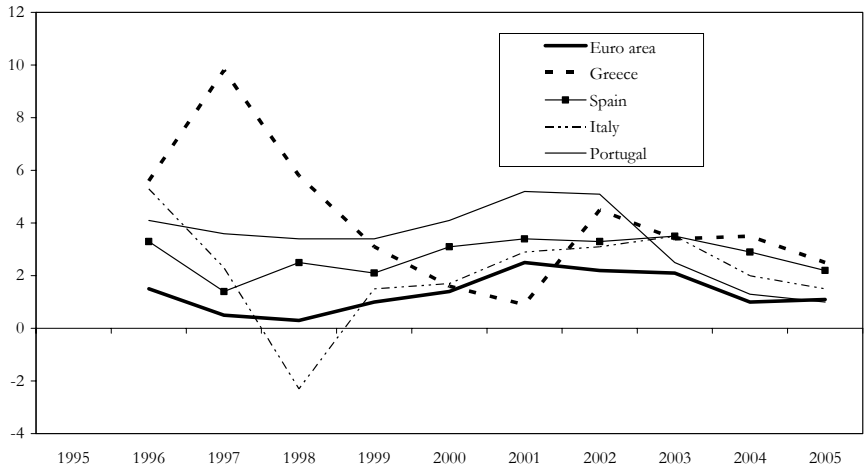
As explained in the previous three paragraphs, it is interesting to look at the negotiated wages in those individual countries where historically the inflation rate has been considerably higher. The following countries have been picked up on this basis: Greece, Portugal, Spain, and Italy. It is also interesting to look at wage developments in countries where inflation convergence did not pose a great challenge but later, inside EMU significant positive inflationary divergence have taken place. These countries are Ireland

[16] Buti et al. (eds.) (1998), 175. o., Buti, M. and Sapir, A. (eds.) (1998): *Economic Policy in EMU. A Study by the European Commission Services*, Clarendon Press, Oxford

and the Netherlands. One more country, Finland has been added, too, as a country which has been prone to significantly higher inflation rate.

The experience of the present participating countries so far is mixed in terms of negotiated wages. There are countries formerly characterised by high inflation rates where wage increases recently have been moderate; i.e. countries, where nominal wage increases exceeding the one compatible with price stability mostly compensated only for excess inflation over the inflation rate expected at the time of concluding the wage contract (e. g. Italy, see Figure 5.). As can be seen from Figure 6., nominal unit labour costs increased in Italy mainly as a result of the unexpectedly lasting slow down of economic growth. Negotiated wages increased only very slightly and only compensated for a higher than expected inflation rate in the first years of EMU.

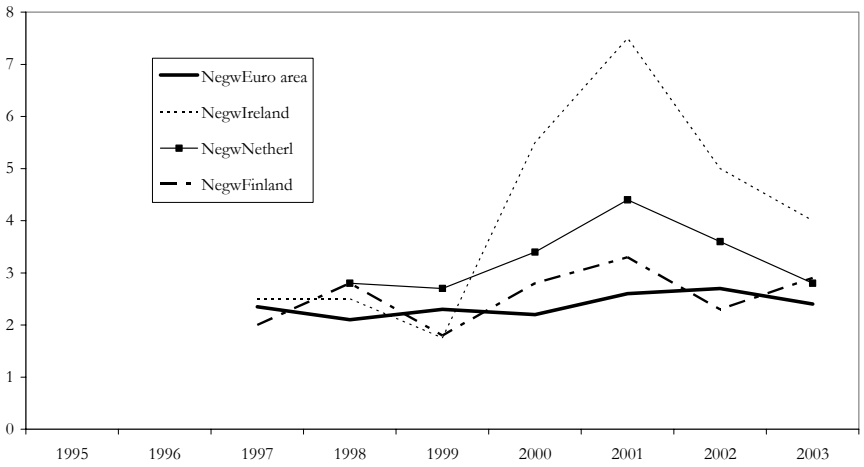
Figure 6.: Nominal unit labour costs in the euro area, Greece, Spain, Italy and Portugal (%)



Source: AMECO database

There is a reverse example as well: a country showing nominal and real wage moderation for nearly two decades experiencing excessive wage increases in both nominal and real terms after entering the euro area (e. g. the Netherlands, see Figure 7.).

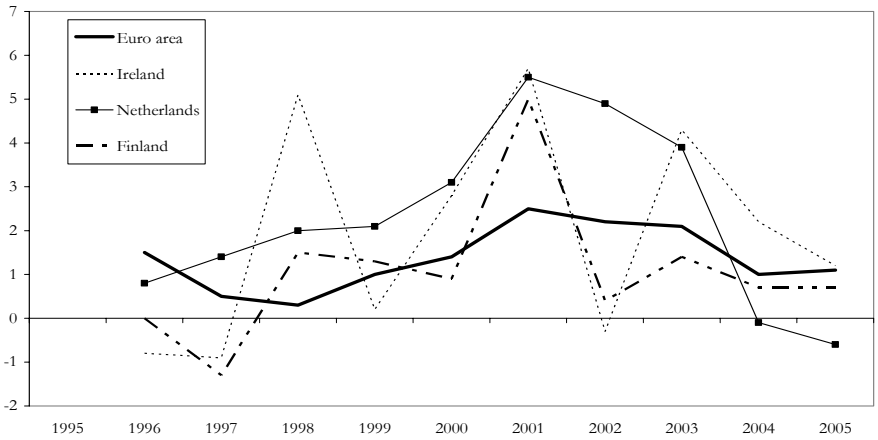
Figure 7.: Negotiated wages in the euro area and the Netherlands, Finland and Ireland (%)



Source: EIRO

In three small participating countries there is indication of overheating. In a monetary union, higher inflation rate and negotiated wages compatible with price stability are part of the optimal adjustment process. In Finland's case the excessive negotiated wages are the most modest among the three and the quickest to return to wage moderation (i. e. quicker than both in the other two smaller countries and in the euro area as a whole, see Figure 8.). In the other two countries the excesses are larger and correction takes more time to be effected. Nonetheless, it is expected that wages will return to moderation by 2004 or 2005. A common feature of the three countries is that they are much more exposed to the global boom-bust cycle than the rest of the monetary union because of their stronger than average extra-EU trade links. Nonetheless, asymmetric developments in the Netherlands can not be fully explained by external factors; domestic developments significantly contributed to the wage and price boom (excessive wage claims, VAT-tax increase, real estate price boom etc.).

Figure 8.: Nominal unit labour costs in the euro area and Ireland, Finland and the Netherlands (%)



Source: AMECO

There is also an example for a country, where wage bargaining partners and price setters appeared to agree on temporary wage and price moderation aiming only to help the country to comply with the convergence criteria, and returning to higher – i.e. non-compatible with price stability – nominal wage and price increases after entering the euro area (e. g. Greece, see Figure 6.). Finally, in Portugal excessively high negotiated wages resulted in a boom and a sharp downward correction coupled with other amplifying factors like a credit boom (see Figure 6.).

Institutional factors of wage formation

Before the inception of EMU many commentators questioned the suitability of the existing European wage-bargaining institutions and labour market regulations for the monetary union. Some feared that in most of the countries these regulations and institutions are too rigid and are unable to adapt to the need for flexible adjustments required by the successful participation in a monetary union with monetary autonomy foregone. Moreover, many commentators expected that wage bargaining institutions and other labour market regulations would change as a response to the new situation, where they face with a single independent, stability oriented central bank.

As far as the labour market regulations are concerned, the average European country is often seen as over-regulated and inflexible compared to the USA. One measure of labour market (over)regulation and (in)flexibility is the EPL-indicator[17] (Employment Protection Legislation) constructed by the OECD. This composite indicator varies widely across EMU-participants. The ranking of the countries according to the EPL-index is customarily regarded as an indicator of institutional or regulatory conditions for wage and price (in)flexibility. However, as several studies – most recently the OECD itself, see OECD

[17] For a recent evaluation of the indicators see Young (2003). See also the latest Employment Outlook by the OECD (OECD 2004b).

(2004b) – acknowledged, the empirical results using EPL indicators are at best mixed. The reasons unsurprisingly include various methodological issues and limitations of comparability. More interestingly from the point of view of the effect of the change in monetary regime change, it is important to draw attention to their limitations from the angle of the behaviour of market players. More specifically, as the EPL indicator informs us about the likely wage and price rigidities in a roundabout way, with predicting behaviour from a particular institutional design, it is no surprise that actual wage and price developments are not always in accord with simple inferences made on the basis of EPL-indicators.

There can be at least two reasons for this. One is that entering the euro zone constitutes a major regime change, leading to altered behaviour by market participants, including wage and price setters, *within* the existing and unchanged institutional setup.[18] Another reason may be that the indicator is based solely on explicit institutions, but does not include implicit agreements. Recent wage developments in the Netherlands are a case in point: although there is no formal wage indexation in the Netherlands, one of the most rigid wage developments recently took place in that country. Ireland has also been characterised by pronounced inertia,[19] despite the fact that this country has been among the best performers in terms of labour market flexibility according to the EPL indicator. For this reason one should avoid relying exclusively on the EPL-index when looking for the causes of rigidities on labour markets. This conclusion seems to apply to the euro area as whole, in comparison to the United States: although Europe is widely seen as an area of institutional rigidities there seems to be very little difference in nominal wage rigidity as compared to the US.[20]

Turning to wage-setting institutions, the relatively high density of union membership was seen as an indication of the high level of monopsony on the European labour markets. These wage-setting institutions were expected to aim at excessive wage growth, which could lead to a loss of competitiveness and decreased employment because of the little scope for businesses to pass over wage premia on consumer prices in competitive European markets. According to this view, a solution for this "excessive wage claim bias" would be to move in the direction of either total decentralisation or complete centralisation of wage-bargaining institutions.[21] In most large European countries the dominant type of wage-bargaining institutions is the intermediate one. These are held in this view as having the most serious inflation bias, because they are too small to internalise all the gains from macroeconomic benefits of moderate wage developments (as the wholly centralised systems do), but are too big to take into account the consequences for the competitiveness (as the bargainers at company level do). Thus, on a longer-term basis, this type of institution cannot remain the dominant one without seriously hampering the competitiveness of the national economy.

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[18] See for example European Commission (2003) and (2004).

[19] European Commission (2004), 77. o. Graph II. 13.

[20] See European Commission (2004) especially pp. 75-76.

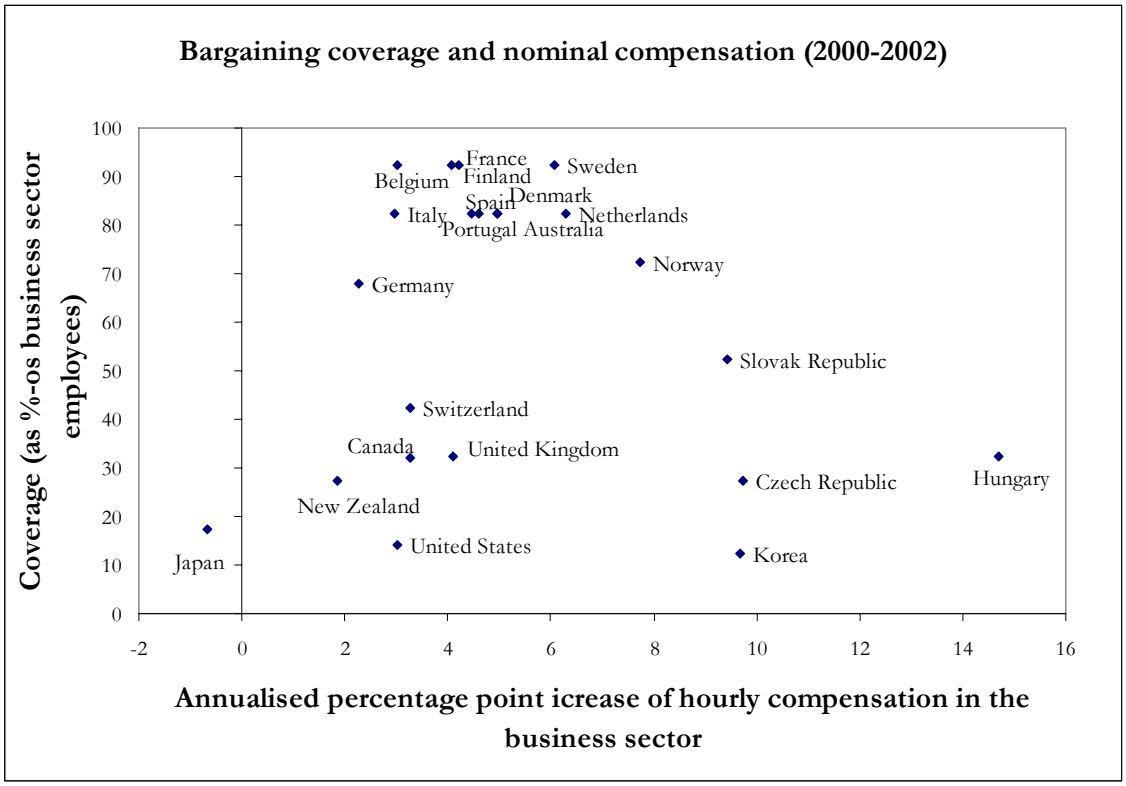
[21] This advice is based on the famous „hump-shaped" view of wage-bargaining institutions invented by Calmfors and Driffil (1988). OECD (1997) and later studies – including Calmfors (2001) himself – found little support for this simple and apparently compelling relationship.

However, even before the launch of monetary union, there were other views as well. The so called corporatist theories look at unions not simply as monopsony players, but macroeconomic wage-setting partners responsible for macroeconomic performance as a whole. The origins of these views go back to interwar Scandinavia, where workers in the exposed sectors wanted to control the wages of non-traded sector workers. The reason was that frequently, workers not exposed to foreign competition were successful in claiming significantly higher wages compared workers engaged in competitive trades. Whenever the wage growth in non-competitive sectors exceeded the average wage growth of the economy as a whole in international comparison, workers in the competitive sectors faced pressures on their own wages as entrepreneurs tried to compensate for the worsening cost competitiveness of their firms. As a solution for this tension, unions and entrepreneurs acted together to set up centralised wage bargaining institutions whereby in non-exposed sectors wage developments had been controlled and driven by wage developments in the exposed sectors. It is important to see that in Germany something similar happened after the Second World War, adapted to the needs of much bigger economy: wage bargaining took place at the industry level, but wage bargainers tended to cooperate among each other and most of the time accepted the leading role of IG Metall. As a result, in a formally less centralised way, wage developments in the main exposed sectors determined the outcomes of wage bargaining in other industries. The German system effectively served the same role in terms of securing international competitiveness at the level of the economy as a whole, and operated as a small open economy with strong export orientation.[22] Thus, centralisation of wage bargaining in these countries aimed to prevent wage inflation and preserve international cost competitiveness, contrary to the monopsony view of the unions. Another difference with the monopsony view is that in this corporative view not only the unions, but also the entrepreneurs are active players in wage-setting and the design of wage-bargaining institutions.[23] This experience is worthwhile to be remembered, because it provides evidence for wage bargaining institutions explicitly tailored to macroeconomic needs. New EU Member States may be interested in such experiences when considering appropriate convergence paths. Actually many older European countries also recoursed at least temporarily to some form of social pact to foster the convergence process during the run-up to the EMU.

[22] There are of course differences in national bargaining systems in terms of more or less state involvement and other issues. Our aim here was just simply show the common (export)orientation of the various systems.

[23] Wallerstein (1998).

Figure 9.: Bargaining coverage and nominal compensation (2000-2002)



Source: OECD (2004).

The experiences of the present EMU-participating countries also demonstrate, that the existing wage-bargaining institutions could adapt to the new realities of the EMU without a major reshuffle of the institutional framework. Although union density did not return to the high levels of the sixties and seventies, they still play an important role in the wage-setting mechanism of the economy. Moreover, recently the tendency towards further decentralization of wage-bargaining institutions seems to have stopped and some coordination took place in most of the countries, especially during the convergence period. We can conclude from the above, that as far as price stability is concerned, present wage-setting institutions do not seem to pose a major problem in Europe.

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The *implications for Hungary* of the experience of present participating countries before and after joining EMU are mixed. The wage bargaining institutions in Hungary are in the formal sense quite flexible, because there are no strong centralized wage-bargaining

institutions at the aggregate or even the industry level.[24] There is currently much less cross-border coordination among Hungarian and European wage bargaining partners and very little is expected to develop in the future. In theory this institutional set-up would lead to moderate wage developments, which is a crucial element of price stability. However – as we see from the above experiences – decentralised bargaining institutions are far from being a guarantee for appropriate wage developments. In Hungary's case the frequent calls for wage convergence – based on the still huge wage differential compared to EMU-average – with little regard to productivity developments may cause problems in the future. In such cases the lack of awareness and institutionalised checks against potentially negative aggregate effects (excessive inflation and deteriorating competitiveness) may prove to be a disadvantage. But even in the case of a more positive scenario, the present institutional arrangement may not be the first best solution in a hypothetic case where wage bargaining partners and the government want to agree in a kind of "social pact" to secure a safe and quick convergence program. Nonetheless, there do not seem to be anything in the current institutional set-up in Hungary which inherently prevents quick and sustained wage moderation supportive to price stability and long-term growth.[25]

3. 1. 4 Financial and balance sheet structures

Financial and balance sheets structures affect to a large extent the interest income and wealth changes of the non-financial sector. There is a relatively strong consensus in the European MTM literature that the income effect is approximately even across euro area countries, while it is significantly stronger in the UK due to differences in housing market structures. Suardi (2001) concludes that the income effect is about equal among the larger euro area economies, although it may be somewhat more powerful in the Netherlands (and much more so in the UK). The more empirically oriented study by Mojon (2000) also comes to the conclusion that the income effect has the same order of magnitude in the larger economies of the euro area.

Households In terms of the net interest bearing assets held by households, which determine the direction of income from interest, former studies typically found Belgian, Greek and Italian[26] households to be the most exposed to interest rate volatility. The figures suggest that net interest bearing assets influencing the direction of interest payments are, with the exception of the Netherlands, positive in the countries of the euro-zone. The net interest bearing asset position of Hungarian households is low despite its moderate level of indebtedness and its rather high government debt ratio, reflecting the fact that a large share of government debt is held by foreign asset holders. Liabilities (loans) expanded in every

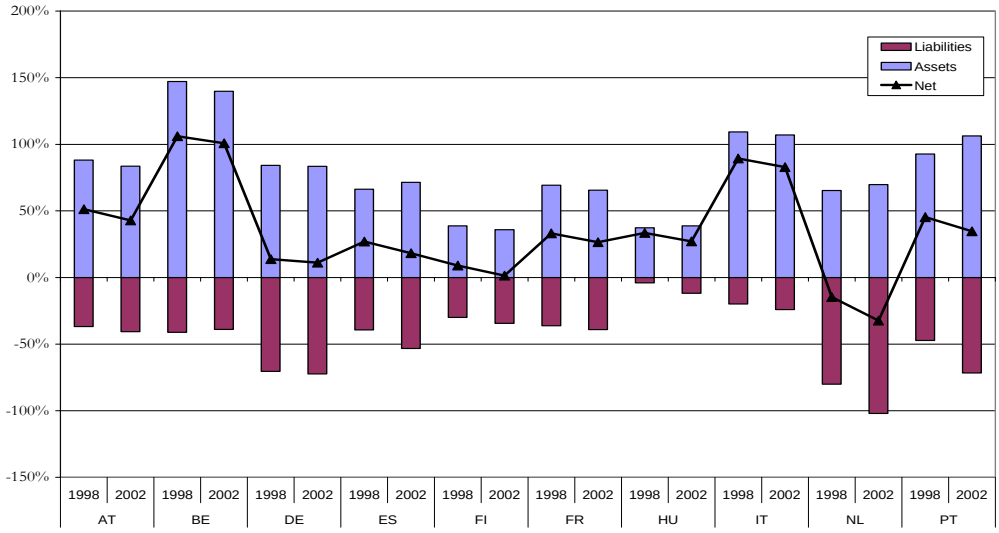
[24] See for example EIRO.

[25] The set of labour market institutions include more than wage bargaining institutions. However, these other institutions' role in MTM seem to be more indirect and of secondary importance. For example, the employment protection legislation – which in itself a complex concept – has little direct effect on nominal and real wage developments, although may have direct effects on employment, unemployment, capital-labour substitution, the speed of real adjustment etc. And even in that case the relationship between the institutional arrangement and labour market outcome is far from being unilateral and simple. See for example Blanchard et al. (2004).

[26] See (Suardi 2001) on Belgium and Italy. On Greece see for example Chapter II "Interest rate convergence and household consumption: How important is the income effect?" by Ioannis Halikias, in: IMF (1999), p. 14-27.

country between 1998 and 2002, which was the key factor behind the fall in the level of net interest bearing assets to GDP. The sharpest increases in household indebtedness were recorded in Spain, Portugal and Hungary. The level of interest bearing assets tends to be higher in countries where the government is highly indebted toward the domestic sectors, and in the case of Italy and Belgium the moderate level of household debt is another important factor in keeping the net interest bearing asset position high, which points to a fairly strong income effect. Besides the net position, gross indebtedness can play a role in that the higher the share of heavily indebted households, the weaker is the precautionary savings motive and the higher is the overall marginal propensity to consume in the economy. In this regard, Germany and the Netherlands were highlighted, Italy and Greece being at the other end of the spectrum.

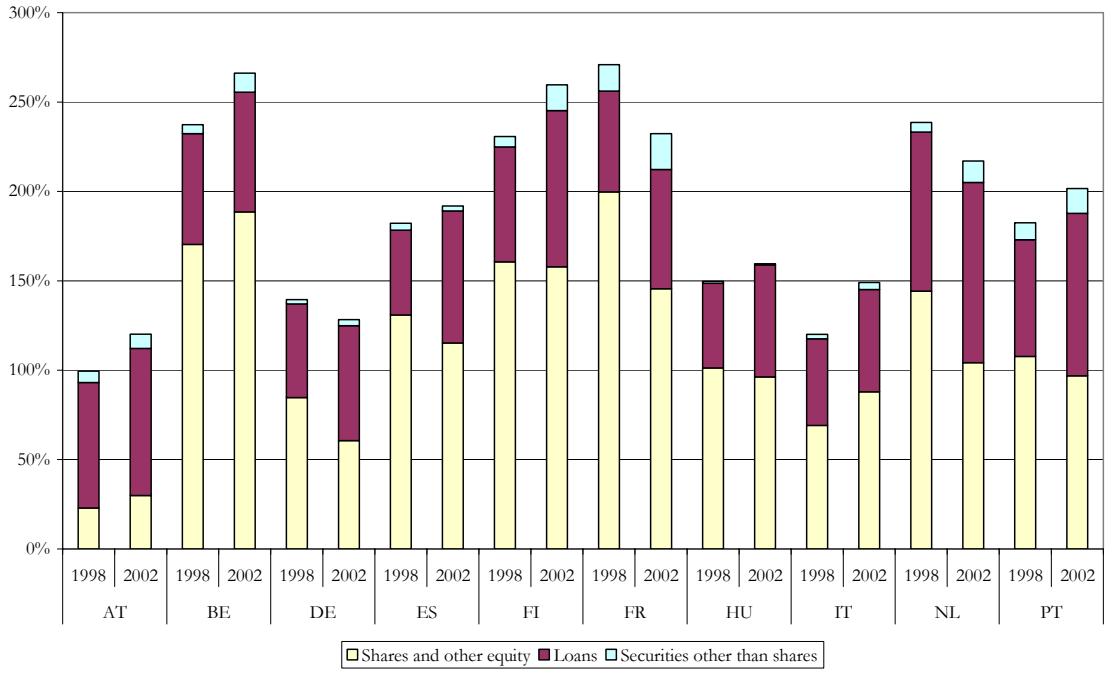
Figure 10.: Households' interest bearing assets and liabilities as a % of GDP



Source: EUROSTAT. Data for Greece, Ireland and Luxemburg were not available

Firms In terms of corporate financing Belgium, Finland and France stand out as having the largest debt, with a substantially larger quantity of equity liabilities and about an equal size of bank loans. The higher corporate debt in Netherlands is equally a result of higher equity financing and a larger stock of bank loans. With the exception of Germany, France and the Netherlands corporate debt grew between 1998 and 2002 in the countries discussed. In a number of cases the share of equity liabilities decreased and external debt financing increased its weight. This development can be attributed to a shrink in stock prices in this period and not to a transformation restructuring in corporate financing. France and the Netherlands seem especially hard hit by the bursting of the IT bubble in 2000.

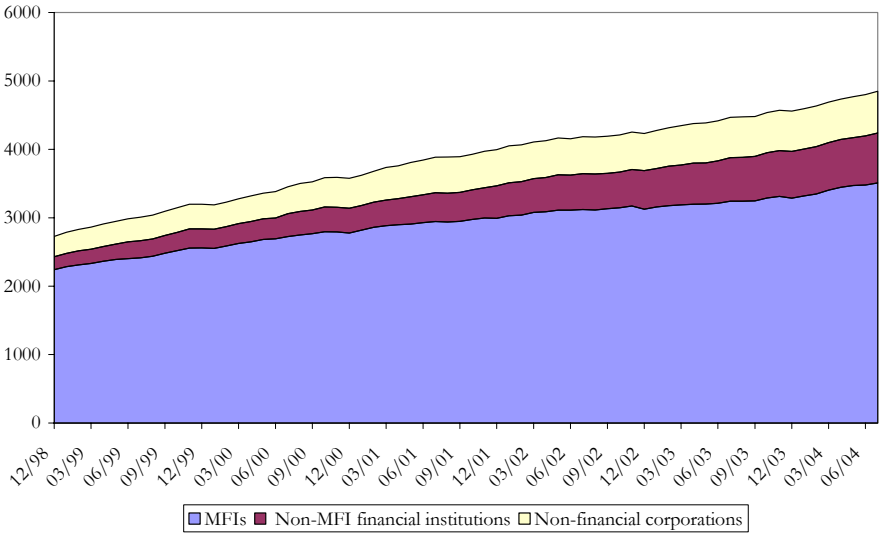
Figure 11.: The size and structure of corporate liabilities as a % of GDP



Source: EUROSTAT. Data for Greece, Ireland and Luxemburg were not available

The market for corporate securities has gone through a remarkable expansion since the introduction of the euro in 1999 and by increasing financing options this market has contributed to the deepening of financial markets in the euro area, and has become an important channel of monetary transmission. Figure 11. does not properly illustrate this expansion as it only includes corporate bonds issued by non-financial corporations. Accounting for issuances by monetary financial institutions and also non-monetary financial institutions we see a steep rise in corporate securities on the euro area level. De Bondt and Lichtenberger (2004) explain this increase in corporate bonds by the introduction of the single currency, which created a larger home-currency investor base and contributed to the wave of corporate restructuring after 1999, and by the increased M&A activity between 1998 and 2001 whose funding was partly done by issuing bonds. However, this growing popularity of mergers and acquisitions in this period is not reflected in the corporate securities liabilities of non-financial corporations, which is an indication that part of the funds necessary for such an operation were extended as bank loans which were securitised by financial institutions (financed by issuing asset-backed securities). Indeed, the bonds issued by non-monetary financial institutions nearly quadrupled between end-1998 and mid-2004 (in nominal terms, see Figure 12.). This suggests that the spreading of securitisation has not been accompanied by a similar increase in disintermediation.

Figure 12.: Corporate securities in the euro area (amounts outstanding, million euros) 1998-2004



The empirical estimates given by de Bondt and Lichtenberger (2004) indicate that the euro had a significant effect on the growth of the corporate bond market, but mainly through its effect on M&A activity. Euro adoption as an explanatory variable was found to be significant for non-MFI financial institutions even controlling for M&A. The positive impact of the euro can also be traced by looking at the denomination of bonds: the attractiveness of euro corporate bonds is reflected in the fact that 90% of bonds issued in the euro area are denominated in euros.

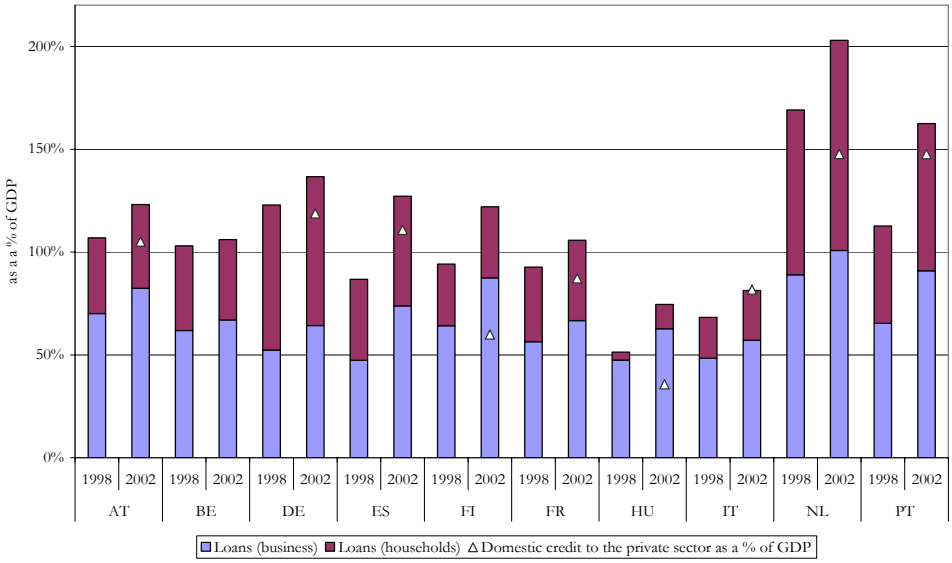
The size of the corporate debt market and its development show substantial variation across countries: bonds issued by non-financial corporations are important in France and to a somewhat lesser extent also in Belgium, Finland, Portugal and the Netherlands. A high share of bonds in the financing structure of non-MFI's is primarily seen in the Netherlands where the securitisation of mortgage loans also extended to non-residents (in other euro area countries) is an important activity due to tax considerations (de Bondt and Lichtenberger 2004). As for MFI's, the picture is equally mixed: corporate securities issued by MFI's are important in Austria, Germany, France, Italy and Luxembourg (with subsidiaries mostly outside the country, in Belgium and Germany). These differences are explained by structural asymmetries as regards institutional and fiscal frameworks, as a result of which the impact of the euro has not been uniform across the euro area. Differences are seen disappearing gradually with the introduction of the euro and these markets are sufficiently integrated (cross-border activity is considerable) to make differences less important from the point of view of MTM.

Hungary To assess the likely changes in the depth of the Hungarian financial sector after euro adoption we consider the present level and the expected changes in household and firm indebtedness. Data are taken from national financial accounts and not from banking statistics, which allow us to avoid looking at a distorted picture by disregarding cross-border banking activity. As shown by the white triangular markers, this distinction is very important, especially in the case of Hungary (but also Finland) because the private sector I is actually more exposed to changes in interest rates due to higher indebtedness than

domestic credit figures would suggest. This implies a large share of total loans of the private sector is extended by non-residents (either banks or firms), which makes debtors sensitive to foreign monetary policy. However, to the extent that the Hungarian private sector borrows from agents resident in the euro area, the cost of these loans will be influenced by "domestic" monetary policy.

Nonetheless, even if we increase the credit stock to include loans granted by non-residents, we still find that the indebtedness of the non-financial sectors is lagging behind the euro-zone average (see Figure 13.) and this is mainly attributable to the small scale household lending. It is also apparent from the figure that there was a considerable increase in this value between 1998 and 2002 and this growing trend has been sustained since then. The catching-up process already underway is further underpinned by the convergence process and the introduction of the euro both directly and indirectly (IMF 2004). On the one hand, the process of convergence of permanent incomes and high rates of return on investment projects will boost the demand for credit in the region. On the other hand, lower nominal interest rates will push down the nominal cost of borrowing and this may in some cases be reinforced by higher equilibrium inflation rates reducing real rates. Fiscal convergence can also promote private credit growth by reducing the financing requirement of the government. The experience of non-core euro area countries suggests that the dramatic expansion of private credit could begin as early as five years before euro adoption and continue thereafter. Some region-specific factors should lessen the risk of a credit boom, such as the more advanced stage of yield convergence and greater competition in the banking sectors, making the drop in interest rates less abrupt. Moreover, FDI could continue to substitute for some bank borrowing. The IMF (2004) estimated an error correction model for the euro area including bank loans to the private sector, the long-run real interest rate and per capita income on PPP. Applying the parameters obtained from this model to Central European countries, it is suggested that credit ratios were on average 41 percent below their equilibrium level in 2002 (this value is 38.4% for Hungary). Dynamic simulations in IMF (2004) reinforce the intuition that adjustment could take place very rapidly in the years to come.

Figure 13.: Loans to the private sector



Source: EUROSTAT and IFS. Data for Greece, Ireland and Luxemburg were not available

Euro adoption is expected to enhance financial deepening also by turning euro denominated liabilities into domestic currency denominated liabilities, which in turn become a medium of monetary transmission. (For sure, these liabilities already play a role in the MTM process, only they transmit shocks from the ECB and not that of the domestic monetary authority.)

Type of contracts Given that central banks have an impact on the very short-term interest rates, an important issue is the maturity of financial contracts and the way they are renegotiated, that is, the extent to which wealth is exposed to changes in the interest rate. As most household debt is mortgage debt, exposure can be captured by the sort of mortgage loans typical of a country (fixed or variable) and by the speed of the pass-through from money market rates to the (variable) mortgage rate. Estimations of the latter suggest that the short-term pass-through of mortgage rates in the euro area has become more powerful after 1999 although still incomplete, and weak relative to the UK.

Table 3.: Pass-through of money market rates into mortgage rates

Percentage point change	**UK**	**Germany**	**Italy**	**Spain**	**France**
Three-month response	0.97	0.78	0.62	0.66	0.33

Source: HM Treasury (2003)

It is very difficult to establish robust stylized facts concerning the adjustability of interest rates in the mortgage market, given the poor quality of data available, reflected in the variation of figures across sources. Although the data refer to different years, the large variation suggests that the differences between datasets are mainly due to different

categorization of mortgage loans and other methodological differences, and do not properly reflect the dynamics of the mortgage markets.

Table 4.: The share of variable and fixed rate financial contracts across EU countries

	BIS (1995)		**Mojon** (2000)		**Suardi** (2001)		**ECB** (2003)	
	Adjustable	*Fixed*	*Adjustable*	*Fixed*	*Adjustable*	*Fixed*	*Adjustable*	*Fixed*
Belgium	100	0	0	100	75	25	25	75
Denmark							25	75
Germany	90	10	2.5	97.5	80	20	fixed/mixed	
Greece							95	5
Spain	80	20	0	99.5	80	20	75	25
France	95	5	40	60	20	80	fixed/mixed	
Ireland							100	0
Italy	75	25	50	50	40	60	72	28
Luxembourg							90	10
Netherlands	90	10	25	75	75	25	26	74
Austria	25	75	77	23				
Portugal							100	0
Finland							98	2

Source: as indicated at the heading of each of the columns

The study volume by the BIS (1995) presented rough data on the share of adjustable rate contracts in the mortgage markets. These figures point to the widespread use of adjustable (variable/renegotiable/reviewable) mortgage loans across European countries. These figures were widely quoted in the studies in the latter half of the 1990's. The data cited by Suardi (2001) show that fixed rate mortgage loans are widespread in France, while variable rate loans are more typical in Spain. In Belgium and the Netherlands renegotiable rate mortgages have the highest share. The data in the ECB's study (ECB 2003) based on surveys conducted by national central banks show that loans with adjustable rates tend to dominate in countries without a history of monetary stability prior to the convergence period (countries of the Mediterranean and Ireland).

The share of fixed rate mortgage contracts had been expected to increase in the economic environment characterized by monetary stability (e.g. Suardi 2001) especially in countries where the lack of macroeconomic stability and inflationary risks caused variable rate mortgages to be more widespread. Furthermore, the integration of European financial markets was expected to create new opportunities for banks to issue more asset-backed securities and expand their longer-term financing. These developments are supposed to make the working of the monetary transmission mechanism less direct (and maybe less powerful), but certainly more even across countries within the monetary union. This expectation has been justified by the experience of the convergence processes of former high inflation countries.[27] The study by Mojon (2000) concludes that during the 1990's some convergence has also taken place among the larger countries of the eurozone in terms of maturity structure.

[27] See for example Chapter II by Halikias in IMF (1999).

Hungary According to surveys conducted by the central bank of Hungary (MNB), rates on loans granted to non-financial corporations are revised on average every three months, i.e. variable/adjustable rate contracts dominate the market, suggesting a faster transmission of monetary policy shocks. However, in the household sector (regulated) mortgage contracts with rates fixed for five years have a somewhat counterbalancing effect on the monetary transmission mechanism for Hungary. As a result of the generous government subsidy scheme fixed rate mortgage lending expanded rapidly in past years, as the rate of all subsidized mortgage was fixed (were not allowed to rise at all) and the risks were carried by the government budget. After the changes in the subsidy system, the interest rates on subsidized mortgage are now fixed five years ahead, and variable rate mortgage is mostly taken in euro or Swiss franc. As mortgage contracts are either fixed or denominated in foreign currency, the impact of monetary policy on consumption via mortgage expenditures is still very limited. Similar to the experience of former high inflation countries, we expect the share of fixed rate contracts to increase after euro adoption, as well as their maturity, as "market based" mortgage contracts gradually replace contracts with "regulated" (fixed) rates. If this expectation is fulfilled, then convergence with the euro area is likely to take place in terms of the adjustability of lending rates.

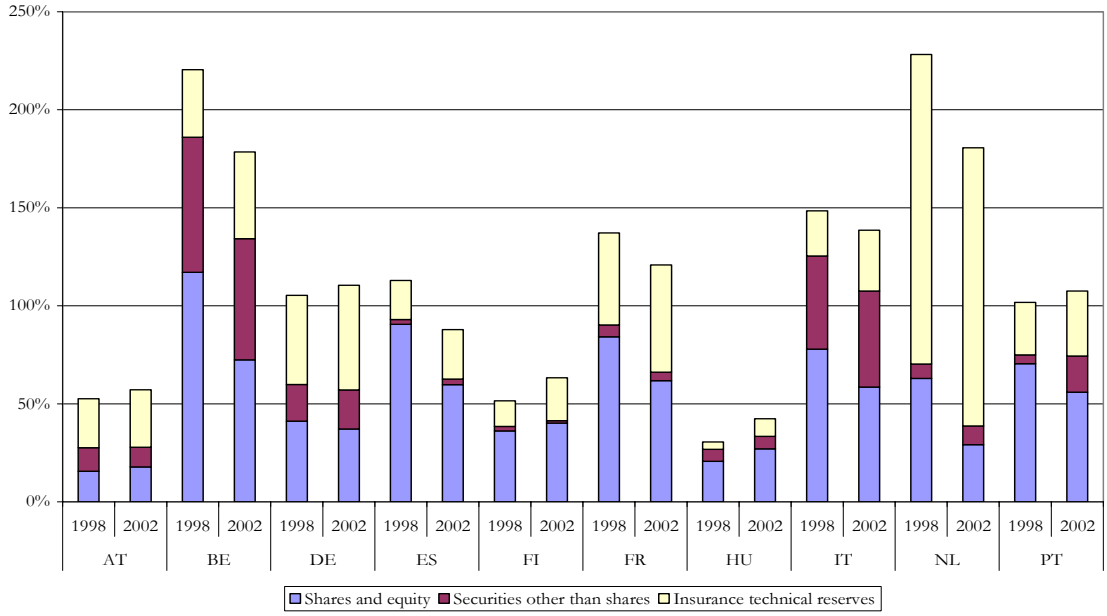
Wealth effect The revaluation of real and financial wealth as a result of monetary policy measures also plays a role in aggregate demand. Households in most euro area countries have low levels of equity in their portfolio, although its share is increasing in some countries. This makes the UK significantly more exposed to the wealth effect. As the size and composition of institutional asset holding depends on decade-long developments, significant differences are expected to prevail in the foreseeable future.

The most important form of holding wealth for households is real estate. The countries participating in the monetary union have considerable differences in housing market institutions, which also has implications for monetary transmission. Household consumption in countries with widespread home ownership is more likely to be influenced by monetary policy, as a result of changing wealth due to changing house prices. This effect was shown to be powerful in the UK, the Netherlands, and to some extent, Germany, but not in other countries of the euro area. [28]

The financial wealth of households as a percentage of GDP has decreased since 1998 in most of the countries that adopted the euro, mainly as a result of a decline in wealth held in stocks and equity during this period, in part compensated for by developing pension funds and insurance reserves (see Figure 14.). It is difficult to assess the actual change in stock ownership because the 1998 data for households' stock and equity holdings were strongly inflated, and the subsequent fall of prices between 1998 and 2002 makes any comparison problematic. If, however, we attribute the change in stocks and equity wealth to a loss of value rather than a major portfolio reallocation, we should conclude that some convergence has taken place in the stock wealth of households.

[28] See HM Treasury (2003a), OECD *Economic Review of the Euro Area* 2004, Maclennan (2000), ECB (2003).

Figure 14.: Assets subject to the wealth effect



Source: EUROSTAT. Data for Greece, Ireland and Luxemburg were not available

The Banco de España has recently published some results concerning the relationship between financial deepening and the interest sensitivity of economic agents (de Molina – Restoy, 2004). Significant changes have taken place in the financial accounts of the household and corporate sector in Spain throughout the 1990's, especially in the size and composition of households' financial assets, and households have also become more indebted. The authors share the results of the formal tests carried out on the stability of parameters in the consumption and investment equations of the Spanish Quarterly Projection Model using a rolling window technique. The results suggest that the parameters of the interest rate, financial and housing wealth, user cost and cash flow have been very unstable, and increased significantly in absolute value between 1990 and 2002, which means that the wealth effect and the effect of the user cost increased significantly. Another important finding is that simulating a 200 bps rise in the short and long term interest rates with the model's parameters set for 2002 they obtained considerably larger GDP-responses than with parameters for 1990. This analysis provides some evidence in support of the assertion that increased monetary stability in the convergence period and the subsequent participation in the monetary union implies stronger income and wealth effects of monetary transmission also for new Member States.

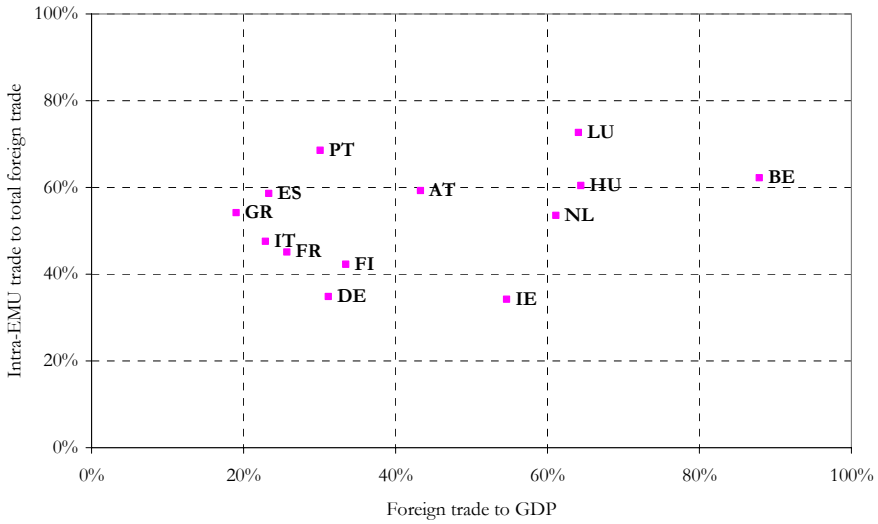
3. 2 The exchange rate channel

The strength of the exchange rate channel in an economy is determined by the relative weight of trade relations with countries outside the currency area. The country participating in the monetary union cannot rely on monetary policy to adapt to asymmetric shocks that might occur due to a higher degree of openness toward non-participating countries than the EMU-average. The problem is particularly important for small countries that have little voice in monetary policy issues and if such exchange rate shocks come about due to a monetary policy move, then we are facing an asymmetric effect due to differences in

monetary transmission. Demand side shocks from foreign markets and exchange rate movements, however, are usually counterbalanced to a certain extent by the high import content of exports and the impact of the exchange rate on purchasing power that boosts domestic demand.

Belgium, Luxemburg and the Netherlands are characterised by a high degree of openness, but trade is directed mostly into the euro area. Other small countries such as Austria and Portugal and Spain are somewhat more closed, and should be insulated from the effect of exchange rate shocks as more than half of their total trade is settled with the eurozone. Therefore both the role of the exchange rate channel and the exposure to external demand shocks are greater in these two countries. Greece stands out as the country with the lowest degree of openness in general, which limits the scope for asymmetric effects via the exchange rate channel. Scaling extra-EMU trade by average traded volume, Greece shows an average degree of trade integration among the participants of the monetary union – reflecting a considerable increase in the share of intra-EMU trade since the mid 1990's – which suggests that the exchange rate channel is unlikely to be disproportionately strong.

Figure 15.: Openness (the ratio of intra-EMU trade to foreign trade and foreign trade to GDP, 2003)



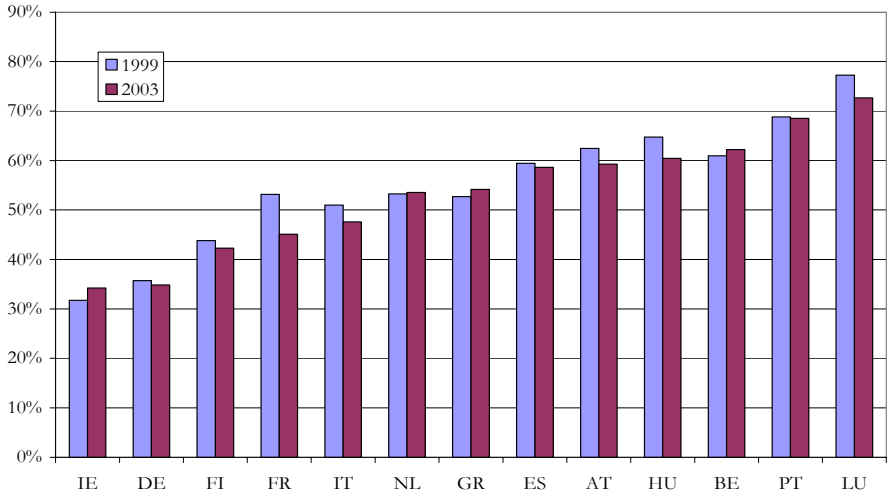
Source: IMF Direction of Trade Statistics, AMECO

By contrast, Finland and Ireland are small and fairly open economies with most of their economic ties linking them to outside the euro area as shown by their relatively low intra-EMU trade-total trade ratios. Germany has kept its second place in terms of highest share of extra-EMU trade in total foreign trade, which makes it very sensitive to the euro exchange rate despite the large size of its economy.

Figure 15. shows that by 2003 many countries of the euro zone, especially the larger ones increased their share of trade with countries outside the currency area in total trade to above the 1999 level. This fact seemingly contradicts the general consensus which holds that the single currency should enhance trade between the countries participating in the monetary union (see e.g. Rose 2000). This increase in extra euro area trade, however, is minor, and it is probably attributable to a number of temporary factors such as strong US

demand, the rise in oil prices, greater economic integration with Central and Eastern Europe and other fast growing economies (like China) and perhaps even the weakening of the euro against the US dollar in part of this period (HM Treasury 2003b). Gravity models of trade[29] and other empirical research have shown that the introduction of the euro actually promoted trade integration to a measurable extent. Micco *et al.* (2003) use a panel of 22 developed countries including the 12 participants of the European monetary union from 1992 to 2002 and find that EMU has not only increased bilateral trade between participating countries but also with the rest of the world.

Figure 16.: The share of trade with the euro area in total trade 1999, 2003



Source: IMF Direction of Trade Statistics, AMECO

Hungary is already one of the countries most integrated into the euro zone, even though it has not adopted the euro yet. Hungary is about as highly integrated into the euro are economy in terms of average traded volume as Belgium or Austria, two core countries of the similar size. This trade integration is expected to be further reinforced as a consequence of full EMU-participation. The study by Csajbók-Csermely (eds. 2002) estimates that euro adoption can expand trade with the currency area by 75% (from its 2001 level) in the long run, which should not only add to growth but also reduce exposure to outside shocks. The picture may change even more after Central and Eastern European countries have introduced the euro. The openness of Austria, Italy and Germany towards the enlarged euro area will increase disproportionately more than that of Hungary or any of the newcomers or old EMU-participants because of their closer linkages to the CEEs. We expect that this development will decrease heterogeneity across countries already in the euro area and those joining later. This statistical effect would also mitigate Hungary's problem of having closer ties with euro area countries that are more exposed to external shocks (e.g. Germany or Italy).

With Hungary's full participation in the monetary union the exchange rate channel which presently absorbs (or generates) shocks will be eliminated. This is likely to have major

[29] E. g. HM Treasury 2003.

consequences as the most important transmission mechanism in Hungary so far has been the exchange rate channel. This aspect has been investigated in our simulation exercise.

3. 3 Credit channel

A separate, so-called credit channel has been added recently to the more traditional channels of the MTM discussed above. As this view of MTM relies heavily on imperfect financial markets, it has been seen as naturally applicable to Europe. The reason for this is that financial markets in Europe are dominated by banks and bank dominance in itself is seen as a sign of market imperfection. Nonetheless, there are considerable differences among EMU-participating countries in terms of relative weight of banks and financial markets. If credit channel is found to be important in the euro area, than the question naturally arises as to what extent the credit channel creates differences in MTM among the participating countries.

The credit channel has been further divided into balance sheet and bank lending channels, of which the former seems to have firmer grounds to stand while the relevance of the latter is less convincing. First, we start with the so-called balance sheet channel because this aspires to a more general validity, including non-bank securities markets. Then we turn to the bank lending channel.

Limitations of space and focus prevent us from discussing the credit channel in greater detail.[30] For our purposes suffice it to remember that the credit channel refers to various financial market imperfections (agency costs, moral hazard and adverse selection). As a result, credit markets do not always clear by attaining equilibrium prices (in this case interest rates). In this view financial intermediaries sometimes and/or vis-à-vis some sort of clients apply credit rationing instead of setting market clearing interest rates. A corollary of non-price clearing of the market is its pronounced non-linearity. A relatively small interest rate change – perhaps an increase of policy rate by the central bank – can have large effect on real activity, depending on the initial conditions of the balance sheet of non-financial companies and households. This is also called the financial accelerator effect.[31]

Proponents of the credit channel aim to explain the widely shared experience that smaller firms and households periodically face credit constraint when it comes to raising external funds because they cannot offer sufficient amount of collateral for creditors. In a perfect market only the expected earnings should limit the creditworthiness of banks' clients or their projects.[32] In an imperfect real world this does not seem to be the case for many

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[30] The literature on the subject is voluminous. A textbook presentation of the subject and a good summary of empirical literature can be found in Walsh (1998) Chapter. 7. For a list of articles see p. 286, footnote 1 of the same book. For representative application on MTM see the conference volume of Boston Fed (Peek et al. (eds) 1995). Stiglitz and Greenwald, who were two of the earliest advocates of financial market imperfections and non-standard MTM channels nicely summarised their views in a new book, Stiglitz et al. (2003). For a more critical survey of capital market imperfections as a basis for new macroeconomic paradigm see for example Delli Gatti et al. (2001).

[31] See the concept in a business cycle context in Bernanke et al. (1995).

[32] In a traditional general equilibrium framework, there is no difference between internal and external sources of finance. All the relevant information about the riskiness and expected payoff of the projects are available freely to all participants. In this perfect world there is no room for debt contracts and financial intermediaries. Not even for firms, hence the use of "projects", instead of companies. In a world with imperfect markets, not all the relevant information are readily available to all, thus, financial intermediaries – called „banks" – emerge

categories of potential borrowers.[33] As financial market imperfections are more prevalent in the case low net worth clients (small firms and households) with little to offer as collateral, adverse financial conditions tend to affect more heavily the smaller firms and households.

Because in EMU the proportion of smaller, non-quoted firms is higher than in the US or in the UK, it seems even more relevant to look at the effects of this particular channel of MTM. On the other hand, there are considerable differences among participating countries as well: 80% of employed persons work for companies with less than 250 employees in Italy and Spain, whereas this ratio is only 60% in Germany and the Netherlands (Suardi 2001). See also the Figure 17. below showing the differences in the proportion of small enterprises among EMU-participating countries.

In addition, the collateral value itself is dependent on the state of the economy and subject to change responding to interest rate movements. Thus, credit flows toward these clients tend to be pro-cyclical: a fall in credit supply may result from a monetary tightening also because it devalues firms' collateral base and so the more widespread is the use of collateral, the higher is the influence of interest rates on loan supply. Suardi (2001) shows that exposure is the highest in the UK, and this effect is weaker and about equal among the larger countries of the euro area. Some authors extended the list of factors which may contribute significantly to financial market imperfections to include various institutional, legal and regulatory features of the economies. Based on differences according to these features they predicted asymmetries in the working of the MTM among EMU countries. They find empirical evidence supporting the existence of a credit channel.[34]

In the bank lending view of the MTM it is supposed that banks play a unique role in the economy: they provide credit for those clients who are not able to raise external funds from other financial intermediaries or from directly issuing securitised debt. Thus, the customers reliant on bank loans cannot switch to other capital markets in case they are rationed by banks. Bank behaviour may be affected by economic prospects or by the actions of the central bank. Gloomier prospects induce banks to be more cautious in extending new loans or rolling over the existing ones. An increase of the central bank interest rate or the reserve requirement may have a similar result, because these actions reduce the amount of funds available for banks to lend. The basic insight proposed by the bank lending channel is that certain sorts of clients may be rationed by their sole source of external finance, namely the banks. As a consequence, output of these clients will diminish which result in a slowdown of the economy as a whole. The interest in this particular channel in the context of EMU should be clear. Similarly to the case of balance sheet channel, bank lending channel was held to be more important in Europe, where banks and small enterprises have greater weight in the economy than in the US. Moreover, in some EMU-participating countries banks traditionally play an important role in financing on a long-term basis especially but far from exclusively for small and medium sized companies.[35]

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to gather and process the necessary information. The information collected in this way is costly, but would lose its economic value if it were available for third parties.

[33] Even if the cash flow plan is realised, the borrower may choose not to (fully) repay the credit if she thinks it is more profitable to her.

[34] Cecchetti (1999), using indices and data of La Porta et al. (1997).

[35] Thus, for example in Germany, non-financial companies have access to long-term finance from banks, instead of having to issue bonds or shares on capital markets. Despite of this fact, the German financial

A related issue is that not only the size of their clients, but also the size of the bank's themselves may be crucial for credit channel. The logic behind is similar: smaller banks are more often liquidity constrained and find it difficult to offset the tightening actions of the central bank. Some researchers refined the argument by looking for more direct indicators of potential liquidity constrain than the sheer size of a bank: direct measures like the proportion of liquid assets in total assets have proved to be significant determinants of banks' reactions to monetary tightening. Again, in Europe the proportion of smaller banks are higher compared to the US, thus suggesting a higher probability of the existence of a credit channel.

However, the relevance and validity of this approach has been subject to fierce criticism on both continents. We think it is fair to say that most of the controversies are directed to one basic feature of the theory, namely that banks are directly constrained in their ability to lend by available liquidity on the inter-bank market and this liquidity is fully or nearly so controlled by the central bank. Economists critical to this theory point out that this has never been the case. Or, if ever there had been something remotely similar to this description in the era of regulated financial markets after the Second World War, it must have changed following the collapse of the Bretton Woods system and the financial deregulations of the 1980's. In today's deregulated financial markets banks are not constrained directly or quantitatively by given liquidity on the markets: banks invented financial instruments by which they are able to attract additional funds to the inter-bank market. Critics also point out that central banks do not operate on the basis of quantitative monetary targets, not even in principle: all major modern central banks operate via controlling short term interest rates. In addition, in open economies it has always been possible to circumvent any liquidity shortage by raising funds in foreign currencies.[36] Thus, proponents of the bank lending channel found themselves in a position where they had to ignore (or deemphasise) the importance of financial innovations in circumventing quantity constraints on financial markets. Also, they had to ignore those important recent developments in monetary theory and practice, whereby the monetary models with important role of monetary aggregates or with central bank operating practices based on such models have given way to other models and operation frameworks in which monetary aggregates do not play any significant role. These new approaches are based on short term interest rate as a key variable both as an instrument and an operating target of the central bank. Of course, the ECB – or its predecessor, the EMI – had expected a much more important role for monetary aggregates in these functions but lately the ECB had to relegate this variable into a secondary pillar in its revision of the monetary policy strategy in 2003.[37]

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system still has capital markets, but here again banks are major issuers of bank bonds (in mid 90's, nearly half of the outstanding bonds have been issues by banks, with the remaining half issued by government, while non-financial issues being negligible, see Bundesbank (1995) p. 57.) On the significance and origin of bank bond markets in Germany see, and Kregel (1995). The counterparts of the medium and long-term credits in the bank's balance sheet are longer-term – more than four years - saving instruments, called "monetary capital formation" in the Bundesbank's terminology. See Deutsche Bundesbank (1995), p. 174.

[36] See Goodhart's contribution to the volume edited by Scheffold (2002). For an empirical model and test of credit channel with the central bank targeting interest rates instead of money supply see for example Bofinger et al. (2004).

[37] ECB explains this move as a clarification, saying that M3 is an important indicator of medium term inflationary pressures and other excesses (e. g. asset price bubbles or credit booms), but it is not becoming less important. The new medium term orientation of the „monetary analysis" is also reinforced by the

The justification of a separate bank lending channel in addition to the traditional interest rate channel is equally hard empirically. Available econometric techniques are not suited to identify a separate bank lending channel which is capable to separate the demand and supply of bank loans and isolate this from the broader balance sheet channel.[38] They mostly try to find variables that could be used as instruments for the loan supply effect. However, empirical works using such roundabout ways seem to have little chance to settle the debate between researchers.

In accordance with these difficulties there is mixed evidence concerning the importance of the credit channel before the third phase of EMU. The method followed in the comprehensive paper by Angeloni *et al.* (2003a) reflects these difficulties with implementing empirical investigation as to the relevance of the credit channel. The authors chose a framework in which they first look at the explanatory power of the interest rate channel. If this channel proves to be sufficient to explain a large part of inflation and output variations in a country then they conclude that the credit channel is weak or absent. They actually found that the interest rate channel plays the primary role in monetary transmission. In cases where the test for the interest rate channel failed to account for a sufficiently large part of inflation and output variation, the non-explained variations were attributed to the undifferentiated "other financial effects". In this way other financial effects were found to be significant in some cases, although this did not always reflect the role played by the banking sector. In the ESCB MTN research the bank lending channel has been found significant in Germany and Italy. In several cases, the effect of this channel was mitigated by other factors such as government subsidies, explicit or implicit government guarantees for part of the banking sector, extensive deposit insurance or close ties among smaller – frequently cooperative or saving – banks[39] helped them to borrow from each other at times of monetary tightening, which provided a buffer etc. Furthermore, in Europe, some features proved to be less relevant in terms of information asymmetries compared to the US. In Europe not the size, but more the liquidity position of banks explain the credit channel. Relationship banking is more prevalent in this side of the Atlantic, which tends to dampen asymmetric information. Moreover, because in some European countries small banks tend to be collectors of retail deposits for the banking sector as a whole, they tend to be more liquid compared to what is expected by looking at their size only.[40] In sum, the credit channel turned out to be less important than previously expected, and even in cases where it was indeed significant, the factors that influenced the strength of the credit channel were not the ones that were expected (liquidity as opposed to capital or bank size).

Hungary The credit channel seems to be partly relevant to Hungary's case. Among the two credit channels the balance sheet channel may be operating, because few companies have access to capital markets. Also, banks have short track records on credits of their clients. On the other hand, companies have little to offer as liquid or otherwise suitable collateral

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statement of the ECB, that target M3 will not be revised on an annual basis. Nonetheless, this is clearly a departure from the practice of the Bundesbank.

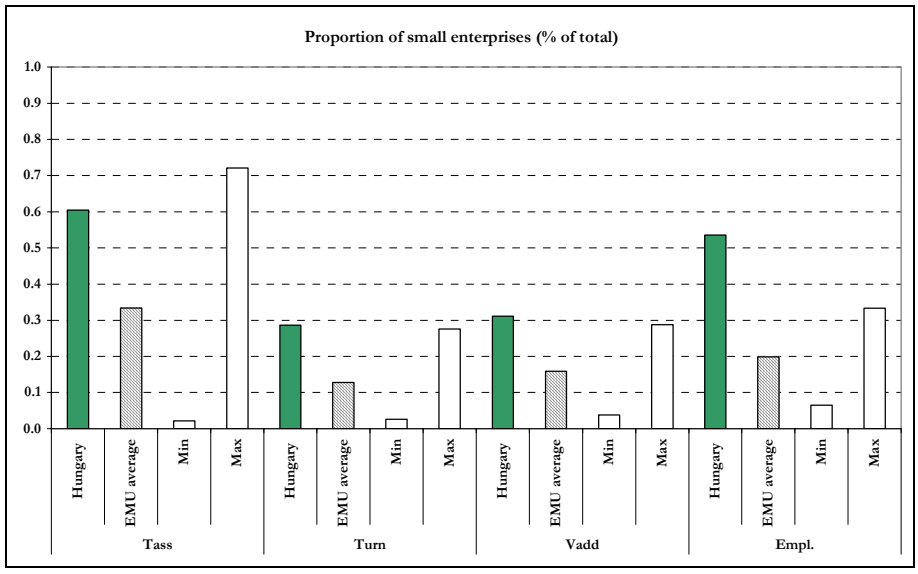
[38] See for example Walsh (1998).

[39] See the study on Germany by Worms (2001), on Spain by Hernandez et al. (2001) on Finland by Topi et al. (2001).

[40] Kregel (1992) and Ehrmann et al. (2001).

to mitigate these shortcomings. A rough comparison of potential importance of credit rationing can be obtained by using available data on enterprise balance sheets in EMU countries and Hungary.[41] The following graph shows that in Hungary the enterprise sector consist of smaller entities than the EMU average measured by either in terms of total assets, turnover, value added or employment (in that order, see Figure 17.). The difference between Hungary and EMU seem to be the largest in the case of employment, where the Hungarian figure exceeds well the maximum value of the EMU as well. In the case of the other three variables, the Hungarian value is very close (turnover and value added) to, or below (total assets) the maximum EMU figure.

Figure 17.: Proportion of small enterprices (% of total)



Source: BACH and APEH databases

More direct indicators of potential financial accelerator effects can be seen from the standard financial ratios (see Figure 18.). The differences between the enterprise balance sheets in Hungary and in the EMU participating countries does not seem to be terribly large. This is certainly true for the most important single indicator, the financial leverage ratio (LEV).

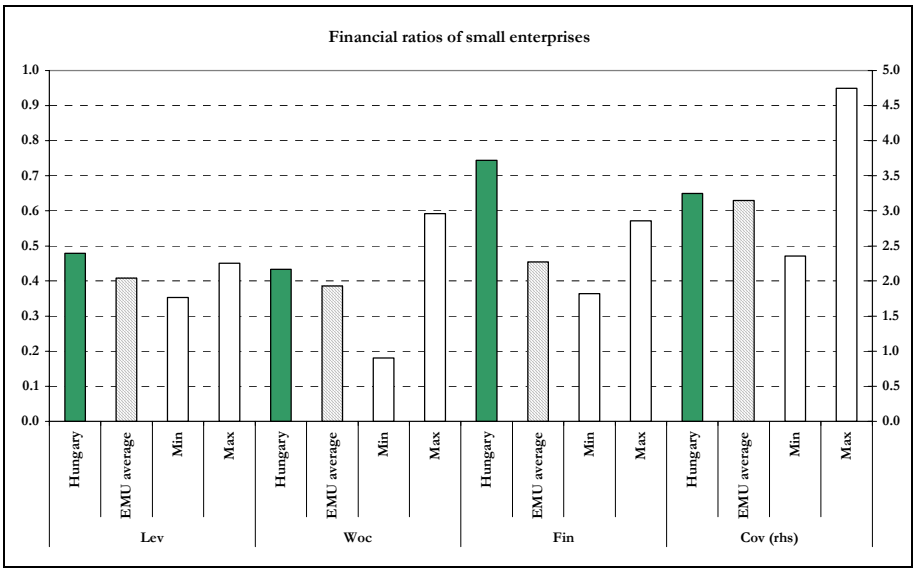
However, the widespread opinion of the market participants seem to be supported by our calculation, namely, that Hungarian enterprises rely more heavily on short-term financing as compared to longer-term one (Fin). Thus, the two charts show that Hungarian enterprises are more exposed to short term interest rate variations, including the changes of the policy rate. However, these differences are not pronounced in general, and in the future, we can expect some convergence of these ratios to the EMU ranges and averages.

With EMU-participation, the increased macroeconomic stability should enhance creditworthiness of companies, especially if there are significant non-linearities in credit markets. A good illustration of this is to look at the long-term segment of the credit

[41] For a more detailed description of data and calculations see Appendix 2: Data on financial leverage channel.

markets: in a low inflation environment, longer term finance is much more attractive than in a volatile environment, where long-term finance may not be available at all. However, there seems to be little evidence for the existence of a bank lending channel. The banking sector is in a net excess liquidity position vis-à-vis the central bank. As in the EU – and contrary to the US – not simply the size, but the banks' liquidity proved to be the relevant indicator for bank lending activity. This aggregate net excess liquidity position of the banks probably will change into the reverse upon EMU-participation, but even in that case it would not be an indication of structural shortage liquidity position in the sense that the banks could not raise external funds in EMU financial markets. Rather, it would be a sign of banks' decision, based on profit motives, and could be adjusted according to business interests of banks.

Figure 18.: Financial ratios of small enterprises



Source: BACH and APEH databases

4 Conclusions

The aim of this paper was to characterise the Hungarian MTM after Hungary's full participation in EMU with the ultimate goal of assessing the risk of a disruptive single monetary policy from the point of view of the Hungarian economy after euro adoption.

To carry out this task we reviewed the euro area monetary transmission literature and stylised facts from the euro area and Hungary. Our purpose was to compare the structural features affecting MTM in Hungary with those in the current euro zone members and find out what changes in MTM occurred in the current members of the euro zone as a result of euro adoption. On this basis we could formulate expectations on the changes in the Hungarian MTM after Hungary has adopted the euro.

Based on the structural features of the Hungarian economy and the experience of participating countries we may conclude that the risk of divergent macroeconomic performance of the Hungarian economy due to asymmetries in the monetary transmission mechanism is fairly small. Moreover, although convergence of the features affecting MTM in the euro area has not been overwhelming, being at a lower stage of real and financial development, such structural changes in Hungary may take place more rapidly, reducing risks of asymmetric transmission of the single monetary policy to the Hungarian economy.

As a consequence of the relatively strong competition in the Hungarian banking sector, the money market rates are transmitted to the bank lending and deposit rates at a speed comparable to the euro area average, and pass-through is particularly rapid in the short-term corporate loans segment of the market. The share of interest sensitive sectors in total manufacturing is close to the highest values of the euro area, but as this is mostly attributable to FDI and mostly sold to foreign markets, it does not enhance the transmission of the Hungarian monetary policy. Nonetheless, after euro adoption, the ECB's monetary policy actions are likely to have a relatively strong effect via the composition of GDP. The expectations channel is expected to converge with the euro area practice, as wage setting behaviour changes with the introduction of the ECB's monetary policy regime and becomes consistent with price stability, even without a change in the institutional setup. As for asymmetric responses to changes in the exchange rate of the euro, Hungary is likely to be much less exposed than most of the current full participants of EMU as trade relations with the euro area are very strong. This is expected only to be reinforced after Hungary (and other new Member States) will have adopted the single currency. Financial depth is the aspect of monetary transmission where the greatest asymmetries should be expected, at least before household indebtedness catches up to euro area levels. Expressed in GDP terms, both the assets and the liabilities of households' and the non-equity liabilities of corporations are lower than in any of the euro area countries (except for Italy in the case of the latter indicator), which implies substantially weaker income and wealth effects of monetary policy. We expect this low degree of financial depth to change markedly as a result of the nominal and real convergence process and the ensuing euro adoption.

Table 5.: Summary of the qualitative findings on MTM in the euro area, Hungary and the changes expected after euro adoption

	MTM in the present EMU-participants	Hungarian MTM in comparison to EMU	Expected impact of Hungary's EMU-participation
Interest rate pass-through	Pass-through is partial and/or rather slow in most countries due to the lack of competition in the banking market and special lender-creditor relationships.	The money market rate feeds into Hungarian corporate loans faster than the EMU average but deposit rates are much slower to adjust.	Evidence of increasing homogeneity within EMU. Further financial integration should support this process. Financial deepening expected after Hungary's euro adoption; is should make pass-through more rapid but the growing share of fixed term contracts should offset that effect.
Composition of output	Some asymmetries detected within EMU, with Germany and Italy potentially more affected but structural differences are found to be not statistically significant.	Hungary has a relatively high share of interest sensitive industries, most of which is FDI-related. This implies stronger output/price reactions to the single monetary policy.	No evidence of systematic change in regional specialisation within EMU since 1999. The more stable macro environment may attract more of such FDI into Hungary after euro adoption, which implies stronger MTM of the ECB's monetary policy.
Expectations channel	Asymmetries in wage-setting behaviour were reduced to a historic low by the convergence period but this proved to be transitory in a few countries, even in some of those with a good track record.	In recent years a strong inertia in inflation and wages is observed, which suggests a weak expectations channel. However, determined policy and wide acceptance by the public can change it fast.	Examples of disciplined, moderate and forward-looking wage-setting behaviour in countries of the euro area where the convergence path was credible and accepted, independently of the institutional setting.
Financial sector	Asymmetries between core and non-core participants exist, but are minor and narrowing. Income and wealth effects seen about equal among participating countries.	The Hungarian financial sector is characterised by significantly lower depth, due to a very small scale but dynamically developing household lending.	Differences have narrowed during convergence process and after the euro. The NMS are expected to experience a similar financial deepening and stronger income/wealth effects of changes in the interest rate.
Exchange rate channel	Some smaller non-core countries (Ireland and Finland) and Germany appear much more sensitive to changes in the euro exchange rate than the EU-average.	Hungary already has stronger trade linkages with the euro area than some participants. However, its main trading partner is exposed to ER channel.	There is some evidence for increased trade within EMU since 1999. The euro should reinforce trade linkages and the inclusion of CEE's in the euro zone is expected to have both a statistical and an economic effect enhancing intra-EMU trade.
Credit channel	Asymmetries detected between relevant structural features of both banks and firms (size, bank reliance, legal framework, collateral). Bank lending channel found less important, while the balance sheet channel looks strong.	The lack of track record and collateral base suggests a balance sheet channel in Hungary even stronger than the EMU-average. Bank lending channel is not relevant.	EMU seems to reduce further the importance of the bank lending channel. The balance sheet channel is expected to continue working for a longer period. Financial features affecting these channels change very slowly. In the very long run, bank reliance of larger companies could be reduced by the spreading of the use of corporate securities. Structural reforms are needed to improve credit access of SMEs.

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6 Appendix: Data on the financial accelerator channel

In an attempt to assess the potential importance of credit channel in the Hungarian economy relative to the present EMU participating countries, we tried to compare three financial ratios of the enterprise sectors. Unfortunately, there is no one single such database, which contain all the necessary data for both EMU and Hungarian enterprises. Thus, we had to use the BACH database[42] for the EMU countries and the APEH (Hungarian Tax Authority's) database for the Hungarian companies. The former database had been used by Peersman et al. (2002) to assess the asymmetric effect of financial accelerator in the monetary transmission mechanism among EMU countries.

Although the constructors and data providers of the BACH database try to make the nationally different balance sheets comparable, important differences remain. Moreover, as we have used another database for Hungarian enterprise balance sheets, the comparison with that of the BACH's is even more problematic, as accounting conventions and practices may very well differ. Another problem is that due to large differences in income levels and structural changes in the economy, the Hungarian enterprise sector seem to be undercapitalised and populated dominantly by smaller entities. Despite of this, we have decided to apply the same amount of turnover in constructing the small and large enterprise groups as used for EMU participating countries. The reason for our choice is that inside EMU Hungarian enterprises will have to operate in roughly the same financial environment as the companies of the larger EMU-participating countries. Thus, we took the 7 million euros turnover as the upper limit for small enterprises and 40 million euros as lower limit for the group of large enterprises (using the average HUF/euro exchange rate for conversion). In all cases, the time period is three years, between years 2000-2002, the latest available time period. We decided to use three years averages instead of one single year because in a few cases data have changed quite a lot from one year to another. The Hungarian sample contains all those companies that are obliged to adopt double-bookeeping, the largest population of companies available for financial analysis.

Due to data limitations, we could obtain data for only 8 EMU participant countries: Austria, Belgium, Finland, France, Italy, the Netherlands, Portugal, Spain. No data was available for Austria and the Netherlands in calculating the proportion of small enterprises in terms of employment, so these proportions are calculated only for the remaining six countries.

The financial ratios used as indicators of potential financial accelerator channel are same as used in Peersman et al. (2002): an indicator for financial leverage (LEV=total debt over total assets), and indicator of the demand for working capital (WOC=ratio of working capital – which is itself equal to current assets minus creditors payable within one year less short term bank loans - over value added), another of the coverage of interest rate obligations (COV= gross operating profits over total interest rate payments) and finally one for indicating the need for short-term financing (FIN=ratio of short term finance to long-term finance).

[42] See http://europa.eu.int/comm/economy_finance/indicators/bachdatabase_en.htm