NBER WORKING PAPER SERIES

IS POLAND AT RISK OF A BOOM-AND-BUST CYCLE IN THE RUN-UP TO EURO ADOPTION?

Barry Eichengreen
Katharina Steiner

Working Paper 14438
http://www.nber.org/papers/w14438

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 2008

This paper was prepared for the National Report on Poland's Membership in the Euro Area, commissioned by the National Bank of Poland. It was begun while Steiner was visiting UC Berkeley, whose hospitality is acknowledged with thanks. We thank Bernhard Mahlberg for helpful comments. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

Is Poland at Risk of a Boom-and-Bust Cycle in the Run-Up to Euro Adoption?
Barry Eichengreen and Katharina Steiner
NBER Working Paper No. 14438
October 2008
JEL No. F0,F15

ABSTRACT

We ask whether Poland is at risk of the boom-bust problem that has afflicted economies around the time of euro adoption. Our answer, inevitably, is mixed. On the one hand the fact that Poland is an outlier, credit-growth wise, accentuates the danger of a boom if one believes in mean reversion. Our econometrics indicate that the fall in interest rates that will flow from expectations of euro adoption will further feed that boom. On the other hand the fact that interest rates have already converged part way to euro-area levels (and more extensively than in earlier adopters that experienced a sharp fall in rates and a pronounced credit boom), especially in the case of lending to firms, suggests that this shock may be less intense in Poland. And it is certainly conceivable that the same policies and country characteristics (not always visible to the econometrician) that have restrained credit growth in the past may continue to do so in the future. The broader literature also points to two set of factors, the first of which makes the danger of an unsustainable credit boom more immediate, the second of which makes it more remote. In the first category are the continuing limitations of the supervisory framework and the weakness of the finance minister in the budget-making process. In the second are a record of rigorous prudential supervision and the existence of relatively competitive labor markets.

Barry Eichengreen
Department of Economics
University of California
549 Evans Hall 3880
Berkeley, CA 94720-3880
and NBER
eichengr@econ.Berkeley.edu

Katharina Steiner
vienna university of economics and business admini
vienna, austria
katharina.steiner@uni-wien.ac.at

Is Poland at Risk of a Boom-and-Bust Cycle in the Run-Up to Euro Adoption?

Barry Eichengreen and Katharina Steiner[1]

September 2008

1. Introduction

This paper takes as a given that Poland will adopt the euro and asks how it should manage the transition.[2] It considers the boom-bust problem that has afflicted economies around the time of euro adoption. It analyzes why those boom-bust cycles occurred. It explores the consequences. It asks what might have ensured superior outcomes.

Poland is not Portugal, Greece, Ireland, Spain, Estonia, Lithuania or Latvia. It is important, in other words, to avoid mechanical comparisons. Compared to other countries that did or are experiencing credit booms in the run-up to euro adoption, the growth of credit to the private sector has been relatively subdued.[3] The increase in housing prices has been relatively limited. Residential mortgage debt as a percent of GDP remains relatively low.[4] The challenge is that it is not always clear in which direction the differences point. On the one hand, that Poland has not displayed similar excesses could mean that it has the problem of booming bank lending, excessive wage growth, and housing-market speculation under control. Firm supervision and regulation, cautious monetary and fiscal policies, and competitive product and factor markets may mean that Poland is at less risk of these excesses than its predecessors. On the other hand, it could simply be that euro adoption has remained sufficiently remote that there has been little

[1] University of California, Berkeley and Vienna University of Economics and Business Administration, respectively.
This paper was prepared for the National Report on Poland's Membership in the Euro Area, commissioned by the National Bank of Poland. It was begun while Steiner was visiting UC Berkeley, whose hospitality is acknowledged with thanks. We thank Bernhard Mahlberg for helpful comments.
[2] The current plan is for euro adoption in 2011.
[3] Some might add the qualifier "until recently."
[4] To avoid misunderstanding, it is important to emphasize that all these are statements about Poland relative to comparator countries.

reason to expect signs of its effects. But not long from now, as euro adoption draws near, the same dynamics evident in the early adopters may develop. Indeed, insofar as there is still scope for movements in prices and quantities, a displacement of Polish markets may occur.

This is not the first paper to consider the credit-boom problem in the run-up to euro adoption.[5] Nor is it the first to consider strategies for managing the transition in Central and Eastern Europe.[6] But it differs from its predecessors in several ways. It does not focus just on member states that experienced pronounced booms in the run-up to euro adoption; it seeks to avoid the problem of selection bias by considering the population of relevant countries. And it looks more closely at Poland's situation, taking as its focus the structure of its financial markets and the organization of supervision and regulation.

Section 2 describes the now familiar boom-and-bust scenario. Section 3 then reviews the experience of other catch-up economies that have adopted the euro. While highlighting the credit-boom-and-bust cycle experienced in some such countries, it also emphasizes the existence of heterogeneity within this subset of EU member states and points to the absence of destabilizing dynamics in some members. This then leads to a discussion of why experience has varied so widely.

Section 4 through 6 then take a closer look at Poland. Section 4 looks more closely at credit market and real estate developments. Sections 5 and 6 then ask whether Poland can avoid the kind of boom-bust cycle that has afflicted other catch-up economies adopting the euro. Section 5 analyzes Poland's susceptibility to a credit boom by estimating credit-market dynamics in a large sample of emerging market economies and using that model to forecast the evolution of private credit. But forecasting exercises only being as reliable as the assumptions that go into

[5] See for example Blanchard (2006), Fagan and Gaspar (2008) and Martin and Schiknecht (2008). Appendix Table A is a summary of contributions to the literature that take the sort of econometric approach that we implement below.
[6] On this see Borowski and Brzoz-Brezezina (2004) and Darvas and Szapary (2008).

them, some uncertainty about the country's susceptibility nonetheless remains. Section 6 suggests that the outcome will turn on four issues. First, how sharply will interest rates come down? Second, how effectively will wage discipline be maintained? Third, will the government be able to resist pressures for increased spending? Fourth, will bank regulators effectively restrain the impulse for an unsustainable credit boom?

Section 7 summarizes the implications of the preceding analysis.

2. The Boom-Bust Scenario

The standard boom-bust scenario for catch-up economies focuses on real interest rates. Prior to the adoption of the euro, real and nominal interest rates are high, reflecting capital scarcity and imperfect policy credibility. As accession to the euro area approaches, inflation and nominal interest rates converge toward euro-area levels. Short rates are driven to equality by capital mobility and the ECB's practice of assigning the short-term sovereign debt instruments of all euro-area member governments to the same liquidity category, implying the same haircut when accepting them as collateral. Convergence of inflation tends to be slower: there is more inertia in product and labor markets, and catch-up economies continue to be characterized by relatively high inflation owing to the Balassa-Samuelson effect.

The consequent decline in real interest rates will stimulate consumption and investment spending. Households and firms will demand additional credit to finance their spending, and the financial system will respond. The decline in real interest rates will put upward pressure on asset prices, including the price of real estate. Strong demand will make for a buoyant labor market, encouraging workers to escalate their wage demands. With investment up and savings down, the

current account deficit will widen. Debt service costs having declined, the government will be tempted to increase spending.

But if the strong growth of real wages persists, international competitiveness will deteriorate. Export growth will slow, and import competition will intensify. As profits are squeezed, firms will cut back on investment, and as growth slows, households will curtail their consumption. As demand falls off, unemployment will rise, and the country will discover that it is saddled with a real overvaluation that can be eliminated only through years of grinding deflation. There will be little scope for using stabilizing policy, since the country lacks monetary independence and the government will have accumulated a substantial debt. The party will be over. The souvenirs will be the memories and the hangover.

A few observations about this story may be helpful. First, the impact effect will depend on the extent of the drop in real interest rates, which will in turn depend on the change in nominal rates and on how far above euro-area levels they were prior to the transition. It will depend on the continuing inflation differential and on how far behind the euro area the country is in per-capita-income terms. We should not expect the same real interest rate effect in all cases.

Second, the reaction of households and firms is not entirely irrational. Lower real interest rates mean positive wealth effects for net foreign debtors. A lower cost of capital will mean faster growth for capital-scarce economies. It thus makes sense for firms to invest more. It makes sense for households to increase their consumption in anticipation of higher future incomes. One would expect to see faster growth in the short run as the economy traverses to a

higher capital/output ratio.[7] One would expect to see transitional current account deficits since the increase in consumption precedes the increase in income.

Third, it is necessary to add disequilibrium dynamics for this temporary acceleration to become an unsustainable boom followed by an extended recession. Real wages have to rise by more than is justified by the increase in the capital stock. Households have to boost their consumption by more than is justified by higher future incomes. The financial system has to increase credit to the public sector by more than is prudent given the fundamentals. The government has to increase its spending by more than is warranted by the decline in debt-servicing costs.[8]

Putting the point this way not meant to deny these possibilities. To the contrary, it is natural for agents, never having seen this adjustment before, to extrapolate from the present. It is not surprising that they overreact. But there is no reason to expect an equally severe overreaction in all times and places. The extent to which real wages rise and competitiveness deteriorates will depend on the structure of the labor market. The extent of the credit boom will depend on the structure of the financial system and on how it is regulated. Whether fiscal policy is a problem or a solution will depend on the political circumstances of the government. The extent to which everyone extrapolates the present and overreacts will depend on how many other

[7] These are presumably the mechanisms through which membership in the EU and the euro area are supposed to give rise to what is known in EU parlance as "convergence" – that is, to closing the gap between per capita incomes in the poorer and richer member stats.

[8] Not simply because, like other agents, it gets carried away by the boom but also because it may have been forced to contract public spending or raise taxes by more than is politically sustainable in the period when it was seeking to quality for admission to the euro area, creating a tendency to relax fiscal discipline immediately thereafter – something that the Stability and Growth Pact is designed to address but has not always succeeded in doing in practice.

catch-up economies have experienced such problems previously and how successfully lessons are drawn from their experience.[9]

3. Comparative Experience

Figure 1 shows the behavior of real interest rates in catch-up economies adopting the euro, other recent entrants to the euro area, and Poland. A sharp drop in real rates (constructed here as the government bond rate adjusted for concurrent CPI inflation) is evident in Greece, Ireland, Portugal and Spain. Rates drop from more than five per cent to the neighborhood of zero in all four cases before moving back up.[10] That there has been some reversal is not surprising: zero is not an equilibrium level for real interest rates. In all four cases the decline in real interest rates began several years before adoption of the euro. In four cases it persisted for several years following the change-over.[11]

It is harder to generalize about the remaining cases. In Slovenia real interest rates had already declined to low levels in 2003, and with the country's high income there was relatively little Balassa-Samuelson inflation. It is thus not surprising that there is not much evidence of a real interest rate decline as euro adoption drew near. Malta and Cyprus similarly have relatively high incomes and well-developed financial systems. Evidently their relatively small and specialized economies make for volatile real interest rates, complicating inference. In Poland

[9] Another way of understanding these points is in the context of exchange-rate-based stabilizations, which are close cousins to euro adoptions. These are episodes where countries bring down inflation by pegging the exchange rate and—hopefully—using that space to implement complementary policies. The decline in inflation is likely to be gradual (though how gradual is a matter of dispute; see Sargent 1986). Interest rates will come down faster. There will be a large capital account surplus and current account deficit as investment surges and flight capital is repatriated. Households will go on a spending spree. Unless fiscal policy is tightened or other measures are taken to damp down demand, there will be an erosion of competitiveness, and eventually boom will turn to bust. This can be thought of as a more extreme version of the same phenomenon considered here. Models of the process include Calvo and Vegh (1999) and Antolia and Buffie (2006).

[10] It is not surprising that the timing and, indeed, the shape of this reversal is different in Ireland, given that country's distinctive industry structure and sensitivity to global high-tech activity.

[11] In Portugal the trend was interrupted in 1999-2000.

real interest rates measured on the same basis as in the other countries have already come down from 6 per cent to less than 4 per cent – that is, half way to a reasonable equilibrium level of 2 per cent. This would seem to imply that the need for a further adjustment and the danger of the associated dislocations, while still there, are less than in the first four cases.

The figures that follow consider the experience of these same countries in the two years prior to euro adoption, in the two years following the changeover, and the two years after that (see Figures 2 to 4).[12] For Poland we use the two most recent years of data at time of writing.

Growth and inflation trajectories are heterogeneous, not surprisingly given that these variables are affected by myriad other influences in addition to euro adoption.[13] Portugal appears unusual in that its growth rate already slowed in its first two years under the euro, a pattern that is not evident elsewhere. Either the competitiveness problem was unusually quick to develop in Portugal, or something else in addition to euro adoption was working to depress growth.[14]

One explanation suggested by Blanchard (2006) is that Portugal's exports have a relatively low technology content, placing the country squarely in the sights of China. According to the Monetary Policy Committee of the European System of Central Banks (2005), some 60 per cent of Portugal's exports are relatively low tech, compared to 30 per cent for the euro area. Sustaining output and employment growth thus would have required a decline in unit labor costs relative to other euro area members, where Portugal saw a substantial rise. This explains why Portugal's experience differed from Ireland's and Spain's, but it does not explain why it differed from Greece's. According to ESCB (2005), Greece had an even higher share of low-tech goods in its exports than Portugal—67 versus 61 per cent—in 2000-1. (In contrast,

[12] Data permitting.
[13] Notably events elsewhere in the EU and the world.
[14] Or both.

Spain had 41 per cent, Ireland 14 per cent.) Evidently, something else was at work in addition to the technology content of exports.

Another possibility is that real wages surged ahead even more strongly than in other catch-up economies, both before and after euro adoption, owing not to market behavior but to public-sector settlements. Comparing public- and private-sector wages shows that it was the former that led the increase. In Portugal spending ministries did not face hard budget constraints owing to the decentralized nature of fiscal policy making. The education ministry could agree to generous increases in teachers' pay (teachers being among their constituents) without having to worry about how to fund them.[15] Hallerberg and Wolff (2006) show Portugal as having weaker budgetary institutions than Ireland and Spain according to their measures of procedural centralization and agenda-setting power of the finance minister. And with public-sector wages surging ahead, private-sector salaries followed.

A related hypothesis is that Portugal entered the period with relatively large fiscal deficits as a result of weak budgetary institutions.[16] Even member states with relatively large deficits in the late 1990s could become founding members of the euro area because they had the ability to prevent the project from going forward, something that is not true of new EU members seeking to join the euro area subsequently. And as a relatively small country, Portugal was then subject to stringent application of the Stability and Growth Pact, its deficit/GDP ratio having risen further to 4.2 per cent by 2001.[17] That member states now seeking to adopt the euro will have to show greater fiscal discipline in the two preceding years (since they lack leverage to block the

[15] In Portugal the relevant minister leads negotiations with the corresponding public-sector union; see European Industrial Relations Observatory (2007).
[16] The decentralization of budgetary procedures and the lack of agenda-setting power of the finance minister allowed primary expenditure as a share of GDP to rise from 34 per cent of GDP in 1990-92 to 37 per cent in 1993-5, 38 per cent in 1996-8 and nearly 41 per cent in 1999-2001. Data from Braga de Macedo (2007).
[17] Application has become somewhat less stringent as the country's doldrums have deepened, allowing the budget deficit to widen again.

process) is reassuring from this point of view. That they may similarly be subject to stringent application of the Stability and Growth Pact is not unless one is sure that there would otherwise be a tendency for fiscal policy to run out of control.

4. A Closer Look at Credit and Real Estate Market Developments in Poland

In this section we take a closer look at developments in Poland. Our focus is on credit aggregates and developments in the real estate market.

Since 2003, credit has grown more slowly in Poland than in any other Central and Eastern European country.[18] Figure 5 shows that credit to households and firms followed a broadly similar pattern in Poland and in Central and Eastern Europe as a whole in the 1990s but diverged thereafter. To be sure, even before 2000 there were differences between Poland and the rest of the region: in Poland credit to firms grew unusually fast in 1998; credit to households continued to increase until 2000 whereas it slowed down in the group of comparator countries. But the most persistent and visible divergences are after the turn of the century. In the CEE-10 as a group, credit to households expanded at rates in excess of 30 per cent per annum and peaking in 2004 at a growth rate of nearly 60 per cent. In Poland, in contrast, the growth of credit to households has remained *relatively* subdued, hovering between 10 and 20 per cent per annum prior to 2006, when its growth rate reached 30 per cent. Even then, this credit aggregate was growing at a slower path than the CEE-10 average. One explanation for this is that the classification of bank loans as nonperforming was relatively rigorous and stringent in Poland (at least through 2003). Having to classify a relatively large number of loans as nonperforming left Polish banks cash strapped (Breuss, Fink and Haiss 2004). See also Figure 6. Subsequently,

[18]Throughout our comparison group is the CEE-10 made up of Hungary, the Czech Republic, Slovakia, Slovenia, Romania, Estonia, Latvia, Lithuania, Croatia and Bulgaria.

loans previously classified as substandard were reclassified as satisfactory, and credit to households took off (National Bank of Poland 2004).

Credit to firms has grown more slowly both in Poland and the region as a whole. But the contrast between Poland and the CEE-10 is equally dramatic. In Poland, credit to firms trended downward in the first half of the present decade, actually shrinking in 2004-5. This is in contrast to the CEE-10, where the growth rate was not only positive and significantly higher than in Poland but also trending upward.[19] Investment by Polish firms was therefore relatively subdued. Firms used a significant portion of their retained earnings to pay off foreign-currency-denominated liabilities. Possible explanations include the fact that demand growth was not as buoyant as in CEE-10 as a whole, the relatively strict classification of loans as nonperforming, which constrained lending to firms by Polish banks (as described above) and political uncertainty (including some discussion of the possibility of reversing earlier privatizations). As with credit to households, there are signs (in the data for 2006-7) that the period of very slow growth of credit to firms may now be over. Still, experience to date is rather different than in the rest of the region.

Figure 7 disaggregates not by type of borrower but by currency of denomination. Again, broadly similar movements (punctuated by temporary divergences like the rapid growth of foreign-currency denominated credit in Poland in 1998) give way to persistent divergences after the turn of the century. Between 2002 and 2007, both the domestic-and foreign-currency components of credit to the private sector grow more slowly in Poland than in the rest of the

[19] The Czech and Slovak Republics also experienced negative growth rates of credit to firms at the beginning of the decade, but those growth rates recovered fast.

region.[20] Again, there are hints that the period of relatively subdued credit growth may be coming to an end. In particular the growth of foreign-currency-denominated credit shoots up in 2006 at the same time that its growth is decelerating in the rest of the region. In 2007, Poland follows the trend of the comparator group with a decrease in foreign currency credit. The majority of Polish foreign currency loans are denominated in Swiss francs, but there are also foreign currency loans in euros and U.S. dollars. The bulk of these foreign currency loans are housing loans secured by mortgages.[21] This suggests where risks may be concentrated going forward.[22]

The prices associated with these quantities can be seen in Figures 8-9. Figure 8 does not point to big differences between Poland and the rest of the region in the cost of domestic- and foreign-currency-denominated borrowing.[23] Figure 9, which again distinguishes households and firms, is more suggestive. The main change in recent years has been the significant decline in the cost of loans to Polish firms, which was concentrated in the period 2001-2003. This may have been due to growing competition from foreign banks, whose presence in the Polish market increased significantly in this period. The cost of borrowing has also declined for households, but less dramatically. The result is that borrowing costs for Polish firms are now indistinguishable from those of firms in the euro area. Polish households, in contrast, continue to face significantly higher costs than their euro-area counterparts. This suggests that if there is going to be a further drop in interest rates with euro adoption, this will be mainly evident in loans

[20] While private credit in foreign currency in CEE-10 increased by 23 percentage points between 2002 and 2005, it declined from 19 percent in 2002 to -3 percent in 2005 in Poland. The only other country besides Poland where the growth of private credit was consistently negative in this period was the Czech Republic.
[21] See Polish National Bank (2007).
[22] We will have more to say about the Polish housing market below.
[23] See Luca and Petrova (2007) for an analysis of drivers of foreign currency credit to firms in CEECs.

to households, including those for housing-related purposes. Evidently, this is where concerns over the credit-boom-and-bust phenomenon need to focus.

Finally, the real estate market has behaved differently in Poland than the rest of the region (see Figure 10). In the five years ending in 2007, housing prices rose by less than 2 per cent per annum, slower than anywhere else in Central and Eastern Europe (Egert and Mihaljek 2007). The behavior of rents is consistent with the relatively subdued behavior of prices: since the turn of the century rents on cooperatively owned properties have essentially been flat in nominal terms, while rents on privately and communally owned properties have risen by about 6 per cent per annum, this in a period when CPI inflation has been averaging 3.5 per cent. But house prices as a share of disposable income are the lowest of any EU country. The share of housing loans in total commercial bank lending to households was lower than in any country but the Czech Republic.[24] The ratio of mortgage debt to GDP as of the end of 2006 was lower than anywhere in the European Union except Romania and Slovenia. The rate of growth of that ratio from 2002 through 2006 was slower than anywhere but Slovenia. Mortgage debt per capita is lower than anywhere but Romania. Loan-to-value ratios on typical new mortgages are as low or lower than anywhere in the EU but Hungary.[25] All this said, real estate prices have been frothy in the center of Warsaw, and the fastest growing component of credit to households has been for housing.[26] Roughly 40 per cent of those loans are foreign-currency denominated. Again this points to the likely location of risks in the not-too-distant future.

The fact that bank credit to the private sector as a share of GDP remains low—at 30 per cent in 2006 considerably lower than in most of the comparator countries—similarly suggests that there may be scope for a lending surge. In Ireland, Portugal and Spain the ratio of private credit

[24] Egert and Mihaljek (2007), Table 2.
[25] Data in this and the preceding four sentences are from Miles and Pillonca (2008).
[26] IMF (2008b), Figure 1, p.21.

to GDP was in the range of 45 per cent to 75 per cent prior to the adoption of the euro and rose to more than 100 per cent subsequently. Using earlier data, Cottarelli, Dell'Ariccia and Vladkova-Hollar (2003) estimated an equilibrium ratio of bank credit to the private sector to GDP for a country with Poland's characteristics on the order of 70 per cent. Their estimate should now probably be regarded as a lower bound.[27] The size of the disequilibrium thus points to the non-negligible possibility of a credit boom.

5. An Econometric Analysis of Credit Market Dynamics

One way of addressing the question of whether Poland is likely to experience a credit boom is to build a model of the determinants of private credit (as a share of GDP) and to extrapolate on the basis of forecasts of the independent variables. We use a balanced panel of annual data for 50 middle-income countries including Poland and covering the period 1996-2006.[28] We estimate a model which includes factors driving demand and supply for credit (building on previous studies such as Cottarelli, Dell'Ariccia and Vladkova-Hollar 2005):

$$\underset{\text{PCGDP}}{} = f\ (\underset{-}{\text{INTR}},\ \underset{+}{\text{RGDPC}},\ \underset{-}{\text{INFL}},\ \underset{+}{\text{INDX}}) \qquad (1)$$

where PCGDP is the ratio of private credit to GDP, INTR is the average nominal interest rate, RGDPC is GDP per capita in constant prices, INFL is the year-on-year CPI inflation rate, and INDX is a financial openness index measuring the absence of capital controls. (LN in the table below indicates that a variable is expressed in logs.) Specification tests tell us that the data

[27] The estimates in Egert, Backe and Zumer (2006) point to somewhat higher equilibrium levels, although the authors emphasize the uncertainty surrounding their estimates. Those in Kiss, Nagy and Vonnak (2006) suggest somewhat lower equilibrium levels. Details are in Appendix A.

[28] The sample is based on the World Trade Organization of middle-income countries. The Czech Republic, Estonia, Hungary, the Slovak Republic and Trinidad and Tobago graduated to the high-income category into 2006 according to the WTO, as did Slovenia in 1997 and Singapore somewhat earlier. The country list and other information related to estimation are in Appendix B.

should be entered in logs rather than levels; in the one case where this is not clear (that of capital account openness), we enter the variable both ways. We also include country dummies where these are needed to pick up shifts in the structural relationship.[29]

Expected signs of the variables are indicated above where they appear in eqn. 1. We expect the interest rate to enter negatively: as interest rates come down, whether for reasons of euro adoption, because of unrelated capital inflows or otherwise, we expect private credit to boom. Higher levels of per capita income are indicative of economic and financial development and stability conducive to the growth of credit markets and the demand for credit. Low and stable inflation should similarly be conducive to the development of credit markets. Finally we expect a more open capital account (a higher value of INDX) to be associated with a higher private credit ratio insofar as this is indicative of a more liberalized financial environment.

Results are in Table 4. The "a" columns show the estimates when we control for country fixed effects. (The two variants differ by whether capital account openness is entered in levels or logs.) All coefficients are statistically significant and enter with their expected signs; the r-squared is relatively high, and the Hausman test accepts the use of country fixed effects. Estimates including time-fixed effects (not reported) differ in that the coefficient on INDX is not significantly different from zero, but this version has a relatively low r-squared and, in any case, the Hausman test rejects the use of time fixed-effects in favor of period-random effects. We therefore report instead estimates using period random effects in the "b" columns. The Hausman test accepts this specification, the distribution of residuals is normal, and the coefficients are all significant. The one anomaly here, for which we don't have an explanation, is the negative

[29] Most of these are quite intuitive. The list of retained country dummies is Brazil starting in 1998 (currency crisis and inflation stabilization), Colombia starting in 2000 (new reporting system for data), the Dominican Republic starting in 2003 (banking crisis), Indonesia starting in 1999 (currency and financial crisis), Suriname starting in 2002 (new data reporting system), Ukraine starting in 1998 (new and improved data reporting system) and Guyana (reason for the structural break not clear to us).

coefficient on the capital account openness variable. Finally in the "c" columns we include both country fixed and time random effects.[30] The coefficients are all significant and have the expected signs. We take this as the preferred specification.[31]

Using this model we can ask whether Poland is a significant outlier. We construct the fitted value of private credit to GDP for Poland for 2006 and compare it with the actual value. As expected, the actual value of private credit as a share of GDP (33.3 per cent) is well below the fitted values shown in Table 5. Our preferred specification in column 2c suggests that the credit/GDP ratio in 2006 should have been 10 percentage points higher than its actual value. (The country-fixed-effects-based estimates point to slightly smaller discrepancies but are basically compatible. The time random effects estimates, with their anomalous coefficients on the openness index among other things, point to much larger discrepancies.)

Say that the discrepancy disappeared in two years (that the credit/GDP ratio rose by 5 percentage points in each year). With nominal GDP growing at 5 per cent, private credit in nominal terms would have to be expanding at almost 10 per cent a year.[32] This suggests that there is scope for at least a modest credit boom if Poland converges to predicted levels of credit in a relatively short period of time. That said, annual rates of growth of nominal credit of 10 per cent are not as alarming as those seen in some other euro-adopting countries. And a ratio to

[30] We also considered a variety of other estimators, such as country random effects and two way random effects, all of which yielded broadly compatible results but none of which were obviously preferred on the basis of the standard specification tests.

[31] We also conducted a number of sensitivity analyses of the results. Most of the results were robust to estimating the equation in first differences; only the coefficient on the interest rate showed instability. Estimating the equation for the Central and Eastern European countries again produced similar results, although a smaller sample meant lower levels of precision. In addition, limiting the sample to Central and Easern Europe allowed us to enter a measure of nonperforming loans (as a share of GDP) – data that we do not have for other regions – which turned out to be statistically significant as well. We did some exploration with other explanatory variables – the ratio of public debt to GDP and a measure of corruption/transparency were statistically significant in some specifications. But we stuck with our initial specification for purposes of counterfactual simulation so as to limit the danger of data mining.

[32] There are of course second-round effects: the rise in the denominator of the credit/GDP will raise credit growth a bit more according to our estimates.

GDP of 43 per cent is not as alarming as the ratios in excess of 80 per cent in countries like Estonia and Latvia in 2006.

A more speculative way of using this model is to assume forecasts for the independent variables for 2010 and to compute the predicted value of the dependent variable. We extrapolate the independent variables linearly on the basis of recent growth rates. We then extrapolate the dependent variable, asking what the credit ratio will look like in 2010 if things continue unchanged.

If the situation in 2005-06 persists, extrapolation suggests a credit/GDP of 58 per cent, up from 33 per cent in 2006. Again this points to an annual rate of growth of nominal credit slightly in excess of 10 per cent.[33] If we extrapolate all the independent variables and use our preferred model (column 2c), we get a predicted ratio for 2010 of 52 per cent. This suggests an annual average rate of nominal credit growth on the order of 8 ½-9 per cent.

6. Is There a Boom-Bust Cycle in Poland's Future?

How much at risk is Poland of the kind of boom-bust cycle that has afflicted other catch-up economies adopting the euro? The answer turns, in our view, on four issues. First, how dramatically will interest rates come down? Second, will wage discipline be maintained? Third, will the government be able to resist pressure for increased public spending? Fourth and finally, will bank regulators effectively restrain the impulse for an unsustainable credit boom? Our answer to the first question, "not that dramatically," is somewhat reassuring. Our answers to the second, third and fourth questions, alas, are maybe, maybe and maybe.

a) How dramatically will interest rates come down?

[33] Again assuming nominal GDP growth of 5 per cent per annum.

Poland's real interest rates have already come down half-way from typical catch-up-economy levels to post-euro-adoption levels, as noted above, both because nominal interest rates are relatively low and because growth is five per cent, lower than in cases like Ireland in the 1990s. This suggests that the financial impulse will be less than in earlier catch-up economies adopting the euro. However, as shown in Figure 15, interest rates on loans to households are still much higher in Poland than in the euro area. The decline in interest rates has been due mainly to the decline in rates on credit to firms which still leaves scope for a significant impulse from declining rates on credit to households.

b) Will wage discipline be maintained?

A key question is how labor market institutions will respond. As interest rates come down with the adoption of the euro and spending increases, will the pressure of demand pass through into wage settlements, eroding the competitiveness of exports? Evidence on what kind of labor market arrangements encourage appropriate adjustments and which ones are conducive to the kind of problems alluded to in the preceding sentence is notoriously fragile. For what it is worth the hump-shaped hypothesis of Calmfors and Driffill (1988) suggests that both highly decentralized and highly centralized/coordinated systems are likely to work relatively well in this context. In highly centralized and coordinated labor markets, social pacts can be negotiated to restrain the growth of wages in the boom period. In relatively atomistic markets, wages will be free to adjust downward when the boom ends. In intermediate systems where union membership and bargaining coverage are extensive but not encompassing or well coordinated, these happy outcomes are less likely. Different sectoral unions will not internalize the implications of their wage setting for wage setting by other sectoral unions. Leapfrogging will occur. It will be difficult to negotiate a social pact to restrain wage inflation. Similarly, when the boom ends,

there will be resistance to being the first union to agree to wage reductions. Insiders, who shape union policy, will have different incentives than their unemployed brethren.

Poland appears to be fairly far out in the direction of competitive labor markets.[34] Union density is low by EU standards (union coverage somewhat less so, reflecting the ability of the government to extend agreements by employers to non-unionized workers in the same sector when this is a "vital social interest").[35] Employment protection legislation is modest by the standards of Greece, Spain and certainly Portugal (which had the most restrictive regulations at the beginning of the present decade).[36] Wages in different sectors appear to move differently depending on the particular demand conditions facing them.[37] There is a very large effective number of unions, according to Visser (2004) the largest number of any EU country. Historically, there has been a relatively low correlation between public sector wages and real wage growth in Polish manufacturing, which militates against Portugal-style wage inflation driven by public sector settlements.[38]

All this is reassuring. Indeed, labor market developments in recent years have not been too bad. While productivity growth and labor force participation may not be all that could be hoped for, the growth of unit labor costs has been contained, and competitiveness has been maintained.[39] Through 2007 the unit-labor-cost-based real exchange rate was still below 2000

[34] Precise rankings differ. That of Visser for 2003 ranks only France and the UK head of Poland in terms of degree of labor market decentralization. See Visser (2004).
[35] This is required under the terms of the Labour Code (OECD 2004).
[36] See OECD (2004) and Boeri and Garibaldi (2006).
[37] See Stockhammer and Onaran (2006).
[38] Boeri and Garibaldi (2006) find a lower correlation in Poland and Hungary than in any of the other Central and Eastern European economies (they do not, however, consider the Baltics).
[39] This is consistent with the view of Boeri and Garibaldi (2006) that not too much should be made of the slow growth of employment, which reflects the continuing efforts of firms to streamline and reduce labor hoarding.

levels, an evolution that compares favorably with that in Hungary, the Czech Republic and (even) Slovakia.[40]

Less reassuring are two additional observations. First, relatively competitive labor markets are likely to be less good at restraining wage growth during the boom than facilitating adjustment during the bust. The euro-adoption boom will be real: with lower interest rates, spending will surge, and with additional demand for domestic goods, labor markets will tighten and wages will surge. This suggests that Poland will not avoid the boom-bust cycle, although the bust may be less painful than elsewhere. Second, there is less than full agreement on the hump-shaped hypothesis. We may know less about how institutional arrangements translate into labor market outcomes than the preceding discussion suggests.

c) Will the government be able to resist pressure for increased spending?

Among the sources of wage pressure in the boom period are permissive public-sector pay policies. This is a specific instance of the general problem of inadequate fiscal discipline in booms. Theory suggests what kind of fiscal institutions are conducive to the maintenance of fiscal discipline. The budgetary process should be centralized and give the finance minister agenda-setting powers. Parliament should have limited options for disregarding the minister's deficit target. There should be obstacles to legislative amendments to the budget in mid-year, but the finance minister should have options for restoring balance if the deficit widens.

Hallerberg and von Hagen (2006) consider Poland's fiscal institutions in this light.[41] They give the country poor marks for budget preparation. Although the finance minister has agenda setting power—he circulates a document specifying the target deficit—spending

[40] IMF (2008b), p.6.
[41] A number of other studies undertake this exercise, including Ylaoutinen (2005), Gleich (2006), and Frabizio and Mody (2006). The advantage of the Hallerberg and von Hagen study is that the authors trace the evolution of Poland's budgetary institutions over time.

ministers can respond to his circular with individual budget bids, and their response can lead to changes in the budget balance figure. Importantly, the final decision on the government's budget proposal is made by the full cabinet, not the finance minister, creating common-pool problems of a sort likely to result in excessive deficits. Poland does better at the legislative stage. Parliament cannot change the deficit target submitted by the government. The government can call for new elections if parliament fails to adopt a budget. Finally, the country scores high in terms of implementation. Changing the budget in mid-course is difficult (a supplementary law is required), transfers of expenditures across budgetary categories require the approval of the finance minister, and the finance minister has the power to block expenditures when the deficit widens unexpectedly. Weighing these considerations, Hallerberg and von Hagen rank Poland slightly above the Central and Eastern European average, behind Estonia, Latvia and Slovenia but ahead of the Czech Republic, Slovakia, Lithuania, Bulgaria, Hungary and Romania.[42]

There is some reassurance in the fact that the three Central and Eastern Europeans coming in ahead of Poland are all strong-currency countries. (One has already adopted the euro, one has a currency board, and one operates within the narrow-band ERM-II.) Overall, Poland comes close to matching their combination of budgetary discipline and flexibility.[43] It falls short mainly because of the weakness of the finance minister. Although the finance minister can veto transfers of funds across spending categories and take steps to narrow the deficit when it widens, as noted above, he requires the consent and support of his cabinet colleagues heading up the various spending ministries when formulating the budget, which often results in his being at their

[42] The data for these other countries are for 2002, their indicators not having been updated subsequently. Timing appears to explain why the estimates in different studies differ. Thus, there was a new constitution in 1997 and a new Public Finance Act in 1998 that significantly strengthened budgeting institutions in Poland. There also have been changes over time in the power of the finance minister (which was greater in 2001 than 2006), and there are differences in assessment depending on whether indices are constructed on the basis of interviews with policy makers or statutory provisions. See the discussion in Hallerberg and von Hagen (2006), p.36.

[43] According to this particular ranking.

mercy. Polish finance ministers have repeatedly resigned or been dismissed for failing to get their cabinet colleagues to agree to spending limits. This does not provide reassurance for how the government will respond to the pressure for public spending created by a euro-accession boom. The picture, perhaps inevitably, is mixed.

d) Will regulators restrain the impulse for an unsustainable credit boom?

The question here is whether the financial system is well regulated, creating confidence that boom-and-bust dynamics will continue to be avoided as euro adoption approaches. In support of a positive answer is the fact that Polish banks are well capitalized.[44] There is the fact that the Polish Commission for Banking Supervision (the precursor of the current Financial Supervisory Authority) promulgated a set of best practices for mortgage-related lending in 2006. The hope is that this will encourage banks to carefully manage both the rate of growth and composition of their mortgage lending.

It may help to put these issues in context. Financial reform in Poland started with the Balcerowicz plan in 1990. This plan combined liberalization with macroeconomic stabilization and aimed at creating the legal, economic, financial and administrative conditions needed for transformation to a functioning market economy. Excessive issuance of money was halted, and interest rates were raised to contain inflation.[45] The National Bank of Poland (NBP) was prohibited by the parliament from extending long-term credits to the government. Cheap credits and preferential lending by the central bank to state owned firms were curtailed. Supervision of the lending business of commercial banks was reinforced.

[44] See e.g. Cottarelli, Dell'Ariccia and Vladkova-Hollar (2003).
[45] Among the main challenges was the establishment of a stable, convertible, national currency, the reduction of the high government deficit and external debt burden. Establishment of a demand and supply driven price system, privatization and the establishment of free trade were only some of the additional measures included in the Balcerowicz plan. For more details see Sachs and Lipton (1990).

Yet the volume of non-performing loans continued to rise during the transition recession of 1991-2.[46] Banks had little incentive to provision against potential loan losses and some had not accumulated enough capital reserves. In 1992 supervision was intensified to prevent gambling to survive. Tighter capital requirements were implemented and the NBP acquired the legal power to enforce capital adequacy and loss provisioning standards. The law also imposed limits on how much a bank could lend to a single borrower.[47] Polish banks were twinned with Western banks to increase their knowledge of modern banking techniques. Employees were offered additional training.[48] Foreign banks were asked to rehabilitate a private domestic bank in financial distress when entering the Polish market.

Despite these efforts, the quality of Polish banks' credit portfolios remained poor (Barisitz 2007). An Enterprise and Bank Restructuring Program (EBRP) was therefore adopted in 1993 to address the undercapitalization and bad loan problems. Specialized regional banks were obliged to undergo credit evaluations to qualify for the program. For those who qualified, one-time recapitalization based on the value of their non-performing loan portfolios at the end of 1991 followed. Banks were also obliged to work out restructuring agreements with bad debtors or forced bankruptcy reorganization or liquidation of those debtors within a fixed period. This approach strengthened financial discipline on firms and forced banks to develop and provide adequate risk assessment capacities.[49] Restructuring was extended to the cooperative banking sector in 1994. Two cooperative banks (PKO BP and PEKAO SA) and the state agricultural

[46] See Barisitz (2007).
[47] No loan could be for more than 10 percent of capital and total loans to a single borrower could not exceed 15 percent of capital (Mondschean and Opiela 1997).
[48] The IMF and the World Bank supported this effort (Mondschean and Opiela 1997).
[49] At the same time, the restructuring agreements with bad debtors failed to achieve fundamental changes in the management and operation of non-financial firms. The restructuring agreements which banks signed with debtors dealt primarily with financial conditions and did not address fundamental management or operational changes on the part of the debtor.

bank (BGZ), were recapitalized in a more centralized approach compared to the above mentioned program (Barisitz 2007).[50]

In the mid 1990s, new accounting principles were introduced and a general deposit insurance scheme was implemented. Bank privatization continued, although the state treasury retained significant stakes. As a result, unclear property rights hampered bank restructuring. In 1997, banking supervision was reorganized and management processes modernized. A new Independent Commission for Banking Supervision responsible for identification and decision making concerning the design of supervisory regulations was established. Executive power remained with the NBP. Foreign owners meanwhile were allowed to control a majority of the equity of banks and the last remaining stakes of the state treasury were sold to private owners.[51] Competition in banking increased with foreign owned banks expanding domestic retail business.

Harmonization with EU legislation accelerated with the run-up to EU accession. In 1999 the NBP set two pre-accession priorities within the National Program of Preparations for Membership in the European Union (NBP, 1999): the adjustment of the NBP for operation within the European System of Central Banks and the harmonization of Polish banking regulations with Community legislation. In 2004, with Poland's accession to the EU, European legislation on banking, such as the single banking license which aims at facilitating the set-up of branches in different European countries, was introduced in the Polish market. In 2005, banking supervision was again enhanced with the implementation of risk-based consolidated supervision.

In 2006, "Recommendation S" (issued by the Commission for Banking Supervision on March 15th, 2006) was introduced with the goal of improving the banks' practices concerning

[50] According to Reininger, Schardax and Summer (2001), costs of recapitalization in Poland were lower than in any other CEE country .
[51] For more details on privatization and consolidation of the Polish banking sector, again see Mondschean and Opiela (1997).

credit exposure and strengthening risk management and disclosure to comply with international practices. The risk weight on housing loans with loan-to-value ratios exceeding 50 percent was raised to 100 percent. Default risk assessments and regular stress tests for the banks' mortgage portfolios were recommended. More information is to be provided to customers to increase their awareness of risks of foreign-currency borrowing. Banks were advised to offer zloty loans first. They were instructed not to apply lower customer creditworthiness standards when extending foreign currency loans. Regulators also warned that further steps to curb foreign currency lending would be implemented as necessary. All this suggests that vigorous supervision and regulation limit the danger of an unsustainable credit boom in the run-up to the euro.

At the same time, there are weaknesses in the supervisory framework. Barisitz (2007) identifies "the often arbitrary and inefficient application of new regulations in Poland which also reflects lingering deficiencies of the court system. Attaching collateral can be costly. Information systems on credit histories have room for improvement." Due to the short lending history in Poland, foreclosure practices remain largely untested. IMF (2007a, p.30) has observed that attempts to clamp down on foreign currency and housing credit growth might simply drive business into the nonbank sector, which would increase supervisory challenges without reducing the associated risks.

7. Conclusions and Recommendations

Financial stability in Poland has rested in recent years on a combination of systematic and idiosyncratic factors that have moderated the rate of credit growth. By systematic factors we mean things like a relatively strict approach to loan classification and other prudential regulations, especially before 2004. By idiosyncratic factors we mean things like the behavior of

housing prices.[52] The result has been to leave credit aggregates below the levels in other Central and Eastern European economies and below the levels one would expect on the basis of the experience of emerging markets generally.

This observation frames the question of whether Poland is at risk of a boom-and-bust-like credit cycle in the run-up to euro adoption. On the one hand the fact that Poland is an outlier, credit-growth wise, accentuates the danger of a boom if one believes in mean reversion. Our econometrics indicate that the fall in interest rates that will flow from expectations of euro adoption will further feed that boom. On the other hand the fact that interest rates have already converged part way to euro-area levels (and more extensively than in earlier adopters that experienced a sharp fall in rates and a pronounced credit boom), especially in the case of lending to firms, suggests that this shock may be less intense in Poland. And it is certainly conceivable that the same policies and country characteristics (not always visible to the econometrician) that have restrained credit growth in the past may continue to do so in the future.

The broader literature also points to two set of factors, the first of which makes the danger of an unsustainable credit boom more immediate, the second of which makes it more remote. In the first category are the continuing limitations of the supervisory framework and the weakness of the finance minister in the budget-making process. In the second are a record of rigorous prudential supervision and the existence of relatively competitive labor markets.

Thus, while Poland is not doomed to follow other euro adopters that have experienced disruptive boom-and-bust cycles in the run-up to the euro, neither should this risk be minimized. Policy makers must remain vigilant as the date of euro adoption approaches, and they must then

[52] Housing price developments are of course a consequence as well as a determinant of credit-market developments, although they are affected also by other factors.

act in response to movements in interest rates, wages, housing prices and credit aggregates signaling the immanence of this danger.

A final somewhat reassuring factor is that Poland's transition to the euro is unlikely to occur for several more years. By that time a number of additional catch-up economies presumably will have made the move to the single currency. Polish officials are aware of the danger of the credit-boom problem that can accompany entry (Rybinski 2007). The more countries that suffer from it—and the more that demonstrate how it can be successfully averted— the more likely Polish policy makers are to draw appropriate lessons.

Appendix A: Related Work on Determinants of Credit Growth

Author	Brzoza-Brzezina (2005)	Kiss et al. (2006)	Backe et al. (2006)	Cottarelli et al. (2003)	IMF (2007)
Time span	1995/Q4-2003/Q4 Quarterly data	1995-2004 Annual data	1993/Q4-2004/Q4 Quarterly data	1973-1996 Annual data	1998/Jan-2005/Dec Monthly data
Country sample	CEE-11	CEE-8, selected euro countries	Total of 43 developed and transition economies	24 countries from North and Latin America, Southeast Asia and Western Europe	PL
Research question	Identification of determinants of private credit development > simulation of possible loan developments	Identification of determinants of private credit development and the equilibrium credit/GDP levels	Identification of determinants of private credit development > analysis of the equilibrium credit/GDP level	Identification of determinants of private credit development, the equilibrium credit/GDP level > trend forecasts	Identification of determinants of private credit development
Method	VECM for individual countries	Dynamic panel, error correction framework, pooled mean group estimator, IV technique	Dynamic panel, pooled and fixed effect OLS, DOLS, MGE	Random effects GLS estimation procedure	OLS
Dependent variable	Real private credit	Aggregated and disaggregated credit/nom. GDP	Private credit/nom. GDP	Private credit/nom. GDP	Change of real disaggregated private credit
Explanatory variables	Real 3-month money market rate	Real short term interest rate	Nominal short and long term interest rate	Dummy variables to account for structural breaks of the dependent variable	Change in real average gross wages
	Real GDP	GDP/capita (PPP based)	GDP/capita (PPS based); industrial production	GDP/capita (PPP based)	Change in industrial production
		Inflation (CPI)	Inflation (CPI)	Inflation index to account for variability and threshold effects	Non performing loans
			Bank credit to the public sector	Stock of public debt/nom. GDP	Change in unemployment rate
			Financial liberalization index	Liberalization index and index on entry restrictions	Change in real policy rate
			Existence of public and private registries	Accounting index	
			Housing prices	Legal origin	

Source: Own compilation.

Appendix B: Data and Sources

Country sample:
23 Latin American countries: Argentina (AR), Belize (BZ), Bolivia (BO), Brazil (BR), Chile (CL), Colombia (CO), Costa Rica (CR), Dominican Republic (DO), Ecuador (EC), El Salvador (SV), Guatemala (GT), Guyana (GY), Honduras (HN), Jamaica (JM), Mexico (MX), Nicaragua (NI), Panama (PA), Paraguay (PY), Peru (PE), Suriname (SR), Trinidad and Tobago (TT), Uruguay (UY), Venezuela (VE)

6 South-, East-Asian countries: China P.R.: Mainland (CN), Indonesia (ID), Malaysia (MY), Singapore (SG), Thailand (TH)

21 Central, Eastern and Southeastern European countries (CEECs):
Albania (AL), Belarus (BY), Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Moldova (MD), Republic of Montenegro, Poland (PL), Romania (RO), Russia (RU), Slovak Republic (SK), Slovenia (Sl), Ukraine (UA), Turkey (TR)

Korea, Albania, Bosnia and Herzegovina (BA), Montenegro, the Republic of Serbia and Turkey were excluded from the sample in order to have a balanced panel.

Time span:
1996 - 2006
Although the short time span suggests using quarterly data, we apply annual data and follow Brzoza-Brzezina (2005, 24) who argues that "since the new Member States have undergone a deep transformation and their time series are not particularly long, models, especially based on quarterly data, are not always of top quality."

Appendix C: Variables and Definitions

Private credit: claims on the private sector, stocks
Source: IMF (2008b).

Interest rate: lending rate, percent per annum, averages; AR, BO, CL, DO, SV, NI, PE, UY: lending rate (foreign currency, USD), percent per annum, seasonal adjusted
Source: IMF (2008b).

GDP Nom.: nominal gross domestic product, flows
Source: IMF (2008b); United Nations Statistics Division (2008; SR, 2002-2004); WIIW (2008).

GDP Deflator: GDP deflator at constant prices (2000=100), averages
Source: IMF (2008b); Econstats (SR).

Inflation: change in consumer price index, percent per annum, averages, exchange rate index
Source: IMF (2008b).

Index of financial liberalization: index measuring the extent of openness in capital account transactions
Source: Chinn and Ito (2007).

Dummy variables:
Brazil: sturctural break in private credit to GDP (pcgdp), 1998-2006, no reason indicated.

Colombia: structural break in pcgdp, 2000-2006, new reporting system for data.

Dominican Republic: structural break in pcgdp, 2004-2006, no reason indicated.

Guyana: structural break in pcgdp, 1998-2002, no reason indicated.

Indonesia: structural break in pcgdp, 1999-2006, no reason indicated.

Suriname: structural break in pcgdp, 2002-2006, data based on changed and improved classification system of data.

Ukraine: structural break in pcgdp, 1998-2006, changed and improved classification of data.
Source: IMF (2008c).

References

Antolia, Manoj and Edward Buffie (2006), "Exchange-Rate-Based Stabilization, Durables Consumption, and Stylized Facts," unpublished manuscript, Indiana University (July).

Blanchard, Olivier (2006), "Adjustment within the Euro: The Difficult Case of Portugal," unpublished manuscript, MIT (February).

Backe, Peter and Tina Zumer (2005), "Developments in Credit to the Private Sector in Central and Eastern European EU Member States: Emerging from Financial Repression – A Comparative View," *Focus on Economic Integration* 2, pp.83-109.

Barisitz, Stephan (2007), *Banking in Central and Eastern Europe 1980-2006: From Communism to Capitalism*, Abingdon: Routledge,

Boeri, Tito and Pietro Garibaldi (2006), "Are Labour Markets in the New Member States Sufficiently Flexible for EMU?" *Journal of Banking and Finance* 30, pp.1393-1407.

Borowski, Jakub and Michal Brzoz-Brezezina (2004), "Designing Poland's Macroeconomic Strategy on the Way to the Euro Area," unpublished manuscript, National Bank of Poland (April).

Braga de Macedo, Jorge (2007), "Competitiveness and Convergence in Portugal," Working Paper no.4, Ministry of Economies and Innovation (November).

Breuss, Fritz, Fink, Gerhard and Peter Haiss (2004), "How Well Prepared are the New Member States for the European Monetary Union?" *Journal of Policy Modeling* 26, pp.769-791.

Broza-Brzezina, Michal (2005), "Lending Booms in the New EU Member States: Will Euro Adoption Mater?" ECB Working Paper no. 543 (November).

Calmfors, Lars and John Driffill (1988), "Bargaining Structure, Corporatism and Macroeconomic Performance," *Economic Policy* 6, pp.14-61.

Calvo, Guillermo and Carlos Vegh (1999), "Inflation Stabilization and Balance of Payments Crises in Developing Countries," in John Taylor and Michael Woodford (eds), *Handbook of Macroeconomics*, Amsterdam: North Holland, vol. 1, pp.1531-1614.

Chinn, Menzie D. and Hiro Ito (2007), "A New Measure of Financial Openness," unpublished appendix, available at http://web.pdx.edu/~ito/.

Cottarelli, Carlo, Giovanni Dell'Ariccia and Ivanna Vladkova-Hollar (2005), "Early Birds, Late Risers and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and in the Balkans," *Journal of Banking and Finance* 29, pp.83-104.

Darvas, Zsolt and Gyorgy Szapary (2008), "Euro Area Enlargement and Euro Adoption Strategies," Economic Paper no.304, European Commission, Directorate of Economic and Financial Affairs (February).

Economist Intelligence Unit (2008), *Country Data Base*, London: EUI.

Econstats (2008), http://www.econstats.com/weo/C152V019.htm.

Egert, Balazs, Peter Backe and Tina Zumer (2006), "Private Sector Credit in Central and Eastern Europe: New (Over) Shooting Stars?" Working Paper no.852, William Davidson Institute (November).

Egert, Balazs and Dubravko Mihaljek (2007), "Determinants of House Prices in Central and Eastern Europe," *Comparative Economic Studies* 49, pp.367-388.

Economist Intelligence Unit (2008), EIU country database.

Euromonitor International (2008), GMID database.

European Bank for Reconstruction and Development (2008), *Transition Report 2008*, London: EBRD.

European Industrial Relations Observatory (2007), "Industrial Relations in the Public Sector," www.eurofound.europa.eu (nd).

Fabrizio, Stefania and Ashoka Mody (2006), "Can Budget Institutions Counteract Political Indiscipline?" *Economic Policy*, pp.689-739.

Fagan, Gabriel and Vitor Gaspar (2008), "Adjusting to the Euro," in Lars Jonung, Christoph Walkner and Max Watson (eds), *Building the Financial Foundations of the Euro: Experiences and Challenges*, Cheltenham, UK: Edward Elgar, pp.56-83.

Gleich, Holger (2003), "Budget Institutions and Fiscal Performance in Central and Eastern European Economies," ECB Working Paper no.215 (February).

Hallerberg, Mark and Guntram B. Wolff (2006), "Fiscal Institutions, Fiscal Policy and Sovereign Risk Premia," Discussion Paper no. 35/2006, Frankfurt: Deutsche Bundesbank.

Hallerberg, Mark and Juergen von Hagen (2006), "Budget Processes in Poland: Promoting Fiscal and Economic Stability," Warsaw: Program Ernst & Young.

Hsiao, Cheng (2003), *Analysis of Panel Data*, Cambridge: Cambridge University Press.

International Monetary Fund (2007), "Republic of Poland: Financial Sector Assessment Program - Technical Note – Credit Growth and Financial Stability," IMF Country Report 01/103 (March).

International Monetary Fund (2008a), "Republic of Poland: Staff Report for the 2007 Article IV Consultation," www.imf.org (19 March).

International Monetary Fund (2008b), *International Financial Statistics*, Washington, D.C.: IMF.

International Monetary Fund (2008c), Country reports, various countries, www.imf.org.

Kiss, Gergely, Marton Nagy and Balazs Vonnak (2006), "Credit Growth in Central and Eastern Europe: Trend, Cycle or Boom?" unpublished manuscript, Magyar Nemzeti Bank (November).

Kraft, Evans. (2005), "Banking Reform in South-East Europe: Accomplishments and Challenges," in Klaus Liebscher, Josef Christl, Peter Mooslechner and Doris Ritzberger-Grünwald (eds), *European Economic Integration and South-East Europe*, Cheltenham: Edward Elgar, pp. 351-367.

Luca, Alina and Iva Petrova (2007), "What Drives Credit Dollarisation in Transition Economies?" *Journal of Banking and Finance* 32/, 858-869.

Martin, Reiner and Ludger Schuknech (2008), "Booms and Busts: Experiences with Internal and External Adjustment," in in Lars Jonung, Christoph Walkner and Max Watson (eds), *Building the Financial Foundations of the Euro: Experiences and Challenges*, Cheltenham, UK: Edward Elgar, pp.84-110

Miles, David and Vladimir Pillonca (2008), "Financial Innovation and European Housing and Mortgage Markets," *Oxford Review of Economic Policy* 24, pp.145-175.

Mondschean, Thomas and Timoth Opiela (1997), "Banking Reform in a Transition Economy: The Case of Poland," *Economic Perspectives* 21/2.

Monetary Policy Committee of the European System of Central Banks (2005), "Competitiveness and Export Performance of the Euro Area," Occasional Paper no.30, Frankfurt: ECB (June).

National Bank of Poland (1999), *Annual Report*, www.nbp.pl.

National Bank of Poland (2001), *The Polish Banking System in the Nineties*, Warsaw: National Bank of Poland.

National Bank of Poland (various years), *Financial Stability Report*, www.nbp.pl.

National Bank of Poland (2007), "Information Taken From a Survey Conducted for a Project on Foreign Currency Credit in CEECs," Research Institute for European Affairs, Vienna University of Economics and Bank Austria.

National Bureau of Statistics China (2008), statistical data, http://www.stats.gov.cn/english/statisticaldata/

National Bureau of Statistics Guyana (2008), statistical data, http://www.statisticsguyana.gov.gy.

OECD (2004), "Wage-Setting Institutions and Outcomes," *OECD Employment Outlook*, pp.127-181.

OeNB (2007), "Data on Credit Development in CEECs by the Austrian National Bank," Vienna: OeNB.

Ötker-Robe, Inci, Zbivniew Polański, Barry Topf and David Vávra (2007), "Coping with Capital Inflows: Experiences of Selected European Countries," IMF Working Paper no. 190 (July).

Reininger, Thomas, Franz Schardax and Martin Summern (2001), "The Financial System in the Czech Republic, Hungary and Poland after a Decade of Transition," Discussion Paper 16/01, Economic Research Centre of the Deutsche Bundesbank.

Rosenberg, Christof (2007), "Euro Adoption: What Have We Learned So Far?" unpublished manuscript, IMF (June), www.imf.org.

Rybinski, Krzysztof (2007), "The Euro Adoption – Assessing Benefits and Costs," speech at the American Chamber of Commerce, Warsaw (17 January), www.bis.org.

Sachs, Jeffrey and David Lipton (1990), "Poland's Economic Reform," *Foreign Affairs* 69/3, pp. 47-66.

Sargent, Thomas (1986), *Rational Expectations and Inflation*, New York: Harper Collins.

Schadler, Susan, Zuzana Murgasova and Rachel van Elkan (2004), "Credit Booms, Demand Booms and Euro Adoption," paper presented to the conference on Challenges to Central Banks in an Enlarged EMU, Vienna, 20-21 February.

Statistics Singapore (2008), http://www.singstat.gov.sg.

Stockhammer, Engelbert and Ozlem Onaran (2006), "National and Sectoral Factors in Wage Formation in Central and Eastern Europe," Working Paper no. 100, Department of Economics, Vienna University of Economics (December).

Tuma, Zdenek (2004), "Euro Adoption and Financial Stability," *BIS Quarterly Review* 8, pp.1-3.

United Nations Statistics Division (2008), *Millennium Development Goals Indicators*, New York: United Nations.

Visser, Jelle (2004), "Patterns and Varations in European Industrial Relations," in European Commission, *Industrial Relations in Europe 2004*, Brussels: European Commission, pp.11-58.

WIIW (2008), *Statistical Data Base*, Vienna: Wiener Institut fuer Internationale Wirtschaftsvergleiche.

World Bank (2007), "Credit Expansion in Emerging Europe: A Cause for Concern?" World Bank EU8+2 Regular Economic Report (January).

Ylaoutinen, Sami (2005), "Development and Functioning of Fiscal Framework in the Central and Eastern European Economies," unpublished dissertation, University of Jyvaskyla.

Table 1. Growth of credit in CEE-11, 2002-2006

	Growth of private credit in percent of nom. GDP					Growth of credit to general government in percent of nom. GDP
	total	to households	to firms	in domestic currency	in foreign currency	
Poland	0.70	8.49	-5.83	1.42	-1.18	7.74
Croatia	3.34	12.81	3.33	7.82	1.63	18.11
Czech Republic	6.62	20.57	0.07	7.80	-1.93	-29.17
Hungary	14.34	24.19	10.15	4.97	29.99	21.66
Slovakia	9.03	21.60	3.71	3.85	11.62	14.36
Slovenia	13.38	12.00	13.93	-4.56	41.65	1.41
Romania	20.35	55.84	10.16	26.81	15.15	na
Latvia	21.74	41.24	11.42	8.39	29.30	-9.72
Estonia	24.84	31.50	19.77	27.82	23.96	-2.80
Bulgaria	24.09	39.22	17.58	21.07	28.01	40.74
Lithuania	30.13	53.36	21.65	27.81	31.88	-20.85

Note: Trend growth rate of credit ratios to nominal Gross Domestic Product (GDP); Least square regressions of the natural logarithm variable series on a time trend are used to obtain the trend growth rate of the available observations.

Table 2. Main Initiatives Affecting the Banking Sector, 1989-2007

1989	Banking Act and Act on the National Bank of Poland Introduction of two-tier banking system: nine regional banks, private banks admitted
1990	January: Balcerowicz plan for Poland's transformation to a market economy
1991	Recapitalization of banks to cover losses from currency devaluation (based on Balcerowicz plan)
1992	Tightening of banking supervision (capital adequacy and loss provisioning standards) Conditional licensing scheme (foreign bank-financed recapitalization of some small credit institutions)
1993	Enterprise and Bank Restructuring Program (EBRP): decentralized recapitalization scheme for regional state owned banks; initiation of hard budget constraints
1994	Act on restructuring of cooperative banks (PKO BP and PEKAO SA) and BGZ (state agricultural bank) Bank Guarantee Fund (implementation of a deposit insurance scheme)
1995	Implementation of new accounting principles (in accordance with EU guidelines)
1997/ 1998	Reorganization of banking supervision: Independent Commission for Banking Supervision in charge of identifying tasks and taking decisions; executive power remains with the NBP
1999	NBP sets priorities within the national program of preparations for membership in the European Union
2001	Economic slowdown coincides with cost cutting and rationalization measures;
2002	Financial situation of PKO BP and BGZ remains fragile, restructuring measures for both; KBC assists Kredytbank with capital injection
2004	Accession to European Union, European banking regulations valid
2005	Adoption of risk-focused consolidated supervision
2006	Recommendation S for improvement of banks' credit exposure

Source: Barisitz (2007) and NBP (2001).

Table 3. Rental Rates in Poland, 1996-2006

Year	Rent of dwelling owned by a co-operative	Rent of communal or company dwelling
	in zl/1m2	
1996	0,67	0,83
1997	0,89	1,05
1998	1,12	1,33
1999	1,35	1,63
2000	1,61	1,98
2001	1,53	1,83
2002	1,38	2,17
2003	1,38	2,28
2004	1,41	2,41
2005	1,44	2,56
2006	1,50	2,75

Source: Personal correspondence with Central Statistical Office of the Government of Poland

Table 4. Determinants of Private Credit Developments in 44 Emerging and Transition Economies, 1996 to 2006

Explanatory variables	Dependent variable: lnpcgdp					
Estimation method	(1a) country fixed effects	(1b) time random effects	(1c) country fixed and time random effects	(2a) country fixed effects	(2b) time random effects	(2c) country fixed and time random effects
constant	2.425***	4.380***	2.650***	2.793***	4.280***	3.167**
	(6.569)	(28.414)	(7.949)	(7.594)	(27.786)	7.989
Lnintr	-0.102**	-0.294***	-0.141**	-0.110***	-0.299***	-0.16**
	(-2.456)	(-6.884)	(-2.489)	(-2.588)	(-7.197)	(-2.476)
Lnrgdpc	0.160***	0.078***	0.139***	0.139**	0.086***	0.109**
	(5.244)	(5.268)	(3.019)	(4.524)	(6.572)	(2.071)
lninfl,	-0.075***	-0.302***	-0.053**	-0.080***	-0.301***	-0.074***
	(-3.811)	(-13.031)	(-1.997)	(-4.184)	(-13.617)	(-1.982)
lnindex_finliberalization,	0.127***	-0.044**	0.140***			
	(5.126)	(-2.520)	(5.883)			
index_finliberalization				0.040***	-0.016***	0.036***
				(5.710)	(-3.259)	(3.374)
dummy_Brazil	-0.353***	0.346***	-0.381***	-0.336***	0.354***	-0.359***
	(-8.162)	(5.845)	(-10.631)	(-7.676)	(6.524)	(-8.925)
dummy_Colombia	-0.283***	-0.109***	-0.313***	-0.300***	-0.105***	-0.350***
	(-4.312)	(-3.389)	(-5.992)	(-4.320)	(-3.683)	(-5.266)
dummy_Guyana	0.202***	0.570***	0.206***	0.199***	0.592***	0.205***
	(9.503)	(14.706)	(9.793)	(9.540)	(17.644)	(9.489)
dummy_Indonesia			-0.853***			-0.886***
			(-10.241)			(-11.229)
dummy_Suriname	0.591***	-0.160***	0.563***	0.550***	-0.144***	0.499***
	(6.682)	(-3.276)	(5.054)	(5.708)	(-3.063)	(4.179)
dummy_Ukraine	2.192***	-0.270*	2.169***			
	(10.972)	(-1.754)	(9.541)			
Adj. r2	0.951	0.347	0.834	0.952	0.347	0.799
F-Value (sign. of r2)	182.105***	29.559***	46.885***	187.650***	33.056***	38.055***

*Static panel data model. GLS estimates with country-fixed or random effects using EViews 5.1. No. of observations 484. t-statistics in parantheses, based on heteroskedasticity-robust standard errors (White cross-section s.e. and cov.; d.f. corrected). Asteriks indicate the significance of the coefficients at the 10% (*), 5%(**) and 1%(***) levels. The Hausman test on fixed effects confirmed the reported estimation results at the 5% level. The Jarque Bera test confirmed normal distribution of the residuals. Dummy variables control for structural breaks in the time series of the dependent variable. See the Appendix for definitions and sources of the variables.

Source: See text.

Table 5. In-sample Actual and Predicted Values of Private Credit to GDP for Poland, 2006 (in percent)

	actual pcgdp (a)	predicted value of pcgdp (b)	absolute deviation (a-b)
1a	33.29	41.22	-7.93
1b	33.29	59.71	-26.42
1c	33.29	41.85	-8.56
2a	33.29	43.27	-9.99
2b	33.29	60.58	-27.29
2c	33.29	43.61	-10.32

Source: See text.

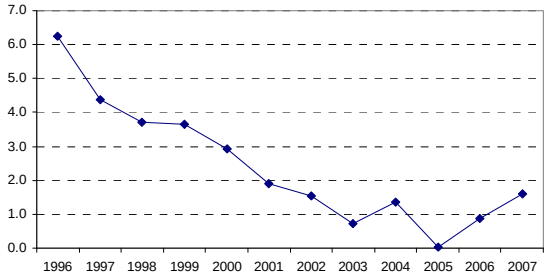
Table 6. Linear Extrapolation of Credit/GDP Ratio and Forecast Based on Estimated Relationship and Linear Extrapolation of Independent Variables (in percent)

extrapolated pcgdp 2010 (a)	predicted value of pcgdp (b)	absolute deviation (a-b)
58.28	48.47	9.80
58.28	83.37	-25.09
58.28	49.88	8.40
58.28	52.21	6.07
58.28	85.20	-26.92
58.28	52.40	5.87

Source: See text.

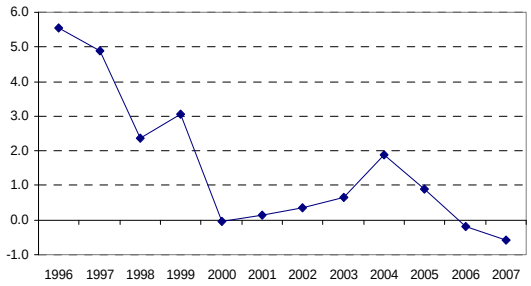
Figure 1: Real Interest Rates around the Time of Euro Adoption

GREECE
REAL INTEREST RATES (1996-2007)



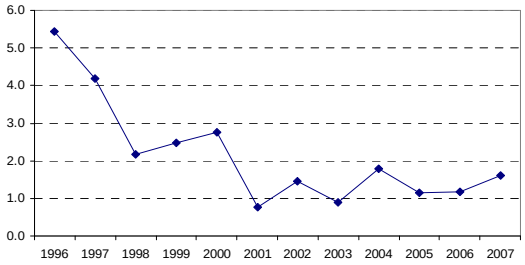
10-year Government Bond yield adjusted by inflation.
Source: IFS

IRELAND
REAL INTEREST RATES (1996-2007)



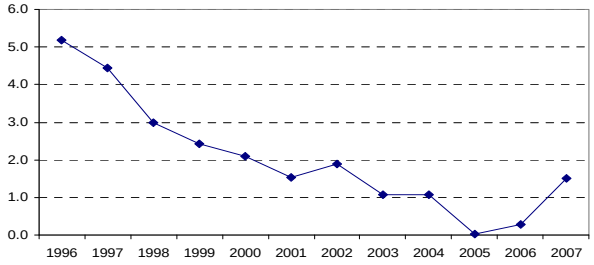
10-year Government Bond yield adjusted by inflation.
Source: IFS

PORTUGAL
REAL INTEREST RATES (1996-2007)



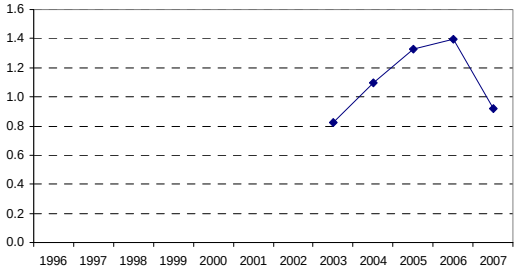
10-year Government Bond yield adjusted by inflation.
Source: IFS

SPAIN
REAL INTEREST RATES (1996-2007)



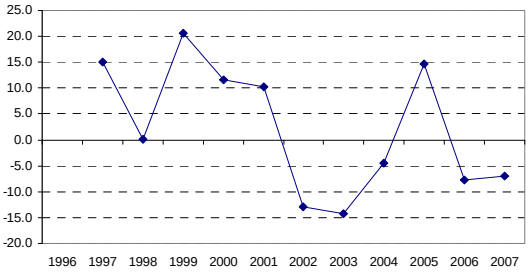
10-year Government Bond yield adjusted by inflation.
Source: IFS

SLOVENIA
REAL INTEREST RATES (2003-2007)



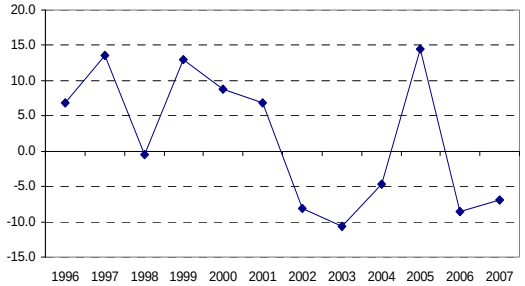
10-year Government Bond yield adjusted by inflation.
Source: IFS

CYPRUS
REAL INTEREST RATES (1997-2007)



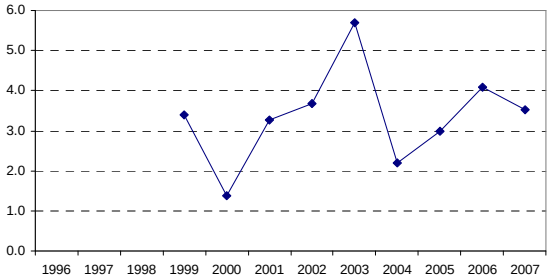
10-year Government Bond yield adjusted by inflation.
Source: IFS and Global Financial Database

MALTA
REAL INTEREST RATES (1996-2007)



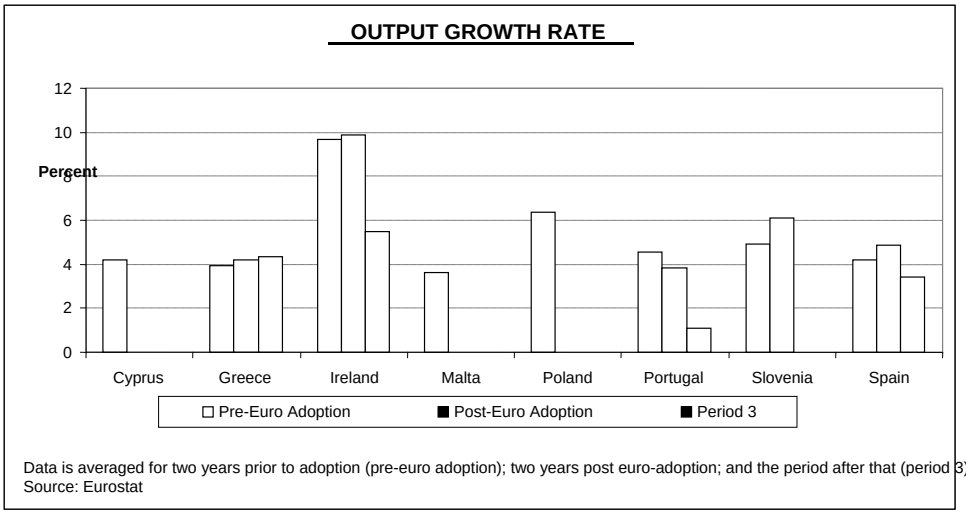
10-year Government Bond yield adjusted by inflation.
Source: IFS and Global Financial Database

POLAND
REAL INTEREST RATES (1999-2007)

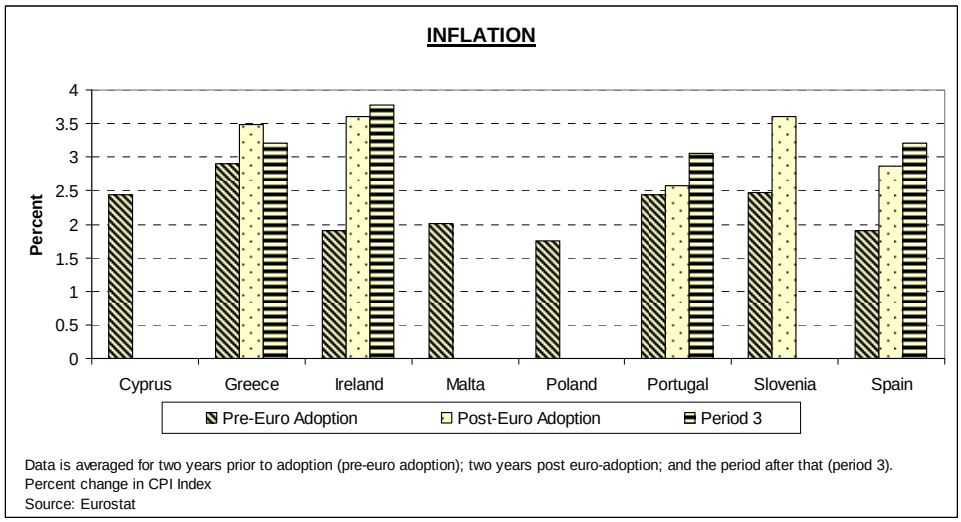


10-year Government Bond yield adjusted by inflation.
Source: IFS and Global Financial Database

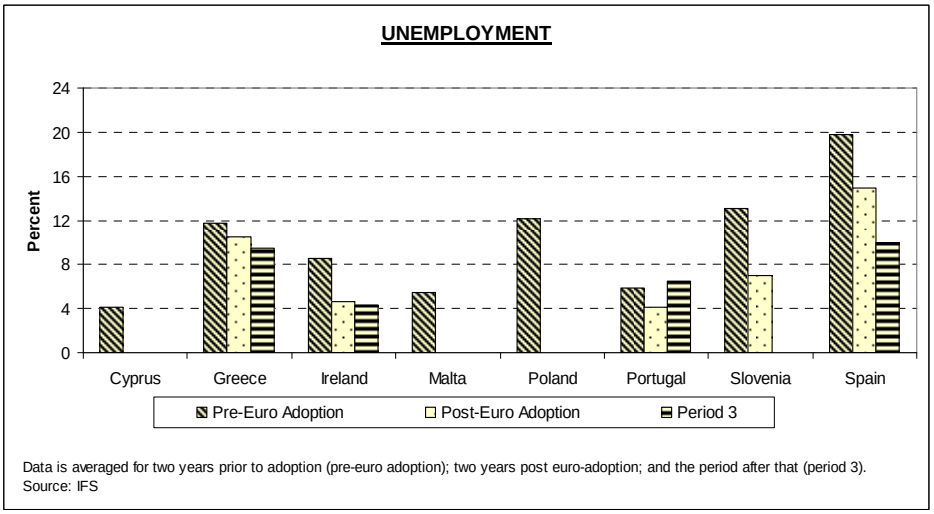
Figure 2: Selected Macroeconomic Variables



Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Source: Eurostat

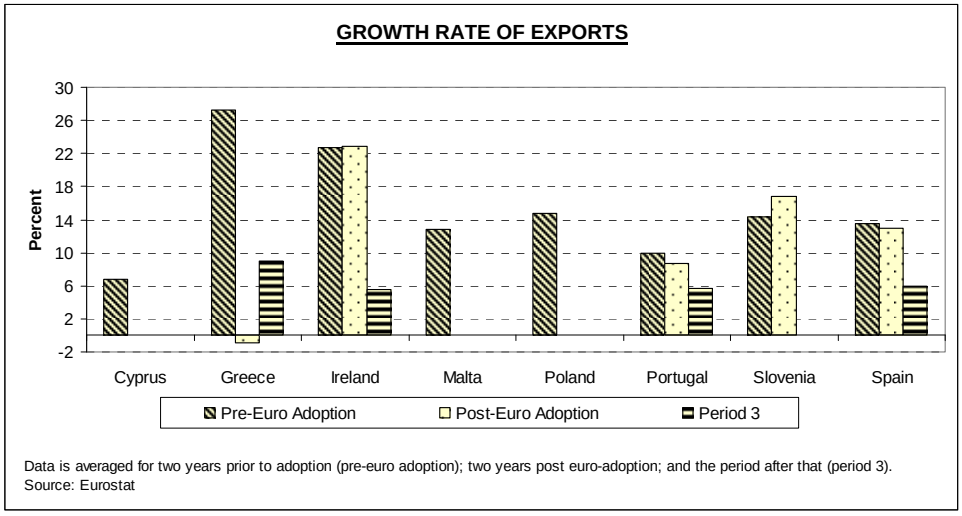


Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Percent change in CPI Index
Source: Eurostat

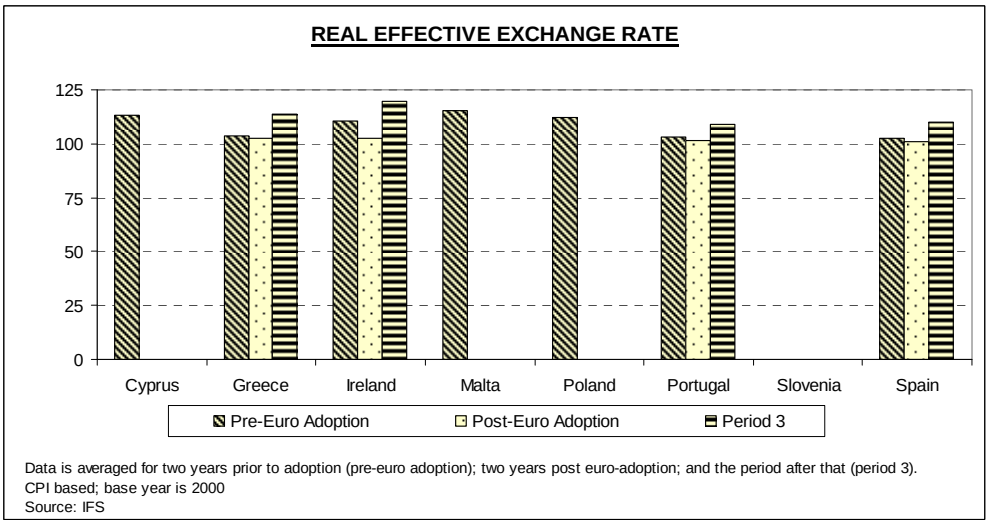


Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Source: IFS

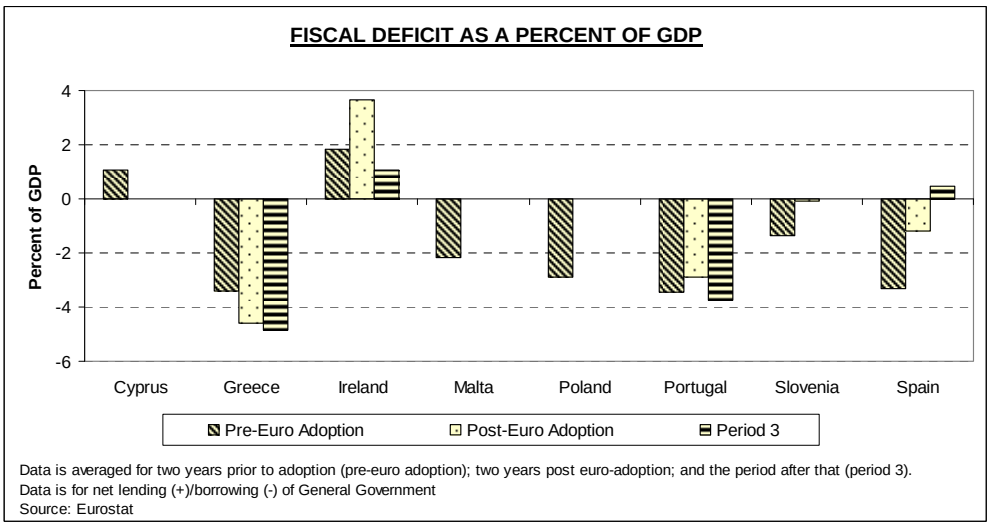
Figure 3: More Macroeconomic Variables



Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Source: Eurostat

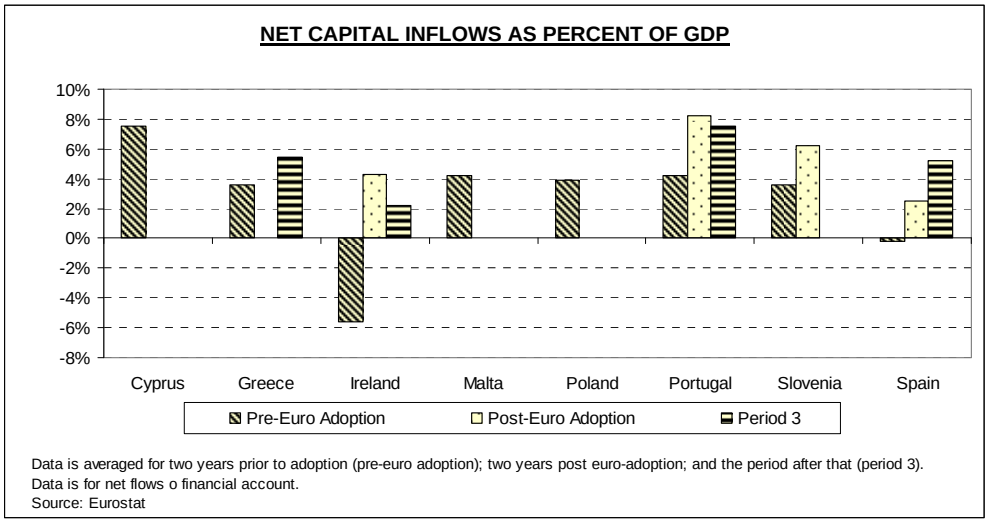


Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
CPI based; base year is 2000
Source: IFS

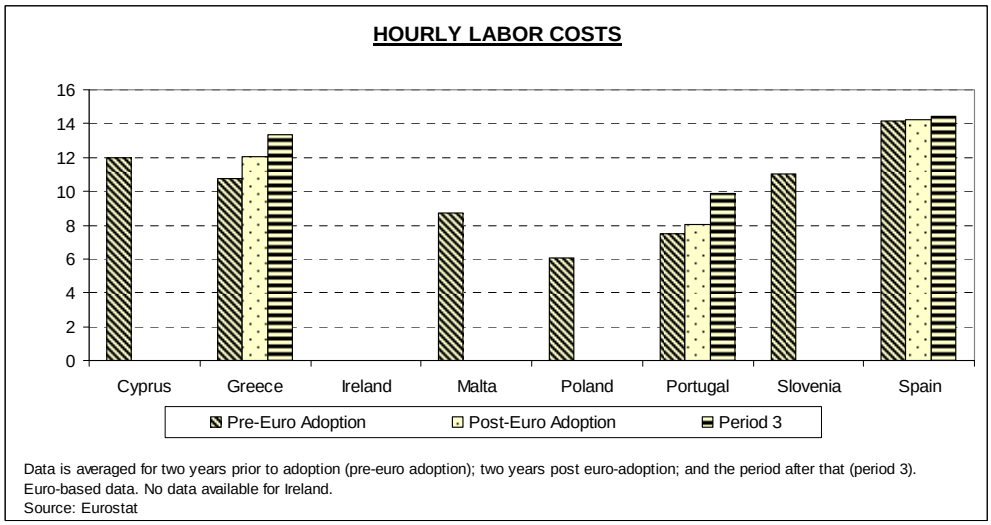


Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Data is for net lending (+)/borrowing (-) of General Government
Source: Eurostat

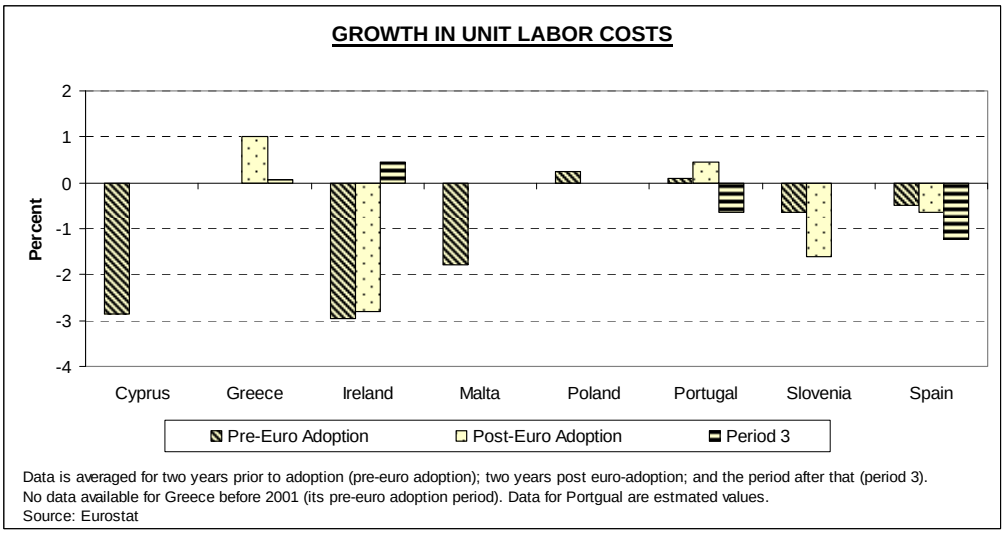
Figure 4: Yet More Macroeconomic Variables



Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Data is for net flows o financial account.
Source: Eurostat

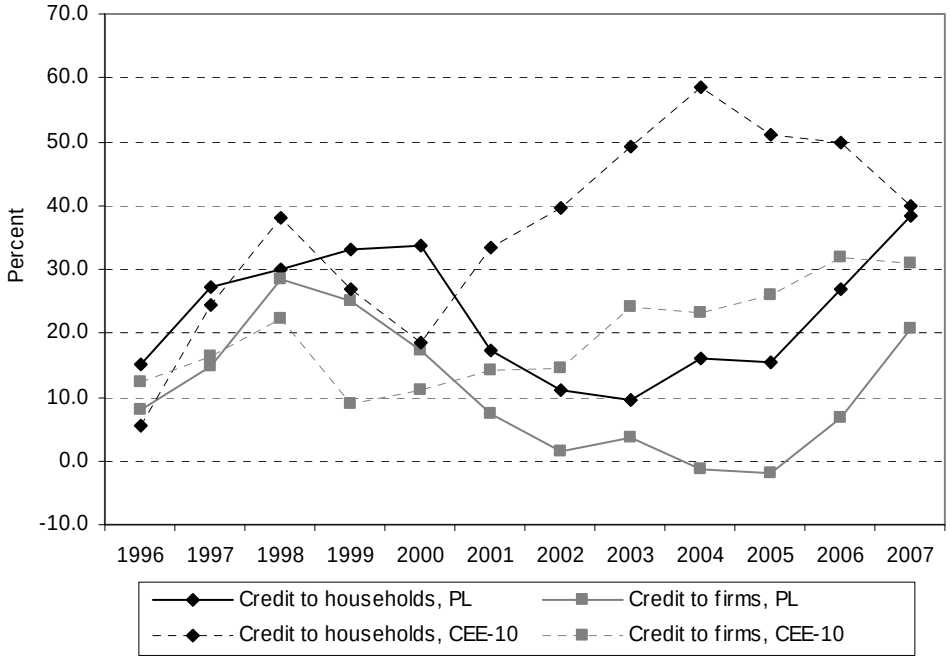


Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
Euro-based data. No data available for Ireland.
Source: Eurostat



Data is averaged for two years prior to adoption (pre-euro adoption); two years post euro-adoption; and the period after that (period 3).
No data available for Greece before 2001 (its pre-euro adoption period). Data for Portgual are estmated values.
Source: Eurostat

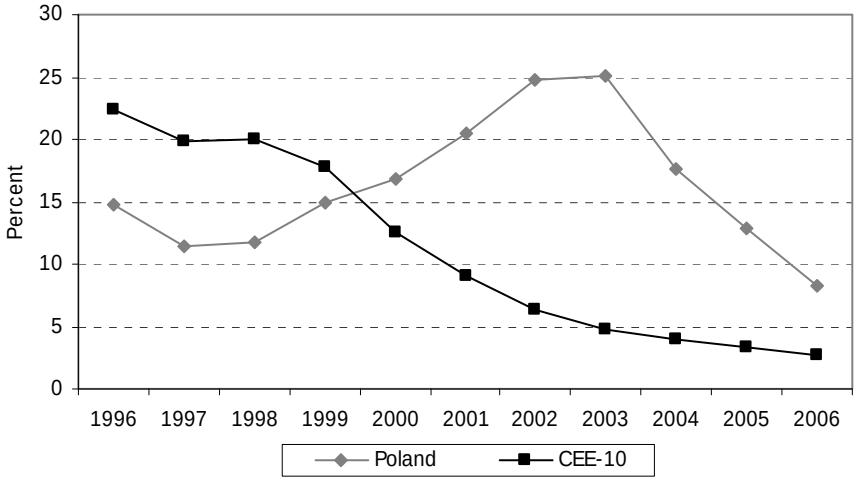
Figure 5: Growth of Credit to the Private Sector by Debtor (1996–2007)



Definition: Loans to households include loans to households and non profit institutions serving households (NPISH); loans to firms include loans to non financial firms and non monetary financial firms; loans to general government.

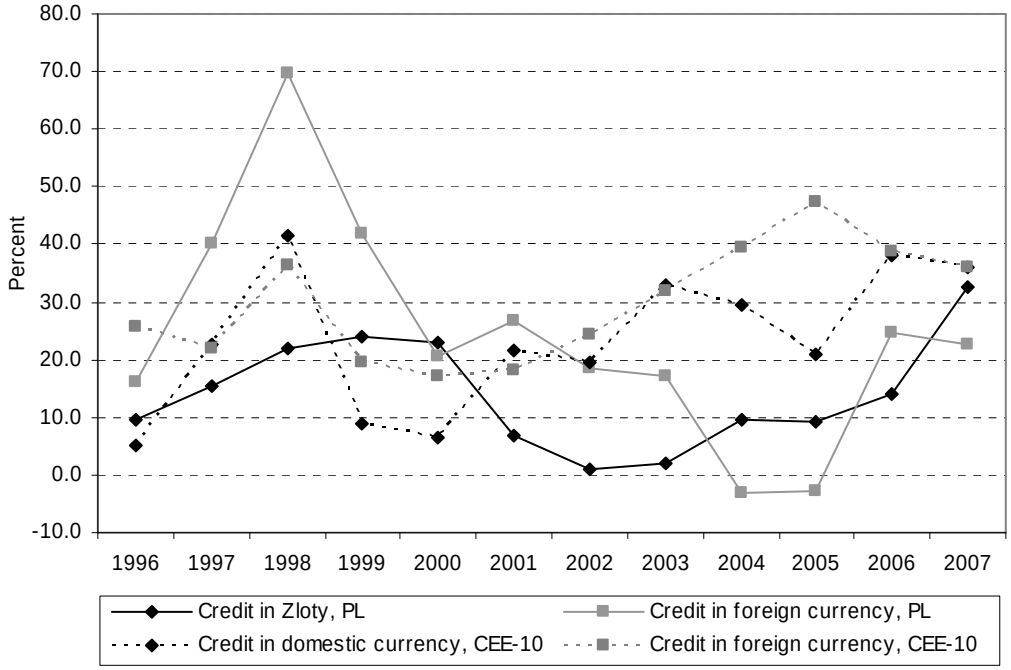
Source: OeNB (2007)

Figure 6: Share of Nonperforming Loans in Total Loans, Poland and CEE-10, 1996-2006



Source: EBRD (2008).

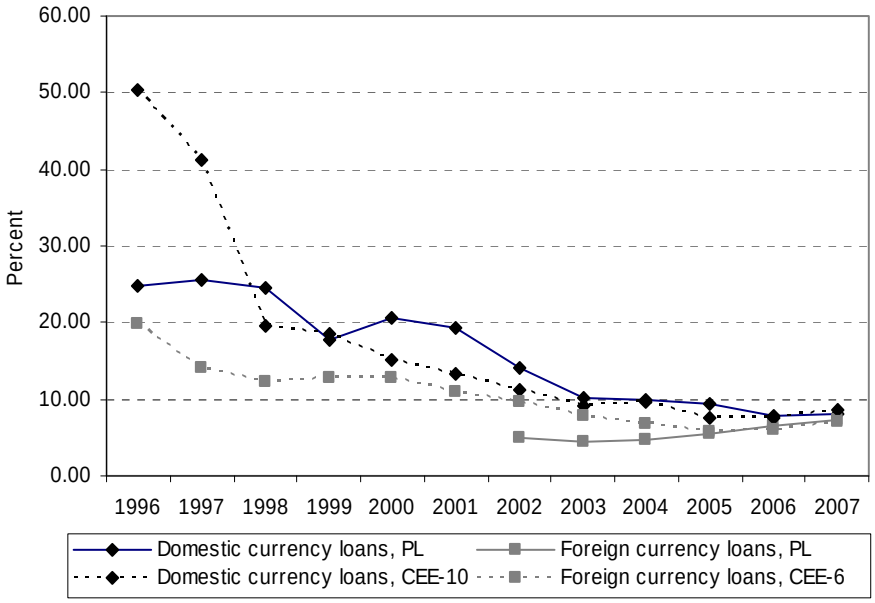
Figure 7: Growth of Credit to the Private Sector by Currency (1996–2007)



Definition: Private credit in domestic and foreign currency includes credit to households and firms.

Source: OeNB (2007)

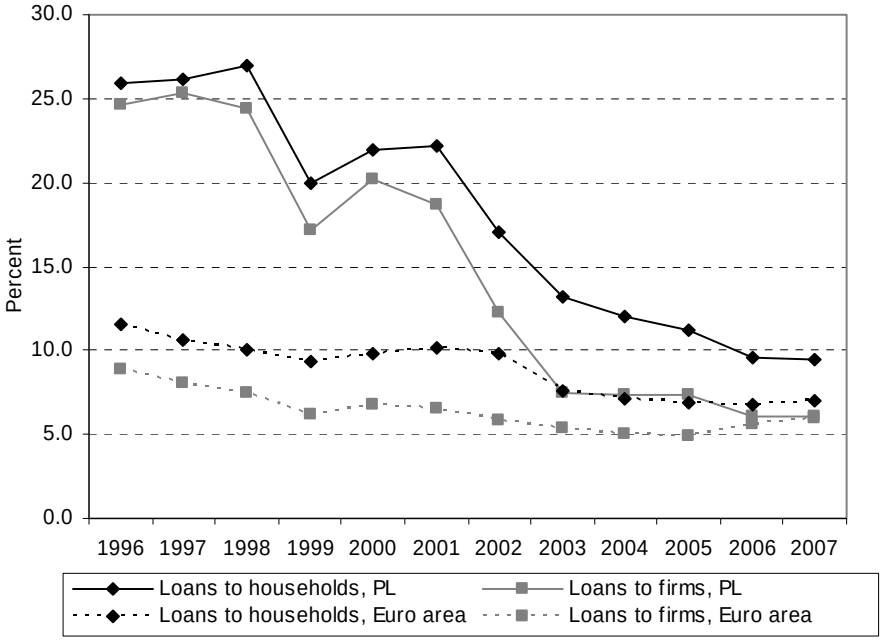
Figure 8: Nominal Interest Rates on Loans by Currency Denomination (1996–2007)



Definition: CEE-6 include Bulgaria, Croatia, Estonia, Latvia, Lithuania and Slovenia.Average interest rates on loans denominated in (and/or indexed to) foreign and domestic currency. The data do not distinguish between credit to the private and public sector. Longer time series on interest rates of foreign currency loans are not available.

Source: OeNB (2007), National Bank of Poland (2008).

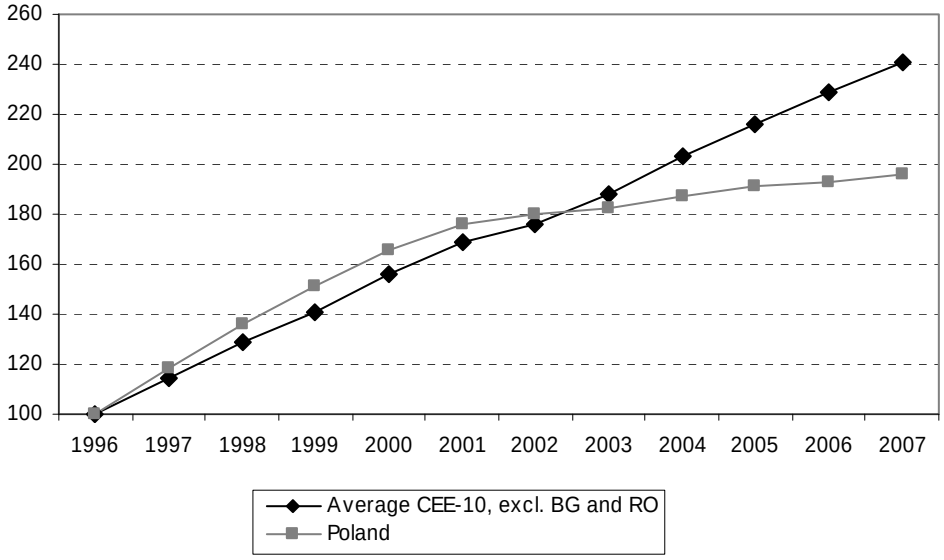
Figure 9: Nominal Interest Rates on Loans to the Private Sector by Debtor (1996–2007)



Definition: Average annual interest rate on loans.

Source: National Bank of Poland (2008) and Economist Intelligence Unit (2008).

Figure 10: Comparative Housing Prices, Poland vs. CEE-10 (1996 – 2007)



Definition: The index of housing prices is constructed as a weighted average of index of actual rentals for housing prices, index of imputed rentals for housing prices, index of maintenance and repair of dwellings prices, index of water and miscellaneous domestic services prices, and index of electricity, gas and other fuels prices.

Source: Euromonitor International (2008).