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# BACK ON TRACK? SAVINGS PUZZLES IN EU ACCESSION COUNTRIES

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**ABSTRACT**

After the collapse in the early years of transition, saving rates in many EU accession countries have recovered and remained stable during recent years. This may indicate that the transformation process has come to an end with regard to savings. Is saving behaviour in EU accession countries now driven by the same forces as it is in market economies? We use a panel data set covering the years 1990 to 1999 to estimate fixed-effects models for domestic and private saving ratios. Our central findings are: saving rates are persistent; income, growth and institutional reforms cause saving to increase, whereas public saving crowds out private saving. Domestic saving and foreign capital are operating as substitutes.

*Keywords*: Panel data, savings, EU accession countries, transformation

*JEL-classification*: C33, E21, P2

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# SAVINGS PUZZLES IN EU ACCESSION COUNTRIES

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### 1. Motivation

Saving rates differ widely around the world. The dynamics of saving have been an issue for many developing countries and emerging markets, namely in Latin America and Asia. Their experiences clearly show that there is a close relationship between domestic savings, domestic investment and growth. If capital were perfectly mobile, however, then changes in domestic investment would be independent of changes in domestic saving. Thus, the importance of domestic saving for domestic investment depends on a country's actual access to the international capital market and on the degree of its integration into international financial markets (Feldstein & Horioka 1980). The transition countries in Central and Eastern Europe (CEE), like other emerging economies, have only limited access to international financial markets – owing to specific macroeconomic and institutional risks. Therefore, the mobilisation of domestic saving is a very important factor in the ability of these countries to finance their own catching-up processes. This is especially pertinent for those transition countries in Central and Eastern Europe that have applied to join the European Union (which we refer to in the following as the EU accession countries). A fairly high level of domestic saving is therefore considered to be a basic requirement for these countries, to ensure economic development and future prosperity.

In fact, after the sharp decline in domestic saving that took place during the early years of transition, saving rates in many EU accession countries soon recovered and have remained relatively stable during recent years. But what are the motives behind domestic saving in these countries? Is saving in EU accession countries now driven by the same forces as it is in market economies? Does this mean that the transition countries are "back on track" with their saving patterns?

Up to now research focusing on saving patterns in EU accession countries is still pending. Studies based on large international data sets, including both industrialised and emerging economies exclude the CEE economies in transition (Loayza, Schmidt-Hebbel & Servén, 1999). Usually, these studies explain trends in *domestic* and *private* saving, and do so mainly through growth and age structure (Edwards 1995; Loayza, Lopez, Schmidt-Hebbel & Servén, 1998; Bailliu & Reisen, 1998; Loayza, Schmidt-Hebbel & Servén, 2000). The small amount of literature on saving (*domestic* as well as *private*) in CEE transition countries, focuses on groups of selected transformation countries at an early stage of transition (Denizer & Wolf, 2000; Denizer, Wolf & Ying, 2000; IMF 2000) and presents contradictory results.[1]

Therefore, this paper attempts to fill at least three analytical gaps: First, our study is based on a panel data set that contains all EU accession countries formerly belonging to the Eastern bloc (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia) and it covers the whole transition period – the years 1990-1999

[1] These empirical studies differ significantly in terms of definitions of domestic and private saving, choice of explanatory variables, country set, underlying time horizon and methodological approach.

for the CEE countries except the Baltics and the period of 1992-1999 for the Baltic countries. Second, we analyse both domestic and private saving in EU accession countries. Besides the standard macroeconomic and demographic variables, we additionally check for the influence of the institutional development in the countries under consideration using a transition indicator recently constructed by the EBRD.[2] This general transition indicator is calculated as the average of four different partial transition indicators, which reflect the state of enterprise restructuring, competition policy, and bank and security market reforms in the countries under consideration.

Third, since the transformation period is a very short time span for an econometric analysis, we have to make efficient use of the information contained in the data. We meet this requirement by applying panel estimation techniques (fixed-effects model) to take advantage of the information content contained in both the time series and the cross-sectional dimension of the data. Regarding the estimation, we followed the approach of Beck and Katz (Beck & Katz 1995 and 1996), who proved that especially for small panel data sets, the Ordinary Least Squares (OLS) method with panel-corrected standard errors should be applied. This rather simple approach yields accurate standard errors whereas the application of the Generalised Least Squares (GLS) method would lead to an underestimation of the variability of the estimated coefficients.

The paper is organised as follows: in section 2, various stylised facts on saving in the countries under consideration in the pre-transition period are discussed and then contrasted with the development during transition. In section 3, the database is presented. In section 4, we briefly discuss some econometric issues concerning panel data and describe the estimation approach. Empirical findings are presented in section 5. Section 6 presents the study's conclusions.

## 2. Stylised Facts

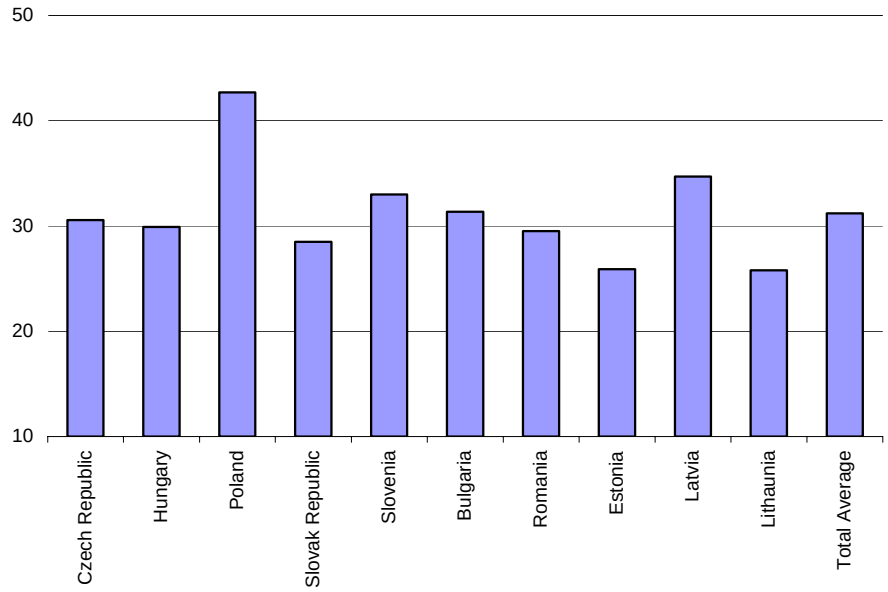
Domestic saving rates were exceptionally high in Central Eastern European countries during the socialist era. In the 1980s, average saving rates of around 30% were reported for these countries, while in the industrialised world, domestic saving rates reached only about 20% of gross domestic product. And in contrast to "Western" saving, which tended to decline, socialist saving rates actually exhibited an upward trend. Saving rates within the socialist bloc, however, differed widely (Figure 1). While Poland was on top with a domestic saving rate of about 43% in 1989, saving rates in Estonia and Lithuania only reached about 26%.

It is assumed that saving during the socialist era was mainly driven by three factors: first, there was "planned" saving, which was necessary for funding "centrally planned" investment. Second, the lack of consumer goods (Denizer & Wolf, 2000 and 1998) motivated what was called "involuntary" or "forced" saving. Third, although neglected in most analyses, voluntary private saving also took place, in particular to finance durable consumer goods.

[2] We are grateful to Daniel Piazolo, who provided us with the extended version of the EBRD transition indicator covering the whole period under consideration.

*Figure 1. Pre-transition domestic saving rates (1989)*

As a percentage of GDP

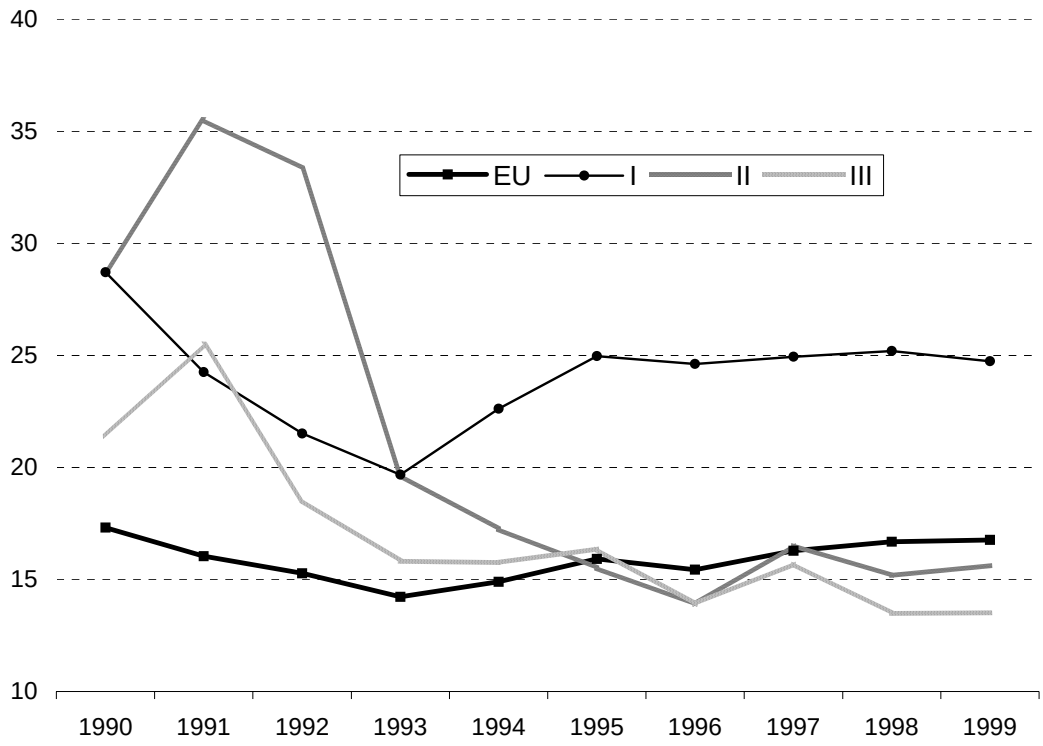



*Sources*: National Statistics, World Development Indicators, authors' own calculations.

With the beginning of the transformation process, domestic saving rates declined significantly in all the countries under consideration (Figure 2). At first glance, the drop in saving rates following the start of the transformation process can be interpreted as a reaction to the consumption constraint and savings overhang inherited from the past. At least one other factor should also be taken into account: the massive uncertainty at the beginning of the transformation process. Inflation rates reached very high levels, GDP dropped, unemployment rose and the outcome of the transformation process as a whole seemed completely uncertain. Under these conditions, it is remarkable that domestic saving rates did not end up being negative in the initial years of transformation (Table 1). In fact, saving rates in many EU accession countries recovered soon after their collapse in the early phase of transition and have remained relatively stable during recent years. The recovery, however, seems to follow different patterns within this group of countries: In Romania and Bulgaria, saving rates stabilised on a fairly low level of about 15%. Saving rates in the Baltics are relatively low too, but Estonia and Lithuania showed comparably low saving rates during the socialist era as well. Currently, saving rates in these five countries are 30% below the average saving rate in EU member countries. In contrast to this, domestic saving rates in the Czech Republic, Hungary, Poland, the Slovak Republic and Slovenia quickly recovered after the drop at the beginning of the transition period and clearly exceeded the EU-member states' average during recent years.

Figure 2: Gross domestic saving rates in EU and EU accession countries

As a percentage of GDP




EU: without Luxembourg; unweighted average.
I: Czech Republic, Hungary, Poland, Slovak Republic, Slovenia; unweighted average.
II: Estonia, Latvia, Lithuania; unweighted average.
III: Bulgaria, Romania; unweighted average.

It can be taken for granted that the determinants of both domestic and private saving have changed considerably during transition; this period commenced with high levels of involuntary saving and is expected to end with market-driven saving. Does this imply that saving in the EU accession countries is now driven by the same forces as it is in market economies?

*Table 1. Gross domestic savings as a percentage of GDP*

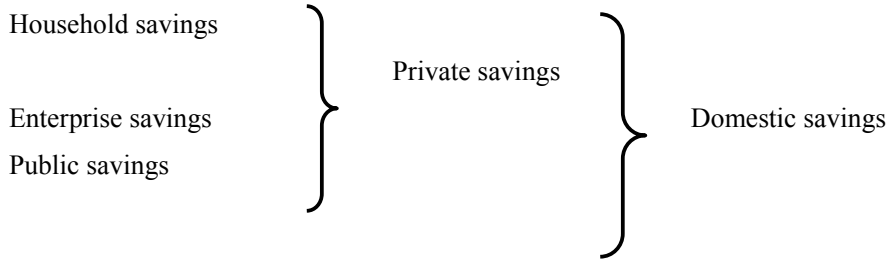
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Czech Republic | 30.6 | 27.8 | 30.1 | 27.2 | 28.2 | 27.1 | 29.3 | 28.6 | 26.8 | 28.3 | 26.9 |
| Hungary | 29.9 | 28.0 | 19.5 | 15.8 | 11.8 | 15.7 | 22.7 | 26.1 | 27.7 | 27.6 | 26.3 |
| Poland | 42.7 | 31.6 | 17.1 | 15.8 | 15.5 | 19.9 | 22.1 | 20.3 | 20.2 | 21.0 | 20.0 |
| Slovak Republic | 28.5 | 24.2 | 28.2 | 24.1 | 22.5 | 27.2 | 29.1 | 25.6 | 26.8 | 25.2 | 26.5 |
| Slovenia | 33.0 | 32.0 | 26.4 | 24.7 | 20.4 | 23.2 | 21.7 | 22.5 | 23.1 | 24.1 | 23.9 |
| Bulgaria | 31.4 | 22.0 | 26.9 | 14.1 | 7.7 | 8.8 | 14.1 | 11.5 | 16.9 | 13.7 | 11.3 |
| Romania | 29.5 | 20.8 | 24.1 | 23.0 | 24.0 | 22.7 | 18.7 | 16.3 | 14.5 | 13.3 | 15.7 |
| Average | 32.2 | 26.6 | 24.6 | 20.7 | 18.6 | 20.7 | 22.5 | 21.6 | 22.3 | 21.9 | 21.5 |
| Estonia | 25.9 | 22.3 | 34.5 | 32.7 | 22.6 | 18.6 | 18.4 | 16.3 | 19.3 | 19.0 | 18.8 |
| Latvia | 34.7 | 38.8 | 43.5 | 48.1 | 25.0 | 20.8 | 15.2 | 10.7 | 14.3 | 14.1 | 15.4 |
| Lithuania | 25.8 | 25.2 | 28.5 | 19.2 | 11.4 | 12.4 | 12.9 | 14.7 | 16.0 | 12.5 | 12.6 |
| Baltics Average | 28.8 | 28.8 | 35.5 | 33.3 | 19.7 | 17.2 | 15.5 | 13.9 | 16.5 | 15.2 | 15.6 |
| | | | | | | | | | | | |
| Total Average | 31.2 | 27.3 | 27.9 | 24.5 | 18.9 | 19.6 | 20.4 | 19.3 | 20.6 | 19.9 | 19.8 |

*Sources*: National Statistics, World Development Indicators, authors' own calculations.

## 3. Database

A large amount of work has already been done on the empirical determinants of saving in market economies. But the analysis of saving behaviour is traditionally plagued by data problems. In this paper, the time series used for domestic savings are those published by the World Bank in the "World Development Indicators". Nevertheless household savings and enterprise savings are unavailable for most of the countries under consideration. Consequently, there is no other choice but to calculate private savings[3] indirectly. We decided to construct private savings by subtracting public savings from domestic savings, using the overall government budget deficit as a proxy for public (dis-)savings. Although this approach can be questioned because of its use of simplified assumptions, it remains the approach most commonly taken if the data situation is comparatively poor (Loayza, Schmidt-Hebbel & Servén, 2000) and offers the advantage of allowing us to compare our findings with those in the literature. Figure 3 illustrates how domestic and private savings are composed.

*Figure 3. Definition of private and domestic savings*




Given that this study assesses the driving forces behind *domestic* and *private* savings, two different equations were formulated. In the first regression, the dependent variable is the ratio of gross domestic savings to GDP, while in the second, it is the ratio of private savings to GDP. We are aware of the fact that there are more appropriate methods to calculate the saving ratios, e.g. using disposable income as a base (Loayza, Schmidt-Hebbel & Servén, 2000), but unfortunately these figures are unavailable for the countries under consideration. Therefore, we have to follow the simple approach that has also been used by Denizer and Wolf (1998).

The explanatory variables are as follows:

*Persistence in saving behaviour*

- domestic (private) saving ratio of the previous period to account for persistence in domestic (private) saving patterns;

*Income variables*

- annual growth rate of real GDP measured in constant 1995 US-dollars as a proxy for income growth; and,
- log of real GDP per capita measured in constant 1995 US-dollars as a proxy for the income level;

(It is possible that saving is determined simultaneously with the income growth and the income level. If an endogeneity problem of this kind exists, the estimated coefficients will be biased and inconsistent. Therefore, appropriate instrument variables have to be used. Since the income level and the income growth variables are reasonably correlated over

[3] Private saving includes households and enterprises.

time, the income level of the previous period and the income growth of the previous period are appropriate instruments and have thus been chosen for use in the regressions.)

*Uncertainty*

- inflation measured as the annual growth rate of the consumer price index[4] and interpreted as a proxy for macroeconomic uncertainty;

*Financial market performance*

- real interest rate calculated as nominal deposit rate minus the inflation rate of the previous period,[5] to take expectations concerning future price development into account;
- credit provision for the private sector as a percentage of GDP is used as an indicator for consumers' access to domestic borrowing;
- M2/nominal GDP is used as a proxy for financial depth and the performance of the domestic financial market;

*Demographics*

- youth and old-age dependency ratio, defined as people aged 0-14 and 65-and-over to the working age population, to account for unequal income flows over the life-cycle;

*International financial integration*

- current account deficit as a percentage of GDP is used as a proxy for international borrowing and therefore for international financial integration;

*Institutional development*

- an extended version of the EBRD transition indicator as a proxy for the progress made as part of the process of transition. Here, progress is measured against the standards of industrialised market economies. The indicator is constructed as the average of "transformation" in the areas of enterprise restructuring, competition policy, as well as bank and security sector reforms. The measurement scale for the single indicators ranges from 1 to 4.25, where 1 represents little or no change from a rigidly planned economy and 4.25 represents the standard of an industrialised market economy.

*Fiscal policy*

- When testing the determinants of the private saving ratio, we additionally used the public saving ratio as an explanatory variable in order to check whether Ricardian effects on private saving can be detected.

The countries included in the data set are Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia (N=10). The regressions are based on annual data taken from the World Bank "World Development Indicators", the EBRD Transition Report, IMF International Financial Statistics and from national statistics (see Appendix, Table A1 for details). Since the study focuses on the transition period, the data covers the period of 1990-1999 for the Central Eastern European countries, except the Baltics, and the period of 1992-1999 for the Baltic countries (Fischer, Sahay & Vegh, 1996). The data underwent extensive checks to make them comparable and compatible.

[4] $\ln(1+\pi_t)$

[5] $\ln(1+i_t)-\ln(1+\pi_{t-1})$

## 4. Econometric Issues

In this study, we estimated fixed-effects models to empirically assess the determinants of domestic and private saving. This type of model is basically an Ordinary Least Squares (OLS) regression that includes a dummy variable for each country to account for country-specific effects. Therefore, it is often referred to as the least squares dummy variable (LSDV) model (Verbeek, 2000). The OLS method is optimal if error processes have the same variance (homoscedasticity) and all of the error processes are independent of each other. Nevertheless, the panel data are typically plagued by complicated error processes (Beck & Katz, 1995):

- panel heteroscedasticity (i.e. variances of the error processes differ from country to country);
- contemporaneous correlation (i.e. large errors for country i at time t will often be associated with large errors for country *j* at time *t*); and,
- serial correlation (i.e. errors for each country show temporal dependence [autocorrelation]).

Suppose that autocorrelation is eliminated from the data, but panel heteroscedasticity and contemporaneous correlation is still present. In this case, OLS yields consistent estimates, but OLS is not optimal: in other words, other estimators exist that are more efficient. But a much more serious problem is that OLS standard errors are unreliable. Since one usually assumes that panel data inherit this complicated error processes, Generalised Least Squares (GLS) methods that account for panel heteroscedasticity and contemporaneous correlation are often used instead. Nevertheless, Beck and Katz (Beck & Katz, 1995 and 1996) showed that these approaches significantly underestimate the variability of the estimated coefficients, especially if the sample size is small. This means that researchers risk relying on estimation results that are in fact not statistically significant. In order to avoid this pitfall, Beck and Katz suggest the following approach: first, the problem of serial correlation can be solved including the lagged endogenous variable as an additional regressor in the estimation equation. Then the dynamic model is estimated applying the OLS method, but using panel-corrected standard errors (PCSE) that account for panel heteroscedasticity and contemporaneous correlation to assure reliable standard errors. In this study, we followed the suggestions of Beck and Katz and estimated dynamic fixed-effects models with panel-corrected standard errors.[6, 7]

Since our panel data set is quite small, we have to keep an eye on the degrees of freedom when specifying the models. Therefore, we started with a small model including the potentially most relevant saving determinants: lagged endogenous variable, lagged income growth, lagged income level, dependency ratios, inflation, current account deficit, and additionally, the public saving rate when testing the determinants of the private saving ratio. Step by step, insignificant variables were excluded from the model until a "core" specification was achieved. Then additional potentially relevant saving determinants were checked one by

[6] All the estimations were performed using Stata 7.0.

[7] We are aware of the fact that the LSDV model with a lagged dependent variable generates downward biased estimates when the time series dimension (*T*) of the panel is small. Based on the results of their Monte Carlo study, Judson and Owen (1999) conclude that the bias is not that important for the explanatory variables but for the lagged dependent variable, especially if the time series is highly autoregressive. For panels with a small *T*, they therefore recommend a corrected LSDV estimator, but this technique is still unavailable for unbalanced panels like ours. Concerning our study, we believe that the bias problem does not adversely effect our results, since the saving rates are not highly persistent and we are primarily interested in the sign of the determining factors of saving and not in the exact coefficients. Nevertheless, we can confirm the size of the estimated coefficient for the lagged private saving rate on the basis of a recent but yet unpublished study where we used a GMM estimator, which yields unbiased estimates.

one to see whether they fit into the model. In the following, only the final specifications of the fixed-effects models for domestic and private saving ratios are presented (Tables 2a and 2b). The country-specific effects are significant and not reported in the tables. Estimation results for the other model specifications are presented in the Appendix (Table A2a and Table A2b).

## 5. Empirical Results

It is striking that both gross domestic and private saving ratios of the countries under consideration are to a large extent determined by the same variables and that even their coefficients are quite similar (Tables 2a and 2b). Therefore, we discuss the estimation results for both equations together and point out where differences occur.

*Persistence in saving behaviour*

Savings rates of the previous period have a positive and highly significant effect on today's saving rates; i.e. savings rates show a certain degree of persistence. Therefore, inheriting high saving rates from the socialist era had a stabilising impact on saving during transition. This may explain why saving rates never became negative in the countries under consideration even during the difficult first years of transition. Our results on persistence of saving are in line with the results reported by Loayza, Schmidt-Hebbel and Servén (1999) using the World Bank data set covering 150 industrialised and non-transition emerging economies.

*Income variables*

The instrument variables for the income growth and the income level (i.e. real GDP growth of the previous period and real GDP per capita of the previous period) are positively related to saving as well. In other words, an increase in economic growth or in per-capita income in period t-1 leads to an increase in saving in period t. Whereas growth positively affects both domestic and private savings,[8] the impact of per-capita income was only significant in the regression for the private saving ratio. The positive influence of income level and growth is reported in many empirical studies, especially on private savings, which usually have the lion's share of domestic savings (Masson, Bayoumi & Samiei, 1995; Edwards, 1996). Here again we can state that EU accession countries behave like other market economies in this respect. In our model, however, we cannot distinguish between changes in savings caused by permanent and temporary changes in income levels.

*Demographics*

For the dependency ratios, negative signs are reported. This means that on an aggregate level a higher proportion of people not belonging to the work force and therefore with little or no income reduces domestic saving. Concerning private savings this finding is in line with the life-cycle hypothesis. According to this theory, individuals achieve their highest savings at the point of their highest earnings, i.e. during their working life. Correspondingly, it is assumed that individuals have negative saving rates both when they are young and also during their retirement, when their income is generally low. In our study, both the youth and the old-age dependency ratio displayed the expected negative signs. Nevertheless, the youth dependency ratio was not included in the final model specifications because this variable was no longer significant. The negative impact of the dependency ratios on domestic as well as on private savings is a common result for

[8] Since the lagged growth rate of real GDP had a significant positive impact on private savings in model 1-6, we also kept it in the final specification even its significance was slightly below the 10% level.

country sets covering industrialised and emerging market economies (e.g. Callen & Thimann 1997, Loayza, Schmidt-Hebbel & Servén, 1999). Nevertheless, Denizer and Wolf (1998 and 2000), who analysed the determinants of the domestic saving ratio for a group 25 transition countries (CEE countries, Baltic states and non-Baltic successor states of the former Soviet Union) during the early period of transition, stated that the dependency ratio displayed the expected negative sign, but was always insignificant. This leads us to the conclusion that during the early years of transition, levelling out uneven income flows over the life-cycle was not the main motive for saving because of the sharp decline in income, tremendous uncertainty and the non-existence of a high-performing banking sector. Since then, however, a notable degree of certainty has been achieved, enabling people to begin expanding their planning horizons.

*Institutional development*

With the implementation of better, stable and market-oriented institutions, not only individuals but also the government can expand its planning horizon. In our approach we measured the influence of the institutional framework on saving using the EBRD transition indicator. We found that the lagged EBRD transition indicator positively affects savings; in other words an improvement in the institutional development in period $t$-1 leads to higher savings in period $t$. The current institutional development also exerts a positive effect on current saving, but is not statistically significant (Tables A2i and A2ii, Appendix). According to our results, better institutions facilitate the levelling out of consumption over the life-time; i.e. during the transition period the implementation of reliable institutions promotes saving. At first glance, this finding may be surprising because one usually expects that better institutions reduce uncertainty and as a consequence saving will decrease. One has to bear in mind, however, that a reliable institutional framework is the prerequisite for people to extend their planning horizons and to make saving a rational behaviour. At a later stage of the transition process, further institutional improvements will possibly reduce saving through precautionary motives. In our study, however, we could not detect this latter effect for the countries under consideration. Our finding seems to be in contrast to that of Denizer & Wolf (2000), who used a liberalisation index to measure institutional development, and determined that a negative correlation exists between the liberalisation of an economy and saving. Nevertheless, we have to mention the differences in the construction of both indicators: while the liberalisation index used by Denizer & Wolf considers internal and external prices as well as the private sector entry, the EBRD transition indicator reflects the "transformation" in the areas of enterprise restructuring, competition policy, and bank and security sector reforms. Thus the indicators themselves are at the root of important conceptual differences between their study and ours.

*Uncertainty*

Inflation was used as a proxy for macroeconomic uncertainty. According to our estimations, it is only significant in the equation for the domestic saving ratio, which reflects the sum of private and governmental savings: that is, it includes the fiscal balance. We found that a reduction of inflation leads to a reduction of savings. Loayza, Schmidt-Hebbel and Servén (1999), who obtained similar results, explained this phenomenon by the precautionary motive for saving. Nevertheless, the positive correlation between inflation and domestic saving seems puzzling. We have to bear in mind, however, that from a government's point of view, revenues resulting from inflation taxes and seigniorage increase with higher prices, thereby broadening the base for governmental

saving. Furthermore, more conceptual arguments that saving can also be achieved via dollarisation and capital flight may offer an interesting explanation for this result. Both dollarisation and capital flight are part of "domestic savings" and these phenomena are observed especially during times of high and volatile inflation as a means of value protection. These forms of savings are not connected with domestic investment and are therefore unfavourable for the catching-up process.

*International financial integration*

In our study, the current account deficit was used as a proxy for foreign borrowing, since it implies that a country receives credit from other countries. Assuming that domestic savings and foreign capital may be substitutes, it is expected that a higher current account deficit is linked to reductions in domestic savings. These expectations are supported by the estimation results. Since the time series for the current account deficit includes negative values and the estimated coefficient is positive, an increase in the current account deficit (e.g. larger negative values) decreases savings. This finding supports the idea that the EU accession countries have relatively good access to the international financial market and that domestic savings and foreign capital operate at least partly as substitutes.

*Fiscal policy*

The public saving ratio was only included in the equation for the private saving ratio. As shown in Table 2b, public saving has a highly significant negative effect on private saving: a rise in public saving of 1 percentage point reduces private saving by about 0.6 percent. This means that public saving crowds out private saving to a large extent. There is no empirical evidence, however, for a one-to-one relationship, as suggested by the Ricardian equivalence theorem.

*Table 2a. Results for the fixed-effects model*

Dependent variable: gross domestic savings as a share of GDP

| Model 7 | Coefficient | Panel-corrected Standard Errors | z-Statistic |
|---|---|---|---|
| Lagged domestic saving rate | 0.41** | 0.08 | 5.2 |
| Lagged growth rate of real GDP | 0.18**[c] | 0.07 | 2.5 |
| Old-age dependency ratio | -1.73** | 0.80 | -2.2 |
| Inflation | 3.43** | 0.99 | 3.5 |
| Current account deficit | 0.25** | 0.09 | 2.8 |
| Lagged EBRD transition indicator | 3.34** | 0.96 | 3.5 |
| Obs | 78 | | |
| $R^2$ [°] | 0.59 | | |

*Notes:* [°] There is no precise counterpart to $R^2$ in the generalised regression model. The $R^2$ from the transformed model is purely descriptive (see Greene 1999:467). Therefore, we displayed the $R^2$ from the original model, because it shows the fit of the model of interest.

[a] $\ln(1+\pi_t)$

** significant at the 5% level.

*Table 2b. Results for the fixed-effects model*

Dependent variable**:** private savings as a share of GDP

| Model 7 | Coefficient | Panel-corrected Standard Errors | z-Statistic |
|---|---|---|---|
| Lagged private saving rate | 0.33** | 0.10 | 3.4 |
| Lagged growth rate of real GDP | 0.11 | 0.07 | 1.5 |
| Lagged real per-capita income[a] | 9.59** | 2.68 | 3.6 |
| Old-age dependency ratio | -2.06** | 0.79 | -2.6 |
| Current account deficit | 0.28** | 0.06 | 4.3 |
| Public saving rate | -0.58** | 0.12 | -5.0 |
| Lagged EBRD transition indicator | 2.26** | 1.19 | 1.9 |
| Obs | 78 | | |
| $R^2$ ° | 0.66 | | |

*Notes:* ° There is no precise counterpart to $R^2$ in the generalised regression model. The $R^2$ from the transformed model is purely descriptive (see Greene 1999:467). Therefore, we displayed the $R^2$ from the original model, because it shows the fit of the model of interest.

[a] ln

** significant at the 5% level.

In Table 2a and Table 2b, only the determinants that have a significant influence on saving are presented. The influence of further variables that have often been used in empirical analyses was also checked. But they had been omitted from this study's estimation equations since they turned out to be insignificant in each case (see Table A2a and Table A2b, Appendix). Credit provision to the private sector, which is usually used to model the budget constraint of the private household, did not show any signs of having an influence on saving behaviour. Many empirical analyses use M2/GDP as a proxy for the performance of the financial sector. Nevertheless, in this study, this variable was completely insignificant. Finally, the real interest rate always had a positive sign but it was always insignificant. Since the real interest rate was calculated as nominal deposit rate minus inflation of the previous period to take expectations concerning future price development into account, the positive sign indicates that an expected increase in prices will increase savings. This is in line with our findings on inflation.

## 6. Conclusions

After the dramatic drop in domestic saving that took place in the early years of transition, saving rates in many EU accession countries soon recovered and have remained relatively stable during recent years. This development may indicate that a process of radical change has come to an end: a period that commenced with high involuntary saving has ended with market-driven saving. Are the EU accession countries now "back on track" with their saving patterns? Does this imply that a convergence in motives has also been achieved? Is saving in the EU accession countries now driven by the same forces as it is in market economies?

Our results for the EU accession countries are very much in line with the findings reported by the World Bank project for emerging and industrialised market economies (Loayza, Schmidt-Hebbe and Servén, 1999). This leads us to the conclusion that saving in the EU accession countries is to a large extent driven by the same forces as saving in Western market

economies: Savings rates inherit a certain degree of persistence; positive changes in both the level of income and income growth positively influences saving; the old-age dependency ratio is negatively related to saving, and relaxing the international borrowing constraint decreases saving. Finally, public saving crowds out private saving, but there is not evidence for Ricardian effects. Furthermore, there is a remarkable similarity in terms of sign and significance of the estimated coefficients for the determinants of the domestic and the private saving ratio, a phenomenon that is also reported for the World Bank project.

Additionally, one interesting aspect can be reported: the EBRD transition indicator used to measure the quality of the external institutional framework turned out to be significantly positive. In other words, better institutions promote higher savings. This finding may be surprising considering that better institutions lead to less uncertainty and may therefore reduce saving through precautionary motives. Nevertheless, the first effect of reliable institutions is that they enable people to level out their consumption over time expanding their planning horizons – thus making saving more attractive. After this, however, such institutional improvements also reduce uncertainty, possibly leading to a new wave of reduction in saving.

To sum up, there is strong evidence that the EU accession countries are "back on track" with their saving patterns. We found out that saving in these countries is now, to a large extent, driven by the same forces as those in market economies. Although the motives for savings seem to be quite similar within our group of countries, the resulting saving rates are still different. This is attributable to many factors, such as the difference in the growth rate etc. If we assume that saving does play an important role in investment, then we are faced with the question of how to promote saving in the countries under consideration. Regarding the estimation results, two strategies seem to be appropriate: First, since income and growth positively influence saving, spurring development is an effective way to increase saving. Second, institutional development seems to be another important way to foster saving. Therefore, further research on the linkages and channels between institutional development and saving seems to be necessary.

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# APPENDIX

*Table A1. List of data sources*

| Data | Source |
|---|---|
| *Demographic Structure* | |
| Dependency ratios | World Bank, World Development Indicators |
| Youth dependency ratio | World Bank, World Development Indicators, own calculations |
| Old-age dependency ratio | World Bank, World Development Indicators, own calculations |
| *Economic Development* | |
| GDP per capita | World Bank, World Development Indicators, own calculations |
| GDP growth | World Bank, World Development Indicators, National Statistics |
| Domestic saving | World Bank, World Development Indicators |
| Unemployment | National Statistics |
| Current account balance | World Bank, World Development Indicators, International Monetary Fund, International Financial Statistics |
| *Monetary and Financial Market Indicators* | |
| CPI | National Statistics |
| Private or domestic credit | International Monetary Fund, International Financial Statistics |
| Interest rates | International Monetary Fund, International Financial Statistics |
| Real interest rate | Own calculations |
| M2/GDP | International Monetary Fund, International Financial Statistics, own calculations |
| *Government* | |
| Budget deficit (Government) | National Statistics |
| Transition indicator | European Bank for Reconstruction and Development |

*Table A2a. Domestic saving: Alternative specifications* (Dependent variable**:** gross domestic savings as a share of GDP)

| | OLS with panel-corrected standard errors that account for panel heteroscedasticity and contemporanous correlation; z-statistic in brackets | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Lagged domestic saving rate | 0.45**<br>(4.8) | 0.45**<br>(5.5) | 0.45**<br>(6.8) | 0.43**<br>(5.1) | 0.49**<br>(5.6) | 0.41**<br>(4.9) | 0.41**<br>(5.2) |
| Lagged growth rate of real GDP | 0.25**<br>(3.6) | 0.25**<br>(3.8) | 0.21**<br>(3.4) | 0.21**<br>(3.4) | 0.24**<br>(3.6) | 0.18**<br>(2.5) | 0.18**<br>(2.5) |
| Lagged real per-capita income[a] | -0.06<br>(-0.0) | | | | | | |
| Youth dependency ratio | -0.39*<br>(-1.8) | -0.39**<br>(-2.0) | -0.50**<br>(-2.5) | -0.19<br>(-1.4) | -0.27<br>(-1.2) | -0.07<br>(-0.3) | |
| Old-age dependency ratio | -1.47*<br>(-1.7) | -1.46*<br>(-1.8) | -0.96<br>(-1.3) | -0.07<br>(-0.2) | -1.7**<br>(-1.9) | -1.9**<br>(-2.2) | -1.73**<br>(-2.2) |
| Inflation[b] | 2.54**<br>(2.6) | 2.54**<br>(2.6) | 2.4**<br>(2.3) | 2.02**<br>(2.2) | 2.62**<br>(2.7) | 3.38**<br>(3.3) | 3.43**<br>(3.5) |
| Real interest rate[c] | | | 0.96<br>(1.2) | | | | |
| Current account deficit | 0.28**<br>(3.4) | 0.28**<br>(3.3) | 0.34**<br>(4.7) | 0.31**<br>(4.0) | 0.26**<br>(2.9) | 0.25**<br>(2.9) | 0.25**<br>(2.8) |
| EBRD transition indicator | | | | | 1.16<br>(1.0) | | |
| Lagged EBRD transition indicator | | | | | | 3.25**<br>(3.0) | 3.34**<br>(3.5) |
| M2/GDP | | | | 0.01<br>(0.2) | | | |
| Obs | 81 | 81 | 76 | 79 | 81 | 78 | 78 |
| $R^2$ ° | 0.58 | 0.58 | 0.59 | 0.58 | 0.59 | 0.59 | 0.59 |

° There is no precise counterpart to $R^2$ in the generalised regression model. The $R^2$ from the transformed model is purely descriptive (see Greene 1999:467). Therefore we displayed the $R^2$ from the original model, because it shows the fit of the model of interest.

[a] ln [b] $\ln(1+\pi_t)$ [c] $\ln(1+i_t)-\ln(1+\pi_{t-1})$

* and **: significant at the 10% and 5% level;

*Table A2b. Private saving: Alternative specifications* (Dependent variable: private savings as a share of GDP)

| | OLS with panel-corrected standard errors that account for panel heteroscedasticity and contemporanous correlation; z-statistic in brackets | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Lagged private saving rate | 0.36**<br>(3.8) | 0.36**<br>(3.9) | 0.40**<br>(4.5) | 0.32**<br>(3.6) | 0.40**<br>(4.4) | 0.35**<br>(3.7) | 0.33**<br>(3.4) |
| Lagged growth rate of real GDP | 0.16**<br>(2.6) | 0.16**<br>(2.7) | 0.16**<br>(2.1) | 0.11**<br>(1.9) | 0.21**<br>(3.3) | 0.14*<br>(1.9) | 0.11<br>(1.51) |
| Lagged real per-capita income[a] | 6.83**<br>(2.4) | 6.83**<br>(2.4) | 1.85<br>(0.4) | 0.39<br>(0.1) | 5.01<br>(0.9) | 9.49**<br>(2.3) | 9.59**<br>(3.6) |
| Youth dependency ratio | -0.35<br>(-1.5) | -0.35<br>(-1.5) | -0.61**<br>(-2.2) | -0.45<br>(-1.5) | -0.44<br>(-1.4) | -0.05<br>(-0.2) | |
| Old-age dependency ratio | -1.9**<br>(-2.0) | -1.91**<br>(-2.0) | -1.74**<br>(-2.1) | -0.51<br>(-0.8) | -1.10<br>(-1.2) | -1.95*<br>(-2.2) | -2.06**<br>(-2.6) |
| Inflation[b] | 0.14<br>(0.1) | | | | | | |
| Real interest rate[c] | | | 0.93<br>(0.9) | | | | |
| Current account deficit | 0.27**<br>(3.6) | 0.27**<br>(3.9) | 0.34**<br>(4.9) | 0.33**<br>(3.3) | 0.34**<br>(4.0) | 0.25**<br>(3.0) | 0.28**<br>(4.3) |
| Credit provision for private sector | | | | | -0.02<br>(-0.3) | | |
| Public saving rate | -0.59**<br>(-5.0) | -0.59**<br>(-5.0) | -0.59**<br>(-3.9) | -0.58**<br>(-4.5) | -0.69**<br>(-4.3) | -0.57**<br>(-4.8) | -0.58**<br>(-5.0) |
| EBRD transition indicator | | | | | | 1.90<br>(1.0) | |
| Lagged EBRD transition indicator | | | | | | | 2.26*<br>(1.9) |
| M2/GDP | | | | 0.06<br>(0.9) | | | |
| Obs | 78 | 78 | 73 | 76 | 71 | 78 | 78 |
| $R^2$ ° | 0.64 | 0.64 | 0.64 | 0.62 | 0.67 | 0.64 | 0.66 |

° There is no precise counterpart to $R^2$ in the generalised regression model. The $R^2$ from the transformed model is purely descriptive (see Greene 1999:467). Therefore we displayed the $R^2$ from the original model, because it shows the fit of the model of interest.

[a] ln [b] $\ln(1+\pi_t)$ [c] $\ln(1+i_t)-\ln(1+\pi_{t-1})$

* and **: significant at the 10% and 5% level;

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