# Financial Liberalization, Saving and Growth: The Experience of Transition Economies in Eastern Europe and the Baltic States

**(1991-2002)**

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## I. Introduction and motivation

Economic growth has been a major concern for economists for many centuries. The classical growth model originated with Adam Smith, who argued that saving is what creates investment and hence growth. According to the Solow's neo-classical growth model, higher saving leads to faster growth, but only temporarily.

The main aim of this paper is to analyze the determinants of domestic and private saving rates in transition economies from Eastern Europe and the Baltics. The countries under consideration are: Czech Republic, Hungary, Poland, Slovak Republic and Slovenia from Central Eastern Europe; Estonia, Latvia and Lithuania from Baltics, which became European Union members in May 2004 and Bulgaria and Romania from South Eastern Europe, which are still under negotiating for EU membership, and being considered for adherence in 2007. Besides focusing on determinants of private and public saving, this paper will also attempt to answer another open question: What is the effect of financial liberalization on saving rate?

In order to catch up with the old EU members there is the need for an increase in investment for both the newly integrated countries as well for the EU candidates. There are two investment sources: domestic saving and foreign capital. If capital were perfectly mobile, changes in investment would be independent of changes in domestic saving (Feldstein and Horioka, 1980). But, because of the difficult access to international capital markets, domestic saving is the most important source of investment for Eastern European and Baltic states considered in this study. For this reason, identifying policies to promote domestic saving, is a high priority for many economies.

Before the beginning of the transition process, Eastern European countries had very high saving rates. This situation started to change once the transition process began and saving rates dropped sharply from levels around thirty percent of GDP to about ten percent in early transition years.

Even though some Eastern European countries like Poland, Czech Republic and Hungary registered an increase in economic growth, most of them were not capable of matching these three leaders. One explanation for the decline in economic growth could be a low level of saving and thus investment.

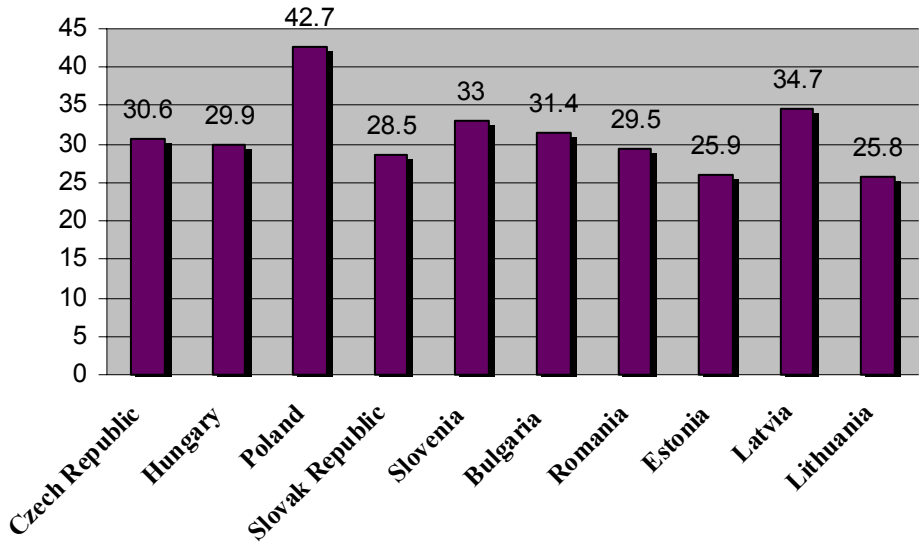
## II. Trends in saving rates

The last decade was characterized by a severe decline in saving, from levels around thirty percent of GDP (before transition) to low twenties and even tens, in almost all transition economies of Eastern Europe.

One explanation for the high saving rates during the socialist era could be the "involuntary" or "forced" saving, caused by the lack of consumer goods. The possibility of involuntary savings during socialist era was the subject to many debates. Involuntary savings can exist if consumers don't have access to any goods or asset market where price movements can equate demand and supply, Dornbush and Wolf (2000). However, the results obtained by Denizer and Wolf (2000) offer some evidence for the presence of involuntary saving in almost all countries considered in this study (except for Czech Republic). Another reason for the high saving rates was the absence or limited access to consumer credit. Because of this, individuals were forced to save the entire amount if they wanted to make an investment in the future.

The pre-transition saving rates (1989) are shown in Figure 1. As the figure shows, saving rates differed significantly in the socialist block with the highest level registered in Poland (42.7 percent of GDP) and the lowest level in Lithuania (25.8 percent of GDP).

**Figure 1 (Saving rates – 1989)**




With the beginning of transition process[1] saving rates dropped sharply from levels above thirty percent to less than twenty percent. The saving rates after 1990 are presented in Table 1 where the sampled countries are grouped according to the starting year of the transition process. The collapse in saving rates might be explained by the elimination of the involuntary savings.

Once economic recovery began, in most of the sampled countries, saving rates registered a slight increase and remained relatively stable during the recent years.

[1] Transition began in 1990 in Czech Republic, Hungary, Poland, Slovenia, Slovak Republic; 1991 in Romania and Bulgaria and in 1992 Baltic countries (Latvia, Lithuania, Estonia).

**Table 1: Gross domestic saving rates as a percentage of GDP**

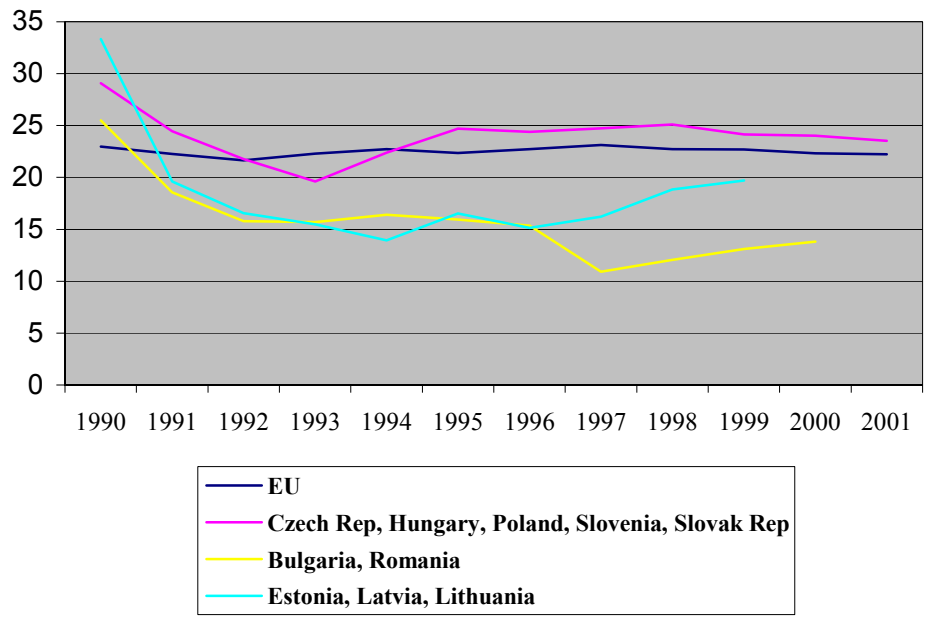
| Country | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|---|
| | | | Transformation process started in 1990 | | | |
| Czech Republic | 27.8 | 30.1 | 27.5 | 28.4 | 27.1 | 29.3 |
| Hungary | 28 | 19.5 | 15.8 | 11.8 | 15.7 | 22.7 |
| Poland | 32.8 | 18 | 16.7 | 16.5 | 19.9 | 22.1 |
| Slovak Republic | 24.2 | 28.2 | 24.1 | 21 | 26 | 28.2 |
| Slovenia | 32.6 | 26.4 | 24.7 | 20.4 | 23.2 | 21.13 |
| | | | Transformation process started in 1991 | | | |
| Romania | 20.8 | 24.1 | 23 | 24 | 22.7 | 18.7 |
| Bulgaria | 22 | 26.8 | 14.1 | 7.6 | 8.7 | 14.1 |
| | | | Transformation process started in 1992 | | | |
| Estonia | 22.3 | 34.5 | 32.7 | 22.4 | 16.5 | 18.6 |
| Latvia | 38.8 | 43.5 | 48.1 | 25 | 20.8 | 15.2 |
| Lithuania | 25.2 | 32.9 | 19.2 | 11.4 | 12.4 | 12.6 |
| Average | 27.45 | 28.41 | 24.59 | 18.85 | 19.3 | 20.263 |
| Standard Deviation | 5.77 | 7.45 | 10.04 | 6.76 | 5.92 | 5.6 |

| Country | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|
| | | | Transformation process started in 1990 | | | | |
| Czech Republic | 28.6 | 26.6 | 28.8 | 26.8 | 26.3 | 27 | NA |
| Hungary | 26.1 | 27.7 | 27.6 | 26 | 27.2 | 25 | NA |
| Poland | 20.3 | 20.2 | 21 | 20 | 18.4 | 17.1 | 15.7 |
| Slovak Republic | 24.4 | 25.7 | 24.1 | 23.9 | 24 | 23.4 | 22.9 |
| Slovenia | 22.5 | 23.4 | 24 | 24 | 24.2 | 25.1 | NA |
| | | | Transformation process started in 1991 | | | | |
| Romania | 17.4 | 13.6 | 9.72 | 11.2 | 14 | 13.8 | 14.6 |
| Bulgaria | 13.5 | 14.45 | 17.11 | 12.1 | 12.9 | 12.8 | 12.1 |
| | | | Transformation process started in 1992 | | | | |
| Estonia | 16.3 | 19.4 | 18.9 | 19.6 | 23.7 | 24 | 23.3 |
| Latvia | 10.8 | 14.3 | 14.1 | 16.7 | 18.5 | 18.8 | 19.5 |
| Lithuania | 14.7 | 15.9 | 12.4 | 12.4 | 14.3 | 16.3 | 16.5 |
| Average | 19.56 | 20.39 | 19.27 | 19.35 | 20.28 | 21.1 | 18.75 |
| Standard Deviation | 5.75 | 5.21 | 6.87 | 5.82 | 5.49 | 4.7 | 3.74 |

**Data source – World Bank Development Indicators**

A comparison between the sampled countries and European Union is useful to see how much saving rates differ within these groups of countries. The saving rates between the years 1991-2002 for EU and Eastern Europe are shown in Figure 2:

**Figure 2**




As mentioned above, saving rates registered a slight increase and began to stabilize for all three groups of countries. The sluggish group is represented by the South Eastern European countries (where transition begun in 1991) and the fastest increase and stabilization of saving rates were registered in Czech Republic, Hungary, Poland, Slovenia and Slovak Republic. As Figure 2 shows, for this group of countries the saving rate increased and then stabilized at a level above the one registered for the European Union.

## III. Theoretical determinants of saving and previous findings

Because understanding the determinants of saving is very important in designing a number of policy interventions, the analysis of saving behavior has become one of the most important issues in empirical macroeconomics. Many of the empirical studies have used domestic saving figures while only a few focused on private saving. Domestic saving is composed of private saving (household saving plus enterprise saving) and public saving. However, because private saving is the main component of domestic saving, discovering the determinants of private saving is of great importance for economists and policy makers.

Before addressing the theoretical determinants of saving individually, presenting some generalities about the Life-Cycle hypothesis could be very useful because the majority of saving determinants are based on this hypothesis.

The idea that income varies over people's lives and that saving allows consumers to move income from the period of life when income is high to those times when income is low is the basis of the Life-cycle hypothesis of consumption which was produced by Franco Modigliani and Albert Ando in a series of articles in the 1950s and 1960s. One important reason that income varies over a person's life is retirement. For this reason accumulation for retirement is the principal motive for saving in the Life-Cycle Hypothesis.

If the model is extended to national level, the major saving determinants are income growth and the age structure of the population.

**Income Growth:**

Modigliani (1966) used the Life-Cycle model to show that saving is positively correlated with income growth. He argued that a higher rate of income growth would, with unchanged saving rates, raise aggregate saving because it would increase the lifetime resources and thus saving of younger-age groups relative to older age groups. On the other hand, if workers expect an increase in their income in the future, according to the Life-Cycle model they would want to consume more. This increase in consumption may reduce individual savings by a sufficient amount to offset the effect of higher growth on aggregate saving. This idea was presented by Tobin (1967) who argued that individual saving rates remain unchanged only in case of myopic expectation of future income.

More recently, Deaton and Paxson (1992) and Bosworth (1993) have provided evidence that higher income growth produces higher saving rates. Also, Loayza *et. al.* (2000) concluded that a 1 percent increase in growth rate leads to a 0.45 percent increase in saving rate , but the effect may be temporary.

**Demographics:**

Life-cycle models indicate that the age structure of the population has a significant effect on the saving rate. The empirical studies made by Leff (1969) and Modigliani (1970) showed that demographic variables indeed influence the saving behavior, more specifically they found that savings rates vary inversely with the proportion of the young and elderly to those of working age. As the life-cycle theory suggests, people have the highest saving rate during the peak earning period, which is during their working life. How much people save varies significantly among different age groups. According the Life-cycle hypothesis, younger people, in order to smooth

fluctuations in income, have negative saving rates because they borrow against their future income and older people dissave  because spend from their saving. The vast majority of the empirical studies on the effect of demographics on saving rates used as an explanatory variable the so-called dependency ratio – those under age 15 and over 65 as a share of the total population.

**Income:**

According to the Life-Cycle model, saving rate is related to income growth and not the level of income. The reason is that people are forward looking and base their saving decisions on lifetime income rather than current income.

But, according to the Permanent-Income hypothesis people tend to maintain a constant standard of living even though their income may vary from one period to another. In consequence, an increase or a reduction in income will have little or no effect on their consumption. This means that an increase in income with unchanged consumption level will have a positive effect on. The existing literature not only suggests that there is a positive correlation between income and saving, but also that income plays a key role in explaining saving behavior Loayza, *et. al.* (2000).

**Interest Rates:**

The effect of interest rates on saving is ambiguous because it depends on the substitution and income effects of interest rate changes.

An increase in interest rate will make the current consumption more expensive relative to future consumption. Thus, the substitution effect arises because the individual will tend to substitute away from current consumption. But, if we assume that both current and future consumption are normal goods an increase in interest rate will increase relative income

inducing people to buy more current consumption; this is known as the income effect. If the substitution effect is stronger than the income effect, an increase in interest rate will have a positive effect on savings and vice versa.

Previous empirical literature on developing economies does not clarify the ambiguity of the effect of real interest rates on saving behavior. For example, Ogaki, Ostri and Reinhart (1994) find positive but small interest rate effects on saving. The same result was obtained by Loayza *et. al.* (1999) who found a weak interest rate elasticity of aggregate and private saving.

**Fiscal Policy:**

When the government changes its spending on public goods or the level of taxes, it affects the demand for the economy's outputs of goods and services and alters the saving decision. An increase in taxation will generate a reduction in private saving and will have an overall negative effect on domestic saving in case the government increases its expenditures by an amount equal to the increase in taxes. A reduction in taxes, will have a positive effect on private saving and an overall negative effect on domestic saving because the increase in private saving is less then the reduction in government saving.

However, a reduction in taxes may leave the aggregate saving unchanged. This idea was promoted by David Ricardo and it is known as the Ricardian equivalence. According to Ricardian view, the forward-looking consumers understand that a reduction in taxes today means an increase in taxes in the future so they will save more now, leaving the aggregate saving unchanged.

**Borrowing Constraint:**

Individuals can smooth consumption over their lifetimes if they can borrow against future income when current income is low. But, a binding borrowing constraint will force individual to save more to finance expenditures in the future.

For example the individual's access to consumer credit: if there is no consumer credit available individuals are forced to save the entire amount if they decide they want to make an investment in the future.

This causes an increase in savings over a lifetime. But, previous findings like Loayza *et. al.* (2000) show a negative impact of the borrowing constraint on saving.

**Inflation:**

The majority of empirical studies on the effect of inflation on the saving behavior show a positive effect of inflation on saving rates. The Mundell-Tobin effect suggests that inflation could lower the real interest rate permanently and cause a portfolio adjustment from real money balances towards real capital.[2] This means that higher inflation could be expected to lead to increased saving and investment. Also higher inflation generates an increase in uncertainty, which in turn will generate an increase in saving from precautionary reasons, Loayza *et. al.* (2000).

**Financial Liberalization:**

Financial reforms in the previously socialist countries included in this paper have consisted mainly of the removal of administrative controls on interest rates, fewer credit constraints, increased saving opportunities, a larger portfolio of investment instruments, a larger number and diversity of financial institutions and a development of securities

[2] This point was independently made by Tobin (1965) and has come to be known as "Mundell-Tobin" effect.

markets. Early literature on financial reform pointed out the possibility that a higher interest rate would boost savings. But, it is not clear that financial liberalization will actually increase saving because the effect of higher interest rate on savings is itself ambiguous (in case income effect is higher than the substitution effect an increase in interest rate will have a negative effect on savings) .

Besides the increase in interest rate, financial liberalization has other characteristics such as larger supply of consumer credit or housing finance that may cause a reduction in saving (Japelli and Pagano, 1994).

The difficult part in determining the effect of financial liberalization on saving behavior is finding ways to measure it. The easiest way to control for financial liberalization is to include in the saving model dummy variables that distinguish between pre and post liberalization periods.

Another way to measure financial liberalization is to construct an index that would attempt to measure both de-regulatory and institution buildings aspects of the process (Bandiera, Caprio, Honohan and Schiantarelli, 1998). In this paper I will use as a measure of financial liberalization two indexes provided by the European Bank for Reconstruction and Development: a banking reform and interest rate liberalization index and a securities market reform index.

## IV. The Model for Estimation

Because I am using a panel data set that combines time series with cross sectional data, the model used in estimating the determinants of both private and domestic saving rates can be written in the following way:

$$y_{it} = \beta_{1it} + \sum_{2}^{k} \beta_{kit} X_{kit} + a_i + e_{it} \qquad (1)$$

Where: $y$ is the ratio of gross domestic saving to GDP i=$\overline{1, N}$ refers to a given country; t=$\overline{1, T}$ refers to a given year; $a_i$ - captures all unobserved, time-constant factors in country $i$ that affect $y_{it}$; $e_{it}$ - represents unobserved factors that change over time and affect $y_{it}$; $y_{it}$ is the dependent variable for country $i$ at time $t$, and $x_{kit}$ is the $k$th explanatory variable for country $i$ at time $t$.

For aggregate saving, the dependent variable is the ratio of gross domestic savings to GDP.

The potential explanatory variables are:

- *Income variables*: annual growth rate of real GDP and real GDP per capita used to measure the level of income
- *Uncertainty* is reflected by including as explanatory variable the inflation rate measured as annual growth rates of the CPI
- *Financial market performance*: real interest rate and M2/nominal GDP as a proxy for financial depth

- *Demographics:* - dependency ratio – i.e., the ratio of people under 15 and over 65 to the total population

  - urbanization ratio – i.e., the ration of urban population to the total population

- *International financial integration*: current account balance as a percentage of GDP as a proxy for the international borrowing constraint of an economy

- Financial liberalization measures

The liberalization measure includes two indexes: the index for interest rate and bank liberalization and the index for securities markets and non-bank financial institutions liberalizations.

In order to estimate the private saving function (households and enterprises), I will include the public saving as an additional explanatory variable and the dependent variable will be the ratio of private saving to GDP.

The period covered by this study is between 1991-2002 and the most important data source is the World Bank, World Development Indicators.

Because of the poor quality of economic data available, private sector saving is unavailable for all sampled countries. In order to estimate these two models I have to do my own calculation to obtain data for private saving. I will calculate private saving by subtracting from domestic saving, the overall government deficit (used as a proxy for public saving or dissaving). Even though this method is very simplified, it is the most commonly used in case of a poor quality of data (see Loayza *et al.* 2000).

The transition from a centrally planed economy to a market economy changed circumstances in the former socialist countries. This is why it is reasonable to expect that

the transformation process might have influenced the saving behavior.

From this reason, besides finding the saving determinants another objective of this paper is to provide some empirical evidence of the effect of financial reform on private and domestic saving. In order to find the determinants of saving and the effect of financial liberalization on saving behavior I will use two estimation procedures: fixed effects and random effects estimators.

The fixed effect estimation is based on the assumption that the unobserved effect $a_i$ is correlated with the explanatory variables. In order to eliminate the fixed effect $a_i$, for each *i*, we have to take the average of equation (1) over time then, subtract the time averages from the corresponding variable.

The random effect estimation assumes that $a_i$ is uncorrelated with each explanatory variable. In this case, equation (1) can be written as follows:

$$y_{it} = \beta_{1it} + \sum_{2}^{k} \beta_{kit} X_{kit} + u_{it} \qquad (2)$$

where: $u_{it} = a_i + e_{it}$ is the composite error term.

If, indeed, $a_i$ is uncorrelated with all $x_{it}$ then random effect model is more appropriate. But if $a_i$ is correlated with some of the explanatory variables the fixed effect method should be used.

I estimated both fixed and random effects model and checked the results of the random effects model using the Hausman specification test. The test indicates that the unobserved country effect is correlated with the explanatory variables. Because of this, I used in my estimation the fixed effects model.

## V. Empirical Results

### V. A. Private and Domestic Savings Determinants

A lot of empirical work has already been done on the determinants of saving. In order to estimate the determinants of private and domestic saving, I used data published by the World Bank in the "World Development Indicators" and by European Bank for Reconstruction and Development (EBRD) in the "Transition Report 2003 and 1999".

Table 2 begins the exploration of savings by comparing the saving regression between domestic and private saving. The results reported in Table 2 show that both private and domestic saving have the same determinants and also the coefficients are very similar. The variables used to reflect the effect of income on saving (GDP growth and GDP per capita) are significant for both private and public saving and show, as the theory predicts, that income positively affects saving.

Inflation is significant for both private and domestic saving and has a positive sign. In my study I used inflation as a proxy for uncertainty. The positive effect of inflation suggests that higher uncertainty induces people to save more. Loayza *et. al.* who obtained the same result explained the positive coefficient by the precautionary motive for saving: higher uncertainty induces people to save a larger fraction of their income from precautionary reasons.

**Table 2: Private and domestic savings rate**

| | Private saving rate | Domestic saving rate |
|---|---|---|
| GDP growth | 0.22 | 0.23 |
| | (2.70)** | (2.95)** |
| GDP per capita | 0.004 | 0.004 |
| | (4.86)** | (4.99)** |
| Young dependency ratio | -0.71 | -0.69 |
| | (-1.17) | (-1.22) |
| Old dependency ratio | -4.20 | -4.05 |
| | (-2.96)** | (-3.02)** |
| Urbanization ratio | -0.32 | -0.33 |
| | (-1.23) | (-1.31) |
| M2/GDP | -0.11 | -0.11 |
| | (-2.05)** | (-2.06)** |
| CA balance/GDP | 0.37 | 0.39 |
| | (3.56)** | (4.20)** |
| Inflation rate | 0.005 | 0.005 |
| | (2.03)** | (2.11)** |
| Gov saving/GDP | -0.93 | - |
| | (-11.16)** | |
| $R^2$ | 0.84 | 0.80 |
| Obs | 99 | 101 |

* and **: significant at 10% and 5% level.
t-statistic in brackets.

The indicator for financial depth, M2/GDP has a negative effect on saving and it is significant for both private and domestic saving. Schroten and Stephan explain the increase in financial depth as a relaxation of the credit constraints that existed during the socialist era. The funds received from those who save are channeled by banks to those who dissave. As I mentioned previously a relaxation of the credit constrained means that people are not forced to save the entire amount if they wanted to make an investment in the future. Thus, financial depth can be considered as an indicator for financial sector development. An increase in financial development has as a result a reduction in self financing which in turn, will have a negative effect on saving. Previous empirical studies,

concentrated on developed economies found an insignificant effect of M2/GDP on saving rate. This means that that a more developed financial sector will have no influence on saving rate. This is understandable because the financial sector for the developed economies is already highly developed.

The current account balance was used as a proxy for foreign borrowing. This variable is significant and has a positive effect for both private and public saving. If we assume that domestic saving and foreign capital are substitutes, it is expected that a higher current account deficit would generate a reduction in saving. The result reported in Table 2 is in line with our expectation since an increase in CA deficit leads to a reduction in CA balance, which has a positive effect on saving.

All three demographic variables – namely the urbanization ratio and the young and old dependency ratios (people under 14 and over 65 as a share in total population)--have a negative impact for both saving functions. However, according to my results only the old dependency ratio is significant. The negative effect of the dependency ratio on saving is in line with the life-cycle hypothesis, which predicted that people have the highest saving rate during the peak earning period which is during their working life. In the life-cycle hypothesis younger people have negative saving rates and older people dissave (spend from their saving) because they have only low income during their retirement phase.

An important determinant for private saving is public saving. The results reported in Table 2 shows that a rise in the public saving rate leads to significant decline in private saving rate. More specifically, private saving rate is reduced by 0.93 percentage points for every 1 percentage point increase in public saving ratio. Even though this is not a one

to one relationship as the Riquardian equivalence suggests, the coefficient for the government saving variable is still very close to –1. For this reason, I tested the null hypothesis: the coefficient for the government saving variable is equal to -1 against the alternative that the coefficient is different than –1. Because the value of t statistic is smaller then $t_c$ I did not reject the null hypothesis and conclude that the results reported in Table 2 are in line with the Riquardian equivalence.

### V. B. The Effect of Financial Liberalization

Another objective of this paper is to find the effect of financial liberalization on private and domestic saving rates. Table 3 and 4 report the regression results obtained by adding two liberalization indexes developed by the European Bank for Reconstruction and Development: the bank reform index and the securities market reform index.

For each saving function, private and domestic, I estimated five models: the first model includes both liberalization indexes, the second model includes only the bank reform index, the third model includes the lagged bank reform index, the forth model includes only the securities market reform index and the last model includes the lagged securities market reform index. I included the lagged liberalization index to analyze the effect of previous year liberalization on current year saving rate. These indexes can take values

between one and four, where one means little or no progress and four means maximum liberalization[3].

The first column of Table 3 and 4 reports the regression results obtained by adding both bank and securities market reform indexes. For private saving rate the bank reform index is significant and has a positive effect on saving rate and for domestic saving rate none of the liberalization indexes are significant. This finding is understandable considering the fact that domestic saving rate includes besides private saving also government saving.

The second column reports the regression results obtained by adding only the bank reform index and the third column reports the results by adding the lagged bank reform index.

For both saving functions, private and domestic, the effect of the banking system liberalization becomes more significant if the regression model includes only the bank reform index. The results change even more if the lagged bank liberalization index is added, especially for the domestic saving rate where the lagged bank liberalization index becomes significant. This means that while the current liberalization does not have a significant effect on current domestic saving, greater liberalization in previous year has a positive effect on current private and domestic saving rates

[3] A more detailed presentation of these indexes is included in Appendix 1.

**Table 3: Dependent variable private saving as a percentage of GDP**

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| GDP growth | 0.14 | 0.13 | 0.21 | 0.22 | 0.24 |
| | (1.85)* | (1.83)* | (1.97)* | (2.34)** | (2.25)** |
| Young dependency ratio | -0.13 | -0.10 | -0.27 | -0.67 | -0.65 |
| | (-1.03) | (-0.98) | (-1.20) | (-0.97) | (-0.92) |
| Old dependency ratio | -1.44 | -1.5 | -1.73 | -1.67 | -1.72 |
| | (-1.87)* | (-1.83)* | (-1.92)* | (-1.75)* | (-1.71)* |
| Urbanization ratio | -0.57 | -0.58 | -0.65 | -0.32 | -0.36 |
| | (-1.79)* | (-1.82)* | (-1.92)* | (-1.09) | (-1.14) |
| M2/GDP | 0.09 | 0.09 | 0.04 | 0.06 | 0.03 |
| | (0.58) | (0.34) | (0.82) | (1.24) | (0.57) |
| CA balance/GDP | 0.39 | 0.39 | 0.43 | 0.35 | 0.37 |
| | (3.29)** | (3.33)** | (3.68)** | (2.98)** | (3.11) |
| Gov saving/GDP | -0.86 | -0.87 | -0.94 | -0.88 | -0.95 |
| | (-9.21)** | (-9.38)** | (-9.84)** | (-9.35)** | (-9.56)** |
| Inflation rate | 0.008 | 0.08 | 0.009 | 0.009 | 0.09 |
| | (3.15)** | (3.19)** | (3.36)** | (3.17)** | (3.21)** |
| Bank reform index | 2.74 | 2.80 | - | - | - |
| | (2.00)** | (2.16)** | | | |
| Lagged bank reform index | - | - | 2.71 | - | - |
| | | | (2.52)** | | |
| Securities market reform index | -0.43 | - | - | 0.05 | - |
| | (-0.54) | | | (0.07) | |
| Lagged securities market Reform index | - | - | - | - | 1.15 |
| | | | | | (1.13) |
| $R^2$ | 0.80 | 0.80 | 0.82 | 0.79 | 0.81 |
| Obs | 98 | 99 | 98 | 98 | 95 |
| Durbin-Watson test (first order serial correlation) | 1.98 | 2.06 | 2.11 | 2.08 | 2.07 |

* and **: significant at 10% and 5% level.
t-statistic in brackets.

According to the results reported in Table 3 and 4, banking liberalization has a positive effect on saving rate, which means that during transition the development of reliable institutions promotes saving. This result was also found also by Bandiera *et. al.* And Schrooten and Stephan,(2003). In their opinion, better institutional framework is the prerequisite for people to extend their planning horizons and to make saving a rational behavior.

**Table 4: Dependent variable gross domestic saving as a percentage of GDP**

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| GDP growth | 0.17 | 0.16 | 0.23 | 0.24 | 0.26 |
| | (1.79)* | (1.74) | (2.23)** | (2.56)** | (2.51)** |
| Young dependency ratio | -0.47 | -0.44 | -0.61 | -0.79 | -0.75 |
| | (-0.69) | (-0.66) | (-0.93) | (-1.21) | (-1.13) |
| Old dependency ratio | -1.63 | -1.71 | -2.08 | -1.66 | -1.79 |
| | (-1.68)* | (-1.81)* | (-1.93)* | (-1.76)* | (-1.87)* |
| Urbanization ratio | -0.45 | -0.46 | -0.5 | -0.3 | -0.32 |
| | (-1.51) | (-1.53) | (-1.61) | (-1.03) | (-1.06) |
| M2/GDP | 0.06 | 0.06 | 0.03 | 0.05 | 0.02 |
| | (0.93) | (0.94) | (0.64) | (0.90) | (0.48) |
| CA balance/GDP | 0.35 | 0.35 | 0.37 | 0.35 | 0.36 |
| | (3.40)** | (3.42)** | (3.69)** | (3.31)** | (3.48)** |
| Inflation rate | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 |
| | (3.38)** | (3.40)** | (3.55)** | (3.38)** | (3.41)** |
| Bank reform index | 2.11 | 2.16 | - | - | - |
| | (1.61) | (1.76)* | | | |
| Lagged bank reform index | - | - | 2.29 | - | - |
| | | | (2.26)** | | |
| Securities market reform index | -0.41 | - | - | -0.003 | - |
| | (-0.52) | | | (-0.02) | |
| Lagged securities market Reform index | - | - | - | - | 1.08 |
| | | | | | (1.11) |
| $R^2$ | 0.75 | 0.75 | 0.77 | 0.74 | 0.76 |
| Obs | 100 | 101 | 98 | 100 | 97 |
| Durbin-Watson test (first order serial correlation) | 2.09 | 2.12 | 2.13 | 2.13 | 2.10 |

* and **: significant at 10% and 5% level.
t-statistic in brackets.

The positive effect of banking reform and interest rate liberalization on saving rate has another explanation: financial liberalization generates an increase in interest rates which may boost saving in case substitution effect is higher then the income effect. For the typical transition economy substitution effect is higher than the income effect. The reasoning for this statement was given by Athukorala and Sen (2001): In transition economies the saving process tends to be highly money intensive because the portfolio choices are very limited. Considering this and the fact that the majority of saving comes from small savers, the substitution effect is generally larger than the income effect of an increase in interest rate.

The last two columns report the regression results by adding only the securities market reform index and the lagged value of this index. The results indicate that the securities market liberalization does not have a significant effect on both saving rates: private and domestic.

## VI. Conclusions

After the dramatic collapse in domestic saving rates during the early years of the transition process, saving rates started to increase and stabilize at a level above the one registered for EU for many transition economies considered in this study, more specifically: Czech Republic, Hungary, Poland, Slovenia and Slovak Republic.

The results obtained in this paper indicate that in transition economies from Eastern Europe and the Baltics, domestic and private saving rates are determined mostly by the same forces. Income is highly significant and has a positive effect on both saving rates. Regarding the relation between public and private saving, the results indicate that private saving rate is reduced by 0.93 percentage points for every 1 percentage point increase in public saving ratio. The positive effect of the current account deficit on saving rate indicates the fact that domestic and foreign capital are not substitutes. Demographic variables have the expected effect on saving rate, more specifically an increase in the share of dependent population in total population will have a negative effect on saving

because younger people have negative saving rates and older people dissave (spend from their saving) because they have only low income during their retirement phase.

With respect to the effect of financial liberalization on saving rate, which was the second objective of this paper, the results indicate that both past and current year banking system development have a positive effect on private saving rate. Regarding the domestic saving rate, previous year liberalization has a positive and significant effect on current year saving rate.

If saving plays an important role for investment, the empirical results reported in this paper suggest that an increase in savings in Eastern Europe and the Baltic states can be attained by encouraging economic development in order to increase income and improve the performance of financial markets.

## *References*


Arestis, P., Demetriades, P. (1999). "Financial liberalization: The experience of developing countries", *Eastern Economic Journal*, 25 (4): 441-457.

Athukorala P., Sen, W. (2001). "The determinants of private saving in India". *Economic Development and Cultural Change.*

Bandiera, O., G. Caprio, P. Honohan, and F. Schiantarelli. (2000). "Does financial reform raise or reduce savings?", *The Review of Economics and Statistics* 82 (2): 239-263.

Chowdhury, A. (2003). "Private savings in transition economies: Are there therms of trade shocks?", William Davison Institute , Working Paper Number 572.

Denizer, C., Wolf, H. (1998). "Aggregate saving in the transition", Working paper; part of World Bank research project: "Savings across the world".

Denizer, C., Wolf, H. (2000). "The saving collapse during the transition in Eastern Europe". Working paper; part of World Bank research project: "Savings across the world".

Dornbush, R., Wolf H. (2000). "Monetary overhangs". University of Chicago Press.

Hurst C., Uppenberg K. (2000). "Investment issues in South-Eastern Europe". European Investment Bank. Financial report 2000.

Johnson, D., Chiu, J. (2001). "The saving-income relation in under-developed and developed countries", *The Economic Journal,* 321-333.

Loayza, N., Schchmidt-Hebbel, K., and Serven, L. (2000). "What drives saving across the world?", The World Bank. Saving across the world project.

Masson, P., Bayoumi, T., and Samiei, H. (1996). "International evidence on the determinants of private saving", Discussion paper: *Center for Economic Policy Research.*

Modigliani, F. & Ando A. (1963): "The life cycle hypothesis of saving: Aggregated implications and tests." *American Economic Review*, 53, 55-84.

Ogaki, M., Ostry, J., and Reihart, C. (1994). "Saving behavior in low and middle-income developing countries: A comparison, IMF working paper.

Samuelson, P., Nordhaus, W. (2001). "Economics 17th edition", McGraw Higher Education.

Schmidt, M. (2001). "Saving and investment: Some international perspectives". "*Southern Economic Journal",* 446-456.

Schrooten, M., Stephan,. S. (2001). "Savings in Central Eastern Europe", *German Institute for Economic Research.*

Tybout, J., Jamie de Melo (1986). "The effects of financial liberalization on savings and investment in Uruguay", *Economic Development and Cultural Change*, 561-587.

Vinhas de Souza, L. (2004). "Financial liberalization and business cycles: The experience of future EU member states in Baltics and Central Eastern Europe", working paper.

## Appendix 1. Classification system for the EBRD transition indicators[4]

**Banking reform and interest rate liberalization:**

1. Little progress beyond establishment of a two-tier system.
2. Significant liberalization of interest rates and credit allocation; limited use of direct credit or interest rate ceilings.
3. Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalization with little preferential access to cheap refinancing; significant lending to private enterprises; substantial financial deepening.
4. Significant movement of banking laws and regulations toward BIS standards; well functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.

4+. Standards and performance norms of advanced industrial economies: full convergence of banking laws and regulations with BIS standards; provision of full set of competitive banking services.

**Securities markets and non-bank financial institutions:**

1. Little progress.
2. Formation of securities exchanges, market-makers and brokers; some trading in government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.
3. Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protections of minority shareholders; emergence of non-bank financial institutions (investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.
4. Securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalism; well functioning non-bank financial institutions and effective regulation.

4+. Standards and performance norms of advanced industrial economies; full convergence of securities laws and regulations with IOSCO standards; fully developed non-bank intermediation.

[4] Source: EBRD Transition Report 2003

## Appendix 2. Major events of domestic financial liberalization and stock market liberalization

### BULGARIA

**Domestic Financial Liberalization.**

- Two-tier banking system established in 1991
- Beginning of privatization of state owned banks in 1992. (In 1992 Bulgarian Government established the Bank Consolidation Company for the purpose of restructuring and privatizing the state owned banks).
- Interest rates are fully liberalized in 1991.
- Credit to residents and non-residents allowed in 1991.
- Deposits on foreign accounts allowed in 1991 (residents and non-residents: non-residents require BNB approval for transaction over 20,000 leva)
- Banking law adopted in 1992 and bankruptcy law adopted in 1994.

**Securities markets and non-bank financial institutions.**

- In 1992 first stock exchange begins trading.
- In 1995 The Law on Securities, Exchange and Securities Companies was adopted.
- Stock exchanges consolidated.

### CZECH REPUBLIC

**Domestic Financial Liberalization.**

- Two-tier banking system established in 1990.
- First bank privatized and liberalization of interest rates in 1992.
- Removal of credit control at the end o of 1997.
- Starting with 2001 deposits on foreign accounts no longer need pre-approval.
- Bankruptcy law enacted in 1991 and banking law enacted in 1992.

**Securities markets and non-bank financial institutions.**

- In 1993 Stock exchange begins trading.
- Securities law adopted in 1992.
- In 1999: elimination of controls on foreign securities.

### ESTONIA

**Domestic Financial Liberalization.**

- In 1995 first state owned bank privatized and first foreign bank founded in 1992.
- Beginning with 1995 deposits on foreign accounts in domestic banks allowed.

- Bankruptcy law enacted in 1992 and banking regulations adopted in 1993.

**Securities markets and non-bank financial institutions.**

- Stock exchange established in 1996 (acquisition of shares, securities and bonds by foreign investors has been allowed since the beginning).
- Securities law enacted in 1993.

**HUNGARY**

**Domestic Financial Liberalization.**

- First state owned bank privatized in 1994.
- Liberalization of interest rates in 1987 for enterprises and in 1992 for households.
- Long term lending to non-residents allowed; in 2001 short-term credit freed.
- Deposits on foreign currency need approval. In 1998 the need for approval from residents and non-residents is extended.
- Banking law adopted in 1990 and bankruptcy law adopted in 1991.

**Securities markets and non-bank financial institutions.**

- In 1990 first Stock Exchange established. (Starting with 1996 non-residents from OECD allowed to buy debt securities of over 1 year maturity).
- Securities law enacted in 1990.

**LATVIA**

**Domestic Financial Liberalization.**

- Two-tired banking system established in 1992.
- In 1995 first state-owned bank privatized.
- Beginning with 1992: interest rates liberalized.
- Banking law enacted in 1992 and bankruptcy law enacted in 1996.
- Credit control removed in 2003.

**Securities markets and non-bank financial institutions.**

- Stock exchange established at the end of 1993 (Dec 1993) and begins trading starting with 1995. Acquisition by foreign investors allowed since the beginning.

**LITHUANIA**

**Domestic Financial Liberalization.**

- Two-tired banking system re-established in 1992.
- The reform of Lithuanian's state owned banking sector was started in 1992.
- No control on interest rates; no credit control (for residents and non-residents).

- Deposits on foreign allowed: 1992.
- Banking crisis in 1995.

**Securities markets and non-bank financial institutions.**

- In 1992 Stock Exchange established and begins trading in 1993. Acquisition repatriation by foreign investors allowed since the beginning.

**POLAND**

**Domestic Financial Liberalization.**

- Two-tier banking system introduced in 1988.
- In 1993 first bank privatized.
- Liberalization of interest rates starting with 1990.
- Permission needed for short-term credit to non-residents (lifted in 1998). Short term financial credit from residents to non-residents prohibited above a given limit.
- In 1990 deposits an foreign accounts allowed with limit.
- Banking law enacted in 1991.

**Securities markets and non-bank financial institutions.**

- Stock exchange begins trading in 1991. Acquisition and repatriation by foreign investors allowed since the beginning.
- Securities law adopted in 1991.
- Buying of foreign securities by banks allowed since 1998.

**ROMANIA**

**Domestic Financial Liberalization.**

- Two-tier banking system introduced in 1990.
- Starting with 1990 deposits on foreign accounts allowed.
- No control on interest rates since 1991.
- Banking legislation adopted in 1992 and bankruptcy law enacted in 1995.
- In 1998 first bank was privatized.
- In 1998 short-term credit with permission from NBR. In 1999 credit operation of over a year liberalized.

**Securities markets and non-bank financial institutions.**

- At the end of 1995 Stock exchange begins to operate. The acquisition of shares by non-residents was fully allowed from the beginning.
- Direct trading of short term government bonds was and is restricted.

**SLOVAK REPUBLIC**

**Domestic Financial Liberalization.**

- Two-tier banking system introduced in 1990.
- Partly privatized two large banks in 1992 when Slovak Rep. was still part of Czechoslovakia (in 1993 Czechoslovakia splits into Czech and Slovak Republics).
- Interest rates were liberalized starting with 1992.
- Bankruptcy law adopted in 1992 and banking law adopted in 1993.
- In 1996: Foreign long-term borrowing by residents allowed; financial long-term credit to non-residents allowed.
- 1998: Deposits on foreign accounts allowed.

**Securities markets and non-bank financial institutions.**

- In 1993 Stock Exchange begins trading.
- Starting with 1998 OECD-nationals can acquire securities.

**SLOVENIA**

**Domestic Financial Liberalization.**

- First bank privatization in 1992.
- Bank rehabilitation begins in 1993.
- Bankruptcy law enacted in 1994.
- Interbank cartel on deposit rates established in 1995 and abolished in 1999.

**Securities markets and non-bank financial institutions.**

- In 1989 Stock exchange begins trading.
- Securities law enacted in 1994 and securities market law enacted in 1999.

## Appendix 3. GDP growth (%)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|---|---|---|---|---|---|---|
| Bulgaria | -9.12 | -8.45 | -7.27 | -1.48 | 1.82 | 2.86 |
| Czech Republic | - | -11.61 | -0.52 | -0.41 | 2.70 | 5.94 |
| Estonia | -7.06 | -8.00 | -21.17 | -8.19 | -1.98 | 4.27 |
| Hungary | -3.50 | -11.89 | -3.06 | -0.58 | 2.95 | 1.49 |
| Latvia | -1.25 | -10.41 | -34.86 | -14.87 | 0.65 | -0.81 |
| Lithuania | - | -5.68 | -21.26 | -16.23 | -9.77 | 3.29 |
| Poland | - | -7.00 | 2.60 | 3.80 | 5.20 | 7.00 |
| Romania | -5.60 | -12.90 | -8.84 | 1.51 | 3.97 | 7.16 |
| Slovak Republic | -2.67 | -14.57 | -6.72 | -3.70 | 5.18 | 6.47 |
| Slovenia | | -8.9 | -5.5 | 1.7 | 5.29 | 3.80 |

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|
| Bulgaria | -9.40 | -5.60 | 4.00 | 2.30 | 5.40 | 4.07 | 4.76 |
| Czech Republic | 4.29 | -0.77 | -1.04 | 0.47 | 3.25 | 3.09 | 1.96 |
| Estonia | 3.92 | 9.79 | 4.60 | -0.63 | 7.30 | 6.46 | 5.98 |
| Hungary | 1.34 | 4.58 | 4.85 | 4.16 | 5.20 | 3.82 | 3.32 |
| Latvia | 3.68 | 8.38 | 4.76 | 2.84 | 6.84 | 7.93 | 6.07 |
| Lithuania | 4.68 | 7.01 | 7.31 | -1.82 | 3.98 | 6.52 | 6.71 |
| Poland | 6.00 | 6.80 | 4.80 | 4.10 | 4.00 | 1.00 | 1.40 |
| Romania | 4.01 | -6.10 | -4.79 | -1.20 | 0.60 | 5.30 | 4.30 |
| Slovak Republic | 5.84 | 5.64 | 3.96 | 1.32 | 2.20 | 3.30 | 4.39 |
| Slovenia | 3.80 | 4.50 | 3.91 | 5.10 | 4.54 | 2.86 | 2.95 |

## Appendix 4. Correlation matrix of the most important saving determinants

| | Saving rate | GDP/ capita | GDP growth | Real int. rate | M2/GDP | Urbanization ratio | Young dependency | Old dependency | Gov. saving/ GDP | CA balance/ GDP | Inflation rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Private saving rate | 1.00 | 0.44 | -0.14 | -0.02 | 0.49 | 0.04 | 0.09 | -0.25 | -0.44 | 0.17 | 0.05 |
| GDP/capita | 0.44 | 1.00 | 0.23 | 0.27 | 0.46 | -0.20 | -0.29 | -0.01 | 0.14 | 0.10 | -0.26 |
| GDP growth | -0.14 | 0.23 | 1.00 | 0.58 | 0.03 | -0.16 | -0.37 | 0.25 | 0.20 | -0.41 | -0.59 |
| Real interest rate | -0.02 | 0.27 | 0.58 | 1.00 | 0.20 | -0.23 | -0.13 | -0.004 | -0.05 | -0.25 | -0.90 |
| M2/GDP | 0.49 | 0.46 | 0.03 | 0.20 | 1.00 | 0.20 | -0.25 | 0.04 | -0.13 | 0.02 | -0.21 |
| Urbanization ratio | 0.04 | -0.20 | -0.16 | -0.23 | 0.20 | 1.00 | -0.05 | 0.33 | -0.05 | -0.179 | 0.09 |
| Young dependency | 0.09 | -0.29 | -0.37 | -0.13 | -0.25 | -0.05 | 1.00 | -0.85 | -0.21 | 0.07 | 0.19 |
| Old dependency | -0.25 | 0.01 | 0.25 | -0.004 | 0.04 | 0.33 | -0.85 | 1.00 | 0.09 | -0.14 | -0.12 |
| Gov. saving/GDP | -0.44 | 0.14 | 0.20 | -0.05 | -0.13 | -0.05 | -0.21 | 0.09 | 1.00 | 0.06 | 0.02 |
| CA balance/GDP | 0.17 | 0.10 | -0.41 | -0.25 | 0.02 | -0.17 | 0.07 | -0.14 | 0.06 | 1.00 | 0.31 |
| Inflation rate | 0.05 | -0.26 | -0.59 | -0.90 | -0.21 | 0.09 | 0.19 | -0.12 | 0.02 | 0.31 | 1.00 |

## Appendix 5: Descriptive Statistics

| | Mean | Std Dev | Min | Max |
|---|---|---|---|---|
| Private saving rate | 21.20 | 6.28 | -5.21 | 34.05 |
| GDP growth | 0.56 | 7.13 | -34.85 | 9.78 |
| Real interest rate | 1.19 | 16.35 | -86.59 | 17.03 |
| M2/GDP | 38.06 | 16.10 | 15.18 | 73.06 |
| Urbanization ratio | 63.28 | 7.34 | 49.18 | 74.72 |
| Young dependency | 19.34 | 2.25 | 14.90 | 24.77 |
| Old dependency | 13.00 | 1.44 | 10.24 | 16.44 |
| Gov. saving/GDP | -1.28 | 3.93 | -15.31 | 22.53 |
| CA balance/GDP | -3.89 | 4.30 | -12.31 | 9.43 |
| Inflation rate | 69.73 | 173.42 | 0.30 | 1076 |
| Bank reform index | 2.82 | 0.63 | 1 | 4 |
| Securities market reform index | 2.40 | 0.71 | 1 | 3.7 |