

ACADEMY OF ECONOMIC STUDIES, BUCHAREST
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**THE EFFECT OF CAPITAL MARKET
LIBERALIZATION IN EASTERN EUROPE:
ECONOMIC GROWTH OR FINANCIAL CRISIS**

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Bucharest, July 2008

1. The Paper's Objective

The last 20 years have witnessed the financial liberalization of equity markets across the world. Equity market liberalizations give foreign investors the opportunity to invest in domestic equity securities and domestic investors the right to transact in foreign equity securities. These measures have opened the international financing path and resulted in risk diversification, capital cost decreases and investment growth. However, liberalization may have negative effects as well. It often played an important role in the incidence of banking and currency crises by increasing macroeconomic volatility to external shocks. The connection between financial fragility and economic growth can be associated with capital market liberalization.

The main aim of this paper is to analyze the effect of financial liberalization in thirteen of Eastern Europe countries, by bringing these two views together. Many of the countries analyzed are post-communist economies that have been in transition in the selected period 1995 – 2007.

The analysis is structured in six parts. A literature review regarding studies about financial liberalization effect on economic growth and on the incidence of financial crises is presented after a short introduction. Then, the third part presents the methodology used in achieving the analysis's results. The research is based on treatment effect models, proposed by James Heckman in 1978, where the medium causal effect of a binary variable is tested on an output variable. One of the assumptions is that financial liberalization has a positive effect on real GDP per capita growth, among with a set of standard control variables. In the same time, I assumed that the incidence of a financial crisis has a negative effect on growth and it depends on a set of variables as well as on the financial liberalization. The treatment effect model allows us to jointly estimate the linear growth equation and the probit model regarding the incidence of crises. The estimation procedure is a two steps one, mentioned by Maddala (1983).

The fourth part is represented by the data presentation, the empirical analysis and the results interpretation. The fifth section presents the conclusions drawn and finally, the sixth part is a references list.

The main conclusion is that, on average, in the Eastern Europe countries, the financial liberalization has a double positive effect: First, it leads to more rapid economic growth and, second, it reduces the probability of crises. The first result is consistent with the existing literature, but the second is contrary.

2. The actual research in the financial liberalization field

The financial liberalization effect on growth and his impact on the incidence of banking or currency crises has been largely studied in empirical analysis, considering these two views separately.

The researches that treated the financial crises have tested whether capital market liberalization increases the crises probability. Kaminski and Reinhart (1998), Detriache and Dremirguc-Kunt (1998) and Glick and Hutchinson (2001) have illustrated the fact that a banking and currency crisis propensity increases in the aftermath of financial liberalization. In contrast, the economists who analyzed the liberalization effect on growth have concentrated on the impact on the long term growth. Bekaert, Harvey and Lundblad (2005) have discovered that capital market liberalization leads to a 1% increase in the economic growth rate. Henry (2000) confirms this result at a firm's level, showing that liberalization leads to an investment boom associated with a decrease in the cost of capital.

The division of the financial liberalization effect in the empirical literature between crises and growth has several disadvantages. First, each one of them is a partial view of the capital market liberalization. The crisis perspective treats the high cost generated by crises on national income, but ignores the benefits in tranquil times. The growth view is based on the linear estimation of the effects on economic growth. A linear approach only considers only the average effects that are between boom and bust times. The second disadvantage is that each view generates its own set of economic policy implications. Researchers of the effect on economic growth sustain financial liberalization policies while authors that have analyzed the impact on crises incidence militate against excessive liberalization.

Ranciere, Tornell and Westermann (2003) have developed a model where the asymmetry between tradable and non-tradable sectors is the key connection between liberalization and growth. Martin and Rey (2005) have analyzed the financial liberalization's impact on capital flows, asset prices and investments. They showed that, in the absence of international assets' transaction costs, capital market liberalization can lead to two possible consequences for a developing economy. In normal circumstances, liberalization has a positive role to generate capital inflows, to create diversification opportunities by decreasing the cost of capital and to stimulate economic growth. However, in certain circumstances, negative expectations regarding the economy's state may be enough to generate a drop in assets' demand, capital outflows and financial crashes, usually associated with a decrease in economic growth.

Dell' Aricia and Marquez (2004) have found that financial liberalization helps developing the credit sector, by reducing the banks' incentive to monitor potential debtors. When capital markets are liberalized and new untested projects needing financing appear, the banks do not have the same ability to monitor all potential debtors and a rapid credit growth appears. Under these circumstances, financial liberalization may lead to investment and economic growth, but also to a decline in credit portfolio's quality. At a macroeconomic level, when negative shocks appear, financial fragility can generate financial crises and losses.

Ranciere, Tornell and Westerman (2006) have made a decomposition of financial liberalization's effect. They used a sample of 60 countries within a 22 years time period. They found that, although liberalization increases the financial crises probability, these are rare events even if their recessionary consequences are sometimes severe. The direct effect on economic growth is a positive one and by far outcomes the negative crises indirect effect. They concluded that the average total effect of financial liberalization leads to an increase of 0.86% in economic growth rate.

In the models discussed above, financial liberalization relaxes capital market's imperfections, but it has the cost of generating financial fragility. In conclusion, the total effect of liberalization is a result of assumed risks. A liberalized economy growth faster than a closed one, however, it is more exposed to shock transmission during the crisis times.

3. The methodology and the model used

The aim of this paper is to analyze the dual effect of capital market liberalization on economic growth in thirteen Eastern Europe countries. The methodology proposed starts by adding two dummies to a Barro standard growth regression: one that reflects the financial liberalization and the second one for the banking or currency crisis. Concomitantly, I considered the crisis dummy as an endogenous variable depending on a set of control variables and on the financial liberalization dummy. Though, the impact of liberalization on economic growth is composed by two effects:

- a) a direct effect, conditioned by a set of variables in the absence of financial crisis and
- b) an indirect effect reflected in the costs associated with a higher propensity to crises.

The empirical specifications combine a linear growth model and a probit crisis model.

The Growth Model is represented by the following panel, with i indexing the country and t indexing the period:

$$y_{i,t} = \alpha X_{i,t} + \beta FL_{i,t} + \gamma I_{i,t} + \varepsilon_{i,t} \quad (1)$$

where:

- $y_{i,t}$ – is the real GDP per capita growth (in logarithm)
- $X_{i,t}$ – is a set of standard control variables
- $FL_{i,t}$ – is a dummy for financial liberalization, taking the value 1 if the country i is liberalized in year t and zero otherwise
- $I_{i,t}$ – is a dummy for crisis, taking the value 1 if there is a banking or currency crisis in the year t and zero otherwise
- $\varepsilon_{i,t}$ – is a random, gaussian component.

The crisis model can be estimated using a probit model and considers $I_{i,t}$ as an endogenous variable, depending of the occurrence of a latent, unobserved variable $W^*_{i,t}$:

$$I_{i,t} = \begin{cases} 1 & \text{if } W^*_{i,t} > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (2)$$

The latent unobservable variable $W^*_{i,t}$ represents the probability of a financial crisis and it is assumed to depend on:

- $Z_{i,t}$ – a set of control variables
- $FL_{i,t}$ – dummy financial liberalization
- $\eta_{i,t}$ – random, gaussian variable.

We can consider:

$$I_{i,t} = \begin{cases} 1 & \text{with probability } P(W^*_{i,t} > 0) = \Phi(aZ_{i,t} + bFL_{i,t}) \\ 0 & \text{with probability } P(W^*_{i,t} \leq 0) = 1 - \Phi(aZ_{i,t} + bFL_{i,t}) \end{cases}$$

Where:

- Φ – is a cumulated distribution function of a standard normal

The treatment effect model developed by Heckman (1978) allows us to jointly estimate the equations (1) and (2) and has its origins in social and medicine experiments. It measures the average causal effect of a binary variable (the treatment) on an output variable. Due to selection-bias and self-selection, it is impossible to measure the effect at an individual level.

In estimating the average effect of financial liberalization, the crisis dummy is the „treatment”, regression (1) is the „output equation” and regression (2) is the „treatment equation”, representing the probability of receiving the „treatment”. The two step procedure described by Maddala (1983) starts by obtaining the probit estimates of the crisis probability.

$$P(I_{i,t} = 1) = P(W_{i,t}^* > 0) = \Phi(aZ_{i,t} + bFL_{i,t})$$

Then, using the probit estimates (a_e , b_e) we compute a hazard variable ($h_{i,t}$) to add to the growth regression:

$$h_{i,t} = \begin{cases} \theta(a_e Z_{i,t} + b_e FL_{i,t}) / \Phi(a_e Z_{i,t} + b_e FL_{i,t}), \text{ daca } I_{i,t} = 1 \\ - \theta(a_e Z_{i,t} + b_e FL_{i,t}) / [1 - \Phi(a_e Z_{i,t} + b_e FL_{i,t})], \text{ daca } I_{i,t} = 0 \end{cases}$$

Where:

- θ – is the repartition density of a standard normal
- Φ – is the cumulated distribution function of a standard normal

The total effect of financial liberalization due to a change in the financial liberalization dummy from zero to one is:

$$E(y_{i,t} | FL_{i,t} = 1) - E(y_{i,t} | FL_{i,t} = 0) = \beta_e + \gamma_e E[\Phi(a_e Z_{i,t} + b_e) - \Phi(a_e Z_{i,t})]$$

Efectul Liberalizării Financiare Efectul Direct Efectul Indirect

4. Data sources

The data set consists of a sample of 13 Eastern Europe Countries. 10 of them have joined the European Union in 2004 (Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia), 2 of them in 2007 (Romania and Bulgaria) and one country who is officially negotiating conditions for joining (Turkey). The time dimension is of 13 years, from 1995 to 2007. The data sources are drawn from AMECO Database and from the Central Bank of each country analyzed. The data series methodology is the one proposed by the European System of

Accounts (1995) for the EU members and the System of National Accounts (1993) for Turkey.

Table 1: List of variables

VARIABLE	DEFINITION AND CONSTRUCTION	DATA SOURCE	ABBREVIATION
Real GDP per capita	The ratio between real GDP (2000 current market price GDP in national currency/ GDP Deflator) and total population	My calculation using AMECO Database	Real_gdp
Growth rate of real GDP per capita	Log-difference of real GDP per capita	My calculation using AMECO Database	Real_gdp_gr
Government size	Ratio of final Government consumption to GDP (the initial series are in current 2000 market prices, national currency)	My calculation using AMECO Database	Gov_size
Population Growth	Log-difference of total population	My calculation using AMECO Database	Pop_gr
Inflation	Log(100+%National CPI all items) 2000=100	My calculation using AMECO Database	Inflatia
Openess to Trade	The ratio between (total Exports + total Imports) to GDP; the initial series are in 2000 current prices, national currency	My calculation using AMECO Database	Openess_trade
Real Effective Exchange Rates Overvaluation	The percentage difference between Real Effective Exchange Rates (relative performance to the 35 industrialized countries: double export weights: EU-27, TR CH NR US CA JP AU MX NZ) and the Hodrick Prescott filter applied to REER, $\lambda=100$	My calculation using AMECO Database	Rero
Real Effective Exchange Rate Detrended	Real Effective Exchange Rate detrended by the Hodrick Prescott filter, $\lambda=100$.	My calculation using AMECO Database	Rero_hptrend01
M2 / (Rezerves – Gold)	The ratio between the monetary aggregate M2 and	My calculation using Central	M2_res

	total international reserves – Gold position (initial series are in national currency)	Banks' statistics and reports	
Dummy Financial Liberalization	De jure binary variable taking the value 1 if the country is liberalized and zero otherwise, corresponding to the regulatory official market liberalization	Geert Bekaert and Campbell R. Harvey Country Risk Analysis Database – Duke University – S.U.A.	Dummy_fl
Dummy financial crisis	Binary variable taking the value one if there is a banking or currency crisis and zero otherwise	Geert Bekaert and Campbell R. Harvey Country Risk Analysis Database – Duke University – S.U.A.	Dummy_crisis

The ESA (1995) and SNA (1993) are made to be comparable and the Central Banks' statistics are computed using Special Data Dissemination Methodology proposed by the Internationally Monetary Fund. Still, a possible issue that could affect my conclusions could be the fact that the cross-country panel is made of a relatively little sample of countries in a relatively short period of time.

5. The results obtained

I found that, on average, the financial liberalization had a double positive effect on economic growth in the Eastern Europe set of countries analyzed in 1995 – 2007 time series. First, its direct effect on real GDP per capita growth from the first linear regression is positive ($\beta_e = 0,21977268$) for a confidence coefficient of 0,1%. Second, the impact of financial liberalization on the probability of crises from the probit model turned out to be negative. However, due to the model's non-linearity, the probit coefficient can not be interpreted as a marginal elasticity. The coefficient's sign means that the capital market liberalization decreases the probability of crises ($b_e = -1,60857$) and is significant for a confidence coefficient of 5%.

Figure 1: Treatment effect model joint estimation of growth and probit regressions

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Treatment-effects model -- two-step estimates
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Number of obs	=	156
wald chi2(9)	=	101.87
Prob > chi2	=	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
real_gd_pe~r					
ln_gdp0	-.0289648	.0097453	-2.97	0.003	-.0480652 -.0098644
gov_size	3.902129	.5471591	7.13	0.000	2.829717 4.974541
pop_gr	7.082338	2.432915	2.91	0.004	2.313913 11.85076
inflatia	-.1715378	.0207527	-8.27	0.000	-.2122124 -.1308633
fl_dummy	.2197727	.0555364	3.96	0.000	.1109234 .328622
crisis	-.3839381	.140292	-2.74	0.006	-.6589053 -.1089709
crisis	(dropped)				
crisis					
gov_size	27.05247	12.60116	2.15	0.032	2.354643 51.7503
pop_gr	127.7304	60.82956	2.10	0.036	8.506634 246.9541
dopeness_t~e	18.58563	6.867513	2.71	0.007	5.125549 32.0457
rer_hp_tr	-.140846	.0502386	-2.80	0.005	-.239312 -.0423801
dm2_rezerve	-.0001151	.0000388	-2.96	0.003	-.0001911 -.000039
fl_dummy	-1.60857	.7330964	-2.19	0.028	-3.045412 -.1717275
inflatia_1	1.216772	.5552594	2.19	0.028	.1284836 2.30506
hazard					
lambda	.1697527	.0784311	2.16	0.030	.0160305 .3234749
rho	0.82431				
sigma	.20593304				
lambda	.16975268	.0784311			

Figure 2: The coefficient's confidence probabilities

variable	active
real_gd_pe~r	
ln_gdp0	-.02896483**
gov_size	3.9021292***
pop_gr	7.0823379**
inflatia	-.17153785***
fl_dummy	.21977268***
crisis	-.38393808**
crisis	0
crisis	
gov_size	27.052472*
pop_gr	127.73039*
dopeness_t~e	18.585626**
rer_hp_tr	-.14084601**
dm2_rezerve	-.00011505**
fl_dummy	-1.60857*
inflatia_1	1.216772*
hazard	
lambda	.16975268*

Legend: * p<.05; ** p<.01; *** p<.001

The average total effect of financial liberalization on economic growth is:

Table 2: Total average effect of financial liberalization

DIRECT EFFECT	β_e	0.2197727
INDIRECT EFFECT	$\gamma_e E[\Phi(a_e Z_{i,t} + b_e) - \Phi(a_e Z_{i,t})]$	2.10817E-19
TOTAL EFFECT	$\beta_e + \gamma_e E[\Phi(a_e Z_{i,t} + b_e) - \Phi(a_e Z_{i,t})]$	0.2197727

Even if the incidence of a crisis has a negative influence on economic growth, the positive direct effect of capital market liberalization outcomes the indirect effect.

The standard control variables analysis is the following:

I considered the economic growth to be influenced by the initial level of real GDP per capita (in logarithm), the government size, the population growth rate and the inflation rate.

The initial real GDP per capita's elasticity is negative ($\alpha = -0,0289648$, $p < 1\%$), which means that, on average, the economic growth rate is smaller for the countries with a higher initial development level. This result was also obtained by Kormendi and Meguire (1985), Barro (1991; 1997) and Sachs and Warner (1995).

The coefficient of the ratio between government consumption and GDP is positive (3,902129, $p < 0,1\%$), which could mean a positive influence on economic growth. The result differs from the one obtained by Barro (1991; 1997), Sachs and Warner (1995) and coincides with the Caeselli's (1996) results. The difference could be explained by the post-communist economies' specifications.

Population growth has a positive influence on growth (7,082338, $p < 1\%$). The results are different in the empirical literature: Kormendi and Meguire (1985), Mankiw (1992), Kelley and Schmidt (1995) □i Bloom and Sachs (1998) have found a negative influence on growth, while Barro and Lee (1994) concluded that the influence is positive.

The inflation's influence is a negative one (-0,17143785, $p < 0,1\%$) and the result obtained is consistent with most of the findings in the empirical literature: Barro (1997), Bruno and Easterly (1998) Motley (1998).

Regarding the appearance of a financial crisis, it has a negative influence on growth (-0,38393808, $p < 1\%$).

In the non-linear probit model of the probability to occur a financial crisis, the government size and the population growth have a positive influence (27.05248 with $p < 5\%$, respective 127.7304 with $p < 5\%$). This may be interpreted as a cost of the positive influence that these two indicators have on economic growth.

An increase in the ratio between the monetary aggregate M2 and liquid international reserves reduces the probability of a financial crisis. (-0,000115 with $p < 1\%$). An increase in the above mentioned indicator means that the monetary aggregate M2 grows faster than the international reserves. The result differs from the economical hypothesis considered, where, before the appearance of a crisis, the monetary aggregate increases concomitantly with a reduction in the reserves position.

An increase in the inflation (1 lag) has a positive influence on the incidence of crisis (1,216772, $p < \%$).

An interesting result was that financial liberalization has a negative influence on the probability of crisis. Unlike the results obtained by Ranciere, Tornell and Westermann (2006) in their empirical analysis *Decomposing the effect of financial liberalization: Crisis vs. Growth* where they tested the effect of financial liberalization on a sixty countries sample within a 22 years period. A possible explanation could be related to the countries' transition economies in the period analyzed. Also, this result could be influenced by the fact that four of the existing crises took place before the official capital market liberalization.

Among the variables that could have influenced the crisis probability, I first chose the Real exchange rate overvaluation, calculated after IMF methodology as the percentage difference between real effective exchange rates and the Hodrick – Prescott detrended real effective exchange rates ($\lambda = 100$). Kazaks (2000) as well as Ranciere, Tornell and Westermann (2006) or Shatz and Tarr (2000) have observed overvaluation periods before a major currency crisis occurs, followed by rapid deterioration of the real exchange rate. This suggests that the anterior evolution had not been sustained by an increase in productivity or changes in the public's currency savings preferences. The authors have showed in their studies that the real appreciation before a crisis is followed by exports deterioration. Still, this empirical analysis's tests didn't find a significant

influence of the real effective exchange rate overvaluation. However, the real effective exchange rate HP detrended had a statistical significant negative influence on the probability of crises (-0,140846, $p < 1\%$). The result could suggest the fact that there have not been overvaluations before the incidence of a crises. More, an increase in the competitiveness compared with the 35 industrialized countries contributes to stability, by the negative effect on the crises probability.

This paper's results may have been biased by the residual distributions that were not normal. The two errors series are not independent (which is consistent with the hypothesis assumed), but they are not bivariate normal.

The results obtained in this dissertation thesis could open more research paths in the study of transition and former communist countries from Eastern Europe. Some of the conclusions differed from the assumptions made or other analysis in the economic literature.

6. Conclusions

The main results indicate that the average total effect of financial liberalization on growth was a positive one for Eastern Europe countries. In the analyzed period, capital market liberalization had a direct influence on real GDP per capita growth and an indirect effect, decreasing the probability of crises. The second result contradicts other empirical studies made about banking and currency crisis occurrence that have shown an increase in financial fragility due to capital market liberalization.

A possible explanation could be that a part of the existing crises took place before the official liberalization of the capital market. Most of the economies are post-communist and have been in transition in the period analyzed. Ten of the countries joined European Union at 1st May 2004; two of them became members at 1st January 2007 and one of them is an official candidate for membership.

Another explanation could be the relative small sample and time period considered in the analysis.

Some limits of the model are related to the non-linearity of the probit model and to the standard variables considered to have an influence in the two regressions. There

are many empirical researches that have evidenced an important number of economic growth determinants (they were summarized by Durlauf, Johnson and Temple (2004) and before, by Durlauf and Quah (1998)).

The current financial evolution, respective the crisis that occurred in most of the financial markets in the context of globalization and financial liberalization may open new research paths. Unlike crises which started in developing economies based on financial fragility that were studied so far, the actual crisis started in one of the most developed economies: the United States one. We can already discuss about an expanding banking crisis, whose shock is being transmitted all over the world through financial flows and capital markets contagions.

The research made in this paper concluded a total positive effect of financial liberalization on economic growth, in the same time, indicating a reduction of the crisis probability. So, new researches could be done regarding the imported crisis due to globalization and financial giants' consolidation, instead of financial fragility.

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8. Appendix:

The financial liberalization and financial crises dates

NO.	COUNTRY	FINANCIAL LIBERALIZATION YEAR	BANKING CRISIS YEAR	CURRENCY CRISIS YEAR	FINANCIAL CRISIS	EU MEMBER FROM
1	BULGARIA*	1998	1995, 1996	1995	1995, 1997	2007
2	CYPRUS	2004				2004
3	CZECH REPUBLIK	1994	1997	1997	1997	2004
4	ESTONIA	1996				2004
5	HUNGARY*	1996	1995		1995	2004
6	LATVIA*	1996	1995		1995	2004
7	LITHUANIA	1996	1995, 1996		1995, 1996	2004
8	MALTA*	2004	1997		1997	2004
9	POLAND	1995				2004
10	ROMANIA	1997	2000		2000	2007
11	SLOVAKIA	1996		1998	1998	2004
12	SLOVENIA	1994				2004
13	TURKEY	1989	2000		2000	-

* The banking or currency crises that took place before the official capital market liberalization