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THE ADJUSTMENT OF FINANCIAL RATIOS IN THE PRESENCE OF SOFT BUDGET CONSTRAINTS : EVIDENCE FROM BULGARIA

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The Adjustment of Financial Ratios in the presence of Soft Budget Constraints: evidence from Bulgaria

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Abstract

This paper is the first to study the behaviour of financial ratios in a Central European country. Using the entire population of company accounts in Bulgaria we find that for the financial ratios we considered, adjustment towards an industry target takes place but is significantly lower than that for Western companies reported in earlier studies. We find the adjustment of financial ratios in Bulgaria to be slowest in those firms, characterised by Soft budget constraints, which is a widespread phenomenon in Central Europe. We also find that the speed of adjustment is not significantly different between quoted and unquoted Bulgarian firms. This could be explained by the virtual inexistence of equity markets.

I.   Introduction

There is a small literature on the adjustment of financial ratios towards industry targets. Lev (1969) was the first to investigate whether companies in addition to 'income smoothing' also engaged in the smoothing of financial ratios. For that purpose he used a partial adjustment model to test adjustment to the industry mean for different financial ratios. Lev (1969)'s paper was based on a time series of 20 years for 245 US companies. Lev's study strongly confirmed the partial adjustment hypothesis for all the financial ratios involved. This suggests that despite of the cost of adjusting their ratio to the industry mean, firms engage in it because there is a cost of being out of equilibrium. The Lev (1969) paper was restricted to industries with a large number of firms in order to avoid that one individual company could affect the industry mean, therefore considering the mean to be exogenous to individual firms.

Chen and Ainina (1994) enriched this partial adjustment model by allowing for the possibility of dynamic adjustment. In the Lev study, the parameter of adjustment was assumed to stay constant over the period of investigation. Chen and Ainina (1994) split the parameter of adjustment into a constant part and a part that can change as the result of micro and macro economic variables, omitted in the Lev study. The underlying idea is that the speed of adjustment of ratios towards the industry mean may differ in economic upturns versus downturns since the cost of adjusting the ratio may be different in both cases. Also, within the same sector there may exist a number of firm specific features that can affect the speed of adjustment. In this spirit, Konings and Roodhooft (1997) explore whether parametric approaches are useful to investigate adjustment. They introduce a non-parametric approach to trace the evolution of financial ratios within the cross-section distribution of a financial ratio for a particular sector. An inference about the long run steady state distribution of financial ratios can then be inferred.

The purpose of this paper is to study the behaviour of financial ratios in an emerging market economy. The analysis of the behaviour of financial ratios in a transition country is particularly relevant given the historical and institutional background. Moreover, in recent years an increased interest of Western investors has led to substantial inflows of direct foreign investment in the region. The financial performance of firms in transition countries is therefore becoming increasingly important to assess amongst others the presence of default risk, credit rating, the cost

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of capital, security analysis and the attractiveness of particular industries for foreign investors. Transition countries are moving from a non-market economy where company targets were imposed by the government, to one where profits and profitability are now most firms' objective. In the post-communist countries of Central and Eastern Europe Western standard accounting methods were non-existent and the profitability of a firm was not crucial for its survival. Governments typically provided direct subsidies to loss making state firms. With the transition to a market economy direct subsidies to loss making companies disappeared and a mass privatization process was implemented. However, this did not mean that firms immediately faced hard budget constraints. Many privatized and state firms are still receiving "hidden" subsidies under various forms (Schaffer, 1998). These hidden subsidies are usually referred to as 'Soft Budget Constraints' (SBC). A more formal definition of SBC was first given by Kornai (1986) and refers to all cases where the government is knowingly bailing out loss-making firms. SBC can come in various forms. Either the government can fail to collect taxes or state banks can give cheap loans or can fail to collect interest payments. Other example of SBC is that state suppliers are often not collecting their invoices or that firms are not paying their utility bills (electricity, water,..). The presence of SBCs are considered to be one of the most important hurdles in the transition process (EBRD, 1999). Ten years after the beginning of the transition process, the presence of SBC is still very widespread in Central and Eastern Europe. In addition, the absence of clearly defined bankruptcy laws, delays in the mass privatization programmes, the absence of well developed equity markets and the absence of commercial banks are just a few of the flaws still present in a number of transition countries. This apparent lack of financial discipline in many emerging market economies had already led to various financial crises (Russia, Bulgaria, Czech Republic, etc..).

In this paper we study the behaviour of financial ratios in Bulgaria. Bulgaria is a typical transition country that is lagging behind in its market oriented reforms and that is characterised by most of the features discussed above.

II.   The Model

The model we will be using is based on the Lev (1969) and Chen and Ainina (1994) models. The simplest specification (Lev, 1969) of a partial adjustment model is as follows

$$y_{i,t} - y_{i,t-1} = \alpha + \beta(y^*_t - y_{i,t-1}) + \varepsilon_{it} \qquad (1)$$

y_t	=	the natural logarithm of a firm's financial ratio at time t
y_{t-1}	=	the natural logarithm of a firm's financial ratio at time t-1
y^*_t	=	the natural logarithm a firm's desired (target) financial ratio at time t

Since y^*_t is not observable, a proxy is used which assumes that the past industry mean is regarded as the target ratio, $y^*_t = x_{i,t-1}$. The coefficient β in (1) represents the speed of adjustment towards the industry mean. Or in other words the extent to which the financial ratio adjusts to the industry mean. A value of $0 < \beta < 1$ reflects adjustment. The closer β is to 1, the larger the speed at which adjustment takes place. In analogy with Chen and Ainina (1994) in order to allow the speed of adjustment to be affected by other variables, we split β into two parts :

$$\beta = \lambda + \gamma Z \qquad (2)$$

where Z is a vector of variables closely related to the particular situation of Central European firms.
The specification of (1) than becomes:

$$y_{i,t} - y_{i,t-1} = \alpha + \lambda(x_{t-1} - y_{i,t-1}) + \gamma Z + \varepsilon_{it} \qquad (3)$$

We now engage in a discussion of the variables included in vector Z.

Soft Budget Constraints (SBC)

According to Schaffer (1998), one of the important indicators of the presence of soft budget constraints is whenever a firm has growing debt levels, indicating additional financing, despite the fact that it is loss making (negative profitability). Growing debt levels at the firm level is measured by the extent of *net bank financing (NBF)*, defined as

$$NBF \quad = \quad \frac{Debt_t - Debt_{t-1}}{Total\,Assets} X100 \tag{4}$$

while profitability is given by the Return on Assets based on operating profit

$$ROA \quad = \quad \frac{Operating\,\Pr ofit_t}{Total\,Assets} X100 \tag{5}$$

Operating profit or EBITD (Earnings before interest, profit tax, depreciation and extraordinary/exceptional charges) is a measure of a firm's economic viability, in contrast to profits and losses that are an indication of a firm's overall economic and financial situation. According to Schaffer (1998), the presence of SBC can be suspected whenever a firm has growing debt levels (positive Net Bank financing) despite the fact that is economically unprofitable (negative ROA). This is the measure of SBC we will use in the regression analysis in section III.

Time element measured by a dummy (TIME)

The process towards market orientation in Bulgaria has been a slow one. We can essentially distinguish two different periods of reform: the period before and after 1997. Before 1997 little progress was achieved in the transition process. This led to a financial crisis in 1996 (EBRD, 1998). From 1997 onwards however, the effort for various reform programmes was increased. Therefore we may consider the period from 1997 onwards as a structurally different episode in the transition period compared to the period before 1997. It is not unlikely that the speed at which

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companies move towards industry means differs substantially between these two periods. Therefore we construct a dummy TIME taking a value of 1 in the period of recovery after 1997 and 0 in the early transition years.

Quoted versus unquoted firms (QUOTE)

Equity markets in Central Europe are very small but growing. Local stock markets are arising and plans for mergers with large Western stock markets exist. To our knowledge, the difference in terms of financial ratio adjustments between quoted and unquoted firms has not been tested in the literature on financial ratio analysis. The hypothesis is that the speed of adjustment is higher for quoted firms due to corporate governance issues.

III.   Ratios, Data and Estimation procedure

The ratios for which we will test adjustment are similar to the ones used in the Lev (1969) and the Chen and Ainina (1994) study :

1) Liquidity ratio = (Current Assets – Stocks) / Current Liabilities
2) Current ratio = Current Assets/Current Liabilities
3) Solvency Ratio = Shareholders Funds/ Total Assets
4) Sales / Total Assets
5) Sales /Inventory

The first two ratios measure liquidity of a firm, the third one measures solvency, while the fourth and fifth one capture turnover.

We have a reliable data set, consisting of the company accounts of all large[1] Bulgarian firms in both the manufacturing and non-manufacturing sectors[2] between 1993 and 1998. The data are collected by Creditreform Bulgaria OOD and

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[1] Our dataset only includes only large Bulgarian firms satisfying at least one of the following criteria: number of employees greater than 100, total assets and operating revenue exceeding 16 million and 8 million USD respectively.

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harmonised by Bureau Van Dijck[3] into a pan-European database. For each of the 1,434 Bulgarian firms in our dataset we have information on the 4-digit NACE sector it operates in. Table 1 gives an overview of the sectors involved and the number of firms per sector included in our dataset. In order to minimize the effect any individual firm may have on an industry target, we selected sectors with at least 20 firms.

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[2] The data do not include firms in the financial sector.

Table 1: Sample of Firms Composition

NACE Rev. 1	Description	Number of Firms	%	Cumulative %
0110	Extraction of crude petroleum and natural gas; service activities incidental to gas extraction excluding surveying	114	7.95%	7.95%
0111	Extraction of crude petroleum and natural gas	88	6.14%	14.09%
0123	Mining of uranium and thorium ores	27	1.88%	15.97%
0130	Mining of metal ores	24	1.67%	17.64%
0200	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	142	9.90%	27.55%
1510	Production, processing and preserving of meat and meat products	25	1.74%	29.29%
1530	Processing and preserving of fruit and vegetables	41	2.86%	32.15%
1581	Manufacture of bread; manufacture of fresh pastry goods and cakes	36	2.51%	34.66%
1598	Production of mineral waters and soft drinks	23	1.60%	36.26%
1600	Manufacture of tobacco products	28	1.95%	38.21%
1700	Manufacture of textiles	61	4.25%	42.47%
1800	Manufacture of wearing apparel; dressing and dyeing of fur	70	4.88%	47.35%
1820	Manufacture of other wearing apparel and accessories	20	1.39%	48.74%
1822	Manufacture of other outerwear	63	4.39%	53.14%
1930	Manufacture of footwear	31	2.16%	55.30%
2800	Manufacture of fabricated metal products, except machinery and equipment	32	2.23%	57.53%
3610	Manufacture of furniture	52	3.63%	61.16%
4500	Construction	210	14.64%	75.80%
4520	Building of complete constructions or parts thereof; civil engineering	26	1.81%	77.62%
4523	Construction of highways, roads, airfields and sport facilities	36	2.51%	80.13%
4524	Construction of water projects	24	1.67%	81.80%
5220	Retail sale of food, beverages and tobacco in specialised stores	37	2.58%	84.38%
5500	Hotels and restaurants	38	2.65%	87.03%
6021	Other scheduled passenger land transport	75	5.23%	92.26%
6024	Freight transport by road	67	4.67%	96.93%
7420	Architectural and engineering activities and related technical consultancy	21	1.46%	98.40%
9000	Sewage and refuse disposal, sanitation and similar activities	23	1.60%	100.00%
Total		**1434**	**100**	

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[3] Bureau Van Dijck is a company listed on the Brussels Stock Exchange. The Bulgarian data belong the a pan-European dataset of over 150,000 companies in 26 different European countries. An effort has been made by Bureau Van Dijck to achieve uniformity by standardisation of accounting information.

Table 2 shows how representative the data are for the entire population of firms in Bulgaria: The sample that we have covers 66% of total employment and 82% of total sales in Bulgaria, so we have a fairly representative sample of firms in Bulgaria.

Table 2: Comparison between Amadeus and National Statistics, 1998

	Bulgaria
Employment coverage	.66
Sales Coverage	.82

Note: Sales coverage ratio = total sales in Amadeus / total national sales. Employment coverage ratio = total employment in Amadeus / total national employment.

Table 3 shows the overall averages for the various ratios that we analyse for Bulgaria. We also show the relevant numbers for Belgium as a way of comparison. The Belgian data consist of the population of firms satisfying the same criteria outlined above. They were also retrieved from the same data source, the Amadeus data base compiled by Bureau Van Dijck. The data are comparable since the company accounts were reported using a uniform standard to make international comparisons possible.

Table 3: Averages for the entire sample of Bulgarian firms

Ratios	**Averages Bulgaria**	**Averages Belgium**
Liquidity	1.10(2.7)	1.82 (5.4)
Current	1.95 (3.0)	2.15 (5.4)
Solvency	54.4 (31.0)	31.45 % (27.65)
Sales/Assets	1.75 (13.4)	2.12 (4.5)
Sales/Inventory	39.7 (298.1)	115.17 (181)

Note: Standard Deviation in Brackets

We note that, on average, all ratios, except the solvency ratio, are lower in Bulgaria than in Belgium and this difference is statistically significant at the 5% critical level. The high solvency ratio for Bulgaria may be attributed to the fact that in

many firms the state is still one of the majority shareholders. In about 50% of the firms in our study, the state is an important shareholder.

When we apply Schaffer's (1998) definition of SBC on our Bulgarian firm level data (more details in section III) we find that 27% of all the large and medium sized firms in Bulgaria are subject to SBC. This can be found in table 4. Table 4 also suggests that the incidence of soft budget through loans to large and medium sized firms is much more prevalent in Bulgaria than in for example Belgium, a West-European country similar in size to Bulgaria.

Table 4: The presence of Soft Budget Constraints

	Bulgaria[a]	Belgium[b]
SBC	27%	9.5%

a) data from Creditreform Bulgaria OOD
b) data from National Bank of Belgium S.A.

IV.   Empirical Results

The basic specification that we seek to estimate is given in equation (4). Rewriting that equation taking into account the variables that are likely to affect the speed of adjustment we obtain:

$$
\begin{aligned}
y_{i,t} - y_{i,t-1} \;=\; &\alpha \;+\; \lambda(x_{t-1} - y_{i,t-1}) \;+\; \\
&\gamma_1(x_{t-1} - y_{i,t-1})SBC \;+\; \\
&\gamma_2(x_{t-1} - y_{i,t-1})TIME \;+\; \\
&\gamma_3(x_{t-1} - y_{i,t-1})QUOTE + \gamma_4 SBC + \gamma_5 TIME + \gamma_6 QUOTE + \varepsilon_{it}
\end{aligned}
\tag{5}
$$

where y stands for the natural logarithm of one of the five ratios and x stands for the natural logarithm of the industry mean of that ratio, i.e. the 4-digit sector mean of the ratio under study. We also included the variables *SBC, TIME* and *QUOTE* as separate control variables.

Tables 5 to 9 report the results of various specifications for each of the ratios. The first column shows the basic Lev (1969) specification assuming that the speed of

adjustment is not affected by any cross-section features nor general macro economic conditions.

Speed of Adjustment

A first observation from column (1) in tables 5-9 emerges. Since for all ratios the value of β lies between 0 and 1, Bulgarian firms are evidently adjusting their ratios towards the industry means. However, comparing the results for Bulgarian firms with those in Western firms (Lev, 1969), shows that the values β found here are systematically closer to 0. This suggests that the speed of adjustment in Bulgaria is on average much lower than the speed of adjustment found in market economies. This is consistent with the idea that financial discipline is not as important in an emerging economy compared to a mature market economy, which may be explained due to the presence of soft budget constraints.

Soft Budget Constraints

In the second column in tables 5-9 we measure the impact of SBC on the speed of adjustment and the level of the ratio. The results are striking. Firms that face soft budget constraints have a significantly lower speed of adjustment relative to those firms that have hard budget constraints. For instance, the speed of adjustment for the liquidity ratio, reported in table 3, is 0.44 for firms that do not face soft budget constraints. This is very similar to the average speed of adjustment found for Western firms (Lev, 1969). However, firms that have SBC have on average a much lower speed of adjustment of 0.29 (=0.44 - 0.15). This confirms the suspicion that when loss making firms are being bailed out by receiving loans, they have less incentives to adjust rapidly towards the norm in the sector. This also indicates that soft budget constraints, albeit through the banking system, are still quite important in Bulgaria, although there are no longer direct subsidies to firms.

It is also interesting to note that the coefficient with SBC itself is always negative and statistically significant, which indicates that on average firms with SBC have lower ratios than firms that do not have SBC. Once hard budget constraints are imposed, (i.e. loss making firms no longer receive any new loans) these firms may enter into serious financial difficulties, which may lead to bankruptcy. This may be triggered by the process of the commercialization of banking which has started taking place in Bulgaria.

Time Effects and Quoted versus Unquoted firms

In columns (3) and (4) we report results which allow for different time effects and for quoted versus non-quoted companies. We do not find robust evidence that these two last factors matter a lot. Several reasons may account for that. The fact that we have a relatively short panel (1993-98) could mean that dynamic effects may not be captured. But a more likely explanation for our failure to find a significant difference in adjustment behaviour of financial ratios between quoted and unquoted firms, is that stock markets are still very much underdeveloped and inefficient in transition countries. Even in the more advanced transition countries market efficiency of stock markets is not yet achieved. Rockinger and Urga (2000) analyse efficiency of stock markets in a number of transition countries and find that in the Czech and Polish markets there is evidence of convergence towards efficiency, however, in Russia, characterised by weak institutions, there is no evidence supporting efficiency, nor convergence towards efficiency. Our results seem suggestive of the fact that stock markets in Bulgaria just like in Russia and other less advanced transition countries are not very efficient.

Table 5: Results for the Liquidity ratio

	(1)	(2)	(3)	(4)
liquidity	0.37*	0.44*	0.38*	0.38*
	(0.016)	(0.027)	(0.032)	(0.036)
liquidity X SBC	-	-0.15*	-0.13*	-0.12*
		(0.052)	(0.053)	(0.053)
liquidity X TIME	-	-	0.08**	0.08**
			(0.047)	(0.048)
liquidity X QUOTED	-	-	-	0.03
				(0.048)
SBC	-	-0.10*	-0.13*	-0.13*
		(0.05)	(0.052)	(0.05)
TIME	-	-	-0.34*	-0.34*
			(0.04)	(0.04)
QUOTED	-	-	-	0.003
				(0.04)
R^2	0.178	0.20	0.23	0.24
Number of obs.	4223	2038	2038	2038

Note: (i) We use the ratio's name to refer to the ($x_{t-1} - y_{t-1}$) in equation (5); (ii) between brackets you find the standard deviations, * denotes statistically significant at the 5% level or lower; ** denotes statistically significant at the 10% level. TIME refers to a dummy equal to 1 if the years are referring to 1997 and 1998.

Table 6: Results for the Current ratio

	(1)	(2)	(3)	(4)
Current	0.39*	0.46*	0.37*	0.37*
	(0.018)	(0.033)	(0.037)	(0.041)
Current X SBC	-	-0.15*	-0.13*	-0.13*
		(0.058)	(0.058)	(0.058)
Current X TIME	-	-	0.20*	0.20*
			(0.057)	(0.057)
Current X QUOTED	-	-	-	-0.028
				(0.051)
SBC	-	-0.18*	-0.20*	-0.20*
		(0.043)	(0.044)	(0.044)
TIME	-	-	-0.13*	-0.13*
			(0.029)	(0.029)
QUOTED	-	-	-	0.06*
				(0.029)
R^2	0.225	0.295	0.302	0.30
Number of obs.	4236	2039	2039	2039

Note: as in table (3)

Table 7: Results for Solvency Ratio

	(1)	(2)	(3)	(4)
Solvency	0.32*	0.39*	0.40	0.44
	(0.041)	(0.069)	(0.149)	(0.15)
Solvency X SBC	-	-0.43*	-0.41*	-0.38*
		(0.112)	(0.105)	(0.098)
Solvency X TIME	-	-	-0.032	-0.03
			(0.144)	(0.13)
Solvency X QUOTED	-	-	-	-0.25*
				(0.111)
SBC	-	-0.17*	-0.16*	-0.17*
		(0.033)	(0.034)	(0.034)
TIME	-	-	0.30*	0.31*
			(0.027)	(0.028)
QUOTED	-	-	-	0.09*
				(0.03)
R^2	0.132	0.17	0.22	0.24
Number of obs.	3849	1745	1745	1745

Note: as in table (3)

Table 8: Results for Sales/Total Assets

	(1)	(2)	(3)	(4)
Sales/Assets	0.22*	0.27*	0.26*	0.24*
	(0.023)	(0.026)	(0.041)	(0.0448)
Sales/Assets X SBC	-	-0.08**	-0.09**	-0.09**
		(0.052)	(0.053)	(0.052)
Sales/Assets X TIME	-	-	0.05	0.05
			(0.049)	(0.05)
Sales/AssetsX QUOTED	-	-	-	0.041
				(0.057)
SBC	-	-0.15*	-0.16*	-0.16*
		(0.038)	(0.037)	(0.037)
TIME	-	-	-0.22*	-0.22*
			(0.028)	(0.028)
QUOTED	-	-	-	-0.05
				(0.035)
R^2	0.094	0.12	0.15	0.15
Number of obs.	4002	1937	1937	1937

Note: as in table (3)

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Table 9: Results for Sales/Inventory

	(1)	(2)	(3)	(4)
Sales/Inventory	0.30*	0.30*	0.33*	0.37*
	(0.021)	(0.033)	(0.046)	(0.052)
Sales/Inventory X SBC	-	-0.09	-0.09	-0.09
		(0.065)	(0.064)	(0.064)
Sales/Inventory X TIME	-	-	-0.03	-0.04
			(0.059)	(0.059)
Sales/Inventory X QUOTED	-	-	-	-0.11*
				(0.053)
SBC	-	-0.13*	-0.14*	-0.14*
		(0.062)	(0.06)	(0.062)
TIME	-	-	-0.17*	-0.16*
			(0.054)	(0.054)
QUOTED	-	-	-	0.03
				(0.047)
R^2	0.125	0.11	0.13	0.13
Number of obs.	4070	1992	1992	1992

Note: as in table 3

V.   Conclusion

This paper is the first to investigate whether financial ratios in firms of an emerging market economy adjust towards the industry mean. For this purpose we used the population of large Bulgarian firm level data. Our findings suggest that in the period 1993-98, the industry means of all the financial ratios considered were on average lower than those found for Western countries in earlier studies. This implies that Bulgarian firms on average tend to be less liquid and have a lower turnover than Western firms. The solvency of Bulgarian firms is on average higher than Western firms, which could be due to the high degree of firms with an important extent of state ownership.

In addition, we find that the speed at which firms converge towards the industry mean is lower, especially for firms that are subject to Soft Budget constraints. Soft budget constraint refers to bailouts by the government or by other institutions of firms that are loss making. This suggests that soft budget constraints do not induce firms to go towards financial discipline.

We fail to find significant differences between quoted and unquoted Bulgarian firms with the exception of solvency which turned out to be higher in quoted firms.

Our findings may be particularly useful in the light of the increased flow of foreign direct investment going to countries like Bulgaria and others. Also in view of the emerging stock markets in transition countries, ratio analysis is revealing.

References

B. Lev (1969),"Industry Averages as targets for Financial Ratios", *Journal of Accounting Research,* Autumn, pp. 290-299.

C. Chen and F. Ainina (1994),"Financial Ratio Adjustment Dynamics and Interest Rate Expectations", *Journal of Business, Finance and Accounting*, 21(8), December, pp. 1126.

Konings, J. and Roodhooft, F. (1997). "Financial Ratio Cross-Section Dynamics: A Non-Parametric Approach", *Journal of Business, Finance and Accounting*, Vol. 24 (9,10), pp. 1331-1343.

Rockinger, Michael and Urga, Giovanni (2000). "The Evolution of Stock Markets in Transition Economies", *Journal of Comparative Economics*, Vol. 28, pp. 456-472.

M. Schaffer (1998),"Do firms in Transition Economies have Soft Budget Constraints? A reconsideration of concepts and Evidence", *Journal of Comparative Economics,* 26,pp.80-103.

European Bank for Reconstruction and Development (EBRD), *Transition Report,* 1998,1999.