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WORKING PAPER

Financial regulation in Central Europe: The role of reserve requirements and capital rules

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Abstract

This contribution devotes attention to the effects of reserve requirements and capital adequacy rules on bank lending in Central Europe. First, it is pointed out that reserve requirements are crucial to understand bank credit in Central Europe. In combination with financial repression minimum reserve requirements constitute a tax on deposits, which contributes to higher interest margins. Second, I review the influence of capital adequacy rules on bank lending. Next to the advantage of less portfolio risk, capital rules may also have adverse effects in the form of smaller banking sectors, less lending and higher interest margins.

***JEL classification**:* P340; G180; G280

***Keywords**:* reserve requirements, capital rules, bank lending, Central Europe

1. Introduction

In this paper we devote attention to two aspects of financial regulation in Central Europe as regards their effect on bank lending, namely reserve requirements and capital adequacy rules.

Nothing is inherently wrong with the application reserve requirements, certainly not in less developed banking markets. One has to understand however that they come at a cost. In addition they have been often complemented with financial repression, a distinctively harmful combination. Together these policies imply a tax on deposits, which has affected and distorted bank lending. This article intends to show that interest margins are related to the inflation tax, imposed by inadequate reserve requirements.

Capital rules on the other hand are commonly considered to be a good and necessary feature of developed banking markets. The question however is whether this model can be copied without further consideration to the developing banking markets of Central Europe. I show that the alleged benefit of higher capital rules, namely less portfolio risk, comes, if correctly measured, at the cost of smaller banking sectors that lend less and may be inefficiently small. There may hence be a trade-off between efficiency and stability in emerging banking markets (see Gorton and Winton, 2000).

I proceed as follows. Section analyses the role of financial repression through required reservation. Section 3 revisits the evolution of bank credit in the light of section 2. This is not central to the paper, but needed because we will use these numbers to measure bank credit correctly in section 4, where I focus on the double-faced role of capital regulation. Section 5 summarises and concludes. The article is focussed on the period 1993-1999, when there was considerable diversity in the region in terms of reserve requirements and capital regulation.

2. Reserve requirements and financial repression

2.1. The inflation tax imposed by reserve requirements

Central banks throughout Europe have in varying degrees, but without exception, resorted to reserve requirements. This is no surprise. First, reserve requirements are a relatively widely applied monetary policy instrument. Many a central bank in the industrialised world, among which the ECB, apply reserve requirements as an instrument to

increase the effectiveness of monetary policy. Required reserves make banks more dependent on central bank liquidity, and hence changes in the price of central bank liquidity will have greater effect. Add to this that reserve requirements were one out of only a few effective monetary policy instruments at the hands of Central Europe's monetary authorities. Indeed, market-based instruments were initially hardly an option because of very thin or even non-existent markets. It was to be expected therefore that reserve requirements were widespread in Central Europe.

Note however that in most developed countries, either reserve requirements are fairly low, required reserves earn a positive real interest rate, or both. Paying interest on reserves has been shown to improve welfare even when financed by distorting taxes on capital (Freeman and Haslag, 1996). However, in Central Europe reserve requirements were high and required reserves paid interest rates below the market rate, in fact often zero.

In table 1, I gathered the reserve requirements in Central Europe in 1993-1999. They range from 5% in Slovenia in 1998 to 39.5% in Croatia in 1995. This is high when compared to the reserve requirements of developed market economies. The ECB for example demands a minimum requirement of only 2% exclusively on deposits and debt securities with maturity up to 2 years, excluding long term liabilities and interbank liabilities from the reserve base (ECB, 1998).

Insert table 1 around here

In addition the ECB remunerates these reserves. In Central Europe on the contrary the remuneration is negative in real terms. Bulgaria, the Czech Republic, Latvia, Lithuania, Poland the Slovak Republic and Slovenia did not remunerate required reserves at all in 1993-1999. Table 2 shows which countries did remunerate required reserves. Romania pays a remuneration that is wildly negative in real terms during the period under study, while the National Bank of Hungary pays an interest rate that closely follows inflation. Only Estonia pays a remuneration that is positive in real terms since July 1999, when it began to pay the ECB-rate on required reserves.

Insert table 2 around here

It is clear therefore that reserve requirements constituted a tax on deposits in Central Europe. Define deposits D that earn the deposit rate i_d, and that are subject to the reserve requirement r. The required reserves are remunerated by an interest rate i_r, while inflation runs at rate p.

This allows us to express the inflation tax imposed by reserve requirements as a proportion of total deposits:

$$t = \frac{rD(p - i_r)}{D} = r(p - i_r) \qquad (1)$$

This inflation tax t is added to the cost of deposits i_d, such that the marginal cost of deposits C_d is defined as:

$$C_d = t + i_d = i_d + r(p - i_r) \qquad (2)$$

It is obvious that if r>0 (reserve requirements) and $p > i_r$ (financial repression), then $C_d > i_d$,. Hence, reserve requirements and financial repression together increase the marginal cost of deposits with an inflation tax t. In table 3, panel a, we calculate tax t for the countries under scrutiny in 1996-1999.

Insert table 3 around here

In addition there is an opportunity cost, because the deposits tied at the central bank through reserve requirements cannot be invested somewhere else. A minimal estimate of this opportunity cost would be the real risk free rate I_{rf}. Since the real risk free rate I_{rf} is roughly defined as the nominal risk free rate i_{rf} minus inflation p, we have:

$$t' = \frac{rD(I_{rf} + p - i_r)}{D} = r(i_{rf} - i_r)$$
$$C_d = t' + i_d = i_d + r(i_{rf} - i_r) \qquad (3)$$

In table 3, panel b we report the relevant t' for 1996-1999.

Both panels of table 3 show that the inflation tax has been decreasing lately because inflation has fallen and because some countries, notably the Czech Republic, Latvia, Poland and Slovenia, substantially reduced reserve requirements[1]. In addition the Bank of Estonia decided to remunerate required reserves from July 1, 1999 onwards. As the Estonian kroon has a de facto peg with the Euro, it was decided that the reserves would earn the ECB rate (Bank of Estonia, 1999). Hence the negative t in 1999 for Estonia. In Romania and to some extent the Slovak Republic the tax of reserve requirements on deposits has remained relatively large, as seen from table 3.

[1] To prevent an undesirable liquidity growth in the banking sector following the lower reserve requirement, the National Bank of Poland (NBP) issued as a substitute interest bearing long-term bonds, which were subsequently purchased by banks (NBP, 1999).

The high inflation tax implied by the low remuneration of required reserves reveals the true nature of reserve requirements in Central Europe, namely an instrument of financial repression rather than monetary policy. There is nothing inherently wrong with that. Bai et al. (2001) show that, when effective income-tax rates are very uneven, raising some government revenue through mild financial repression can be more efficient than collecting income tax only.

2.2. The adverse effect on interest margins

One needs to keep in mind however that the income from financial repression comes at the cost of an implicit tax on bank deposits. Since banks could in most cases not easily react by decreasing deposit rates[2], this implicit tax was mainly borne by bank profits and by borrowers. The question then is whether financial repression through unremunerated reserve requirements might have contributed to high interest margins in Central Europe? There is some literature on the link between reserve requirements and interest margins. Ho and Saunders (1981) for example show a model where reserve requirements increase the interest margin. Brock and Suarez (2000) provide recent cross-country empirical evidence of this link for a panel of Latin American countries. In table 4 we show the interest margins according to data from the IMF's IFS- statistics. We calculate the lending rate (IFS 60l) minus the deposit rate (IFS 60p).

Insert table 4 around here

Note that among the most developed Central European countries (Hungary, Czech Republic, Poland, Slovak Republic, Slovenia), Hungary was the only country to remunerate required reserves at a rate that more or less compensates inflation (see table 2). Table 4 shows that this was mirrored in substantially lower interest margins throughout the period under study for Hungary. In effect Hungary is the only country to boast lower interest margins than the euro-zone since 1997. In Estonia, interest margins fell from 8.6 percentage points to 4.51 percentage points in 1999, the year when remuneration of required reserves was introduced.

[2] The presence of state-owned savings banks, that were in several instances exempted from reserve requirements and/or bore a government guarantee, ensured that banks could not decrease deposit rates easily. The state-owned savings banks set a benchmark that could not be undercut by commercial banks without losing depositors and deposits. Also, in some countries deposit rates were strictly regulated. Slovenia for example introduced a cartel agreement on maximum interest rates on deposits in June 1995. This cartel had been approved by the Bank of Slovenia and the anti-monopoly office and was only abolished on 1 March 1999 (European Commission, 1999).

To explore the nature of the relation between interest margins versus financial repression through required reservation, we plotted our estimate of t' against the interest margin according to IFS for all countries concerned and over the period 1996-1998.

Insert figure 1 about here

Figure 1 suggests a positive relation. This is further verified by calculating the correlation coefficient. In panel a, I show all data (33 data points over three years) and find a pooled correlation of 0.66. In panel b we excluded Bulgaria in 1997 and 1996, because of the hyperinflation experience in that period. The pooled correlation coefficient is then at 0.408. One cannot easily reject therefore the conjecture that reserve requirements have contributed to higher interest margins, and financial repression through required reservation they may help to explain why high interest margins persisted even after stabilisation, as seen from table 4.

2.3. Empirical validation

Ideally we would like to perform a panel-data analysis on individual bank data, but bank-specific interest margin data are not available and we have only a relatively limited sample, which strongly limits our empirical options. Therefore we performed a simple pooled OLS on the period 1996-1998, with the exclusion of Bulgaria because of hyperinflation. The dependent variable is the interest margin as measured by IFS (see table 4). For the selection of independent variables we are inspired by Ho and Saunders (1981) who decompose interest margins in a regulatory component, a market structure component and a risk premium component. The regulatory component examined in this contribution is the system of minimum reserve requirements. As independent variable we use our estimate of t' (see table 3). We employ two structural variables, namely the share of assets held by state-owned banks and the EBRD-index of bank sector reform. For the share of state banks we expect a negative coefficient, because state banks represent the continued presence of soft budget constraints in the financial system. The EBRD-index should carry a negative sign too, as more competitive and market-based banking markets should yield lower interest rates. As risk premium component, we use the share of bad loans in total loans. High bad loans will result in a higher risk premium in lending rates and hence in higher interest margins. With the exception of t', all independent variables are drawn from the EBRD 2000 Transition report. Year dummies are also included in all equations. The results are reported in table 5.

Insert table 5

In equation 1 we include all independent variables. All show the expected sign, but the risk variable (bad loans) is highly insignificant and is excluded in equation 2. The structural variables show the expected sign in both equations and are significant, with the exception of the variable for state banks in equation 1 that still comes close to significance. Most interestingly, the coefficient for t' is significantly positive in both equations. It is clear therefore, that one cannot reject the hypothesis that financial repression through required reservation has contributed to high interest margins throughout Central Europe. For one percentage point of tax on deposits, the interest margin will increase roughly by one third of a percentage point (given an coefficient of 0.353). This is an economically significant finding. Investment finance is typically drawn from retained earnings, bank credit and capital markets. However in Central Europe capital markets were very small and bank credit was, partially because of required reservation, relatively expensive. This has made investment more dependent on retained earnings and must have hampered investment and growth. Note that our variables explain only 27% of the variation in interest margins. Clearly, unobserved factors are also at play.

3. Bank credit revisited

Using the insight of the previous section that required reserves are a liability rather than an asset, we calculate a corrected estimate of total bank assets. We will use this method of measuring bank assets in section 4, where we assess the effect of too high capital rules on bank assets.

3.1. Tied assets

In the previous section we determined that required reserves in practice constitute a tax on deposits. In addition most of the banks in these banking systems held large unremunerated excess reserves in the period under study. Excess reserves at the central bank in developing market economies are often a symptom of payment system inefficiencies. The large and unpredictable payment float that results from an inefficient payments system implies that banks end up with unremunerated excess reserves (Baliño, Dhawan and Sunderarajan (1994). Schoors (2001) shows that the perceived excess reserves of Russian banks in 1992-1994 were to a large extent explained by payment system inefficiencies. Neither required nor excess reserves can therefore be regarded as genuine bank assets, as they are in many respects a

liability rather than an asset. I therefore refer to the sum of required and excess reserves in Central Europe's banking systems as 'tied assets'. Indeed, in the period under study the large majority of reserve money was tied at the central bank involuntarily and at penalty interest rates, because of reserve requirement rules or payment system inefficiencies. In the following sections we will look at bank credit in Central Europe, discounting the blurring presence of tied assets in the banking system.

3.2. The size of Central Europe's banking systems

Insert figure 2 around here.

Scholtens (2000) divides total bank assets by GDP and claims that there is 'no general tendency with respect to the development of the size of the banking sector in central Europe' (Scholtens, 2000, p.538). His view might be hindered by the presence of tied assets in total bank assets. I calculate bank credit as a percentage of GDP (which is by definition net of required reserves and excess reserves and changes therein) and show the results in figure 2. Figure 2 seems to suggest that there is indeed no convergence of the size of banking systems across Central Europe, as the countries concerned are pursuing different models and development paths. Table 6 reports the mean and the standard deviation of the size of Central Europe's banking systems. The standard deviation increases strongly from 0.1986 in 1993, over 0.2486 in 1996, to 0.2755 in 1999, while the average is relatively stable. The results in table 6 therefore indicate that, if anything, the size of Central Europe's banking systems is actually diverging instead of converging, which is a surprising result.

Insert table 6 around here.

3.3. Lending behaviour within Central Europe's banking systems

The next question is whether, given a certain size of the banking system, bank credit to the private sector increases or falls as a percentage of genuine banking assets? To answer this question I discount tied assets, as to rule out the possibility that a decrease of reserve requirements and/or higher efficiency in the payment system (and hence lower measured total banking assets) would be perceived as a proportional increase in lending to the private sector. As a matter of fact, lower tied assets would lead to the perception of all genuine bank assets having a higher measured share of total bank assets, without there being a genuine shift in lending behaviour.

As a measure for tied assets I use the reserves of banks with the central bank (IFS 20). Total assets are calculated as the sum of all bank liabilities, since they are better reported than assets. I then estimate 'free assets' as total assets minus tied assets. The estimated free assets will serve as the denominator to evaluate bank credit. I divide total credit to the economy (IFS 32d+32c) by free assets. Where the numbers are available, I separate credit to non-financial public enterprises from credit to the private sector[3]. Panel a of figure 3 shows credit to the private sector as a proportion of free assets, while panel b shows credit to non-financial enterprises as a proportion of free assets.

Insert figure 3 around here

Panel a of figure 3 shows how countries with an initial ratio of credit to the private sector/free assets above 50% experienced a fall in their bank credit to private sector/free assets ratio, while the opposite is true for countries with an initial ratio below 50%. Presumably the banking systems of these countries (the Czech Republic, Lithuania and Estonia) were carrying excessive amounts of private sector loans and chose to reduce their exposure to private sector lending[4]. In panel b of figure 3 we see that the share of credit to the public sector has fallen significantly over the years in all countries, with the exception of the Slovak Republic where figures have gone up in the last sub period (1996-1998).

Coming from a distorted lending equilibrium, dictated by the planned economy - but substantially different across Central Europe-, and having chosen very different initial transition paths, the countries concerned were by 1993 maintaining a wide variety of structurally different banking systems. Since 1993, banks seem to have been converging to what could be called a long-term common structure. To verify this hypothesis of convergence, we calculate in table 7 the averages and standard deviations across countries of the data shown in figure 3.

Insert table 7 around here.

The cross-country standard deviation of credit to the private sector (see column 5, table 7) falls from 0.215 in 1993 to 0.068 in 1999, as compared to an increased average. This strongly suggests convergence to a common structure. According to table 7 this common Central European bank structure will have more credit to the private sector, more precisely an

[3] IFS does not give the separation for Hungary and Slovenia.

[4] The Slovak Republic is again the exception. Bank credit to the private sector has actually risen from 1993-1999. This is due to the severe bad loan problems (more than 44% in 1998 as seen in table 7). Long overdue restructuring will most likely bring the figure for the Slovak Republic down to the region's average.

increase from 37% of free assets to 48% of free assets, and less credit to public enterprises, while total credit to the economy is relatively stable. The convergence to the new average is gradual over the whole period under study: 5 percentage points in 1993-1996, 6 percentage points in 1996-1999. In short, though the size of the banking sectors is not converging, the structure of the banking assets becomes more comparable across countries.

4. The double-edged sword of capital regulation

Capital regulation is the second segment of financial regulation addressed in this paper. Central European countries have been advised to increase bank capitalisation as a consequence of their EU-convergence efforts. Scholtens (2000) shows in table 6 of his article that all the countries concerned had capital adequacy rules of 8% (the BIS-norm) and in fact some had even higher rules. So the message seems to have come across, but was it the right one? Is it possible that too high capital rules harm a banking system rather than protect it? Throughout this section we are forced to use the method of graphical cross-country comparison, as more sophisticated panel data on regulatory capital are lacking for the region and the period under study. Still this should not keep us from comparing the available data.

The objective of capital rules is to contain risk-taking by banks and in this way protect creditors and the stability of the banking system against the dire consequences of excess risk taking by banks. If capital rules are effective, higher capital adequacy rules should be mirrored in lower credit risk some time in the future. In figure 4 we plotted the changes in loan quality in the period 1996-1998 against the capital rules in place in 1996. There is a clear indication of a negative relation. Counties with higher capital rules show bigger falls in bad loan density in subsequent years. This is a reassuring result.

Insert figure 4 around here

It is though a well-known result in the literature that capital rules might also have adverse consequences (see Berger, Herring and Szegö, 1995, for an overview). Specifically the introduction of binding capital rules might lead to a credit crunch (see Peek and Rosengren, 1995; Brinkmann and Horvitz, 1995; Berger and Udell, 1994; Thakor, 1996; Hancock and Wilcox, 1998). This negative side effect of capital regulations might have produced in Central Europe. In figure 5 we plotted bank lending as a percentage of free assets in 1998 against the capital rules in 1996. Higher capital rules in 1996 seem to be associated with lower preferences for lending within the banking system two years on, which is

consistent with the credit crunch hypothesis. Obviously one cannot speak of causality here, since mixed demand and supply effects may be present.

Insert figure 5 around here

An additional side-effect of too high capital rules may be higher interest margins. Schoors and Vandervennet (2002) show in a theoretical model that binding capital rules might induce banks to set higher optimal interest margins. Higher interest margins are also a typical symptom of a credit crunch. This conjecture is not rejected by the aggregate data either. In figure 6 we plotted the interest margins of 1998 (latest full data availability) against the capital adequacy rules for 1996. Figure 6 seems to suggest that high capital rules are associated with higher interest margins, an observation consistent with theoretical predictions.

Insert figure 6 around here

In addition, Gorton and Winton (1998) show that capital regulations may have the adverse effect to shrink already inefficiently small banking systems in transition countries, as bank owners choose to exit and re-deploy their capital somewhere else. Schoors and Vandervennet (2001) find that, under ineffective monitoring, banks are more likely to abandon lending if capital rules are higher, which is equivalent to the Gorton and Winton (1998) finding. This implies that specifically in the transition context of Central Europe, banking systems are predicted to become smaller with higher capital rules. Are these theoretical findings sustained by facts? In figure 7 we plotted the 1996 capital rules against the risky assets to which the capital rules apply, namely credit to the private sector. We use credit to the private sector as a percentage of GDP in 1998, to express the scale of the banking system. The figure suggests that higher capital rules in 1996 are associated with smaller banking systems in 1998, as measured by credit to the private sector/GDP. Again, aggregate data do not reject the theoretical predictions.

Insert figure 7 around here

In short, while capital regulation is in general probably a good thing to guarantee the stability and safety of Central Europe's banking markets (see also Berger, Herring and Szegö, 1995, for a general overview), one must bear in mind that there can be too much of a good thing. Aggregate data suggest that, as a side effect, too high capital adequacy rules are associated with lower lending as a percentage of bank assets, higher interest margins and smaller banking sectors in Central Europe. These side-effects are likely to hamper growth

rather than stimulate it and hence capital rules should be advised to and applied in Central Europe with due caution. While we took care to get the time sequence right (capital rules 1996, other data 1998), it is still true that causality is not clear-cut in figures 6, 7, 8 and 9. One would need to use bank panel data to relate changes in capital rules to changes in lending behaviour, changes in interest margins and changes in the size of the banking system, but this is far beyond the scope of this contribution since the needed data are not available. Still the observations of this paper should make us cautious about possible undesirable effects of too high capital rules. The sheer possibility of these side effects should be enough to invite further empirical research to the effects of capital rules in developing banking markets and to justify due caution from policymakers and advisors in the meanwhile.

5. Concluding remarks

Banking markets in Central Europe have suffered from financial repression though unremunerated reserve requirements, which has contributed to higher interest margins in the region. Discounting the effect of financial repression, Central Europe's bank balances seem to be converging to a long-term common structure, which exhibits more bank credit to the private sector. This bodes well for the future, as it will allow private business to grow faster and will contribute to higher growth. Capital rules are related to lower bad loan density, which suggests that capital rules perform their function well. One should however apply capital rules with due caution, as one cannot rule out that too high capital rules have had side-effects in the form of smaller banking sectors, higher interest margins, and a credit crunch, all of which might be undesirable. Further research on the precise effects of capital regulation in imperfect banking markets is therefore urgently needed. This will require better data than are currently available. In the meanwhile capital rules should not be copied blindly to developing market economies without due caution.

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Table 1. Reserve requirements as a % of eligible deposits in Central Europe

	Bul	*Cro*	*Cze R*	*Est*	*Hun*	*Lat*	*Lit*	*Pol*	*Rom*	*Slo R.*	*Slo*
1993	5.0			10		8	12			4.5	
1994	8.5			10	12	8	12			5.0	
1995	9.0		8.5	10	17	8	12	10.0		5.1	
1996	9.5	35.9	12.0	10	12	8	5	9.5		9.0	9
1997	9.5	32.0	10.0	10	12	8	8	11.8		9.0	9
1998	10.0	30.5	7.5	10	12	8	10	11.6	15.0	9.5	9
1999	11.0	30.0	5.0	13	12	8	10	5.0	25.0	9.5	5

Sources: Own calculations (in case of different requirements for different classes) based on various IMF Staff Country Reports, World Bank, Central Bank of Croatia, Central Bank of Estonia, Estonian Review, no.14 , Central bank of Hungary, Helmenstein (1999)

Table 2. Interest earned on reserve requirements

	Interest on reserve requirements (eop)				*Inflation*			
	Cro	*Est*	*Hun*	*Rom*	*Cro*	*Est*	*Hun*	*Rom*
1993		0	3	10	1446.7	89.9	22.6	254.4
1994	5.15	0	8	25	107.3	47.7	18.8	137.0
1995	5.5	0	15.5	9.1	4.0	28.7	28.4	32.3
1996	5.5	0	14	12	4.3	23.1	23.5	38.8
1997	4.5	0	14	15	4.1	10.6	18.3	154.8
1998	5.9	0	10	10.25	6.4	8.2	14.4	59.1
1999	5.9	ECB-rate	8.25	9.5	3.7	3.3	10.3	45.8

Source: Various national sources and central banks

Table 3. Estimates of the additional tax on deposits by reserve requirements in 1996-1999.

	Panel a, estimates of t										
	Bul	*Cro*	*Cze R.*	*Est*	*Hun*	*Lat*	*Lit*	*Pol*	*Rom*	*Slo R.*	*Slo*
1996	11.7%	-0.4%	1.1%	2.3%	1.1%	1.4%	1.2%	1.9%	4.0%	0.5%	0.9%
1997	102.8%	-0.1%	0.8%	1.1%	0.5%	0.7%	0.7%	1.9%	21.0%	0.6%	0.8%
1998	2.2%	0.2%	0.8%	0.8%	0.5%	0.4%	0.5%	1.4%	7.3%	0.6%	0.8%
1999	0.1%	-0.7%	0.1%	-0.1%	0.2%	0.2%	0.1%	0.4%	9.1%	1.0%	0.3%
	Panel b, estimates of t'										
1996	22.5%	4.6%	2.2%	3.3%	4.0%	2.59%	2.3%	3.8%	11.7%	1.6%	1.8%
1997	110.3%	3.0%	1.9%	2.4%	2.9%	2.04%	1.4%	4.4%	33.8%	2.0%	2.1%
1998	2.8%	3.3%	1.6%	2.1%	2.7%	1.14%	1.6%	3.6%	16.9%	2.4%	1.5%
1999	0.7%	2.2%	0.4%	1.3%	2.0%	1.18%	1.2%	1.0%	27.6%	2.7%	0.8%

Source: Own calculations. p is CPI from IFS, r and i_r are from table 1 and 2 respectively. I_{rf} is the treasury bill rate from IFS. For Croatia, Czech Republic, Estonia, Latvia and Slovak Republic i_{rf} is the average of the lending rate and the deposit rate (also from IFS), since no T-bill rates were available.

Table 4. Interest margins in Central Europe

	Bul	*Cro*	*Cze R*	*Est*	*Hun*	*Lat*	*Lit*	*Pol*	*Rom*	*Slo R*	*Slo*	*Euro*	*US*
1993	15.74	1064.3	7.04	27.30	9.7	51.58	3.55	1.3	9.1	6.39	15.57		2.83
1994	21.44	16.39	6.05	11.57	7.1	24.18	13.87	-0.6	13.2	5.24	10.77		2.51
1995	23.04	14.71	5.84	7.21	6.5	19.77	7.03	6.7	7.0	7.84	7.98		2.91
1996	48.80	16.93	5.75	7.62	5.1	14.07	7.61	6.1	9.6	4.62	7.52	4.77	2.88
1997	37.13	11.17	5.49	13.63	3.3	9.35	6.50	5.6	14.7	5.21	6.83	4.17	2.82
1998	10.30	11.13	4.73	8.60	3.1	8.96	6.23	6.3	9.1	4.92	5.55	3.54	2.88
1999	9.58	10.63	4.20	4.51	3.0	9.16	8.15	5.8		6.70	5.14	3.22	2.66

Source: IFS 2000, CB of Romania for Romania, calculated as lending rates minus deposit rates.

Table 5. Interest margins decomposed

Independent variable	*Equation 1*	*Equation 2*
Inflation tax t' (see table 3)	0.353*	0.378**
	(0.050)	(0.034)
Asset share of state banks	-0.046	-0.056*
	(0.147)	(0.059)
EBRD-bank reform index	-0.054***	-0.051***
	(0.007)	(0.009)
Share of bad loans in total loans	-0.033	
	(0.380)	
d97	-0.006	-0.007
	(0.643)	(0.593)
d98	-0.016	-0.017
	(0.253)	(0.222)
Constant	0.262***	0.250***
	(0.000)	(0.000)
Adjusted R^2	0.266	0.272
Number of observations	30	30

*, ** and *** denote 1%, 5% and 10% significance respectively.

P-values are between brackets.

Table 6. Divergence in the scale of banking systems

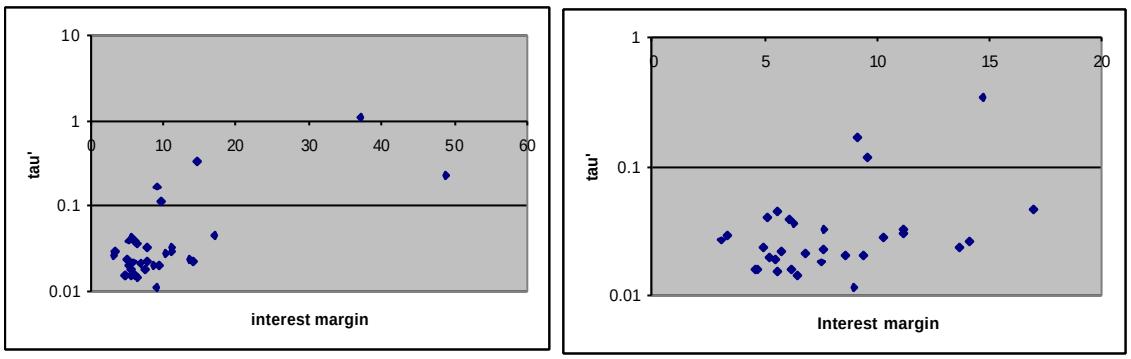
	Bank credit to the private sector / GDP	
	Standard deviation	Average
1993	0.1986	0.1467
1996	0.2486	0.1436
1998	0.2755	0.1621

Source: own calculations based on IFS

Table 7 Convergence of the structure of banking systems

	Average of bank credit as a percentage of free assets to			*Standard deviation of bank credit as a percentage of free assets to*		
	Economy	Private sector	Public enterprises	Economy	Private sector	Public enterprises
	(1)	(2)	(3)	(4)	(5)	(6)
1993	58%	37%	21%	0.202	0.215	0.227
1996	51%	42%	10%	0.155	0.141	0.106
1999	54%	48%	6%	0.102	0.068	0.076

Source: Own calculations based on IFS



Panel a

All countries, 1996-1998

Panel b

Bulgaria excluded in 1996 and 1997.

Figure 1. Financial repression and interest margins

Source: Own calculations based on table 3 and table 4

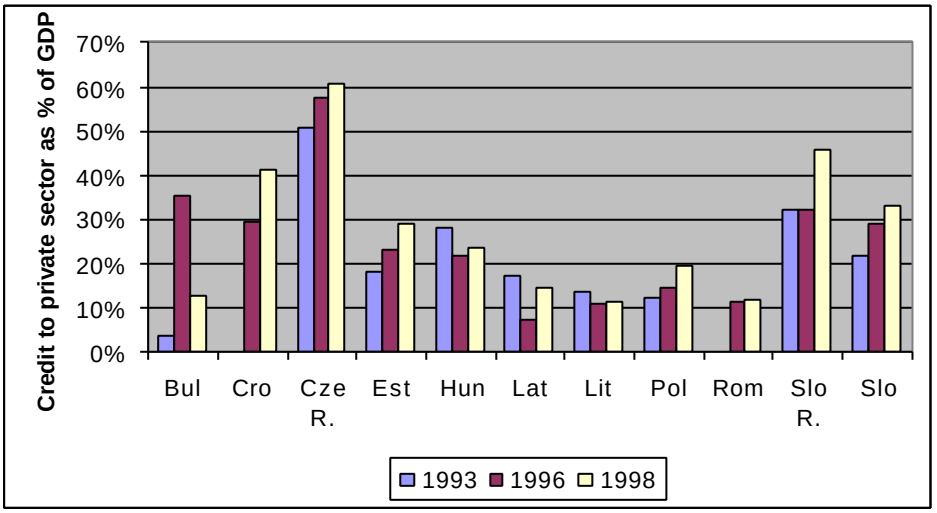
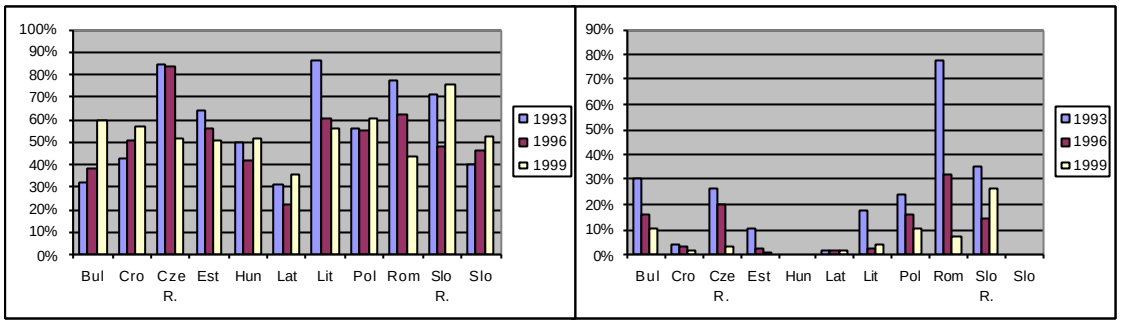


Figure 2. The size of Central Europe's banking systems

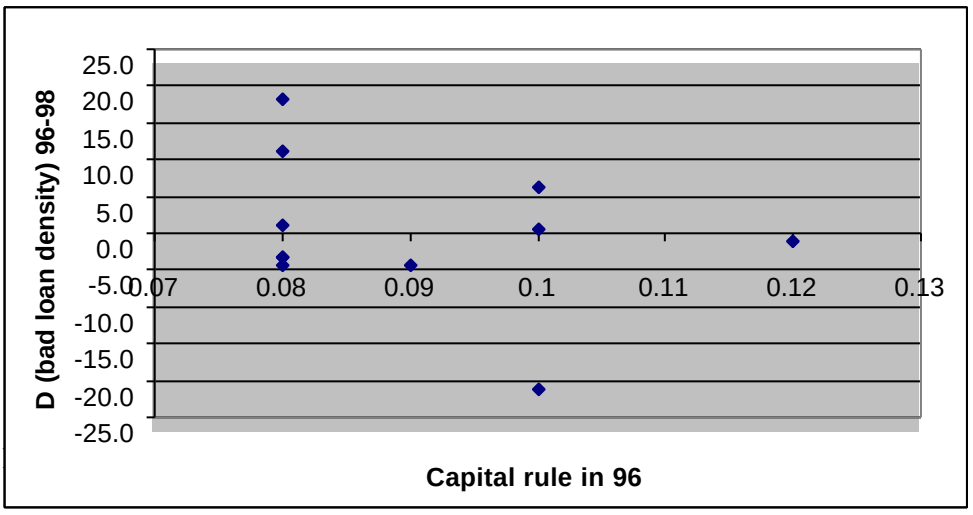
Source: Own calculations based on IFS



Panel a: bank credit private sector/free assets Panel b: bank credit public sector/free assets

Figure 3. Disentangling bank credit to the private sector and to the public sector

Source: Own calculations based on IFS



Source: Own calculations based on Scholtens (2000) and EBRD(2000)

Figure 4. Capital rules and loan quality

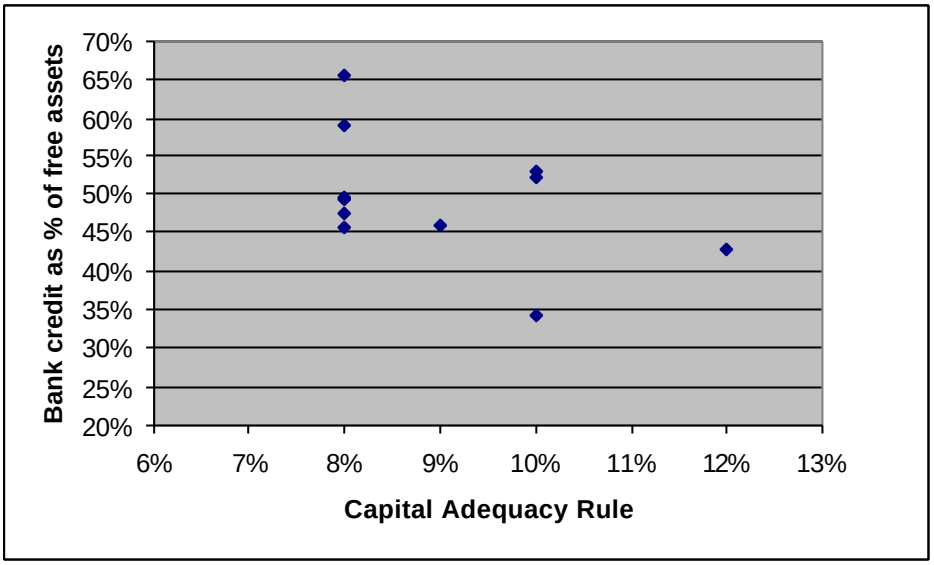


Figure 5. The effect of capital rules on bank lending

Source: Bank credit for 1998 from own calculations based on IFS, capital adequacy from Scholtens (2000)

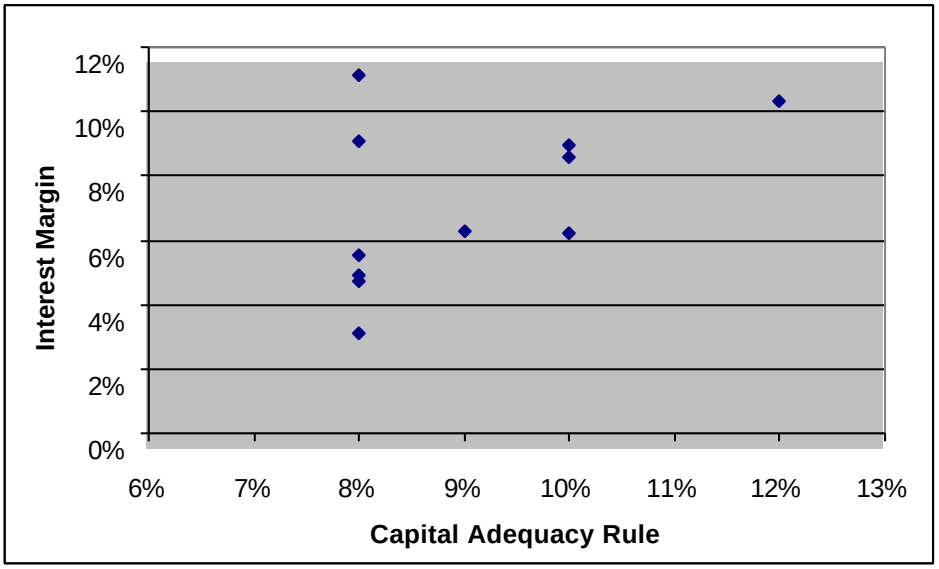


Figure 6. The effect of capital rules on interest margins in Eastern Europe

Source: Interest margins from table 3 (1998), capital adequacy from Scholtens (2000)

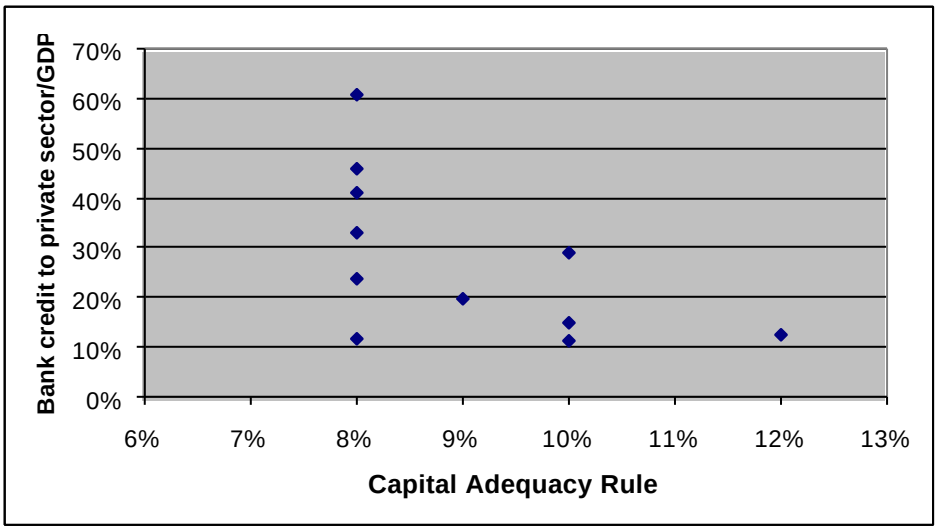


Figure 7. The effect of capital rules on the scale of the banking sector

Source: Capital rules from Scholtens (2000), scale of the banking system from own calculations based on IFS and the Central Bureau of Statistics of the Republic of Croatia for Croatian GDP.

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