Market power and stability of CEE banks

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Motivation

- **Competition – fragility** view –banks with market power have higher opportunity cost of defaulting – they protect their **franchise value** so they are more stable

- **Competition – stability** view –banks with market power have higher prices leading to increased risk in clients` balance sheet which shifts into banks` balance sheet – **risk shifting** paradigm

- So which one is it? Theory allows both, empirical studies confirm both

- CEE countries - Swiss franc loans as a memory of the period of increased competition (*Others are doing it…*)

Failing to reach an agreement…

- ❑ Researchers started asking philosophical questions:
- Is the relationship linear?
- Is it necessarily intuitive?
- Is it case dependent?
- Is it to complex to understand?

  …

- ❑ While in the same time not having any doubt in Z-score or Lerner index as indicators.
- ❑ Beck (2011): Raises the question of spurious relationship between some indicators and concludes that bank level research on this matter offers most inconsistent findings

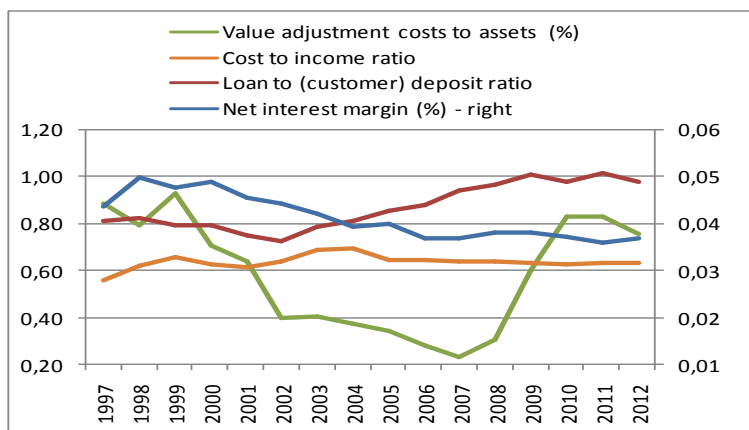# Stylized facts – standard banking data vs. empirical indicators

Standard banking data – does not offer all the answers

Figure 1: Z-score and its` components for medial CEE bank
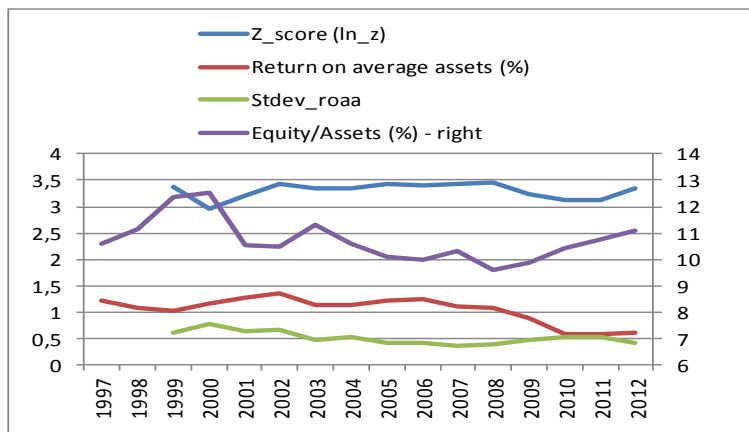
Source: Own calculation based on Bankscope data

Figure 2: Other standard banking indicators for medial CEE bank

Source: Own calculation based on Bankscope data

❑ Banking sector stability – high between 2001 and 2008:

   ❑ Solid and stable earnings.

   ❑ Decreasing capital / assets.

❑ Profitability driven by solid loan performance and increasing share of loans in assets.

❑ Decreasing net interest margin – often commented as a result of increasing competition.

❑ After 2008 – value adjustment cost increased rapidly

Lerner index

❑ Bank specific market power indicator derived from the microeconomic theory.

❑ Formula: $L = \dfrac{P - MC}{P}$

❑ Popular, intuitive, easy to calculate providing we know marginal cost.

❑ However, one has to keep in mind its specificity.

❑ What does it really show?

❑ It shows market power for a bank that uses market power to increase prices!!!

❑ It is closely related to profitability and could result in mechanical rather than economical relationship with Z-score, net-interest margin, implicit loan rates.

Competition efficiency frontier (CEF)

❑ Bolt and Humphrey (2010) to investigate competition in non-loan activities

❑ Kraft and Huljak (2011) to investigate competition on different segments of the same market

❑ Advantage – not calculated from the prices, allows the possibility of non-pricing strategy of a bank with market power

❑ However, it is a relative indicator and it shows the power compared with the weakest bank on the market

❑ Technically, it is an efficiency measure (efficiency of the competition to restrain the revenue) – Distribution free approach to dismantle error (in-efficiency and random term) – random term will average out in 5 or 6 years

$$\ln(Y_i) = \theta_0 + \sum_{i=1}^{5} \theta_i \ln X_i + 1/2 \sum_{i=1}^{5} \sum_{i=1}^{5} \theta_{ij} \ln X_i \ln x_j + \sum_{i=1}^{5} \sum_{k=1}^{2} \lambda_k \ln X_i \ln P_k + \sum_{k=1}^{2} \pi_k P_k + 1/2 \sum_{k=1}^{2} \sum_{m=1}^{2} \pi_{km} \ln P_k \ln P_m$$

$$\ln(rev/oc) = R(\ln X_i, \ln X_j, \ln P_k) + \ln e + \ln u$$

$$CE_i = \exp(\ln \bar{u}_i - \ln \bar{u}_{min}) - 1 = (\bar{u}_i / \bar{u}_{min}) - 1$$

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# Other data – x-efficiency and franchise value

❑ X-efficiency (Berger and Hannan, 1998) – to measure managerial cost efficiency

    ❑ Combines alocative and technical efficiency in unknown (X) ratio.

    ❑ Not driven by economies of scale.

❑ Calculated from translog function, DFA

❑ Franchise value – approximating market value by discounting net income with average cost of capital

$$FV_{ij} = \frac{MVA_{ij}}{BVA_{ij}}, MVAL_{ij} = \frac{OP_{ij}}{WACC_{ij}}, BVA_{ij} = EQ_{ij},$$

with FV - franchise value, MVA - market value, BVA - book value,
OP - operating profit, WACC - weighted average cost of capital,
EQ - balance sheet equity.

Additional data – the big picture

Figure 3: Empirical banking indicators for medial bank, 5 year moving averages
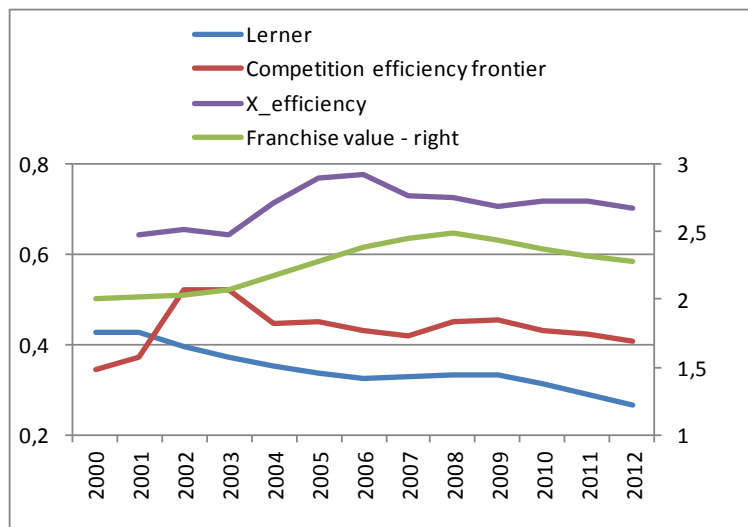
Source: Own calculation based on Bankscope data

- ❑ Bank competition in CEE increasing since 2002 (but from relatively low level)

- ❑ Franchise value started to decrease after 2008 (just like Z-score)

- ❑ After 2006 bank cost x-efficiency decreasing – it appears banks did not increase their efficiency after the crisis started.

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Testing the competition – stability and related hypothesis

Empirical strategy

❑ Bankscope (Fitch) data

❑ Starting with 3555 bank-year obs (15 countries, 16 years, unbalanced)

❑ On average we cover 80% of national banking sector assets

❑ After dealing with outliers and missing data we end up with 1421 obs (in Lerner spec.) and 579 (in CEF spec.)

❑ Strategy at this point: Panel OLS and country fixed effects

❑ Control: 2sls, bank fixed effects, lagged dependent var.

❑ Chow test – to confirm it makes sense to break up the sample

❑ Hausman test to confirm fixed effects

❑ Running the regressions on sub samples and using separately two indicators of market power

❑ Also, decomposing the Z-score:

$$Z = \frac{ROAA + E/A}{ST\_DEV\_ROAA} = POR\_STA + LEV\_STA$$

Quick test – franchise value
Variables: De Jonghe and Vennet (2007)

Table 1: Franchise value elasticity test

	Lerner index				CEF			
	OLS		Country f.e.		OLS		Country f.e.	
Dep_ Franchize value								
market power	0,550	***	0,524	***	0,912	***	0,841	***
x_efficiency	-0,257	**	-0,117		0,019		0,009	
nt interest mar	0,081	***	0,110	***	0,129	***	0,134	***
market share	1,188	***	1,103	***	1,322	***	1,061	***
interbank	0,000		0,000		0,000		0,000	
equity to asset	-0,060	***	-0,059	***	-0,069	***	-0,065	***
regulation	-1,836	***	-1,540	***	-2,487	***	-2,274	***
_cons	2,771	***	2,287	***	2,250	***	2,061	***
N	728		728		307		307	
r2	0,44		0,51		0,51		0,58	

*Note: *,** and *** - significant at 10%, 5% and 1%*

Source: Own calculation based on Bankscope data

Competition – fragility test
Variables: Beck and others (2011)

Table 2: Competition – fragility test with Z-score and its components

| | Lerner index | | | | Competition efficiency frontier | | | |
| | Pre-crisis period | | Crisis period | | Pre-crisis period | | Crisis period | |
	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.
	Pre-crisis period		Crisi period		Pre-crisis period		Crisi period	
Dep: Z-score								
market power	0.0664	0.0003	1.3452 ***	1.2758 ***	0.5300	-0.3664	0.3948	-0.0904
x_efficiency	0.5239	1.4428	-0.1427	0.3875 ***	1.2314 *	2.4917 ***	-0.7326 *	0.0992
liquidity	-0.0010	0.0000	-0.0004	0.0008	-0.0024	-0.0020	0.0003	0.0067
credit growth	-0.0016	-0.0002	0.0018	0.0022 **	0.0031	0.0011	0.0146 ***	0.0130 ***
loan to deposit	-0.0027	0.0142 **	0.0065 **	0.0049 ***	0.0639	0.1067	-0.0363	0.0104
market share	0.5174	1.3[obscured]	.4977	1.0262 ***	0.6606	2.4113 ***	0.6204	1.9749 *
growth	0.0079	.0142	[obscured] ***	-0.0141	-0.0133	0.1785 *	-0.0590 ***	-0.0173
_cons	3.0604 **	2.5610 ***	[obscured]	2.7080 ***	2.5994 ***	0.1427	3.9791 ***	3.2444 ***
N of obs	36[obscured]	362	[obscured]	877	144	144	416	416
R-sq.	0.0[obscured]	0.15	0.[obscured]	0.23	0.07	0.24	0.15	0.33
Dep: Portfolio stability								
market power	0.3358	0.1358	0.9[obscured]	0.9914 ***	1.0914 *	0.5764	0.8790 **	0.6329 **
x_efficiency	0.9226 **	1.7096	-0.9[obscured]	-0.2917 *	1.4520 *	2.8724 ***	-1.2379 **	-0.4574
liquidity	-0.0022	-0.0011	-0[obscured]	0.0005	-0.0075	-0.0060	0.0009	0.0042 **
credit growth	-0.0001	0.0008	0[obscured]	0.0036 **	0.0012	-0.0001	0.0130 ***	0.0134 ***
loan to deposit	-0.0706	-0.0441 *	[obscured] **	0.0035 **	0.2561	0.2635	-0.0427	-0.0085
market share	1.9167 ***	2.7897 ***	[obscured] ***	3.5118 ***	2.4634 ***	4.1865 ***	3.3898 ***	4.6903 ***
growth	0.0058	-0.0047	[obscured]172	0.0094 ***	-0.0218	-0.1926	-0.0070	0.0057
_cons	0.4933 *	-0.1604	.4421 ***	0.6547	-0.0774	-2.8986 **	1.3575 ***	0.7780
N of obs	334	334	699	699	133	133	333	333
R-sq.	0.14	0.25	0.09	0.20	0.22	0.33	0.14	0.26
Dep: Leverage stability								
market power	0.0047	-0.0673	1.0939 ***	1.0213 ***	0.4545	-0.4215	0.3622	-0.1446
x_efficiency	0.4123	1.3242 ***	-0.2584	0.2102	1.0956 *	2.3489 ***	-0.8031 *	-0.1091
liquidity	-0.0008	0.0001	-0.0001	0.0010	-0.0023	-0.0018	0.0004	0.0053
credit growth	-0.0015	-0.000[obscured]	0.0015	0.0018	0.0029	0.0012	0.0125 ***	0.0112 ***
loan to deposit	-0.0057	0.0[obscured]	0.0066 ***	0.0052 **	0.0628	0.0936	-0.0275	0.0150
market share	0.2930	1.1[obscured]	0.0172	0.6061	0.4383	2.1085 **	0.0886	1.4450
growth	0.0067	-0.01[obscured]	-0.0450 ***	-0.0046	-0.0144	0.1635 *	-0.0481 ***	-0.0097
_cons	3.0844 ***	2.6400 ***	3.4141 ***	2.7362 ***	2.6695 ***	0.2828	3.9480 ***	3.3011 ***
N of obs	362	362	878	878	144	144	416	416
R-sq.	0.02	0.15	0.11	0.22	0.05	0.23	0.13	0.31

*Note: *,** and *** - significant at 10%, 5% and 1%*

Source: Own calculation based on Bankscope data

Competition – cost of funding test

Table 3: Bank competition and cost of funding

	Lerner index				Competition efficiency frontier			
	Pre-crisis period		Crisis period		Pre-crisis period		Crisis period	
	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.
Dep: Net interest margin								
market power	2.2239 **	1.3012 *	1.5765 ***	1.5656 ***	0.0525	0.0363	-1.3778 **	0.1294
x_efficiency	0.3747	0.7871	-1.0261 *	-0.7513 *	-0.0879	2.3918 *	-0.0766	0.8159
market share	1.8962 *	2.4341 **	-1.5430	-1.1254	0.9736	2.2734	-0.6137	0.5344
loan to deposit	-0.8480 ***	-0.9761 ***	-0.0072 *	-0.0043	-0.5954	-0.0912	-0.3152	-0.6885 **
loan to assets	3.7004 ***	3.7358 ***	2.5523 ***	2.6791 ***	4.0839 *	0.0052	1.8314	3.9902 ***
equity to assets	0.2749 ***	0.2675 ***	0.1015 ***	0.0449 ***	0.2455 ***	0.2241 ***	0.1428 ***	0.0267
non-interest revenue	0.5058 *	0.5917 **	1.1715 ***	0.7602 ***	0.7173	0.3721	0.8572 ***	0.3340 *
credit growth	0.0062	0.0023	0.0060 *	-0.0020	0.0048	0.0076	0.0135 *	0.0042
growth	-0.0591 *	-0.0451	-0.0217	-0.0152	-0.0742	-0.2277	-0.0394 *	-0.0222
nplr	0.0253	0.0249	0.0312 ***	0.0124 *	0.0419 *	0.0255	0.0048	0.0043
coverage	0.0004	0.0012	0.0076 ***	0.0048 ***	0.0014	0.0011	0.0052 **	0.0063 ***
_cons	-1.0887	1.4629	-0.1953	2.7163 ***	-0.6792	1.3516	1.1452	2.0102 **
N of obs	17_	17_	695	695	82	82	363	363
R-sq.	0._	0.7_	0.34	0.69	0.62	0.75	0.29	0.67
Dep: Implicit loan rate								
market power	11.2760	10.7_2 ***	5.2260 ***	5.3028 ***	-4.2742 *	-5.2876 *	-4.1945 ***	-2.3798 **
x_efficiency	-1.0541	-4.5_39 *	-0.5076	-1.6072 *	-4.0620	-3.9235	-0.4982	-1.0851
market share	-1.2856	-6_093 ***	-9.1552 ***	-9.6176 ***	-5.2144 *	-10.6039 **	-7.0715 **	-4.6611 *
loan to deposit	2.4374 *_	_867 ***	-0.0045	0.0054	1.0832	1.8326	0.2248	-0.7428
loan to assets	-8.4088 ***	_0160 ***	-3.3835 ***	-3.2349 ***	-11.9288 *	-17.8896 **	-8.6398 ***	-5.0073 **
equity to assets	0.2408 ***	_2086 ***	0.0000	-0.0748 ***	0.1776	0.0802	0.1070 **	-0.0522
non-interest revenue	1.4280 **	_2978 *	1.8564 ***	1.1460 ***	-0.0539	0.3116	1.6193 ***	0.8291 **
credit growth	0.0074	_0043	0.0076	-0.0027	-0.0025	0.0092	0.0017	-0.0084
growth	-0.1572 **	_5815 ***	-0.0062	-0.0585 **	-0.0323	-0.6339	-0.0338	-0.1139 ***
nplr	0.0638	_577	0.0358 **	-0.0047	0.0021	-0.0550	-0.0238	-0.0342 *
coverage	0.0025	_042 *	0.0088 ***	0.0036 *	0.0017	0.0029	0.0059	0.0065 *
_cons	6.5804 **	2_99 ***	7.3460 ***	13.0275 ***	18.5976 **	28.3134 ***	13.3402 ***	17.3241 ***
N of obs	176	_	695	695	82	82	363	363
R-sq.	0.64	_	0.31	0.59	0.38	0.50	0.26	0.55
Dep: Implicit deposit rate								
market power	-0.73_	0.00_	0.9176	1.3436	-3.5313 ***	-3.3751 ***	-3.3162 ***	-1.7436 ***
x_efficiency	-0.2_	-2.54_	-0.0001	-2.8174 *	0.5786	1.3100	-0.2552	-0.1635
market share	-2_ *	-7.4_	-2.6878	-4.0140	-3.0304 **	-3.2111 *	-3.5056 **	-3.9155 **
loan to deposit	1_ *	9_	0.0554 ***	0.0610 ***	3.0114 ***	3.0548 ***	1.3697 ***	0.6270 *
loan to assets	-21.7247 ***	-22.1121 ***	-1.3029	-1.0911	-10.1376 ***	-10.9490 ***	-4.3794 ***	-1.7694
equity to assets	-0.0596	-0.0777	-0.0225	-0.0203	0.0608	0.0413	0.0425	0.0109
non-interest revenue	2.3746 ***	2.5438 ***	-0.2447	-0.5712	-0.0667	-0.1695	0.5611 **	-0.1257
credit growth	0.0122	0.0077	0.0112	0.0063	-0.0059	-0.0013	-0.0007	-0.0027
growth	-0.1175 *	-0.3644 *	-0.0309	-0.0378	-0.0050	-0.1258	-0.0276	-0.0302
nplr	0.0276	0.0298	0.0102	-0.0163	0.0785 **	0.0650 *	0.0046	-0.0068
coverage	-0.0010	0.0005	0.0002	-0.0036	0.0026	0.0032 *	-0.0013	-0.0016
_cons	6.9212 ***	16.8183 ***	5.0483 ***	7.7475 ***	7.0513 ***	9.0586 ***	5.9821 ***	6.0418 ***
N of obs	163	163	667	667	75	75	355	355
R-sq.	0.89	0.91	0.05	0.13	0.61	0.63	0.22	0.46

*Note: *,** and *** - significant at 10%, 5% and 1%*

Source: Own calculation based on Bankscope data

Quiet –life test (Hicks, 1935: *The best thing about monopoly is quiet life*)
Variables: Coccorese and Pellechina (2010)

Table 3: Testing out the quiet life hypothesis

	Lerner index				Competition efficiency frontier			
	Pre-crisis period		Crisis period		Pre-crisis period		Crisis period	
	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.	OLS	Country f.e.
Dep: Bank efficiency								
market power	0.0680	-0.0254	0.0629 *	0.0898 ***	-0.1522 ***	-0.1537 **	0.0524	-0.0461
market share	0.0601	-0.2678 **	-0.1359	-0.3587 ***	0.0967	0.1187	-0.3088	-0.1387
loan to deposit	0.0898 ***	0.0630 ***	0.0001	0.0005	-0.0011	0.0551 *	0.0273	-0.0051
regulation	-0.1359	-0.0097	-0.0002	-0.1792	0.0684	0.0778	-0.1190	-0.4571 **
Liquidity	-0.0016 ***	-0.0009 *	-0.0003	-0.0004 **	-0.0015 ***	-0.0016 *	-0.0013	-0.0012 **
credit growth	0.0000	-0.0004	0.0002	0.0002	0.0003	-0.0003	-0.0008	0.0001
equity to assets	0.0003	0.0029	0.0037 **	0.0042 ***	0.0033	0.0047 *	-0.0045	0.0040 *
_cons	0.6734 ***	0.8415 ***	0.6680 ***	0.7848 ***	0.7611 ***	0.7032 ***	0.7863 ***	0.7999 ***
N of obs	286	286	636	636	290	290	414	414
R-sq.	0.12	0.41	0.03	0.36	0.09	0.14	0.09	0.34

*Note: *,** and *** - significant at 10%, 5% and 1%*

Source: Own calculation based on Bankscope data

Conclusion

Market power and stability of CEE banks

- CEE banks risk-build-up happened in the period of increasing competition. Franchise value and Z-score decreased together after 2008.
- Banks with more market power have higher franchise value and higher stability. In good times, they do enjoy their Quiet life.
- Their stability is the result of portfolio stability (better credit risk management)
- No evidence of market power leading to higher prices – no evidence of risk shifting (no risk and no shifting)
- We find evidence of franchise value being disciplining mechanism leading to competition – fragility relationship
- Informational rents instead of economic rents?

Technically

- Perhaps researchers reached an agreement on the indicators to soon to attend the techniques in this area?

- Perhaps Lerner index of market power has to much of market power?

- Higher prices are not the only way to exercise your market power

- Future work – dynamic panel and allowing for the non-linearity of the relationship

Policy implications

- Franchise value seems to be a functional self-disciplining mechanism.

- More competition in banking does not mean higher social welfare.

- However, competition on CEE banking markets is increasing (especially with market shrinking) leading to franchise value decreasing.

- Should someone take the role of franchise value in CEE?

- The effect of joining Bank union?

Thank you