FINANCIAL LEVERAGE OF COMMERCIAL BANKS: THE CASE OF BALTIC COUNTRIES

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Abstract

The crisis events started in 2007 missed no country and revealed those risks and problems which had not been paid due attention before the crisis. One of such underestimated risks is the risk of commercial banks' financial leverage impact upon economic development. Financial leverage is the ratio of the bank's assets towards its capital. Increase in financial leverage allows the bank reaching higher returns on capital. High level of banks financial leverage, in turn, contributes to occurrence of crisis events. Thus, uncontrollable credit expansion on growing market leads to increasing profits while adverse cycle phases multiply losses and deepens economic recession. Why? What is the mechanism of banks financial leverage impact upon economy? How to restrict negative effect of this impact by managing the financial leverage? Author of this article tries answering these questions. The purpose of this study is to assess changes in financial leverage level in banks of Baltic countries, clarify mechanisms of banks financial leverage impact upon stability of the banks themselves and upon economy in general, as well as develop recommendations for financial leverage management in order to smoothen adverse economic changes.

Keywords: financial leverage, bank financial management, crisis, credit expansion.

1. THE ESSENCE OF FINANCIAL OVERLEVERAGE PROBLEM

Financial system was at the epicentre of crisis that hit the world economy in 2007. Financial markets were just those who have triggered a full-scale economic crisis accompanied by declining output, growing unemployment, reduced investments into equity of companies. This fact shows the importance of financial sector in economy. Therefore, analyzing the consequences of the crisis, it becomes evident the need for a serious reform of financial market, in particular the banking system. The desire to receive high return on equity within the pre-crisis period made a number of banks, including large, systemically important banks in Europe, Japan, United States, significantly increase their financial leverage, i.e. the ratio of bank assets to capital. It is known that banks are featured by a higher level of financial leverage compared to organisations in other industries of national economy, which is associated with specific activity of banks being the intermediaries on financial markets. Raising funds on financial markets, banks increase the debt burden; therefore the leverage ratio is sometimes called the debt load ratio. But what is the danger of high specific weight of assets in the bank capital? The problems with the effect of leverage of the bank upon its financial standing and upon economy in general have attracted researchers studying the causes for occurrence of financial crisis 2007-2008. Much attention in studies of financial crisis is paid to large US investment banks that were operating with high leverage within the period 2003-2007. Trends of financial leverage ratio in some large US banks are presented in Table 1.

Table 1

Financial leverage ratios of large US investment banks in 2003-2007

	Lehman B.	Bear Stearns	Merill L.	Goldman S.	Morgan S.
2003	22.7	27.40	15.60	17.70	32.20
2004	22.90	27.50	19.00	20.20	25.50
2005	23.40	26.10	18.10	24.20	29.80
2006	25.20	27.00	20.60	22.40	30.70
2007	29.70	32.50	30.90	25.20	

Sourse: Annual reports (2003.-2007)

At the same time, some US investment banks, including Lehman Brothers, are known to have been manipulating with the reporting to save their rating and have better image on the market. As a result of such manipulations the banks showed lower levels of leverage than they actually were. Actual leverage figures were above 40-45. D. Miles (David Miles, 2011) in his study proved that highly leveraged banks went under, threatening to drag down the entire financial system with them. The most important findings performed studies research are the following: Leverage has been one of the key factors responsible for the serious liquidity shortages that were revealed after 2007, when the crises erupted (Nikolaos Papanikolaou, Christian Wolff, 2010); leverage is procyclical for large banks in the United States and to a lesser extent in Europe. Leverege level in commercial bank is less than in investment bank. (Sebnem Kalemli-Ozcan, Bent Sorensen, Sevcan Yesiltas, 2011). The empirical results of Adrian and Shin (Adrian and Shin, 2008, 2009) and Greenlaw, Hatzius, Kashyap, and Shin (Greenlaw, Hatzius, Kashyap, and Shin, 2008) regarding the procyclical nature of leverage suggest that the largest banks manage their capital structures based on internal value at risk and not based on regulatory constraints. The Basel Committee for Banking Supervision points out that one of the underlying features of the crisis was the build up of excessive on - and off-balance sheet leverage in the banking system. In many cases, banks built up excessive leverage while still showing strong risk based capital ratios (BIS, 2010).

The performed studies involved the assessment of sensitivity degree of European and American economies towards financial leverage of banks.

The purpose of this study is to assess changes in financial leverage level in banks of Baltic countries, clarify mechanisms of banks financial leverage impact upon stability of the banks themselves and upon economy in general, as well as develop recommendations for financial leverage management in order to smoothen adverse economic changes.

The subject of the research is the activity of commercial banks in Baltic countries. The author has used the quantitative and qualitative methods of economic study, such as a comparative analysis, synthesis, method of groupings, method of graphic information display as well as regression analysis.

To study the impact of financial leverage upon the stability of an individual bank, it is necessary to determine the nature of financial leverage effect. The financial leverage effect is the gain in return on equity obtained by gearing of borrowed funds, provided the economic return on company assets exceeds the interest rate on borrowed capital. Positive leverage effect upon financial results of the bank shows up in cases where the value of bank assets is growing due to favourable market trends. In this case, banks with low specific weight of equity in assets enjoy a significant increase in return on capital. For purposes of clarity, we consider a hypothetical example. Suppose the bank has the target financial leverage 12.5. (100/8).

Asset	Liabilities
Securities ⇧101	Debt 92 Equity ⇧9
Case 1. The price of assets increase to 101. Hence, leverage falls from 12.5 to 11.2.	

Asset	Liabilities
Securities ⇧112.5	Debt ⇧ 103.5 Equity 9
Case 2. If the bank targets a leverage of 12.5, it raises debts of 11.50 and purchases securities on the asset side for EUR11.50	

Asset	Liabilities
Securities ⇩99	Debt ⇩92 Equity ⇩ 7
Case 3. A price shock in bonds triggers a fall of assets to 99. The equity position has to absorb the loss of EUR 1.	

Figure 1**.** Hypothetical example of influence of assets market price upon financial results of investment bank

Sourse: www.fitforbanking.com

It is commonly believed the problems associated with excessive financial leverage are more typical for investment banks of which funding strongly depends on the interbank market and which evaluate their assets on market-to-market principle. In this regard it should be noted that banking sector in Baltic countries is represented by commercial banks, not by investment ones. Does it therefrom follow that commercial banks are not suffering from high financial leverage? Now consider the specific weight of individual balance sheet items in assets of Baltic banks (see Table 2).

Table 2

Proportion of individual balance sheet items in assets of Baltic banks within 2000 - 2011

	Latvia	Estonia	Lithuania
Average specific weight of loan to non-banking sector in assets of banks	59.6	69.8	66.1
Maximum specific weight of loan to non-banking sector in assets of banks	73.8	79.2	87.6
Minimum specific weight of loan to non-banking sector in assets of banks	40.0	57.4	32.9
Average specific weight of deposits in assets of banks	54.2	46.9	55.8
Maximum specific weight of deposits in assets of banks	67.5	76.5	68.6
Minimum specific weight of deposits in assets of banks	40.8	23.5	40.5
Average specific weight of liabilities to MFI in assets of banks	26.1	20.1	28.1
Maximum specific weight of liabilities to MFI in assets of banks	42.4	34.8	35.6
Minimum specific weight of liabilities to MFI in assets of banks	10.0	9.2	10.6
Average ratio of banks' financial leverage	11.6	10.1	11.9
Maximum ratio of banks' financial leverage	27.8	23.3	17.7
Minimum ratio of banks' financial leverage	7.9	6.3	6.2

Sourse: annual reports (2000.-2011.)

Data of Table 2 show that the sources of financing of commercial banks are more stable compared to investment banks: average specific weight of deposits is about 50% of the banks' assets. During the period of credit expansion the specific weight of liabilities to MFI (Monetary Financial Institutions) was growing. This growth was driven by the increase in financing attracted from parent European companies, which is explained by desire of the latter to earn on increased demand for loans in the Baltic region. The volume of short-term interbank resource borrowing was not changed significantly. As to assets, it should be noted that on average more than half of all assets in Baltic banks is made by loans provided to non-bank institutions. In certain periods of time, such as during the period of credit expansion 2004-2007, the specific weight of loans in banks' assets was above 70%. Thus, maximum specific weight of loans in assets of Lithuanian banks within the analyzed period reached to 87.6% (!). Figure 2 illustrates the lending growth rates in banking systems of Baltic countries. Maximum rate of growth in lending was observed in Latvia in 2004 (+58.9%).

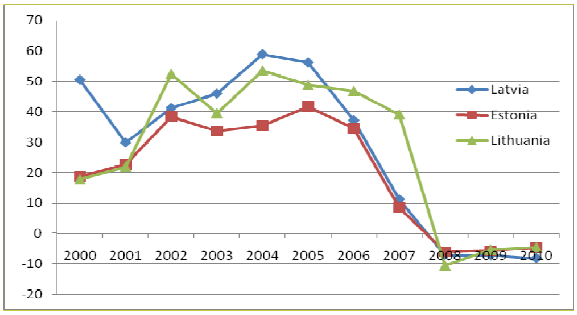

Figure 2. Lending growth rates in banking systems of Baltic countries within period 2000-2010
Sourse: FCMC, Bank of Lithuania, Bank of Estonia

Crisis developments in economy have greatly undermined the ability of customers to repay their obligations, and the banks were forced to create huge loan loss provisions. Thus, the capital of commercial banks was decreasing due to deterioration of the loan portfolio quality. In case the bank owners did not increase the equity capital, the financial leverage ratio was growing. The Author demonstrates it by hypothetical example similar to the example of an investment bank.

Asset	Liabilities
Loans ⇧100	Debt 92 Equity 8
Case 1.Initial version. Financial leverage ratio 12.5	

Asset	Liabilities
Loans ⇩97	Debt 92 Equity ⇩5
Case 2. Borrowers do not repay debts and the bank creates savings reducing the profit and, accordingly, the bank capital. Financial leverage becomes 19.4.	

Figure 3. Hypothetical example of influence of loan quality upon financial results, equity and financial leverage of commercial bank

This example shows that in times of economic recession (in case the bank owners did not increase the equity capital) the financial leverage ratio increases, which demonstrates a decline in reliability of the bank caused by falling specific weight of "bank's safety airbag" - its capital. How does the financial leverage ratio influence the results of bank's activity in periods of upsurge and aggressive lending activity? Naturally, the banks expand their operations and increase the assets in times of economic growth. At this time the leverage also can grow, provided the bank increases lending at the expense of borrowed resources without increasing the capital. Thus, the effect of leverage on the commercial bank is mainly realized through the credit activity of banks on the market.

In connection with this conclusion and excessive lending in Baltic countries within the period 2004-2007, the author believes it useful to assess the empirically feasible effect of financial leverage on the economy.

2. EMPIRICAL ASSESSMENT OF FINANCIAL LEVERAGE IMPACT ON ECONOMIC GROWTH RATES IN BALTIC COUNTRIES

Now we assess the impact of growth rates of the main ratio of financial leverage (bank assets/book equity) on growth rates of commercial banks assets in Baltic countries since the lending, being the part of asset is a powerful stimulator of economy. As subjects of the study, the author has chosen all commercial banks of the three Baltic countries, were operating within the period 2000 to 2011. The author did not include in the analysis the banks that have been operating within a shorter period and the foreign branches of commercial banks since the estimation of equity employed is not possible within the territory of a single country. In the result of analysis the author came to a conclusion that interrelation existed between the growth rates of leverage and asset in all Baltic countries, but the determination coefficient was not too high. (See Figures 4. - 6.).

To make the study more comprehensive, the author apart from main financial leverage ratio also estimates the inverted Tier 1 leverage ratio (aggregate assets/ Tier I capital), Short –term leverage ratio (short –term borrowing to equity capital), Long –term leverage ratio (long–term borrowing to equity capital). The author supposes that the financial leverage can be one of factors having impact upon GDP of a country. To verify this hypothesis, the author carries out the regression analysis of impact made by the factors upon GDP (*ln_gdp*), having added to above-mentioned factors of financial leverage also other factors chosen by means of economic analysis:

- The ratio of total assets to book equity capital (*lev_1*);
- The inverted Tier 1 leverage ratio (*lev_2*);
- Short –term leverage ratio (*short_lev*);

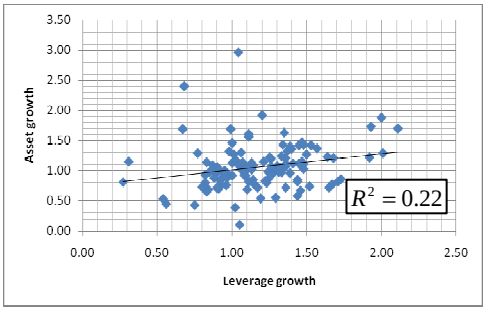

Figure 4. Iinterrelation between growth rates of aggregate assets and financial leverage in Latvian banking system within 2000 - 2011

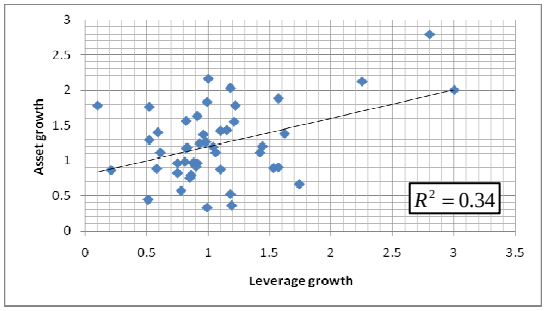

Figure 5. Interrelation between growth rates of aggregate assets and financial leverage in Estonian banking system within 2000 - 2011

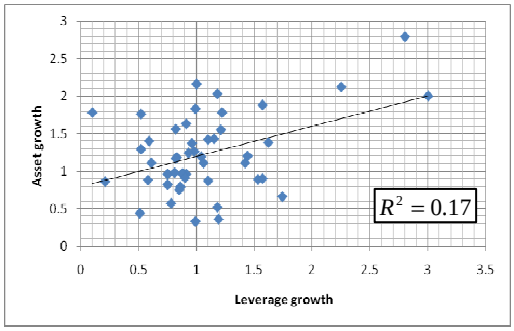

Figure 6. Interrelation between growth rates of aggregate assets and financial leverage in Lithuanian banking system within 2000 - 2011

- Long –term leverage ratio (*long_lev*);
- Ratio of credit provisions to gross credit portfolio (*cred_risk)*;
- Captal adequacy ratio (*cap_adeq*);
- The quarterly standard diviation of the day-to day 1-month RIGIBOR/TALIBOR/VILIBOR rates *(interest_risk*);
- Asset composition – the ratio of net loans to total assets (*assets_comp*);
- Liability composition - the ratio of demand deposits to total liabilities (*liabil_comp*);
- Natural logarithm of subordinate capital of commercial banks (*sub_cap*).

The analysis was carried out individually for each Baltic country and employed data of period 2000 to 2011 inclusive, with quarterly distribution. For the analysis the author uses bank statistics from website of Bank Supervisory Authority in Latvia – Financial and Capital Market Commission (FCMC), bank statistics from website of Bank Supervisory Authority in Estonia - Financial Supervision Authority (FSA) , bank statistics from website of Bank Supervisory Authority in Lithuania – Bank of Lithuania, statistics from website of Central Statistical Bureau in Latvia (CSB), and statistics from website of Bank of Estonia (Eesti Pank). SPSS statistic package and stepwise regression method were used for purposes of modelling.

The performed analysis allowed identifying the following factors having impact upon GDP in Latvia: Asset composition (*assets_comp*), Short – term leverage (*short_lev*), and The inverted Tier 1 leverage ratio (*lev_2*). Model summary and regression ratios are presented in Table 3 and 4.

Table 3

Results of regression analysis of factors influencing Latvian GDP

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.802	0.644	0.636	12.2306	83.166	0.000
2	0.891	0.795	0.785	9.3906	87.654	0.000
3	0.902	0.813	0.800	9.0570	63.847	0.000

Table 4

Regression ratios of factors influencing Latvian GDP

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
1. (Constant)	25.044	2.386		10.197	0.000
asset_comp	4.022	0.441	0.802	9.120	0.000
2. (Constant)	59.902	6.336		9.455	0.000
asset_comp	2.550	0.425	0.509	6.006	0.000
short_lev	-21.393	3.722	-0.487	-5.747	0.000
3. (Constant)	41.014	10.903		3.762	0.000
asset_comp	2.436	0.413	0.486	5.897	0.000
short_lev	-20.982	3.595	-0.477	-5.836	0.000
lev_2	1.180	0.564	0.139	2.092	0.042

Table 5

Results of regression analysis regarding factorial effect on GDP of Estonia

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.925	0.855	0.852	0.1386	265.43	0.000
2	0.959	0.919	0.915	0.1047	249.66	0.000
3	0.975	0.952	0.948	8.191E-02	281.76	0.000
4	0.087	0.973	0.971	6.143E-02	384.31	0.000
5	0.989	0.977	0.974	5.754E-02	351.90	0.000

Table 6

Regression ratios of factors influencing GDP in Estonia

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
1. (Constant)	9.534	0.109		87.680	0.000
liab_comp	-4.890	0.300	-0.925	-16.292	0.000
2. (Constant)	7.171	0.409		17.937	0.000
liab_comp	-2.860	0.412	-0.541	-6.937	0.000
assets_comp	2.356	0.400	0.460	5.896	0.000
3. (Constant)	6.538	0.341		19.177	0.000
liab_comp	-2.143	0.349	-0.405	-6.140	0.000
asset_comp	2.369	0.313	0.462	7.579	0.000
cap_adeq	-2.292E-02	0.004	-0.225	-5.379	0.000
4. (Constant)	5.878	0.279		21.042	0.000
liab_comp	-0.958	0.331	-0.181	-2.898	0.006
asset_comp	1.133	0.315	0.221	3.595	0.001
cap_adeq	-3.763E-02	0.004	-0.369	-9.266	0.000
lev_1	8.568E-02	0.015	0.410	5.869	0.000
5. (Constant)	5.809	0.263		22.096	0.000
liab_comp	-0.872	0.311	-0.165	-2.801	0.008
asset_comp	0.886	0.310	0.173	2.861	0.007
cap_adeq	-4.215E-02	0.004	-0.413	-10.095	0.000
lev_1	6.714E-02	0.015	0.322	4.363	0.000
lev_2	2.863E-02	0.011	0.149	2.624	0.012

All the obtained models are statistically significant with a probability above 95%. The best determination coefficient was demonstrated by the third model: the chosen factors describe 81.3% of GDP changes, witnessing a high operational significance of commercial banks and huge influence on economy.

Two of factors affecting GDP are the leverage ratios: The inverted Tier 1 leverage ratio (*lev_2*) and Short – term leverage ratio (*short_lev*).

The performed analysis allowed identifying the following factors having impact upon GDP in Estonia: the ratio of demand deposits to total liabilities (*liabil_comp*), the ratio of net loans to total assets (*assets_comp*), Captal adequacy ratio (*cap_adeq*), The ratio of total assets to book equity capital (*lev_1*) and The inverted Tier 1 leverage ratio (*lev_2*). Model summary and regression ratios are presented in Table 5 and 6.

All the obtained models are statistically significant with a probability above 95%. The best determination coefficient was demonstrated by the fifth model: the chosen factors describe 97.7% of GDP changes.

Factors affecting GDP in Lithuania are the ratio of net loans to total assets *(assets_comp)*, the Capital adequacy ratio *(cap_adeq)* and the inverted Tier 1 leverage ratio *(lev_2)*. Model summary and regression ratios are presented in Table 7 and 8.

Table 7

Results of regression analysis regarding factorial effect on GDP of Lithuania

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.862	0.744	0.738	0.1737	133.35	0.000
2	0.934	0.873	0.867	0.1236	154.61	0.000
3	0.950	0.903	0.896	0.1094	135.92	0.000

Table 8

Regression ratios of factors influencing GDP in Lithuania

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
1. (Constant)	7.700	0.081		94.780	0.000
asset_comp	1.351	0.117	0.862	11.548	0.000
2. (Constant)	8.648	0.152		57.078	0.000
asset_comp	1.181	0.087	0.754	13.581	0.000
cap_adeq	-6.143E-02	0.009	-0.376	-6.771	0.000
3. (Constant)	9.101	0.182		49.878	0.000
asset_comp	1.013	0.090	0.647	11.301	0.000
cap_adeq	-9.474E-02	0.012	-0.580	-7.804	0.000
lev_2	3.270E-02	0.009	0.265	3.660	0.001

The best determination coefficient was demonstrated by model 3. The chosen factors describe 90.3% of GDP changes.

Regression analysis demonstrated that GDP in the Baltic countries was affected by similar factors. The greater influence upon GDP in all Baltic countries was brought by the ratio of net loans to total assets (*assets_comp*). Positive regression coefficients of this factor mean that with the growth of credit activity in the market, the financing which fosters economy growth is increased. The second statistically significant factor which affected GDP in all Baltic countries was the inverted Tier 1 leverage ratio (*lev_2*). Positive regression coefficients mean that liabilities provided for financing of economy increased more intensively than Tier 1 capital. Consequently, financial leverage is important factor of bank's market activities. The third regression coefficient for the model which described factors influencing Latvian GDP is Short – term leverage ratio (*short_lev*), which is negative. This coefficient could be explained by the following information: Latvian commercial banks mostly financed their activity throughout the analyzed period and, in particular, in the credit expansion period with long-term liabilities (mostly, borrowings from parent financial companies, syndicated loans ect.) But if the specific weigh of long-term liabilities in bank passive increases, the part of short-term liabilities decreases. The common Estonian and Lithuanian GDP influencing factor is capital adequacy ratio. In both selected models, the capital adequacy factor had negative coefficients. This fact could be explained by more intensive Risk Weighted Assets (RWA) increase than bank own capital increase in the analyzed period. But the most significant part of the RWA is the economy stimulated lending.

In despite of the banks of Baltic countries showed no high financial leverage ratios within the analyzed period, an interrelation is found between economic growth and changes in financial leverage. Thus, the restriction of financial leverage of banks reduces the risk of negative impact of banks on national economy.

The Basel Committee on Banking Supervision has stressed the need of leverage monitoring and pointed out that leverage ratio can be a useful prudential tool. The Basel Committee on Banking Supervision therefore is introducing a leverage ratio requirement that is intended to achieve the following objectives:

- put a floor under the build-up of leverage in the banking sector, thus helping to mitigate the risk of the destabilizing deleveraging processes which can damage the financial system and the economy; and
- introduce additional safeguards against model risk and measurement error by supplementing the risk based measure with a simple, transparent, independent measure of risk that is based on gross exposures.

This ratio will help contain the build up of excessive leverage in the banking system, introduce additional safeguards against attempts to game the risk based requirements, and help address model risk. To ensure comparability, the details of the leverage ratio will be harmonized internationally, fully adjusting for any remaining differences in accounting. The ratio will be calibrated so that it serves as a credible supplementary measure to the riskbased requirements, taking into account the forthcoming changes to the Basel II framework (BIS, 2010).

In many world countries the bank supervisory authorities have already introduced requirements of financial leverage while its estimation approaches differ. Thus, in US the ratio is calculated on a consolidated basis, but it does not take into account off-balance-sheet exposures. Leverage ratio in USA expressed as a minimum ratio of Tier 1 capital to total average adjusted assets. The leverage ratio is set at 3 percent for banks rated "strong" (those that present no supervisory, operational, and managerial weaknesses and are therefore rated highly under the supervisory rating system) and at 4 percent for all other banks (D'Hulster K., 2009). In Canada, financial leverage ratios are also estimated on a consolidated basis the ratio of assets to Tier I and Tier II, but with the inclusion of off-balance sheet items. The Swiss leverage ratio is based on Tier 1 capital as a proportion of total adjusted assets and is set at a minimum of 3 percent at the consolidated level and 4 percent at the individual bank level (D'Hulster K., 2009).

Baltic countries currently have no requirements of financial leverage. The performed study demonstrated that a more significant impact on economy in all Baltic countries is made by indicator The inverted Tier 1 leverage ratio, and the author recommends the commercial banks to independently establish the in-bank restriction of this ratio within capital management during period while supervising bodies have not yet introduced the requirements of leverage.

3. CONCLUSIONS AND RECOMMENDATIONS

As a result of the given research the author has arrived to the following conclusions:

1. Positive leverage effect upon financial results of the investment bank shows up in cases where the value of bank assets is growing due to favourable market trends. In this case, banks with low specific weight of equity in assets enjoy a significant increase in return on capital.
2. The sources of financing of commercial banks are more stable compared to investment banks: average specific weight of deposits is about 50% of the banks' assets. During the period of credit expansion the specific weight of liabilities to MFI was growing. This growth was driven by the increase in financing attracted from parent European companies, which is explained by desire of the latter to earn on increased demand for loans in the Baltic region. More than half of all assets in Baltic banks are made by loans provided to non-bank institutions. In certain periods of time, such as during the period of credit expansion 2004-2007, the specific weight of loans in banks' assets was above 70%. Maximum rate of growth in lending in Baltic countries was observed in Latvia in 2004 (+58.9%).
3. Crisis developments in economy have greatly undermined the ability of customers to repay their obligations, and the banks were forced to create huge loan loss provisions. Thus, the capital of commercial banks - "bank's safety airbag" - was decreasing due to deterioration of the loan portfolio quality.
4. At the time of economic growth the leverage also can grow, provided the bank increases lending at the expense of borrowed resources without increasing the capital. Thus, the effect of leverage on the commercial bank is mainly realized through the credit activity of banks on the market.

5. In despite of the banks of Baltic countries showed no high financial leverage ratios within the analyzed period, regression models shown that financial bank leverage ratio was significant factors influencing GDP in all Baltic countries. More significant impact on economy in all Baltic countries is made by indicator The inverted Tier 1 leverage ratio.

The above-made conclusions lead to the following recommendations:

1. Supervisory institutions have to control bank‘s financial leverage ratios and banks have to limit their leverages, while bank financial leverage have direct close relationship with GDP.
2. The author recommends the commercial banks to independently establish the internal restriction of this ratio within capital management during period while supervising bodies have not yet introduced the requirements of leverage.

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