WARSAW SCHOOL OF ECONOMICS

Andrzej Walitza

The summary of doctoral dissertation

TITLE

The effects of increased capital requirements on the Polish banking sector

Discipline: Economics, Finance

Dissertation Supervisor:
Prof. SGH dr hab. Paweł Niedziółka

Warsaw, June 2015

Rationale topic

The turn of the first and second decades of the 21st century brought a deep change in banking sector law. On the one hand, tighter regulation of the banking market has become a natural consequence of the global financial crisis that erupted in autumn 2008, hence the tightening of capital requirements was widely expected by the banking sector since 2010. On the other hand, for many market participants, both the scale and pace of launching a stricter law seemed to be excessive and could have harmed unprepared entities, which would not be indifferent to credit supply in the economy.

The prudential requirements were launched by the *Basel Committee of Banking Supervision* (called Basel III) and enforced by the *European Commission* by implementing *CRD IV/CRR* directive followed by the *Banking Union* system. The fundamental goal set by market supervisors was to reduce the risk of financial crisis by strengthening the capital base in terms of its size and quality, strengthen the solvency ratio which ensures better absorption of losses, reduce the leverage of banking activities and improve the liquidity of the banks in the short and long term. These activities were designed to increase the safety of the operation of banks, systematically improve the level of trust between the participants, as well as to reduce the costs associated with the bankruptcy of a single institution.

Dozens of major European banks came under pressure to supplement regulatory capital. Even though the law implementation time schedule was set for the end of 2019, the market and supervisory expectations pointed that equity should have been delivered not within years, but rather months . Regulatory capital shortage in mid-2011 exceeded 500 billion euro and concerned over 50% of most important European banking groups. The equity could have been supplemented either by complementing high-quality capital or by reducing the *risk weighted assets* including deleverage in the loan portfolio. The first solution was strongly expected by supervisors, however excessive cost and low profits significantly discouraged bank owners and managers to focus on it. Therefore, it seemed to be more realistic that banks would rather reduce credit portfolios and the scale of operations. Common concerns about the negative effects on the real economy because of limited access to financing seemed to be justifiable. Widely quoted calculations expected a decrease in lending between two and four billion euro in the eurozone.

From this perspective, the situation of the Polish banking sector seemed to be unclear. On the one hand, simple balance sheets and very limited quantitative finance protected the Polish banking sector from being affected too deeply. Moreover, a stress test carried out by a local supervisor showed no concerns about meeting new capital requirements. Nevertheless, a very strong dependence of Polish commercial banks and their foreign owners seemed to be the biggest threat to the local financial stability in times of capital pressure. Shortly after the *Basel III* presentation capital outflows from Polish banking subsidiaries became alarming. At the turn of 2011 and 2012 foreign banks receivables held in Polish banks decreased from 47 billion down to 20 billion USD. Therefore credit growth in the entire Polish banking sector slowed down significantly.

Despite many forecasts elaborated by private and public institutions trying to assess potential negative effects which might come along with more restrictive regulations, no holistic studies have been carried out. Above all there is a notable lack of empirical data analysis which could assess the real cost of the changes. This kind of knowledge seems to be necessary for the proper construction of capital regulation in the future, both at the local and international level.

In addition, a detailed analysis of the sector, especially in terms of the efficiency of capital, might be interesting for many entities. Such knowledge can be used by owners to let them evaluate the profitability of investing in the Polish market. The efficiency is also crucial for the highest-level bank managers who set the financing structure in subordinate units. An in-depth analysis of the market reaction to the capital standards tightening is necessary for creating scenarios for future restrictions of capital access. Moreover, conclusions from an empirical study should be a groundwork for further changes in banking law.

Work structure

The first chapter presents the role of equity in banking business. The introduction aims to explain why the level and quality of bank capital is so important in financial market stability. There is also a brief research of cost of capital. This section looks into Polish and foreign literature considering the equity and it shows why the assumptions of the *Modigliani – Miller* theory considering the equal cost of equity and external funding are not relevant to the real economy. Moreover, there is a review of the most accurate studies carried out by other

authors, which prove a higher cost of equity and show what is an actual price of a rapid equity raising. This perspective permits to understand the long running conflict between banks and supervisors trying to settle the most appropriate capital level.

The second chapter describes capital standards in 20th and 21st century from a time perspective. This kind of approach is important for two reasons. Firstly, further regulations are complementary to the previous ones, hence the correct interpretation requires a reference to an earlier law. Secondly, a better understanding of the effects of the regulation requires a look at the actual responses of the banking sector from the perspective of the past years. There are two main conclusions drawn from this section. The first one points to the fact that the liberal and incomplete banking regulations, which were in force in the first decade of the 21st century, were strongly abused which caused the deepest financial crisis since the *Great Depression* in 1930s. On the other hand, the period of 2010 - 2013 brought the reform of the financial system on an unprecedented scale.

Chapter 3 presents a review of actual condition of the Polish and European banking sector in terms of changing capital standards. The description includes the market scenarios arising as a result of the adoption of *Basel III*, as well as the actual data and market trends observed during the study period. The banking sector is analyzed on the level of assets growth, profitability and quality of capital. Conclusions from this research show an important reduction of capital supply from the *Eurozone* countries provided to Polish banks. Taking into account a strong codependency between Polish and European financial systems, it is reasonable to look into the capital situation of both local and foreign banks. Hence, a detailed analysis of the research carried out by the *Polish Financial Supervision Authority*, *Basel Committee* and *European Banking Authority* and its *capital exercise* is presented in this part. Conclusions from the above mentioned research indicate that undercapitalized banks took far-reaching measures including deleveraging and changes in *risk weighted assets*. This is a basis to set *credit crunch* and *efficiency crunch* hypothesis which are verified in last two chapters.

Chapter 4 tries to answer the question of Polish banks' actual reactions regarding loan activity in the light of new banking regulations. This part opens with a presentation of literature followed by a selection of research methods. The next step is the calibration of he research tool. Hypothesis tests are preceded by macro economy analysis considering capital flows that occurred in the Polish financial sector. This research is conducted following the *positive interest rate differential theory*. It is shown that flows were not correlated with

a change in real rate of return. Moreover, the capital withdrawals of foreign banks from the Polish banking sector were significantly higher comparing to other financial assets.

From this perspective, the *credit crunch* hypothesis can not be rejected. Moreover, the actual condition of the Polish banking sector is dependent on the economic situation in other countries which are the most important foreign business partners. Taking into account the *capital flows theory,* it is highly probable that an economic slowdown in the *Eurozone* would contaminate the Polish banking sector. If for example such a recession among neighbor countries is due to the implementation of stricter capital standards, then the *credit crunch* and *efficiency crunch* hypothesis become more realistic. Yet the external factors are beyond the scope of this dissertation and are shown as an important problem for some further research.

On the level of the Polish banking sector, this paper provides an insight into the credit policy and its correlation with additional capital requirements. This research is conducted both on the level of credit spreads as well as on tightening and easing of credit supply. It is shown that changes in credit policy coincided with the key elements of rising capital standards. Moreover, an increase in bond issuing proves that corporate companies started to look for alternatives to banking funding sources.

Thus, at the level of macroeconomic data it can not be denied that the *Basel III* regulations had some negative effect on the Polish banking sector. This is the background for conducting statistical tests taking into account correlation between credit supply and equity ratio presented in the last two subsections.

The fifth chapter is devoted to the study of the efficiency of banking entities. Additional regulation could result in deterioration of a bank's profitability and negatively translate into their business by increasing costs. Therefore capital pressure might force banks to rescale their strategy of being present on the local market. Both of the above mentioned factors might have some negative impact on the market competitiveness and may perturb the credit supply.

At the beginning of this part the notion of efficiency is defined for the purpose of further analysis. A presentation of research tools and conclusions coming from earlier

studies follow. Finally the parameterization is demonstrated and results achieved form the research.

The last part describes mergers and acquisition transactions in the Polish banking market. The analysis of the six most important transactions initiated between 2010 and 2013 is briefly discussed from the perspective of capital strength of both the buying and selling party.

Research methods

The research focuses on the Polish banking sector between 2010 and 2013. This is the period which precedes the actual moment of the implementation of the tightened banking law, but, in fact, possible negative consequences are stronger than at any other time. The calculations are carried out on the basis of information from the balance sheets of the 21 largest commercial banks operating in Poland, with total assets accounted to over 75% of the assets of the entire banking sector. Data are taken from the *Bankscope* database - *Bureau van Dijk*, as well as from a magazine called *Bank* which shows an annual report: *50 largest banks in Poland.* The other data come form publications of: *European Banking Authority, World Bank, European Central Bank, National Bank of Poland, Polish Financial Supervision Authority, International Monetary Found*, etc.

The main doctoral thesis is defined as:

Tightening of capital standards has brought benefits to the banking market in Poland which exceeded the implantation cost.

The verification of the thesis is proceeded by two assumptions. First saying that the scope of effects is diverse and strongly depends on the actual capital condition of a bank. The second assumption indicates a desire of banks to maximize the market position measured in terms of assets. Hence, banks with an equity surplus take advantage and increase its market share. Taking into account those two assumptions, it is reasonable to argue that the stronger the regulatory impact, the more differential the banks' reaction. For this reason subsidiary hypotheses are defined as follows:

The change in funding structure increased safety of the banking sector in Poland

Undercapitalised banks showed slower credit growth comparing to other banks;

Undercapitalised banks changed the structure of capital assets by reducing risk weighted assets;

Despite the tightening of capital regulations, the efficiency of the Polish banking sector remained stable.

The first hypothesis analyzes banks reactions and potential market trends which could point positive effects of increasing safety The second and third hypotheses ask a question of whether banks operating on the Polish market have decided to reduce lending due to limited capital (so-called *credit crunch hypothesis*). Deleveraging might be a result of a weak capital situation on both local and parent company, so the research is carried out on both levels. The fourth hypotheses verify the efficiency of the market (so-called *efficiency crunch hypothesis*).

The actual slowdown in lending is verified following a statistical analysis measuring correlation between the rate of growth in credit and capital strength. The *risk weighted assets* change is considered as a potential displacement of lending and State Treasury bills, which are associated with lower capital requirements. This correlation is calculated following a simple linear regression. Alternative hypotheses are verified based on *Student's t-statistics* measuring the significance of the correlation defined as the *Pearson ratio.* Additionally, in order to reduce the risk of error due to the assumption of normal distribution of the sample, the *U Mann-Whitney test* based on rank correlation is effectuated.

The second group of research tools measures the efficiency of banks. This is elaborated as an ability to convert inputs into outcomes and minimize costs while maximizing the desired effects. Analysis of the effectiveness of the banking sector entities is based on two complementary methods. The first is to construct an aggregate indicator using *Return on Equity* (*ROE*), *Cost Income Ratio* (*CIR*), *Net Interest Margin* (*NIM*) and *Non Performing Loans* (*NPL*). The second method is calculating the technical efficiency following the *Data Envelopment Analysis*. This is a non-parametric method, which allows to determine the relative effectiveness of banks. Inputs used in this research are: equity, employment and deposits. Results taken for the calculation are loans and profits from the banking activity.

The last level of the analyzed effects measures the outflow of capital from Poland. For this purpose, it is verified whether the foreign banking groups, which control most of the commercial banking sector, reduced the funding to subsidiaries in Poland in order to protect the capital at the level of the parent company. Such cases should be reviewed in the light of both the structure of the claims of foreign banks in Polish entities as well as strategies to build or reduce positions in Poland. The last part of the study looks at the consolidation of the banking market. The six most important mergers and acquisitions presented form the perspective of capital power of buying and selling parties

Results and conclusions

The firs subsidiary hypothesis was supported by the banking bonds growth as well as new securitization transactions. The most interesting conclusions come from the funding structure analysis. The sharp decline of foreign financing became an impetus to a positive change leading to a deeper diversification of capital structure. Moreover, there was no important costs increase. Thus, it seems to be legitimate to claim, that tighter capital regulations brought some positive effects within first few years.

According to research results, it is proven that both *credit crunch* and *efficiency crunch hypothesis* are rejected. The second subsidiary hypothesis implying a limited pace of credit supply is not supported by actual rate of credit growth both in well and poorly capitalized entities. The correlation between credit supply and equity is not significant neither at the level of a Polish bank, nor its foreign owner company. Similar conclusions are drawn after examining the third subsidiary hypothesis conditioning changes in *risk weighted assets*. On the basis of statistical methods it has been proved that there was no important capital optimization between 2010 and 2013 in the Polish banking sector. The evidence provided by two independent statistical tests lends credibility to the rejection of both *credit crunch* hypotheses, both assuming that the selected variables were characterized by a normal distribution as well as a lack of it.

Results coming from the 4rd subsidiary hypothesis research show that a shortage in equity has had no impact on financial situations of the Polish banking sector. Throughout the study period, the mean effectiveness of undercapitalized banks was higher comparing

to the rest of the sector. Moreover banks under capital pressure became even more efficient than the whole sector thereby it is proved that banking law strengthening has had no significant impact on rising costs. Considering the last subsidiary hypothesis, M&A transactions indicate that stricter capital standards are unlikely to have a key role in deciding whether to reduce or improve the activity in the Polish banking sector. In all six cases the capital strength was insignificant in the strategic decisions of the consolidation of the banking market in Poland.

On this basis both subsidiary hypotheses which are supportive to the main doctoral thesis are approved. On the other hand, both credit crunch hypotheses are rejected. These conclusions are supported in the light of the data in Chapter 3 in terms of the positive supply of credit in the Polish market. Firstly, it has been shown that the banking sector in Poland grew rapidly throughout the study, although at this point it should be noted that credit growth was dictated by many factors, both international and domestic. The central banks policy resulting in an enormous increase of the money supply, interest rates reductions and economic support programs, definitely have had an significant impact on the lending scale. However, it seems reasonable to say that if the regulation of the banking sector capital had a negative impact on the supply of credit, undercapitalized banks would suffer more than the rest of the sector. As none such relation has been found, it seems to be allowed to state that regardless the external factors in the Polish economy *Basel III* did not result either in a reduction of lending or in a decrease in efficiency. Moreover, some positive effects have occurred shortly after regulations tightening. Thus, the main doctoral thesis has been approved.

The second interesting conclusion comes from the third chapter, where a high level of competitiveness of the Polish banking sector is presented. Throughout the period there is a lack of improvement in profitability despite significant cost reduction. The return on equity, return on assets and interest margin decreased significantly. Moreover, the cost income ratio deteriorated regardless of the cost optimization. This state of affairs seems to be contradictory to the conclusions of efficiency research. However, such a situation may have occurred due to external factors limiting the profitability of banks. Among the most important are lower interest rates and macroeconomic stagnation which decreased the income earned by the banks. It seems that the banks have decided to absorb most of the costs of increased capital standards. This is indicated by the falling cost of credit. Bank margins have been reduced in scale from 28 to 68 bp depending on the type of financing.

The third conclusion concerns the relationships between the Polish banking and foreign owners. It has been shown that entities operating in Poland have proven to be strong enough to meet the stricter capital regulations and to overcome the outflow of funds. There are few reasons why local banks showed themselves resistant to capital pressure. First of all it was a stable economy during the whole period. Moreover, the banking sector itself seemed to be well prepared for capital pressure and banks were able to replace mother company support by local funding. Finally profitability in local banks outperformed results achieved by entities in Central and Western Europe. Higher rate of return in the Polish banking business supported by an increasing investment security could have been a key factor in determining the steady growth of the sector throughout the study.

Plan

Preface

Chapter 1 Sources of financing the banking business

1.1. The essence of bank equity

1.2. Displacement of equity by external funding

1.3. The level of equity and the amplitude of the economic cycle

1.4. Releasing regulatory capital instruments

1.5. Alternative forms of capital

Chapter 2 Legislation establishing capital requirements of the banking sector

2.1. Historical overview of capital regulation

2.2. Market flexibility in *Basel II*

2.3. The reform of the capital requirements under *Basel III*

2.4. Selected capital regulations adopted by the European Union

2.5. Capital regulations in the Polish law

Chapter 3 The European and the Polish banking sector in the light of the regulation of capital

3.1. The condition of the banking sector in Poland

3.2. The capital structure of banks in Poland

3.3. The dependence of the condition of the Polish banking sector from the European sector

3.4. The condition of the European banking sector

3.5. The capital structure of the European banking sector

Chapter 4 The effects of capital regulations on the Polish economy
4.1. Parameterization of analysis tools to change the structure of bank balance sheets
4.2. A review of selected researches predicting capital tightening costs
4.3. Capital flows in the Polish economy
4.4. Cost of Credit and the limitations of its financing supply
4.5. Polish banks' balance sheet structure in the light of more stringent capital standards

Chapter 5 The efficiency of banks operating in Poland in the light the regulation of capital
5.1. The choice of research methods of measuring the effectiveness of banks
5.2. A review of the effectiveness of credit institutions
5.3. Parameterization of performance measurement tools
5.4. The efficiency of banks in Poland during the study period
5.5. Acquisition of Polish banking assets in the light of the stricter capital standards
Summary
Bibliography