ROMANIAN ACADEMY
SCOSAAR

HABILITATION THESIS

Studies in Economic Convergence and Bank Efficiency

Fundamental field: Social science
Habilitation field: Economics

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Thesis presented to obtain habilitation certificate in order to coordinate doctoral activities in Economics.

BUCHAREST
2017

Summary

The habilitation thesis resumes part of my research activities following the successful PhD Thesis defence at University of Craiova in 2011. The thesis is structured as follows. First section highlights some of my major contribution grouped in two parts: (i) contribution in economic convergence; (ii) contribution in bank efficiency and risk. Second section reviews my career development plan. Third section lists the references.

The first part, contribution to economic convergence, emphasizes my main papers on the development of the convergence process, with a special focus on Central and Eastern European (CEE) countries. This part lists three studies: "Productivity clustering and growth in Central and Eastern Europe"; "Testing financial markets convergence in Central and Eastern Europe: a non-linear single factor model"; "Co-movements and Contagion in European Union Stock Markets: Patterns and Determinants". The topics of these studies cover the following two areas of research: (i) economic integration and convergence, with a more pronounced focus on regional disparities, productivity convergence, and sectorial convergence patters; (ii) financial integration and convergence, with a more pronounced focus on stock markets co-movements and determinants, stock markets contagion, sovereign risk disparities, and banks interest rates. The emerging countries in CEE and Romania, in particular, have an important role in our studies. Hereinafter, we briefly detail the research questions, contributions, and results of the studies.

The first study uses a non-linear time varying model to test productivity convergence in 10 emerging countries within Central and Eastern Europe. The research questions of the study can be summarized as follows. Is there a common labor productivity pattern in CEE countries? How did the labor productivity evolved over the last decades in CEE countries and in Romania? In terms of labor productivity what countries are performing and what countries are laggard in CEE region?

Our study complements existing literature and adds important contributions to this field. Firstly, Phillips and Sul (2007) clustering model has not been previously applied to test the productivity convergence for total economy and for other sectors within the CEE region. We have chosen this model due to its features that make it useful in practical work. Some of the most important advantages of this model are: i) it does not need particular assumptions on the trend stationarity or non-stationarity of the variables; ii) it allows the estimation of long-run equilibrium in a heterogeneous panel, including the history of a country in transition dynamics; iii) it enables illustration of the transition path for each country, more precisely the behavior of a data series in relation to the panel average, which offers important information on individual

behavior in the panel. Secondly, in order to achieve a comprehensive picture of labor productivity patterns, we are interested in testing the convergence hypothesis at the level of activity sectors. We considered two main sectors, manufacturing and market services and other activity sectors, such as: construction, agriculture, trade, transport and storage, post and telecommunications, financial intermediation, renting and other business activities, public administration, education and health, and real estate activities.

The results show that the convergence algorithm has rejected the null hypothesis of convergence for all countries in most of the sectors. Also, we find evidence that the productivity clusters for total economy and other sectors are very different in terms of number and countries. Additionally, even if the productivity gaps in the region have been reduced, we still notice significant disparities between countries. The clustering algorithm shows countries which have a high productivity growth in some sectors and a low productivity growth in others. This reveals the prevalence of idiosyncratic factors in productivity determinants. The best performers in the region are unequivocally the Baltic countries which have a strong catch-up process. The performance of Slovakia and Poland is noteworthy. The productivity pattern in Bulgaria is well below the sample average, while in Romania, especially after 2000, we noticed a catch-up process with more visible results in the manufacturing industry. However, Romania alongside Bulgaria, still have the lowest productivity levels in this region.

The second study investigates the financial convergence between Central and Eastern European countries that are members of the European Union (EU). The analysis covers the period 2007-2014, which accounts for the global financial crisis and for the sovereign debt crisis. To examine the convergence dynamics of these financial markets, we have employed the Philips and Sul (2007) methodology that is based on a nonlinear time-varying factor model. This paper provides a comprehensive picture of the financial systems within CEE by testing the convergence of their stock markets together with their credit default swap spreads, long term government bonds, and the banking sector. The research questions can be summarized as follows. The stock markets, sovereign risk and banking systems in CEE countries are integrated? What are the differences and the similarities in terms of stock markets, sovereign risk, and banking systems in CEE region? How the global financial crisis and European debt crisis did influenced the integration of the CEE financial markets?

Our study adds value to the existing literature for several reasons. To our knowledge, the Phillips and Sul (2007) methodology has not been previously applied to test the convergence hypothesis for long-term bonds yields and 5-year sovereign CDS spreads, despite their relevance. In addition, the integration of financial markets in ECE has not been previously tested.

Finally, the time frame set to examine this issue will help to determine the impact that the global financial crisis and European sovereign debt crisis had on the CEE financial markets integration.

The empirical findings show that the CEE financial markets do not form a homogenous convergence club. Findings on stock markets suggest an obvious segmentation and a natural variation of the convergence process within CEE stock markets over time. The convergence of sovereign risk, tested through 5-year CDS spreads and long-term government bonds interest rates, indicated heterogeneity of the risk in this region. Clustering tests also reveal a fragmentation of the banking systems within CEE. Furthermore, in the aftermath of the global financial crisis and the sovereign debt crisis, the disparities between these financial markets have been amplified. The striking divergence revealed by our analysis emphasizes the different levels of development within CEE financial markets. However, we noticed that some of the countries belong to the same club in most of the cases. For example, Bulgaria and Romania tend to have a similar behavior regarding the capital markets and banking sector. Even if there are differences between the two neighbouring countries (i.e. economic size, level of industrialization), they share common features: Bulgaria and Romania became members of the EU at the same date, the two frontier capital markets are insufficiently developed compared to other CEE capital markets, and both countries have a low share of bank loans to GDP and high levels of non-performing loans. Also, the Czech Republic and Slovakia exhibit a similar pattern with respect to CDS spreads, bond market, and banking sector, while the Baltic countries are always included in the last convergence cluster and have significant downward sloping curves, indicating low levels for interest rates and a significant downward adjustment process. These findings reveal clear regional linkages. In our opinion, the CEE countries should further implement structural reforms in order to achieve a greater financial convergence.

The third study paper analyses the co-movements and contagion in 24 European Union stock markets from January 5, 2004 to July 1, 2016. We apply a Dynamic Conditional Correlation - Mixed Data Sampling model (DCC-MIDAS) to extract short and long-run correlations. We use short-term correlations to detect contagion. Finally, we employ a gravity-type regression to investigate the determinants of long-term correlations. The research questions can be summarized as follows. How did the stock market co-movements evolved over time? Are there major differences in cross-country DCCs? Is there evidence of contagion in European stock markets in crisis times? What is the time varying nature of contagion during turmoil? What drives stock markets co-movements during normal and crisis period? What are the drivers of long-term correlations in contagion times?

Our contributions to the literature are manifold. First, we differ from the literature by using a Dynamic Conditional Correlation - Mixed Data Sampling model that enable the extraction of a high and low-frequency component for the pairwise DCC. To our knowledge, the empirical literature that uses DCC-MIDAS for examining European stock markets is limited. Second, we contribute to the stock markets contagion literature through the varying nature over time and across country pairs of the estimated contagion indicator. Third, despite the important body of literature, the number of papers that investigate the drivers in European stock markets co-movements, especially in the light of the global financial crisis and European sovereign debt crisis, is not significant. Furthermore, we add to the literature by studying the wake-up hypothesis in contagion times and the nexus between banking flows and pairwise stock market dynamic correlation.

The results are summarized as following. First, we find significant differences between the stock markets co-movements, which seem to depend on economic development and market deepening. When studying closely these values, we notice homogeneity across some groups of countries. Excepting Greece, all the co-movements between old EU countries are high (i.e. between 0.62 and 0.94), reflecting a significant level of integration. There is a group of three countries, the Czech Republic, Hungary, and Poland, for which the pairwise dynamic correlations with the old EU countries and among these countries are lower, i.e. between 0.70 and 0.52. Greece would fit better to this group of countries. Lastly, we have the group of Estonia, Latvia, Lithuania, Bulgaria, Croatia, and Romania, where the co-movements with the first two groups of countries and between them are within a range of 0.57 and 0.28. The time varying correlations emphasize different phases of development, i.e. integration, contagion, herding and divergence. Second, the contagion estimates reveal that, during some crisis episodes, the contagion is temporary, while for other periods the contagion becomes more persistent, indicating a herding behaviour. Third, the co-movements determinants show that global factors and economic similarities are important in explaining correlations. Hence, excess global volatility and illiquidity in financial markets lead to an increase of the co-movements, while regional proximity is not relevant. Generally, we find that in both normal and crisis times, economic, institutional, and financial variables play an important role in explaining the pairwise dynamic correlations. Therefore, similarities in terms of inflation, public debt, bilateral trade, institutional development, cross-banking inflows, and market size are positively associated to the pairwise stock markets co-movements. Dissimilarities in GDP growth rate lead to lower dynamic correlations, but are not relevant during the crisis times. Finally, our findings for long-term correlations drivers in contagion times are mixed, revealing, on one hand, pure contagion, i.e. not

explained by fundamentals, and, on the other hand, a wake-up call in terms of cross-border bank flows.

The second part of the first section, contribution to the bank efficiency and risk, highlights the results for the efficiency and risk estimates for the banking systems from the emerging countries. This part lists two studies: "Determinants of bank cost efficiency in transition economies: Evidence for Latin America, Central and Eastern Europe and South-East Asia"; "The relationship between bank efficiency and risk and productivity patterns in Romanian banking system". The topics of these studies cover the following two areas of research: (i) banks' performance, with a more pronounced focus banks' efficiency, banks' productivity and banks' efficiency determinants; (ii) banks' risk, with a more pronounced focus on the nexus between efficiency and risk in banking systems. As we have mentioned before, the emerging countries in and Romania, in particular, have an important role in our studies. Hereinafter, we briefly detail the research questions, contributions, and results of the studies.

In the first study we adopt Wang's (2002) heteroscedastic stochastic frontier model, which allows us to investigate bank cost efficiency and to measure the marginal effects of some variables on both the level and the variability of inefficiency. In recent years, the financial crisis has significantly affected the banking systems of the transition countries. Hence, the efficiency is of major importance for the stability of the banks. The research questions of this study can be summarized as follows. What are the main drivers of banks' cost efficiency in emerging banking systems? In terms of efficiency what are the performing and the laggard banking systems? How the global financial crisis did influenced banks' efficiency?

The contributions of our study to the existent literature are significant from many points of view. Firstly, a considerable number of observations for the banking systems from 16 emerging countries from three different regions - Latin America, Central and Eastern Europe and South Eastern Asia - is included in the model. Secondly, our study provides not only results concerning the inefficiency differences between the analysed countries, but also the factors that influence the level and the variability of the bank efficiency. We consider that this evidence is essential, bearing in mind the effects of the financial crisis on the banking systems. Thirdly, within the inefficiency determinants we included variables that describe the economic and financial development, the banks' risk taking, the bank's performance, the efficiency of financial intermediation and the degree of diversification. Fourthly, taking into account the fact that banks faced higher risks during the analysed period, we included a variable that quantifies the risk of failure for banks within the variables that influence inefficiency.

We find evidence that banks that follow a more cautious strategy, characterized by lower risk appetite and average expectations on profitability, have higher cost efficiency. We also find that traditional deposit-taking and loan-making still remain the most efficient activity of the banks. Additionally, the results showed that a higher Gross Domestic Product growth rate implies an increase in the inefficiency level, indicating an unsustainable bank management behaviour, which in periods of economic growth adopts policies that can generate inefficiency in order to gain market share and to obtain higher bonuses. Country cost efficiency results show significant differences. Argentina, Romania, and Philippines have the most inefficiency banks within their region, while Brazil, the Czech Republic, and India are among the performers. The banking systems in transition countries in South Eastern Asia appear to have a higher cost efficiency level. Also, the effects of the financial crisis were less significant in this region.

The second study uses a data envelopment model and an input slack-based productivity index to investigate banks' cost efficiency and productivity patterns in the Romanian banking system from 2005 to 2011. Also, we will assess the determinants of efficiency, emphasizing the relation between efficiency and risks. The research questions can be summarized as follows. What is the relationship between concentration and efficiency in the Romanian banking systems? What are the main drivers of efficiency in the Romanian banking systems? How the Romanian banks' productivity did evolved over the last years?

Our study adds value to the existing literature for several reasons. To our knowledge, the literature that analyzes Romanian banks' efficiency and productivity patterns and determinants is scarce. Also, we contribute to this field by studying the efficiency and productivity determinants and the effects of the global financial crisis on Romanian banks.

In the Romanian banking system, the relationship between concentration and efficiency supports Hicks's "quiet life hypothesis". With respect to the impact risk factors on efficiency, we find that a lower failure risk and a higher liquidity are positively associated with efficiency, while solvency risk is negatively associated with efficiency. We also find that banks with a higher return on equity and a higher level of financial intermediation are more efficient. An increase in the net interest margin leads to a decrease in efficiency, signalling a higher credit risk. The effects of the financial crisis on commercial banks in Romania were observable in 2008, when the cost efficiency and productivity decreased. Empirical results suggest that the contribution of the funds to the increase of productivity is the most significant, while that of labour and capital productivity is lower.

The second section of the habilitation thesis reviews my career development plan, emphasizing my perspectives in research activities. My main area of research in economics and

my professional research experience include the following fields of expertise: (i) economic and financial convergence; (ii) efficiency and risk in banking systems; (iii) leverage, prudential policies, and foreign ownership in banking systems; (iv) interdependence and contagion in financial markets; (v) monetary policy. Future research activities include the analysis of the regional convergence within European Union, and the nexus between leverage, foreign ownership, and prudential policy in Central and Eastern Europe banking systems.

The third section of the habilitation thesis includes the references list.