"HENRI COANDA"
AIR FORCE ACADEMY
ROMANIA

GERMANY

"GENERAL M.R. STEFANIK"
ARMED FORCES ACADEMY
SLOVAK REPUBLIC

INTERNATIONAL CONFERENCE of SCIENTIFIC PAPER
AFASES 2011
Brasov, 26-28 May 2011

AN ECONOMETRIC APPROACH OF ACTUAL FINANCIAL CRISIS[1]

Stelian STANCU *, Oana Mădălina PREDESCU *, George Viorel VOINESCU *, Anca Domnica LUPU*

* Academy of Economic Studies, Bucharest, ROMANIA

Abstract: *The paper is structured on 4 levels: the first level presents the actual financial crisis: nature, genesis, global context, chronolog.y. The second level presents the role of the Basel II Agreement in the stimulation of the risk management along the financial crisis. The Basel II Agreement has obliged banks and other authorized financial institutions to communicate at the beginning of each day the daily estimated risk to the nearest monetary authority using one or more models of Value at Risk. The third level emphasizes risk management at the level of the banking system. The model shows the most adverse expected loss for a certain time horizon, a certain level of confidence and various methods used to calculate the Value at Risk. The fourth level is dedicated to the prominence of the prudential regulations at macroeconomic level – actions to come out of the actual financial crisis.*

Keywords: *crisis, financial market, econometric analysis, Basel II Agreement, Value at Risk.*

1. Actual financial crisis: nature, genesis, global context, chronology

The actual economic crisis was generated, as it is widely known, by the downfall of the American mortgage industry, which started in the summer of 2007.

At the beginning of the fall of 2008 the crisis passed through a new phase of acceleration and development. The successive downfalls like a domino of the stock markets and the serious problems of the banking system remember the year of 1929.

Among the causes that have generated the American crisis, are mentioned:

- the U.S. economy had the experience of a reduced interest rate;
- an inflow of capital from the exterior, especially from the Asian countries, but also because the U.S. Federal Reserve had a relaxed policy regarding the interest rate.

The Asian countries had bought American assets both to diminish their own exchange rates, but also to protect themselves against a depreciation of their currency in comparison to the dollar, a lesson learned along with the Asian crisis at the end of the 90's. On this background, the U.S. households saving's rate diminished almost near zero. Moreover, most of the consumption growth in U.S. was financed from the current account deficit. It can be spoken also about a funding liquidity, an indicator that can describe the ease with which investors could obtain funds.

Consequently, the credit expansion, recorded mostly in U.S. and Great Britain, was the result of the structural modification of the expected revenue redistribution, an expression of neo-liberal capitalism.

Such it has been recorded a reduction of the salaries, emphasizing a deflation generated by salaries, while corporation profits reached levels that have never been seen, than before the Great Depression in 1929.

While the average salary had risen significantly until 2006, the median salary had not recorded improvements, but reductions in certain American states.

If credit expansion had not existed, this would have lead inevitably to economic stagnation, with demand restriction. Mistake or not the credit expansion has been preferred especially in the mortgage sector.

The financial turmoil of 2007 and 2008 was generated by the growth of defaults on subprime mortgages, loans made to borrowers with weak credit histories. The severity of the crisis is demonstrated by unprecedented interventions of Federal Reserve and other governmental institutions on financial markets during this period.

1.1. The hosing and mortgage markets – main causes of the actual financial crisis

For several years through 2005, the U.S. housing market has experienced a significant boom, through the increase in the volume of home constructions, sales and prices.[1].

The factors that fuelled this boom:

- a low level of interest rates;
- some buyers apparently thought that home prices would continue to grow and bought houses hoping to increase their wealth via speculative buying and selling;
- a surge in subprime mortgages[2].

Rapidly rising house prices encouraged many borrowers to refinance their mortgages quickly, leading to an increase in their equities, improving credit worthiness and allowing them to borrow on better terms. As a sequel

- until the middle of the period, house prices reached high levels, making the housing market less attractive;
- Federal Reserve began to raise short-term interest rates in 2004, leading to an increase in mortgage rates;
- the volume of the sales of homes started to decline and the number of unsold houses rose sharply relative to sales;
- house prices decelerated sharply in 2006 and started to decline;
- with house prices decelerating, borrowers with a high loan – to – value ratio could not refinance anymore their credits;
- delinquency rates on subprime adjustable rate mortgages rose sharply in 2006;
- by early 2008, more than a quarter of the loans were at least 90 days delinquent or in foreclosure;
- delinquency rates for the “Alt-A” adjustable rate mortgages[3] began to rise sharply in 2007.

Over the past 70 years, the mortgage market has changed radically from one in which local depository institutions make loans to one that is centred in the major Wall Street banks and securities firms, which employ the latest financial engineering to repackage mortgages into securities through credit derivatives and collateralized debt obligations[4].

The symptoms of the crisis have manifested also in Romania through:

- the exacerbated growth of house prices and lands;
- the exaggerated encouragement of consumption credit.

All these aspects and others, lead to the growth of the number of creditors and also of those that can not pay the outstanding rates.

Regarding the Romanian exchange market, it can be appreciated that it fell in 2008 in the number and volume of the transactions. Related to this aspect it has been recorded also a downfall of the price of the listed assets. It can be mentioned that during approximately one year home prices fell with almost 20 percent for hoses recently constructed and with almost 30-40 percent for the old ones.

---

[1] Krohn G.A., Gruver W.R., *The Complexities of the Fianancial Turmoil of 2007 and 2008*, October 2008.

[2] a benefic result of the housing boom was that by the year of 2005 the home ownership rate had reached the highest level of all times of 69 percent.

[3] “Alt-A” mortgages are a mix of prime, almost-prime and subprime mortgages.

[4] Dodd R., *Subprime: Tentacles of a Crisis*, Finance&Development, December 2007.

We believe that in present time, regarding the actual financial world crisis, in Romania the psychological and not the real manifestation factors are dominating. We also believe that the real financial crisis in Romania will be triggered after the presidential elections in autumn, when it is expected that the Romanian state will not sustain anymore the banking system with the help of the policy of the National Romanian Bank (see the measures adopted in the first part of the year 2009 in this direction: the reduction of mandatory deposits of the National Romanian Bank etc).

1.2.The chronology of the actual crisis

The chronology of the genesis and evolution of the actual financial crisis has developed into a global pattern (see **Figure 1**).

The low economic growth in the euro area is due to:

- a rigid monetary policy imposed by the Central European Bank;
- the zero-inflation target imposed, also, by the Central European Bank;
- the overcapitalization of euro in connection to the dollar has costed only the French economy almost 0,6 -1 percent of the Gross Domestic Product;
- Germany is adopting the neo-mercantilist model, and a characteristic in this period is that most factories that produce subassemblies are moved in the countries that are recently members of the European Union (see the factory for mobile devices that has moved in 2008 in Romania);

The Central European Bank, through its policy, has extended the turmoil on the international monetary market, contributing thus fully in the development of the actual monetary and financial crisis.

The actual financial crisis has affected the real world through a series of channels like: the downfall of the credits has lead to the downfall of the prices both for speculative assets and for real ones; the mechanism used to extract housing assets lead to a significant reduction of consumption.

So it is imperious to adopt a new global monetary order, in order to strengthen both the monetary and financial systems based on new principles characterized by stability, dynamic flexibility and adaptability.

Regarding the role of the Central European Bank, its status should be completely redefined, following financial stability, inflation reduction, the work force problem, the security of the work places etc.

Since in the last 6 to 9 months the Central European Bank has been "bombed" with numerous toxic assets (those with an overvalued price), the governments in the euro area have the task to support the process of recapitalization in the next period at the level of the Central European Bank.

2. The Role of the Basel II Agreement in the stimulation of the risk management along the financial crisis

The Basel II Agreement has forced banks and other authorized financial institutions to communicate at the beginning of each day the daily estimated risk to the next most nearby monetary authority using one or more models of Value at Risk (VaR) measurement.

The Basel Agreement determines the following:

- The Value at Risk (VaR) in the day t is given by

$$VaR_t = \hat{Q}_t - \alpha_t \cdot \hat{\sigma}_t$$

- The daily capital modification (ΔK) is given by

$$\Delta K_t = \max\{-VaR_{t-1}; -(3+k)\overline{VaR_{60}}\}$$

where:

VaR_{t-1} - Value at Risk in day *t*;

$\hat{Q}_t$ - the estimated revenue in day t;

α_t - the critical value of a percent of the estimated revenue in day *t*;

$\hat{\sigma}_t$ - the estimated risk (the square root of the volatility) in day *t*;

ΔK_t - the capital modification in day t in comparison to day *t*-1;

k - the penalty value of the Basel II Agreement breaching, with $k \in [0,1]$.

So, the daily capital modification must be determined at the highest level of the Value at Risk (VaR) from the previous day or at the average VaR of the last 60 days, multiplied with the penalty factor of 3+*k*.

3. The management of the banking system

On the basis of the data given by The Bank[5], we will consider a portfolio with two foreign currencies, the American dollar and the euro. We assume that the currencies are not correlated. Also, the considered portfolio is formed by several types of credits:

- Credits given to juridical persons and local public authorities;
- Credits given to physical persons:
- hosing and mortgage credits;
- credits for car procurement.

The Romanian banking system formed and consolidated after the 90's, the effective legislation and the macroeconomic context have fostered strategic options for the global profile. Bank involvement in the financing of a restructuring economy, effects felt in the hyperinflation, budget and commercial deficits, currency devaluation, consumption of goods and services contraction, has determined a standing tightening of the business climate and the aggravation of the risks involved in current activities.

The large number of new banks has contributed to the increase and development of banking services and also to the improvement of their quality in a climate of sustained competition, making banks to adopt a careful policy of risk quantification in order to obtain acceptable revenues.

Among the banking services offered, the lending activity has experienced a rapid growth.

The lending activity organization represents a complex process, so in order to perform it banks have to mobilize monetary resources temporarily available and spread them according to their credit policies.

As the lending activity implicates risk assumption by the Bank it is necessary to pay a special attention in the lending activity to the analysis of the client worthiness, and also to the general evaluation of the lending risk.

The model studied in this paper is Value at Risk, and it shows the most adverse expected loss for a certain time horizon, a certain level of confidence and various methods used to calculate the Value at Risk.

The essence of the VaR model consists in the prediction of the biggest expected loss for a given portfolio. Also, the Value at Risk instruments, like the marginal VaR analyzed and calculated in the application, are very important for the management of the lending risk. The marginal VaR can be very useful in the portfolio diversification and also in the reduction of the risk met.

4. The prudential regulation at macroeconomic level. Actions to come out of the actual financial crisis

The Basel II Regulation is based on the most comfortable measure of risk, namely the Value at Risk (VaR) which emphasizes only the individual bank risk.

A measure of risk which focuses on the contribution of a financial institution at systemic level is CoVaR[6].

CoVaR at the level of an institution is defined like VaR at the level of the financial

[5] so the bank analyzed it will be generically called The Bank.

[6] Brunnermeier M.K., *Financial Crises: Mechanisms, Prevention, and Management*, http://fmg.lse.ac.uk/upload_file/1197_BrunnermeierPaper.pdf

sector, depending on the in-going of the institution in the process of improving the situation. The percentage difference between VaR and CoVaR emphasizes the degree in which a private institution contributes to the risk of the financial system.

The greater the contribution of a financial institution to the risk of the financial system is, the greater the capital demand, Pigovian[7] taxation or the mandatory insurance prime should be.

Among the actions that can be adopted to come out of the actual financial crisis, can be numbered:

- the liquidity regulation of the financial system;
- non-cycle measures;
- the coverage with swaps;
- state acquisition of the debts at market price;
- nationalization and prompt corrective action;
- partial nationalization and the injection of public funds;
- the guarantee of a minimum price for assets;
- state acquisition of toxic assets;
- home price adjustment through the mortgage subsidizes – besides the introduction of the refinancing schemes to minimize the number of lost homes, the government can try to reduce mortgage rates and thus increase home prices. This can be done with the support of the Central European Bank directly buying long-term mortgage goods or accepting them as collateral for uncertain loans;
- crisis management – needs a certain form of recapitalization or restructuring of the banking sector through the government. The recapitalization of a limited sector like the banking sector can be done on the expense of the (i) debtors and/or (ii) tax payers.

[7] this grows along with the CoVaR growth at bank level and along with other measures of systemic risk.

BIBLIOGRAPHY

1. Adrian, T. & M. K. Brunnermeier (2009). *CoVaR*. Available at http://www.princeton.edu/~markus/ research/papers/CoVaR.

2. Brunnermeier, M. K. (2009). 'Deciphering the Liquidity and Credit Crunch 2007-08'. *Journal of Economic Perspectives*. Available at http://www.princeton.edu/~markus/ research/papers/liquidity_credit _crunch.

3. Burnside, C., Eichenbaum, M. & S. Rebelo (2004). 'Government guarantees and selffulfilling speculative attacks'. *Journal of Economic Theory* 119: 31–63.

4. Chadha, J., L. Sarno & G. Valente (2004). 'Monetary policy rules, asset prices and exchange rates', *International Monetary Fund Staff Papers* 51: 529–52.

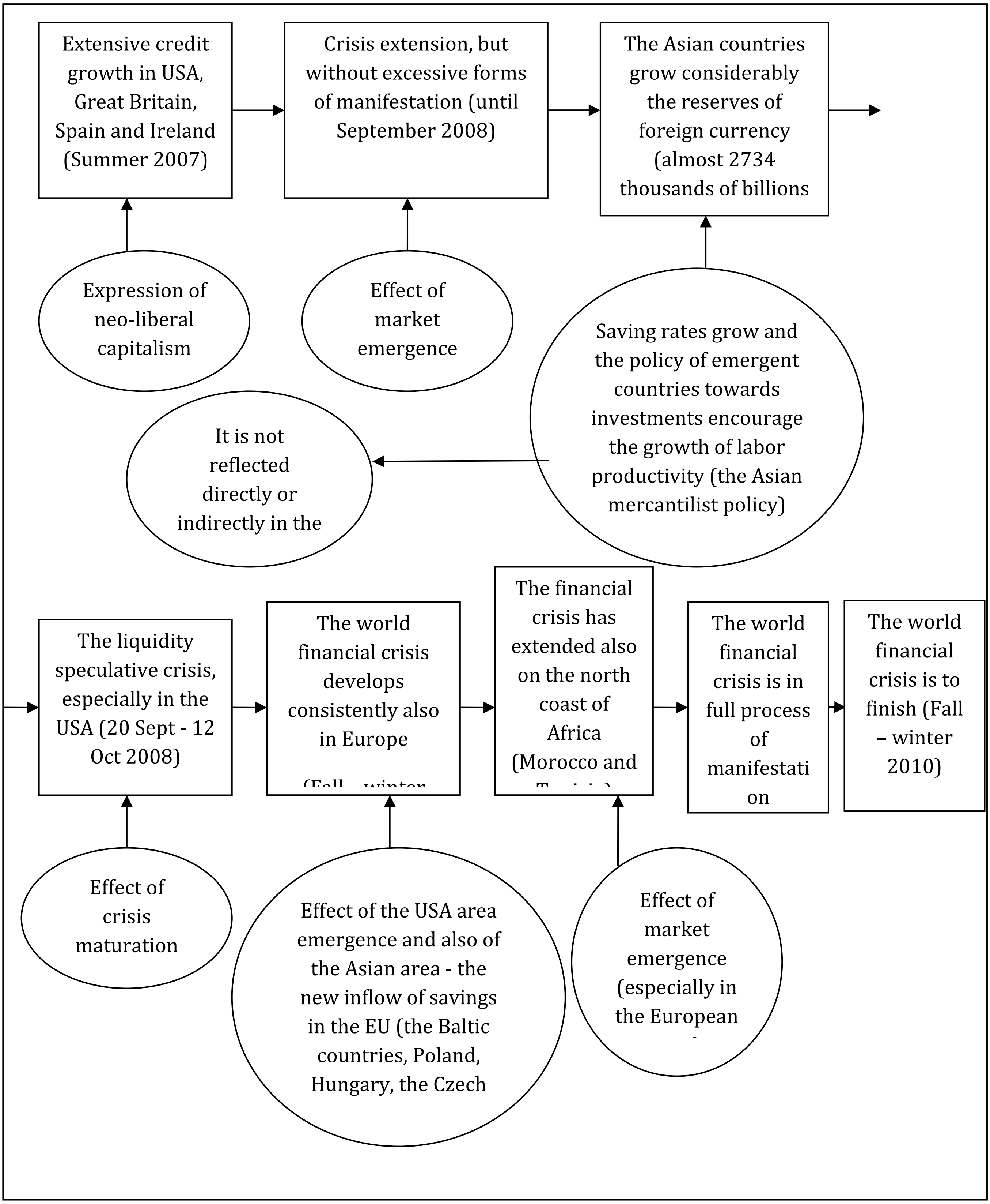
5. Christiano, L., Braggion, F. & J. Roldos (2006). *The optimal monetary response to a financial crisis*. Mimeo, Northwestern University.

6. Corsetti, G. & B. Mackowiak (2006). 'Fiscal imbalances and the dynamics of currency crises'. *European Economic Review* 50: 1317–38.

7. Del Negro, M. & F. Shorfheide (2004). 'Priors from General Equilibrium Models for VARs'. *International Economic Review* 45: 643-673.

8. Juselius, K. & S. Johansen (2005). 'Extracting information from the data: A Popperian viewon empirical macro', in D. Colander (ed.), *Post Walrasian Macroeconomics: Beyond the Dynamic Stochastic General Equilibrium Model*, Cambridge University Press.

Figure 1



[1] Această lucrare este rezultat al Proiectului de Cercetare PN2 - 92-082/2008, Coordonator Proiect - Academia de Studii Economice Bucureşti.