Central European Review of Economics & Finance

No 1/2011

Contents

ISSN 2082-8500

Central European Review of Economics & Finance
Kazimierz Pulaski Technical University of Radom
Publishing Office
ul. Malczewskiego 29, 26-600 Radom, POLAND
www.cer.pr.radom.pl, cer@pr.radom.pl

From the Editors

We have a great pleasure to present to you the first issue of the *Central European Review of Economics and Finance (CEREF)* starting a new series of periodicals which we hope will provide an important forum to exchange views on current issues bothering economists both in Poland and in other countries. The scientific profile of this periodical has been formulated in such a way as to enable a publication of valuable, original papers presenting research results in the field of economics and finance, placing primary emphasis on the highest quality of analytical and empirical contributions in the above mentioned major areas. Our periodical is open first of all to all scholars of academic institutions in Poland and abroad, authors carrying out independent research projects as well as economic practitioners willing to share their experiences in a broader context. All sorts of comparative analyses with reference to Central European and EU countries will be particularly welcome. Technical parameters concerning submitted materials are given on: www.cer.pr.radom.pl

We hope that scientific papers included in subsequent issues of our periodical will turn out valuable and useful not only for a narrow group of specialists but also for students of economic faculties, economic practitioners and a large community of readers interested in following and interpreting the changes occurring in economy. Our periodical will appear twice a year – in spring and autumn. There is a possibility of special issues containing scientific achievements of annual conferences organized by the Departments of Finance at the Technical University of Radom. We want to assure you that we will do our best to have our periodical included on the list of those receiving points from the Ministry of Science and Higher Education as well as to make it evaluated and accepted for listing in EconLit and RePEc.

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CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 4-10

Henning Klodt*

THE PSYCHOLOGY OF FINANCIAL CRISES

Abstract

Traditional economic theory has tried to explain speculative bubbles as the result of rational economic behavior – and has failed. This calls for the integration of socio-psychological patterns, which allow capturing irrational behavior in economic analyses. The paper suggests four fundamental psychological pitfalls derived from the theory of cognitive dissonance, which might be at the roots of the present financial crisis and which should better not be ignored by monetary policy makers.

Keywords: financial crisis, financial markets, behavioral economics
JEL: D01, G01

Introduction

If investors had followed Egon Sohmen (1930–1977), the current financial crisis would never have happened. He was deeply convinced that financial markets are inherently stable and that speculation has a fundamentally stabilizing effect on markets. In his opinion, speculative bubbles like we have seen recently first in real estate markets and then in stock and commodity markets are disturbances that automatically and quietly rectify themselves.

His line of argumentation still sounds convincing today: When the market value of an investment tends to fluctuate around its fundamental value in long-term average, then it is more probable that price changes will move the market value closer to the fundamental value than away from it. Speculators who wait for increasing gaps between market value and fundamental value will, on average, take a loss. However, speculators who wait for decreasing gaps between market value and fundamental value will earn a profit, and their purchases will support the movement of the market value towards the fundamental value. The upshot of this line of argumentation is that speculators who earn a profit tend to stabilize market values, whereas speculators who take a loss tend to automatically disappear from the market because they run out of money.

How can economists contribute to explaining phenomena such as the current financial crisis when economic theory clearly maintains that such phenomena are impossible to occur? To foreclose the answer: this paper argues that traditional economic theory needs to be supplemented by insights derived from social psychology - insights that explain human behavior much more realistically than economic theory does. This paper thus moves into the territory of behavioral economics, which has developed very dynamically in recent

* *Kiel Institute of World Economy*, Germany, henning.klodt@ifw-kiel.de

years, but which has probably been given too little attention when analyzing the current financial crisis.

Are Financial Markets Rational?

The line of argumentation that speculation stabilizes markets is known in the literature on financial markets as the efficient market hypothesis. However, its foundation is not considered to have been laid by the Austrian Egon Sohmen in his book published in 1981, but by the American Eugene Fama in his seminal article published in 1970. The literature that builds on this hypothesis differentiates between three different versions:

- The weak version, in which past price movements do not allow conclusions about future price movements to be drawn. Thus, speculation based on chart analysis is ineffective.
- The middle version, in which current prices reflect all publicly available information about a certain investment. Thus, fundamental analysis is also ineffective.
- The strong version, in which prices reflect not only publicly available, but also any other information of all market participants. Thus, not only are chart and fundamental value analyses ineffective, so is insider trading.

All three versions have in common that they stand on a weak empirical footing. Many different pieces of evidence could be cited here. But, above all, the efficient market hypothesis posits that speculative bubbles cannot occur, which nobody believes any more after the new economy boom of 1999–2001 and the real estate and stock market bubble that burst in 2008.

Economists have a difficult time abandoning the efficient market hypothesis because this would imply to abandon the core hypothesis of all modern economic theory, namely, that economic agents behave rationally, at least on average over time and across various agents. Ultimately, this means "Homo economicus" would have to be retired, which would question the theoretical foundations of both microeconomics and neoclassical macroeconomics.

Thus, there have been several attempts to save the efficient market hypothesis by positing the existence of "rational bubbles." Rational bubble models themselves are, however, not really convincing, especially since they all assume that the probability that a bubble will burst does not depend on its size, that is, does not depend on the divergence between market value and fundamental value. They further assume an infinite time horizon, as bubbles would otherwise collapse as a result of backward induction (see LeRoy, 2004).

At best, one might hypothesize that the performance and remuneration of funds managers is not determined by the absolute performance of their funds, but rather by the performance of their funds relative to a general index ("beating the index"). Then, it could be profitable for them to "ride the bubble," that is, to not pull out of the market before other market participants when a bubble starts occurring. When the bubble bursts, their losses would not exceed the losses of their competitors and they would still have a chance of beating the index. In this version of rational bubbles, the funds managers would, after all, behave rationally. However, the question would remain why rational investors could entrust their money to funds managers who are only interested in relative performance, and not in absolute performance. Thus, even this version of rational bubbles cannot dispense with irrational behavior. It is merely shifts irrationality from funds managers to investors.

Homo Economicus and Homo Sapiens

The discrepancies between the assumption of rational behavior upon which the predictions of traditional economic theory build and what actually happens in financial markets are so glaring that economists are increasingly willing to retire Homo economicus, at least partially. Thus, behavioral finance attempts to take into account the fundamental insights derived by psychology in order to predict human economic behavior. This expansion of the economic horizon has not been restricted to financial market analyses. It has also served as the basis for the relatively young discipline of behavioral economics (Rabin, 1998). The pioneering work in this regard was done by David Kahneman and Amos Tversky, who developed the so-called prospect theory, for which Kahneman was awarded the Nobel Prize in 2002. This theory is based on a new utility function that assumes that consumer's utility does not depend on the absolute quantity of available consumer goods, but rather on changes in quantity. In addition, it assumes that negative changes (losses) are weighted more heavily than positive changes (profits). As Kahneman and Tversky (1979) have demonstrated, these assumptions are well founded by empirical socio-psychology (for a critique of prospect theory through the eyes of a psychologist, see Schmook et al. 2002).

The popularity of behavioral economics was strongly promoted by the book of Akerlof and Shiller (2009), which emphasizes the importance of "animal spirits" for understanding economics. They chose this term, which they borrowed from John Maynard Keynes, to illustrate that human behavior is to a great extent driven by animalistic instincts rather than by rationality. Behavioral economics is, however, still far from having an empirically firm micro fundament. Up to now, measurable success has been confined to behavioral finance, where socio-psychology has contributed to the revival of chart analysis.

The problem with integrating socio-psychology into traditional economics is that progress in economics is all too often considered as progress in modeling economic processes consistently. "Consistently" in this respect means to avoid any inconsistencies in each analytical step, which, in turn, are all based on the assumption of rational behavior. Economic models are thus not able at all to cope with irrational behavior. "Economics has thus, by its methodology, tied its own hands" (Lux and Westerhoff 2009).

To solve this problem, it will not suffice to arbitrarily replace the "rational agents" of current economic models by "irrational agents," as this would make the models arbitrary and meaningless. Thus, there still are many respectable economists who view behavioral economics very skeptically, and advocate remaining faithful to the tried and tested Homo economicus in spite of the fact that he obviously does not reflect reality well. Eugene Rama, for example, calls behavioral economics a crowd of anomalies that has nothing in common with a scientific theory.

Pitfalls

Criticism of the shortcomings of behavioral economics is without doubt justified. However, it cannot be denied that extensive experimental research and the opening up of economics to socio-psychology have revealed certain patterns that make the irrational behaviors frequently involved in economic decision-making at least somewhat predictable. In the far future, these patterns might well form the basis of a new theory that could be as consistent in itself as neoclassical utility theory (see, for example, Ariely 2008). Since irrational behavior runs counter to the individual economic agent's own interests, they can be considered "pitfalls" - pitfalls that would not happen to Homo economicus. For a better

understanding of speculative bubbles in general and the current financial crisis in particular, four such pitfalls seem to be especially important:

Pitfall 1: We tend to overestimate our own skills. Thaler (2000) relates how almost all of his students expect to do better than the average at the beginning of a semester and how approximately half of them are disappointed at the end of the semester.

Pitfall 2: Once we have made a decision, we tend to pay greater attention to information that supports the decision than to information that questions it. This pitfall, which was first described by Brehm (1956), is called *post-decisional dissonance* by socio-psychologists. It causes us to correct mistakes too late.

Pitfall 3: As the above-mentioned prospect theory emphasizes, we tend to give losses greater weight than gains. This *loss aversion* is much more pronounced than would be consistent with rational risk aversion. According to Kahneman and Tverski (1979), the asymmetry is even 3:1, which means that it takes a gain of 300 dollars to cancel out the dissatisfaction caused by a loss of 100 dollars. As a direct consequence of this pitfall, we want to keep goods we have bought, selling them only if we can get a much better price than the one we originally paid. Therefore, this effect is also known as *endowment effect* (Knetsch 1989).

Pitfall 4: After a certain event, we often have the feeling that we knew it was going to happen even though we cannot possibly have known it was going to happen. This effect is labeled as the *curse of knowledge* by Thaler (2000). Socio-psychologists call it the *hindsight effect* or the *knew-it-all-along effect* (Fischhoff and Beyth 1975). It not only causes us to overestimate our ability to predict events, but also prevents us from learning from previous false predictions because we convince ourselves that our previous predictions were correct.

A common denominator for these pitfalls is provided by the *theory of cognitive dissonance*, which was developed by Leon Festinger (1957) and which Frey and Gaska (2002) justifiably call one of the most influential of all socio-psychological theories. It states that we try to avoid contradictory cognitions (of ourselves and/or our environment) or at least to reduce the dissonance between contradictory cognitions. In *Pitfall 1*, we reduce the dissonance between our own idealized cognition of our abilities and our actual abilities by overestimating these abilities. In *Pitfall 2*, dissonant information is filtered out, while consonant information is given greater cognitive attention. In *Pitfall 3*, the value we attach to things we have bought confirms the soundness of our decision to buy them, thus preventing a dissonance between the value we attach to these things before and after we buy them. In *Pitfall 4*, we reduce the dissonance between our expectations and actual events by changing our expectations retroactively to conform to reality.

All in all, it could be imagined that the theory of cognitive dissonance will once become as important for behavioral economics as it is already today for socio-psychology. (But, of course, this prediction rests upon the assumption that behavioral economics itself is more than just a speculative bubble.)

The Financial Crisis

For the purpose of this paper, the origins and course of the global financial crisis can be outlined as follows:

- The starting point was an extremely expansive monetary policy that began in the United States in the late 1990s and continued in the wake of the dotcom bubble on into the early 2000s, also spreading to Europe.
- Monetary expansion was followed by a surge in inflation, albeit not in goods markets but in asset markets. The first of these markets to be affected were real estate markets (although not in all countries), then stock markets followed, and finally commodity markets were affected.
- Additional liquidity was infused into financial markets by the explosion in the supply of derivatives, which was fostered by a far too permissive regulation of financial markets. This pumped up the speculative bubbles even more.
- The real estate bubble burst first. It burst because ever riskier financing models caused private real estate owners to default on their real estate loans. As a result, the solidity of other asset-backed securities and other derivates began to be doubted, which caused the speculative bubbles in the stock and commodity markets to burst too, and ultimately threw the global financial economy into a spin.

In the katzenjammer that followed, the blame for the crisis was placed primarily on the deregulation of financial markets and on rating agencies, whereby the agencies were accused of giving euphorically high ratings to extremely risky derivatives.

On a descriptive level, these accusations are quite convincing. But they ignore several fundamental issues: Why were banks and investors far too willing to accept adventurous derivative securitization schemes and buy products they did not really understand? Was, concomitant to deregulation, the lifting of the restrictions on dealing in extremely risky "credit substitutes" sufficient reason to actually accept such risks? Why were investors so willing to believe the hype of the rating agencies although it was well known that these agencies were on the payroll of the issuers of derivatives. Why did banks ignore their own early warning systems in order to participate in spinning the gambling wheel of speculation? Those who blame deregulation and rating agencies as the major originators of the financial crisis are making things too easy for themselves.

To state it differently: Homo economicus would never have made all these mistakes. He would have become highly suspicious when real estate prices skyrocketed; he would have realized that excessive expansion of money supply can only generate profits on paper; he would have been skeptical of ratings given by rating agencies that rate their own, paying customers; and he would have seen no reason to stop using his own tried and true methods of analyzing and assessing risk. He would perhaps have been glad about all the additional opportunities resulting from the deregulation of financial markets and related financial innovations. But he would not have blindly and recklessly jumped at all of these opportunities.

Homo sapiens, however, ticks differently:

- When a speculative bubble begins to build up, *Pitfall 1* causes her to believe that she will be able to make money on the bubble and then pull out before everyone else, before the bubble bursts.
- After investing in speculative markets, he only takes notice, because of *Pitfall 2*, of information that justifies his decision to invest, even becoming susceptible to the siren songs of the rating agencies, although he would otherwise have plugged his ears to such songs.

- Even when a bubble starts to deflate and prices start falling, she does not, because of *Pitfall 3*, quickly pull out of the market, because she considers her own assets to be particularly valuable.
- And after all the bubbles have burst, and everything is all over, he does not, because of *Pitfall 4*, learn from his mistakes, because he convinces himself that he saw the bursting of the bubbles coming all along and thus will have everything under control when new bubbles occur.

Those who are willing to take Homo sapiens seriously and who do not let themselves be fettered analytically by the rationality postulate do not at all consider the occurrence of gigantic speculative bubbles and the financial crisis triggered by their bursting to be inexplicable. They also have the unpleasant feeling that this crisis will most likely not be the last one, and that the whole game of riding the bubble will begin anew in the foreseeable future.

Conclusions

The main consequence of the line of argumentation put forward in this paper is that it will not be easy to prevent a repeat of global financial crises through economic policy. Better global governance and internationally coordinated regulation could of course help to prevent excesses in the markets for derivatives, but neither will diminish people's willingness to fall for speculative bubbles. The only preventative measure that will work seems to be to deprive bubbles of inflationary gases from the very beginning by controlling the supply of liquidity better than has hitherto been the case.

Apparently, central banks, when implementing their monetary policies, have been too focused on price trends in goods markets, while paying less attention to asset price bubbles. To prevent future financial crises, they will have to take better responsibility for inflationary developments in asset markets by implementing monetary policy instruments of all types to nip bubbles in the bud.

For an economist, the consequences for the future of economic theory are at least as exiting. First, there should be no doubt any more that speculative bubbles can only be understood by taking recourse to socio-psychological insights. The speculative excesses in asset markets were simply too large to be explained by using rational bubble models. The most adamant advocates of Homo economicus still manage to fit these excesses into their rational models somehow, but their models are reminiscent of the Ptolemaic system of the universe, which was still using complicated formulas during the Renaissance to fit the orbits of the planets into a geocentric system although Copernicus, Keppler, and Galileo had already greatly simplified things by using the heliocentric system.

Second, behavioral economics has evolved into more than just an anecdotal collection of behavioral anomalies, even if it is still far from being able to provide stringent micro-based models. However, the theory of cognitive dissonance could play a key role in developing such models. It is theoretically rigorous and it seems powerful enough to provide a theoretical framework for capturing patterns of irrational behavior such as the ones outlined in this paper.

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CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 11-25

Jüri Sepp[*], Diana Eerma[**]

WHY ECONOMIC DEVELOPMENT DEVIATES FROM HUMAN DEVELOPMENT

Abstract

The aim of this article is to analyze and explain closer deviations in the economic and human development trying to reach to theoretical as well empirical explanations.

The institutional economics offers a starting-point with its understanding that just institutions are stimulation systems for the society. The quality of human capital may be insofar as good itself, but without free and secure institutional environment there is a little hope for the motivated activity of individuals. Besides it the different countries are with very different natural environment and what is especially important – with different natural resources.

In the current work we perform two empirical regression analyses – one on transition countries and another on aggregated dataset. Doing so makes possible to perceive robustness of the results. The data of human and economic development originate from the HDR 2009 and characterize the year 2007. The institutional measures are from the Heritage Foundation database of the year 2009. Regarding natural resources we use the DICE database from IFO- Institute.

Keywords: endogenous economic growth, economic development, human development, transition countries
JEL: D69, O10

Introduction

The endogenous economic growth theory (Romer, Lucas) has been made well-known relation between human capital and economic growth. Also, empirical analysis has confirmed positive connection between human capital and economic growth. Perhaps the most well-known from its regularity and spread are the United Nations Human Development Reports (HDR), where repeatedly have been highlighted two aspects of human development – strong positive correlation of education and health with the third component of human development general index – economic welfare.

Therefore, the deviations, what are documented by the HDR in terms of human and economic development by countries every year, are more interesting research object. At that, there are relatively stable specialties what have their objective reasons. At the same

[*] University of Tartu, Estonia; juri.sepp@ut.ee
[**] University of Tartu, Estonia; diana.eerma@ut.ee

time, it is not characterized as an absolute static, but there also appear relatively certain directional shifts. Therefore, we have taken for the aim of this article to analyze and explain closer deviations in the economic and human development trying to reach to theoretical as well empirical explanations.

For systematic opening of the differences formation there is applied econometric analysis, what assumes to set up hypothesis about factors of deviation in advance. Here, the institutional economics offers one starting-point with its understanding (by North) that just institutions are stimulation systems for the society.[1] Hereby, the quality of human capital may be insofar as good itself, but without free and secure environment there is little hope for the motivated activity of individuals. Thus it is natural to take economic freedom[2], what is also internationally largely measured and analyzed (Heritage Foundation), for one controlled factor.

Certainly does not only the institutional environment with its legal and social norms create opportunities for action. Besides it, different countries are with very different natural environment and what is especially important – with different natural resources. Here as well solely observation of extreme deviations hints to possible connection.

Study of mentioned connections forms the content of the article, whereby for results robustness test we will use two different aggregate sets: total aggregate set of world countries according to availability of information and set of transition countries separately.

United Nations' concept of human development

For introduction we present the United Nations' concept of human development and its measurement. First of all it is an attempt to characterize social development broader than through usual entirely economic indicators (for example, level and growth of Gross domestic product (GDP)). In case of human development accrue additional aspects of life quality, even if differently from subjective happiness indicators the focus stays on objective indicators.[3]

The United Nations' approach defines human development as general success in a composite measure of three dimensions: healthy life, education and economic well-being.[4] For empirical application of the concept, there have been chosen suitable indicators and measurement methods.[5] Finally, in all three directions will be amounted to one index which value is between 0 and 1. It is possible due to determining lower and upper limit value of the measurer:

[1] „Neo-classical theory is simply an inappropriate tool to analyze and prescribe policies that will induce development. … It focused on technological development and more recently human capital investment, but ignored the incentive structure embodied in institutions that determined the extent of societal investment in those factors. … Institutions form the incentive structure of a society and the political and economic institutions, in consequence, are the underlying determinant of economic performance." (North, 1993) Institutions provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation, or decline (North 1991, 97).

[2] In an economically free society, each person controls the fruits of his or her own labor and initiative (Miller, Kim 2010).

[3] http://worlddatabaseofhappiness.eur.nl/

[4] Further we also observe human development close in sense of two first components.

[5] http://hdr.undp.org/en/media/HDR_20072008_Tech_Note_1.pdf

Index = (actual level of measurer – lower limit)/(upper limit – lower limit)

For the health and well-being is applied only one measurer – accordingly life expectancy at birth and level of GDP *per capita* measured in purchasing-power parity (ppp). From latter measurer has been found the logarithm, because it is ensuring that the index of economic development will have approximately same variation as the indexes of human development and linearity of connection between them. In terms of education two base indicators are adult literacy and the share of enrolment at the primary, secondary and tertiary level in particular age-group. In integration all three spheres are approached as equivalent (table 1).

	Partial index	**Lower limit**	**Upper limit**	**Share in composite index**
A	Life expectancy at birth	25 years	85 years	33 %
B1	Adult literacy	0 %	100 %	22 %
B2	Share of learners in their age-group	0 %	100 %	11 %
C	Purchasing power[6]	100 USD	40.000 USD	33 %

Tab. 1: *Components of the human development index*
Source: HDR 2007/2008

However, our object of interest is not so much synthesis of different components and partial indexes as their mutual connections. Primarily we concentrate on the study of relations between economic success and human capital quality in different countries. At that, we have based directly on the qualitative model introduced in the Human Development Report in the year 2003. In principal this model has institutional economics background.[7] Next we test empirical assumptions concerning some factors what may impact balance of economic and human development.

The balance of economic and human development

Before approaching the factors we observe the balance of economic and human development in the countries. The HDR contains always one interesting indicator, which has deserved relatively little attention so far: in its main table – it is difference in the ranking positions between economic and human development.[8] Figure 1 shows sequence by both measurers. At first is noticeable the strong positive correlation. According to human capital theory would be complicated to expect anything else. Therefore, as a matter of fact is more interesting that the relation is not fairly and squarely and determinated. In case of some countries is recognizable large difference between the two ranking tables. Cuba, Albania and Myanmar represent countries where economic development lags behind from human development considerably. But the United Arab Emirates, Gabon, Equatorial-Guinea and Botswana belong amongst the countries where the economic welfare is unexpectedly high on the basis of available level of the HDI.

[6] GDP *per capita* measured in seeing ppp. Hereinafter we call this indicator also a measurer of economic development.
[7] http://hdr.undp.org/en/media/hdr03_chapter_31.pdf
[8] Table H. http://hdr.undp.org/en/media/HDR_2009_Tables.xls.

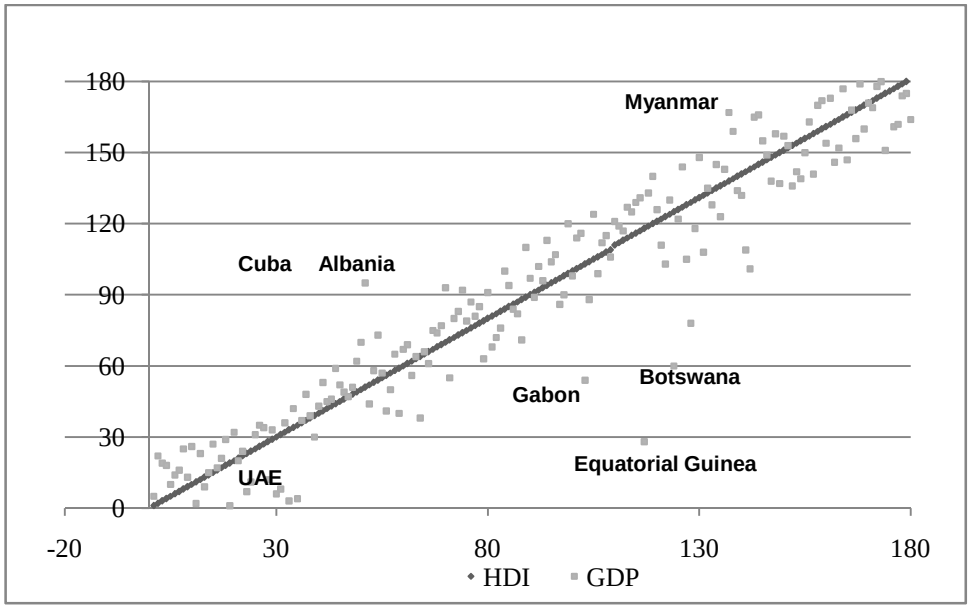

Fig. 1: *Ranking of countries by economic and human development in year 2007*
Source: HDR 2009

Table 2 shows the widest differences in numbers in terms of the positions in ranking tables. Certain asymmetry is insistent. Positive deviations (better human development) are not as keen as negative ones. As the sum of deviations of both directions has to equal zero, then the positive deviations appear more frequently.

Our main objective in the study is to find out the factors which cause or explain these deviations. At that, we take for the starting-point scheme (model) from the HDR (Figure 2). Here the connection between economic development and quality of human capital (health and education) has been set to the first place. The figure shows that connections in both directions run through formal and informal institutions, which may serve as filters and drags as well as amplifiers.

Country	HDI-Ranking	GDP-Ranking	GDP-HDI
Equatorial Guinea	118	28	-90
Botswana	125	60	-65
South Africa	129	78	-51
Albania	70	93	23
Myanmar	138	167	29
Cuba	51	95	44

Tab. 2: *Largest differences in human and economic development*
Source: HDR 2009

Next, the economic freedom has been selected for characterizing the institutional quality, because its positive meaning on economic development has been sufficiently explained theoretically and empirically. At that, we will be limited to two indicators – the

general indicator of Heritage Foundation and in addition, the partial index of freedom from corruption.[9] The first has been essentially influenced by formal legal and administrative institutions, but the second resounds rather informal environment of economic affairs.[10] Naturally, their role may have also other environmental factors. Figure 1 induced us at least to control the importance of natural resources. Regarding natural resources we use the DICE database (Database for Institutional Comparisons in Europe) from IFO- Institute.

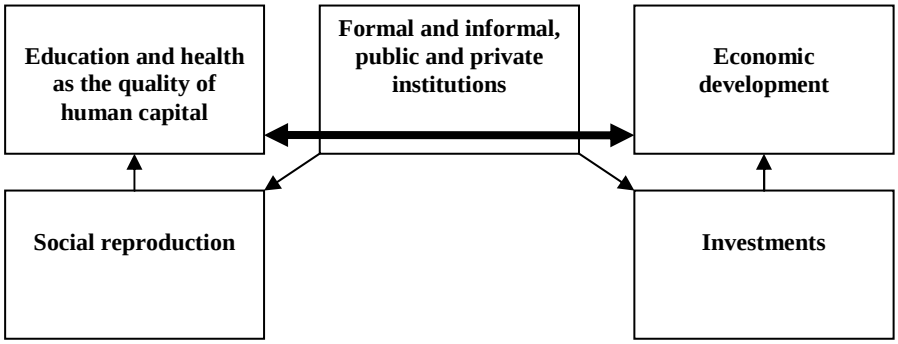

Fig. 2: *Human development model*
Source: Compiled by authors on the base of HDR 2003

In the current work we perform two empirical regression analyses – one on transition countries and another on aggregated dataset. Doing so makes possible to perceive robustness of the results. The data of human and economic development originate from the HDR 2009 and characterize the year 2007. The institutional measures are from the *Heritage Foundation* database of the year 2009.

Human and economic development in transition countries

The first analysis concerns 30 transition countries. For independent variable are applied directly the order deviations of economic and human development (gap between corresponding ranking positions in the tables). For the factors are computed following measurers: economic freedom, freedom from corruption and oil production *per capita*.

Table 3 indicates data of transition countries ordered by observed deviations size. On the one hand, Cuba represents, as we already know, the biggest lag of economic development from human development. Albania comes next. These are countries where transition has not started yet or acts with big delay.

[9] http://www.heritage.org/Index/PDF/2009/Index2009_Methodology.pdf
[10] http://www.transparency.org/policy_research/surveys_indices/cpi/2009

Country	Economic freedom	Freedom from corruption	Oil production *per capita* (tons)	Order deviation (SKP-HDI)
Russian Federation	54.0	24.0	3.5	-16
Kazakhstan	60.4	26.0	4.4	-10
Turkmenistan	42.5	18.0	2.0	-3
Azerbaijan	55.4	22.0	4.9	-2
Czech Republic	69.7	43.0	0.0	1
Romania	61.3	30.0	0.2	1
Estonia	78.1	64.0	0.0	3
Hungary	66.2	50.0	0.0	3
Latvia	68.2	42.0	0.0	3
Lithuania	72.0	48.0	0.0	3
Slovakia	68.4	43.0	0.0	3
Slovenia	63.6	61.0	0.0	4
Belarus	47.4	26.0	0.0	6
Croatia	55.3	34.0	0.0	7
Bulgaria	62.2	40.0	0.0	8
Macedonia	60.8	27.0	0.0	8
Ukraine	53.3	26.0	0.0	9
China	54.0	32.0	0.1	10
Mongolia	60.1	30.0	0.0	10
Bosnia and Herzegovina	54.7	29.0	0.0	11
Poland	58.8	34.0	0.0	12
Viet Nam	50.0	26.0	0.2	13
Moldova	59.5	29.0	0.0	14
Uzbekistan	52.6	22.0	0.2	14
Armenia	69.4	29.0	0.0	16
Tajikistan	56.9	21.0	0.0	17
Kyrgyzstan	59.9	23.0	0.0	20
Georgia	68.7	23.0	0.0	21
Albania	61.4	24.0	0.0	23
Cuba	29.7	38.0	0.0	43

Tab. 3: *Deviation factors of human and economic development in transition countries in the year 2007 (ordered by deviation size)*
Source: HDR 2009, Heritage Foundation, DICE

Another extremity form Russia and Kazakhstan what as known are not most successful reforming countries, but they have oil and other natural resources. These resources can practically substitute the institutional development. The most successful transition countries (CZ, EE) locate in the average positions in table 3, where economic development generally corresponds to human development and vice versa.

The regression analysis generally confirmed our hypothesis (Table 4). Interestingly enough

- is the general index of economic freedom, which primarily accentuates the formal side of reforms, statistically significant, and the index of freedom from corruption stays on backwards (statistically insignificant).

- Is demanded for balance of human and economic development, on the bases of this model, just the level of economic freedom as it is in Estonia – ca 80% from maximum.

On the other hand, also oil production *per capita* turned out to be essential factor for order deviations. In average, each ton of this measurer shifts economic development from human development by five ranking positions higher in the rating table.

Comparing the real order deviations with prognosis from model we see only partial overlapping – the determination coefficient (R^2) is ca 50%. Obviously could be possible to predict as positive as well negative impacts. Here probably would suit specific transition indicators (for example, from EBRD[11]) better than the general indicator of economic freedom in refining positive deviations. In the case of negative deviations apparently also other deficit natural resources and their export have to taken into account. Still, in the current work we abandon developing the analysis in mentioned directions and try entirely to evaluate robustness of preliminary results by repeating analysis on the data of total set of countries.

Factor	Regression coefficient	Standard error	t-Statistic
Constant term	40.42	9.42	4.29
Economic freedom (index)	-0.50	0.16	-3.19
Oil production per capita (tons)	-5.28	1.11	-4.74

Tab. 4: *The results of regression analysis of order deviations on economic and human development in transition countries*
Source: Authors' calculations

Analysis of the total set

The second analysis includes the data of 154 countries. Time aspect stays the same – the year 2007. But at that we change substantially measurers and techniques of modelling. For dependent variable we take directly logarithm[12] of GDP *per capita*, which factors as two partial indexes of human capital quality – education and health indexes – can be switched into regression equation. It is clear, that real and predicted deviations of GDP *per capita* by mentioned partial indexes are practically equivalent with order deviations observed previously. However, we do not start to modelling deviations separately, but switch into the equation additionally to earlier studied institutional and natural resources indicators in the second phase of the analysis. Oil production *per capita* is computed in logarithmic form. Additionally, we control institutional impacts by the instrumentality of some fictive variables – separately for transition countries and the Commonwealth of Independent States (CIS).

The data are presented in Annex 1. Already visually is noticeable that all factors have expected impact. It is possible to point out sets of two countries, whereof in case of differences is crucial just impact of specific factors.

- Myanmar and Botswana are quite close in terms of human resources quality, but have very different institutional backgrounds. Therefore the difference in terms of GDP *per capita* is even 15 times in favour of the latter.

[11] http://www.ebrd.com/country/sector/econo/stats/index.htm
[12] Here as well the purpose of finding the logarithm has been obtaining linear connections on the example of UN methodology.

- Cuba forestalls Estonia in terms of human development, but people in Cuba are three times poorer compare to Estonia.
- The quality of human and institutional capital in New-Zealand is the same as in Norway, but Norway is two times richer because of oil.

In the regression analysis we distinguish three steps (table 5).

1. At first, analyze only connections inside of human development total index. Interestingly coincided the regression coefficient of education and health exactly. In case of the change in both indexes by 1 percent point the GDP *per capita* (pc) will increase by 3.3%. In all explained human development 70% of the economic development variation.

Factors	1. Step R^2=0.70		2. Step R^2=0.85		3. Step R^2=0.86	
	Regression coefficient	t Statistic	Regression coefficient	t Statistic	Regression coefficient	t Statistic
Constant term	3.78	13.82	3.76	10.75	3.74	10.84
Health (index)	3.31	6.40	1.59	4.00	1.52	3.86
Education (index)	3.31	6.49	2.56	7.05	2.89	7.50
Economic freedom (index)			1.35	1.99	1.20	1.79
Freedom from Corruption (index)			2.06	6.02	1.91	5.56
Oil production (*per capita* ln)			0.13	7.94	0.13	8.02
Dummy (CIS)					-0.37	-2.32

Tab. 5: *The results of regression analysis of economic welfare on aggregated data set*
Source: Authors' calculations

2. In the second step we added earlier observed institutional and natural factors. The representation capacity increased significantly – up to 85%. Differently from previous analysis, appeared here more significant just informal side of institutional environment – freedom from corruption. The general index of economic freedom turned out to be only provisionally significant here. At the same time decreased also significantly regression coefficients for the quality indicators of human capital (especially for the health). Here we can see that part of the initial impact of human capital is practically connected quite with institutional and natural environment. In case of comparable environment the impact of health is ca 2 times less. All three indexes increase in *ceteris paribus* condition economic development 1.4 – 2.6% per each percentage point.
3. In the third step we controlled impact of fictive variables. Significant turned to be only being part of the CIS. The level of economic development was less compare to elsewhere ca 40%, if other conditions stayed the same. In general this variable improved the quality of the model still little.

The results are illustrated by two following figures. Figure 3 shows the deviations of ln GDP *per capita* from the expected human development level. Here appears the sight that is

familiar already from the analysis of order deviations. Cuba and Myanmar get much higher prediction of economic development compare to this what they have in reality. And vice versa – South Africa, Botswana and Equatorial-Guinea are unexpectedly rich on their level of human development. However, in general we see, that the human development cannot explain the higher levels of economic development. In this sense all the richest countries are too rich – the human development does not explain this welfare solely.

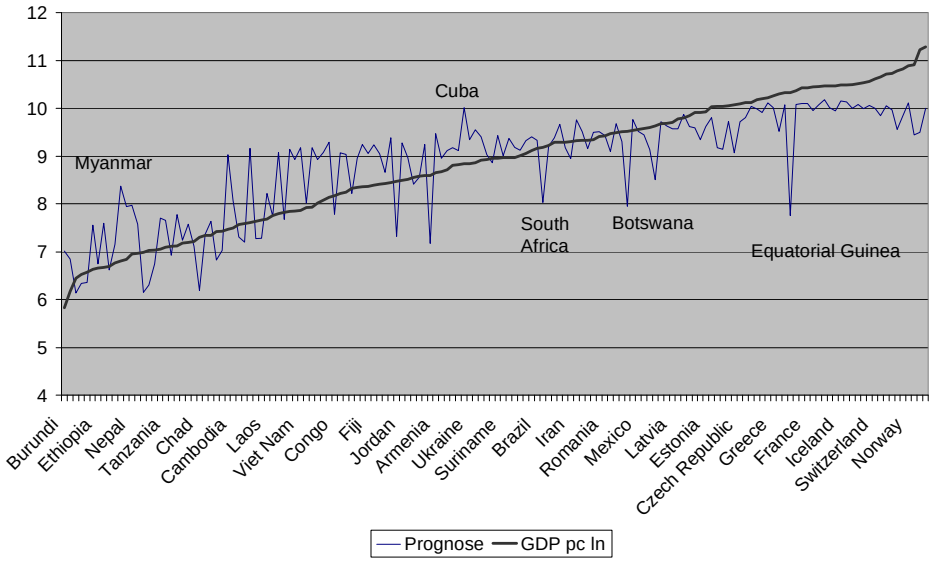

Fig. 3: *The real and predicted (on the basis of human capital) level of economic development in the aggregated set of countries (step 1).*
Source: Compiled by authors

If we add to the model also indicators of institutional and natural environment (steps 2 and 3), then the quality of the model improves considerably and with this improvement also large deviations between real and expected economic development disappear (Figure 4). However, also on bases of these results we may raise further research questions. Why are Scandinavian countries (especially DK, NO) relatively poor on the light of researched (compare to the prognoses), as well faraway countries as Oceania countries Australia and New-Zealand? Of course, it may be an occasion, but also some peculiarities of the mentioned countries.

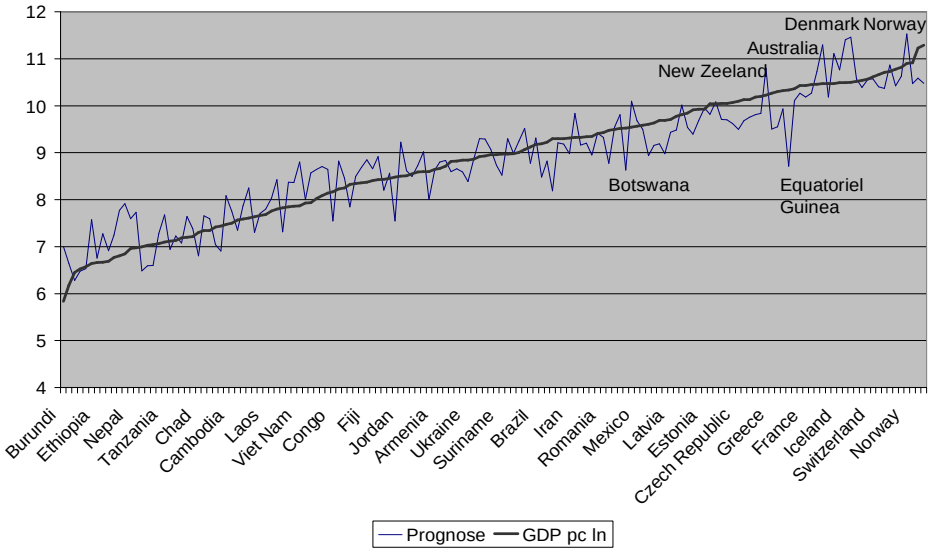

Fig. 4. *The real economic development and expected level on the basis of all observed factors in the aggregated set of countries (step 3).*
Source: Compiled by authors

Hopefully, the further analysis will bring more clarity. The ideas of analysis development, what we looked at in connection with transition countries, need also more control, including more diversified accounting of natural resources. Also needs more explanation the dynamics of economic and human development deviations by analysis of corresponding time-series.

Conclusion

Our analysis supports the following:

1. Certainly, the mutual connection between human and economic development does not function automatically, but is influenced by country specific formal and informal, and private and public institutions.
2. The productivity of human capital is prospered first of all by free and secure economic system and abundant natural resources. Beside of formal legal and administrative regulation have essential role to play, sometimes even more important role, unwritten rules, including attitude to corruption.
3. The research results are relatively robust, because find confirmation on the data of the transition countries as well on the aggregated set of world countries.
4. Further analysis deserve as institutional as well natural environment impacts from static as well from dynamic aspect.

Acknowledgements

This work has been supported by the Estonian Ministry of Science and Education foundation project No SF0180037s08.

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Annex 1. The factors of economic development in the world countries in year 2007 (ranking by economic development)

Country	Index of health	Index of Edu-cation	Index of Econo-mic Freedom	Index of freedom from corrup-tion	CIS mem-bers	Ln of oil produc-tion pc	Ln of GDP pc
1	2	3	4	5	6	7	8
Burundi	0.418	0.559	0.463	0.240	0	0	5.83
Guinea-Bissau	0.375	0.552	0.451	0.100	0	0	6.17
Niger	0.431	0.282	0.527	0.230	0	0	6.44
Sierra Leone	0.371	0.403	0.489	0.220	0	0	6.52
Central African Republic	0.361	0.419	0.482	0.240	0	0	6.57
Malawi	0.456	0.685	0.538	0.270	0	0	6.63
Ethiopia	0.496	0.403	0.532	0.240	0	0	6.66
Togo	0.620	0.534	0.488	0.240	0	0	6.67
Mozambique	0.380	0.478	0.566	0.280	0	0	6.69
Rwanda	0.412	0.607	0.541	0.250	0	0	6.76
Myanmar	0.603	0.787	0.395	0.190	0	0	6.81
Madagascar	0.582	0.676	0.624	0.310	0	0	6.84
Nepal	0.688	0.579	0.547	0.250	0	0	6.96
Uganda	0.449	0.698	0.644	0.270	0	0	6.97
Mali	0.385	0.331	0.555	0.280	0	0	6.99
Burkina Faso	0.462	0.301	0.556	0.320	0	0	7.02
Guinea	0.538	0.361	0.528	0.190	0	0	7.04

Country	Index of health	Index of Edu-cation	Index of Econo-mic Freedom	Index of freedom from corrup-tion	CIS mem-bers	Ln of oil produc-tion pc	Ln of GDP pc
1	2	3	4	5	6	7	8
Haiti	0.600	0.588	0.489	0.180	0	0	7.05
Tanzania	0.500	0.673	0.564	0.290	0	0	7.10
Gambia	0.511	0.439	0.566	0.250	0	0	7.11
Bangladesh	0.678	0.530	0.449	0.200	0	0	7.12
Benin	0.601	0.445	0.550	0.250	0	0	7.18
Ghana	0.525	0.622	0.567	0.330	0	0	7.20
Zambia	0.326	0.682	0.564	0.260	0	0	7.21
Chad	0.393	0.334	0.477	0.200	0	4.26	7.30
Lesotho	0.332	0.753	0.519	0.320	0	0	7.34
Kenya	0.477	0.690	0.596	0.220	0	0	7.34
Senegal	0.506	0.417	0.582	0.330	0	0	7.42
Côte d'Ivoire	0.531	0.450	0.549	0.210	0	0	7.43
Tajikistan	0.691	0.896	0.545	0.220	1	0	7.47
Cambodia	0.593	0.704	0.562	0.210	0	0	7.50
Mauritania	0.526	0.541	0.550	0.310	0	0	7.56
Nigeria	0.378	0.657	0.555	0.220	0	4.35	7.59
Kyrgyzstan	0.710	0.918	0.611	0.220	1	0	7.60
Djibouti	0.501	0.554	0.523	0.300	0	0	7.63
Cameroon	0.431	0.627	0.540	0.230	0	3.11	7.66
Laos	0.659	0.683	0.492	0.260	0	0	7.68
Yemen	0.624	0.574	0.528	0.260	0	4.26	7.76
Uzbekistan	0.711	0.888	0.523	0.210	1	2.90	7.79
Pakistan	0.687	0.492	0.568	0.220	0	0	7.82
Moldova	0.722	0.899	0.584	0.320	1	0	7.84
Nicaragua	0.795	0.760	0.600	0.260	0	0	7.85
Viet Nam	0.821	0.810	0.498	0.260	0	2.95	7.86
India	0.639	0.643	0.542	0.330	0	1.16	7.92
Guyana	0.691	0.939	0.494	0.250	0	0	7.93
Cape Verde	0.769	0.786	0.584	0.400	0	0	8.02
Mongolia	0.687	0.913	0.628	0.280	0	0	8.08
Philippines	0.777	0.888	0.569	0.250	0	0	8.13
Congo	0.474	0.736	0.452	0.220	0	0	8.16
Indonesia	0.758	0.840	0.539	0.240	0	3.05	8.22
Honduras	0.783	0.806	0.602	0.250	0	0	8.24
Morocco	0.767	0.574	0.564	0.320	0	0	8.32
Bolivia	0.673	0.892	0.532	0.270	0	0	8.34
Sri Lanka	0.816	0.834	0.583	0.310	0	0	8.35
Fiji	0.728	0.868	0.615	0.400	0	0	8.37
Paraguay	0.778	0.871	0.605	0.260	0	0	8.40
Syria	0.818	0.773	0.466	0.290	0	4.56	8.41
Guatemala	0.752	0.723	0.605	0.260	0	0	8.43

Country	Index of health	Index of Edu-cation	Index of Econo-mic Freedom	Index of freedom from corrup-tion	CIS mem-bers	Ln of oil produc-tion pc	Ln of GDP pc
1	2	3	4	5	6	7	8
Georgia	0.777	0.916	0.692	0.280	1	0	8.45
Swaziland	0.339	0.731	0.589	0.250	0	0	8.47
Jordan	0.790	0.870	0.630	0.530	0	0	8.50
Turkmenistan	0.661	0.906	0.434	0.220	1	5.28	8.51
Namibia	0.590	0.811	0.610	0.410	0	0	8.55
Egypt	0.749	0.697	0.592	0.330	0	3.75	8.58
China	0.799	0.851	0.528	0.330	0	2.64	8.59
Angola	0.359	0.667	0.471	0.220	0	6.17	8.59
Armenia	0.810	0.909	0.703	0.290	1	0	8.65
El Salvador	0.771	0.794	0.692	0.400	0	0	8.67
Jamaica	0.778	0.834	0.662	0.370	0	0	8.71
Dominican Republic	0.790	0.839	0.585	0.280	0	0	8.81
Belize	0.851	0.762	0.628	0.350	0	0	8.81
Cuba	0.891	0.993	0.275	0.350	1	0	8.84
Ukraine	0.720	0.960	0.511	0.280	1	0	8.84
Albania	0.858	0.886	0.633	0.260	0	0	8.86
Ecuador	0.833	0.866	0.554	0.230	0	5.29	8.92
Tunisia	0.813	0.772	0.593	0.460	0	3.82	8.93
Algeria	0.787	0.748	0.557	0.310	0	5.54	8.95
Bosnia and Herzegovina	0.834	0.874	0.537	0.290	0	0	8.96
Suriname	0.729	0.850	0.539	0.300	0	0	8.96
Peru	0.800	0.891	0.635	0.330	0	2.88	8.97
Azerbaijan	0.751	0.881	0.553	0.240	1	6.21	8.97
Thailand	0.728	0.888	0.635	0.360	0	2.94	9.00
Colombia	0.795	0.881	0.619	0.390	0	4.13	9.06
Macedonia	0.819	0.880	0.611	0.270	0	0	9.12
Brazil	0.787	0.891	0.559	0.330	0	3.86	9.17
South Africa	0.442	0.843	0.632	0.460	0	0	9.19
Lebanon	0.781	0.857	0.609	0.360	0	0	9.22
Belarus	0.733	0.961	0.447	0.210	1	0	9.29
Costa Rica	0.896	0.883	0.648	0.410	0	0	9.29
Kazakhstan	0.666	0.965	0.605	0.260	1	6.10	9.29
Iran	0.769	0.793	0.440	0.270	0	5.68	9.30
Uruguay	0.852	0.955	0.681	0.640	0	0	9.33
Bulgaria	0.802	0.930	0.629	0.400	0	0	9.33
Mauritius	0.785	0.839	0.723	0.510	0	0	9.33
Panama	0.842	0.888	0.647	0.310	0	0	9.34
Venezuela	0.811	0.921	0.450	0.230	0	6.18	9.41
Romania	0.792	0.915	0.615	0.310	0	3.15	9.42
Turkey	0.779	0.828	0.608	0.380	0	0	9.47
Argentina	0.836	0.946	0.551	0.290	0	4.48	9.49

Country	Index of health	Index of Edu-cation	Index of Econo-mic Freedom	Index of freedom from corrup-tion	CIS mem-bers	Ln of oil produc-tion pc	Ln of GDP pc
1	2	3	4	5	6	7	8
Malaysia	0.819	0.851	0.645	0.500	0	4.86	9.51
Botswana	0.473	0.788	0.686	0.560	0	0	9.52
Chile	0.891	0.919	0.798	0.730	0	0	9.54
Mexico	0.850	0.886	0.664	0.330	0	5.08	9.55
Libya	0.814	0.898	0.387	0.270	0	7.23	9.57
Russian Federation	0.686	0.933	0.499	0.250	1	5.85	9.59
Gabon	0.584	0.843	0.536	0.300	0	6.71	9.63
Poland	0.842	0.952	0.595	0.370	0	0	9.68
Croatia	0.850	0.916	0.546	0.340	0	0	9.68
Latvia	0.788	0.961	0.683	0.470	0	0	9.70
Lithuania	0.780	0.968	0.708	0.480	0	0	9.77
Barbados	0.867	0.975	0.713	0.670	0	0	9.80
Hungary	0.805	0.960	0.672	0.520	0	0	9.84
Slovakia	0.827	0.928	0.687	0.470	0	0	9.91
Bahamas	0.804	0.878	0.711	0.700	0	0	9.92
Estonia	0.799	0.964	0.778	0.670	0	0	9.92
Portugal	0.893	0.929	0.643	0.660	0	0	10.03
Oman	0.841	0.790	0.674	0.540	0	7.18	10.04
Saudi Arabia	0.794	0.828	0.628	0.330	0	7.60	10.04
Malta	0.910	0.887	0.660	0.640	0	0	10.05
Trinidad and Tobago	0.737	0.861	0.702	0.320	0	6.33	10.07
Czech Republic	0.856	0.938	0.685	0.480	0	0	10.09
Cyprus	0.910	0.910	0.713	0.560	0	0	10.12
Korea	0.904	0.988	0.679	0.510	0	0	10.12
Israel	0.928	0.947	0.661	0.590	0	0	10.18
Slovenia	0.886	0.969	0.606	0.640	0	0	10.19
New Zealand	0.919	0.993	0.802	0.960	0	0	10.22
Greece	0.902	0.981	0.601	0.440	0	0	10.26
Bahrain	0.843	0.893	0.722	0.570	0	0	10.30
Italy	0.935	0.965	0.625	0.490	0	2.30	10.32
Equatorial Guinea	0.415	0.787	0.525	0.210	0	8.01	10.33
Spain	0.929	0.975	0.697	0.680	0	0	10.36
Japan	0.961	0.949	0.725	0.760	0	0	10.42
France	0.933	0.978	0.654	0.740	0	0	10.42
Germany	0.913	0.954	0.712	0.800	0	0	10.45
Finland	0.908	0.993	0.748	0.960	0	0	10.45
Australia	0.940	0.993	0.820	0.870	0	4.74	10.46
Belgium	0.908	0.974	0.715	0.730	0	0	10.46
United Kingdom	0.906	0.957	0.795	0.860	0	4.84	10.47
Iceland	0.946	0.980	0.765	0.960	0	0	10.48
Canada	0.927	0.991	0.802	0.850	0	6.18	10.49

Country	Index of health	Index of Edu-cation	Index of Econo-mic Freedom	Index of freedom from corrup-tion	CIS mem-bers	Ln of oil produc-tion pc	Ln of GDP pc
1	2	3	4	5	6	7	8
Denmark	0.887	0.993	0.792	0.950	0	5.64	10.49
Sweden	0.930	0.974	0.704	0.920	0	0	10.51
Austria	0.915	0.962	0.700	0.860	0	0	10.53
Netherlands	0.914	0.985	0.768	0.870	0	0	10.56
Switzerland	0.945	0.936	0.797	0.910	0	0	10.61
Hong Kong	0.953	0.879	0.903	0.830	0	0	10.65
Ireland	0.911	0.985	0.824	0.740	0	0	10.71
United States	0.902	0.968	0.806	0.730	0	4.61	10.73
Kuwait	0.875	0.872	0.683	0.480	0	8.40	10.78
Singapore	0.920	0.913	0.874	0.940	0	0	10.81
Norway	0.925	0.989	0.690	0.880	0	7.84	10.89
United Arab Emirates	0.872	0.838	0.628	0.620	0	8.04	10.91
Qatar	0.841	0.888	0.622	0.600	0	8.49	11.22

Sources: HDR 2009, Heritage Foundation, DICE

CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 26-36

Marian Żukowski[*], Helena Żukowska[**]

REASONS FOR FINANCIAL CRISES IN THE CONTEXT OF THE MORTGAGE MARKET CRISIS

Abstract

The following paper addresses the question whether the recent mortgage crisis is a cause or an effect of the global financial crisis of 2007-2009. According to authors of the paper mortgage market is not considered to be the main reason of present financial crisis. A wide spectrum of others factors that has evoked financial system instability in 2007-2009 is presented.

Keywords: financial crisis, financial markets, mortgage market, financial market disruption
JEL: G01

> *„Financial markets are in constant conflict. This war has been going on from their beginnings, that is from the onset of the commodity and money economy until nowadays. There is no end to this war: the struggle for profits lasts 24 hours a day, 7 days a week, and 365 days a year.*
> (Lundell D., 1999, Sun Tzu's Art of War for Traders and Investors, p.IX.)
> *„Conflicts on the financial market sometimes end in spectacular financial crashes."*
> (Pietrzak B., Polański Z., Woźniak B. (2008),System finansowy, p.275)

The following paper addresses the question whether the recent mortgage crisis is a cause or an effect of the global financial crisis of 2007-2008.

Financial crises have occurred in the economy since the close of the 17th c. They appear irregularly, and each time they come unexpected, ruining the established order on the financial market. Transactions on the financial market are carried out by means of financial instruments. The basic elements of the financial market are: market entities, objects of transactions, entities supporting the operation of the market (a financial safety net), as well as principles of conducting transactions on the financial market. Depending on the

[*] The John Paul II Catholic University of Lublin, Poland ; marian.zukowski@kul.pl
[**] The John Paul II Catholic University of Lublin, Poland; helena.zukowska@kul.pl

transaction object, financial markets can be divided into money markets, capital markets, foreign exchange markets and derivatives markets. Financial market institutions include:

- financial intermediaries, transaction participants (buying and selling financial assets),
- safety net institutions, necessary for the secure functioning of the financial market (supervisory and regulatory institutions, establishments which increase market transparency, rating agencies, institutions protecting market participants).

An important area of the financial market covers the principles of its functioning – **rules of the financial market.** There are three kinds of rules governing the operation of the market: regulations specified by legal acts, standards established by the financial system entities, and customs shaped in the course of time (Jajuga, 2007).

The operation of the financial market must be safe and stable owing to its significance to the economic and social system, and due to imperfections of the financial market (asymmetric information, moral hazard and adverse selection). Moreover, the financial market stability is regarded as public good. Thus, for the reasons mentioned above, state intervention is needed in the operation of the financial market. Institutions of the financial market are supported with the institutional infrastructure of the financial system, usually established on the initiative of the state (safety net institutions).

The desired condition of the financial market is its stability, defined in a number of ways:

- as a condition of dynamic and continuous equilibrium on interconnected financial markets (Solarz, 2001, pp. 195-200),
- as a condition when the financial market does not exhibit regularly a loss of liquidity (Crockett & Jackson, 1997, pp. 8-14),
- as development in the circumstances of no financial crisis (NBP, 2004, p. 3).

Financial crises are defined in various manners – as e.g.:

- overtrading (Smith, 1776)
- banking panic, market rush, market euphoria (Pigou, 1927)
- a situation when the bankruptcy of one bank creates an atmosphere of distrust around other banks and brings ruin to banks which are actually in good condition (Marshall, 1923, p. 305),
- speculations turning into rushes and crashes with the „inherent" instability of credit (Hansen, 1957),
- an effect of mistakes in the monetary policy, i.e. errors in money creation which is incompatible with changes of production volume (Schwatz & Friedman, 1963),
- a situation when markets whose normal functioning is just right get caught in a trap and a banking panic follows (Kindleberger, 1999),
- a process of the financial market disruption, where due to market imperfections (adverse selection and moral hazard in the circumstances of asymmetric information) the financial markets no longer fulfil their role of a channel through which financial resources are efficiently allocated to the best investors (Mishkin, 1990, p. 42),
- a situation when the financial system does not carry out its functions,
- a situation when a considerable group of financial institutions have in their balance sheets liabilities exceeding the market value of assets (Sundararajan & Balino, 1991, p. 3),

- episodes of abrupt changes on the financial markets, connected with liquidity deficit and insolvency of market participants and (or) interventions of state authorities which are to prevent them (Bordo et al., 2000, p. 22),
- strong disturbances in the financial intermediation system, causing disruptions in the real sphere of the economy (Sławiński, 2002, p. 175),
- a consequence of shaking the confidence in the stability of the whole economy, the financial system, the stability of the financial market (its particular elements – financial intermediaries, prices of financial instruments, rules of the market's operation), the ability to maintain equilibrium in balance of payments by a given state (Mishkin, 2002, p. 8),
- an abrupt change (a decline/increase) in assets prices, leading to a crisis situation of financial market participants (Eichengreen, 2004),
- a situation in which the financial markets are unable to manage risk properly (Stiglitz, 2008).

A financial crisis is inability of the financial system to (Schinasi, 2006):

a) perform the functions allocated to it,
b) conduct transactions in confidence and at prices which are not subject to considerable short-term fluctuations,
c) eliminate external shocks affecting the financial system,
d) allocate efficiently financial resources of the economy,
e) identify and manage efficiently risks in the financial system.

We should remember that crises always come unexpected. We can foresee some standard phenomena, but not disasters which happen for the first time. Some events occurring in the global economy in recent times were alarming and difficult to explain. They informed about certain unfamiliar processes taking place in the economy, but were not interpreted correctly. These phenomena are:

– A drop in the value of the dollar in relation to other currencies (the majority of them),
– An abrupt increase in prices of oil and other resources (signalling that a "speculative bubble" is emerging),
– A steady growth in prices of financial assets on the financial markets,
– Profits of the financial sector higher than in other sectors of the economy (rate of return of certain hedge funds was approaching even 900% annually),
– A growth in managers' wages (mainly in the financial sector), not related to their work effort,
– A rapid development of financial innovations (securitization and new financial instruments).

It is hard to agree with a thesis that the mortgage market gave rise to the crisis of 2007-2008. The ongoing crisis on the financial markets has much deeper causes. The crisis originated formally in the mortgage market crash, but the reasons for the current crisis are:

– Globalization of the financial markets at the lack of global democracy, global regulations and global safety net,
– Global imbalances (disproportions between the real and the financial sphere, the countries - debtors and creditors, the rich and poor countries),
– Flaws of the economic policy in globally dominant economies (low interest rates in the USA, generating huge money supply in the USA due to the development of

securitization, and, at the same time, enormous reserves of the American currency in Japan, China and other countries, as a consequence a decrease in value of the American dollar in relation to other currencies, a corresponding deficit in the USA – balance of payments and a growing deficit of the federal budget),
- Greed and maximization of profits (both individual and corporate ones). Aiming at profits maximization and moral hazard led to the emergence of systemic risk,
- Financial markets aiming at privatization of profits and nationalization of losses,
- Taking risk, disregarding it, then shifting it onto others and concealing its effects,
- Complicated financial instruments, whose construction and consequences were not fully understood even by their creators,
- The financial safety net which was incomplete and ill-suited to the development level of the financial markets. A safety net can be an automatic regulatory factor of financial stability, on condition that it keeps up with the development of the financial market,
- Speculative bubbles on the financial assets market and resources market, on an unprecedented scale, intensified by the mechanism of financial leverage,
- Standards (methods) of valuating assets, liabilities and financial instruments, which enable creation of huge profits when prices of financial assets are going up, but cause havoc in balance sheets of enterprises and financial institutions (leading even to their bankruptcies) when prices drop rapidly on the financial markets (valuation by means of the market value method),
- Lack of responsibility for wrong decisions on the financial markets,
- Widespread decrease of confidence (in the government, the central bank and other banks),
- Looking for liquidity, which enforced mass selling of financial assets and caused a rapid decline in prices of these assets (deflation of assets),
- Freezing of the markets will lead in the long run to collapse of investments and to severe recession, whose depth will be conditional on the time the financial markets will rebuild confidence and resume credit creation and investors will be optimistic in estimating the prospects of their investments.

The scale and depth of the financial crisis of 2007-2008 convinced everyone that it is necessary to validate both the rules of the financial market's operation and relations between the market and the state, including the range of the state influence on the financial market. Economists do not agree who is to blame for the current crisis:

- is it the market which is not a perfect mechanism of allocation of resources due to financial market imperfections that need to be compensated for with actions of the state?
- are these institutions of the state which, through their policy aimed at long-term economic growth, led to the deformation of the financial market?

In everyday language the „state" is understood as central and local public institutions and their activity to the benefit of the society and the economy. The activity of these institutions can be categorised according to three functions: social, political and economic. The range of the economic function of the state can vary a lot, but the presence of the state in the economy is justified by the need to eliminate market imperfections, to establish a legal framework for the proper functioning of the society and the economy, to remove

negative external effects of economic activity, on account of public goods, to protect the weakest members of the society, and to stabilize the economy (Kurczewska, 2009).

The role of the state in the society and the economy is one of the key distinguishing factors in the main trends of the economic theory. The dispute concerns not only the character of the state activity in the economic system, but also touches upon the degree of participation of the market and the state in allocation of resources in the economy. While certain trends (e.g. Marxism) assign some major tasks in the economic and social life to the state, others (e.g. liberalism) tend to reduce the role of the state in the society. Between these two extreme positions there are many branches of economics, attributing very different scope of activity to the institution of the state. Advocates of the strong involvement of the state in the social and economic life point to market imperfections (imperfect competition, public goods, production of harmful goods, incomplete markets, asymmetric information). On the other hand, supporters of the market mechanism point to the government failure and numerous deficiencies in the functioning of public institutions.

The bigger or smaller role of the state in the economy means exchangeability with market forces. Advocates of the free market argue that the competitive, free-market economy brings many benefits, and the „invisible hand of the market" guarantees high economic efficiency achieved in a natural way. In contrast, economists representing other schools of thought claim it is a duty of state institutions to carry out the economic policy (including fiscal and monetary policies) and to stimulate economic growth. Such an approach to the role of the state in the economy was characteristic of mercantilism, which reserved for the state also the area of customs protectionism. The physiocrats supported economic liberalism and emphasized the role of the market and freely fluctuating prices as a perfect mechanism of resources allocation in the economy. According to the classical economics and its eminent representative Adam Smith, private ownership and unrestricted market give wealth to the state and affluence to the individual (*homo economicus) (Smith, 1954)*. The activity of the state should be limited to the function of a „night watchman". Another representative of the classical economics, David Ricardo, was the first to signal the „crowding out" of private sector investment by public expenditure. The classics who wrote about the role of the state emphasized its vital political functions (national defence, as well as protection of ownership, public order, freedom of citizens and competition). The state should be strong, but intervening in the economy only to a small extent.

John Maynard Keynes and his followers also favoured state intervention in special circumstances (Keynes, 1936). In their opinion, the government's responsibility and goal is to ensure sustainable, long-term economic growth, through a fiscal policy. By means of a revenue and expenditure policy and implemented formal conveniences, the state launches investment programmes and influences production of goods, provision of services, and citizens' consumption. The state can take actions which determine the economic equilibrium and, in consequence, employment. The state intervention in the market economy does not have an obligatory character for enterprises. It should stimulate them through economic methods to guide their actions in the right direction, from the point of view of long-term social goals. According to Keynes, the economy left on its own will repeatedly fall into imbalances. Thus, the active role of the state in the economy is necessary.

Keynesianism was followed by monetarism which indicated another important area of the state activity, i.e. the monetary policy. While criticizing the policy of stimulating global

demand, the monetarists advocated assigning the monetary policy to the central bank and the fiscal policy to the government. On the other hand, promoters of neoliberalism criticized intervention of the state in the economy and suggested limiting its role to fighting inflation. Similarly, restriction of the function of the state in the economy was recommended by representatives of the new classical economics (R. Lucas), the Real Business Cycle Theory (R. Barro), and the new Austrian School (L. von Mises). It is also worth mentioning the institutional economics school which distinguishes two areas of the state activity (real and regulatory ones). Advocates of this theory support the strong involvement of the state, but in the regulatory area (and not in the real area) (Skawińska et al., 2008, pp. 17-27).

In the current circumstances of the global financial crisis, the question which role can – and should – be performed by the state has to be asked once again. In the economic literature there are many arguments in favour of the active role of the state in reinforcing stability on the financial markets. These arguments are generally known and they refer to the duties of the state connected with the need to ensure an effective economic system in terms of its legal side and institutional and organizational issues (Schumpeter, 1960). Most importantly, the state should establish legal norms and institutions protecting property rights, regulating private entrepreneurship and guaranteeing economic freedom. It is also a duty of the state to prevent such phenomena as: unreasonable use of productive capacity, large downswing in economic activity, unemployment and inflation, which result in destabilization of the economy and excessive social disparities. Another responsibility of the state is to determine the scope of public and private ownership, which facilitates the rational allocation of economic resources, maximization of social welfare, and efficient use of production factors. The state is also responsible for promoting rules of ethical behaviour in the economy and eliminating such pathological phenomena as corruption or lobbing. State institutions should monitor the processes taking place in the economy (also in the financial system) and, when there is risk of disturbances on the financial markets, should try and prevent their escalation.

The role of the state in the process of ensuring financial stability is hard to overestimate. The state is the last, and frequently the only authority able to exert substantial impact on the market. Moreover, the state can establish and make use of necessary institutions and instruments enhancing the stability of the financial market. The state has as its disposal some instruments suitable for integration of autonomous national institutions, thus promoting the financial stability and, in consequence, improving the economic security (Skawińska et al., 2008). Besides taking immediate actions to prevent disturbances of the financial stability (as e.g. “fiscal packages”, popular in 2008), the state should aim at creating the conditions of safety on financial markets.

According to the Basel Committee on Banking Supervision, the macroeconomic determinants of the financial markets’ stability belong, in principle, to the scope of operation of state institutions, as well:

- a healthy and steady macroeconomic policy, suited to the needs of the economy and leading to sustained economic growth;
- well-developed public infrastructure, i.e. a system of economic law which creates favourable conditions for entrepreneurship, accounting rules and principles which conform to international standards and guarantee financial transparency of companies, an independent auditing system for financial settlements of larger companies,

effective financial supervision, well-defined rules of operation of the financial markets, secure and efficient payments and settlements system for financial transactions with controlled risk associated with the transaction partner,
- efficient market discipline (ensuring market transparency, competitive conditions on the market, good information flow to market participants, and accountability for managing financial institutions);
- efficient procedures in case of bank problems (creating the conditions for gradual withdrawal of problem institutions from the market, carrying out the restructuring, possibly recapitalization),
- mechanisms of ensuring a proper level of system protection (for depositors, investors or consumers of financial services).

Another important task of the state is building a safety net which can be an automatic factor regulating financial stability. A safety net is a group of institutional solutions and regulations whose aim is to protect the financial system against destabilization (creating conditions of financial stability) (Żukowska, 2007, p. 8). The safety net can be viewed in a broad or a narrow sense. In its broad meaning, the safety net comprises all institutions, legal regulations and codes of good practices of the financial market, protecting the economy and the general public against the effects of liquidity loss and insolvency of financial institutions. In its narrow sense, the safety net consists only of institutions dealing with the banking system (the central bank, banking supervision – more and more frequently integrated with financial supervision – and a system of guaranteeing deposits).

One of the significant responsibilities of the state is modification of the safety net to follow the changes occurring on the financial market and around. Poor adjustment of the safety net architecture to the development of the financial market and to the conditions of its functioning can be a catalyst for a financial crisis. The current safety net is not prepared to operate in the circumstances of globalization of the financial markets. There is no international Lender of Last Resort, there are national models of supervision and protection of depositors, national systems of crisis management, and there are no rules or mechanism of sharing fiscal costs of restoring the financial market's stability. Thus, major changes in safety net institutions are necessary, initiated both on the national and global level.

The financial crisis, which became stronger in the second half of 2008, stimulated a search for the solutions that would offer better protection of the financial system's stability. The state has as its disposal various instruments of crisis management. These actions can be divided into two groups: overcoming the crisis (crisis management) and preventing another one (crisis prevention).

The crisis management function covers actions which can be classified into the following three groups:

1) short-term actions (overcoming panic on the market and reconstructing the liquidity of the financial market, of a market segment, or of financial institutions important to the financial market; actions preventing spread of the financial crisis to other (healthy) institutions, segments of the market and the whole economy (causing recession),
2) medium-term actions (eliminating effects of the financial crisis, repair and restructuring actions in the financial system, including the banking system),
3) long term actions (eliminating causes of the crisis, preventing another crisis).

Panic on the financial market can be stopped in several ways: by the market itself – market participants will notice the undervaluation of assets and will start buying them,

administrative close – e.g. closing down a stock-exchange, banking „holidays", restoring confidence in the market by the Lender of Last Resort, introducing deposit guarantees and raising them, introducing government guarantees for transactions on the interbank market, and other actions. An important element of curbing panic is an information policy of the government and of the central bank.

Owing to the fact that in the crisis situation it is cash that is the most sought after financial asset, it is vital to rebuild the liquidity of the financial market. This should be done while maintaining the standards of providing liquidity to individual banks by the central bank in the function of the Lender of Last Resort. The problem of emergency supply of liquidity to the banking system is whether it is the market or individual financial institutions that should be provided with liquidity. In practice, it is often hard to determine which approach should be adopted in particular situations and to distinguish clearly between the two (Borio, 2004). In general, financial supply to individual institutions should be adopted when:

a) it is highly probable that the systemic risk will become materialized,
b) there is no alternative to using funds of the central bank,
c) moral hazard is excluded,
d) reliability and accountability of the central bank is not threatened.

Nevertheless, in the situation of a global financial crisis, financial resources of central banks are deeply inadequate (especially in small economies and when there are cross-border banks in the banking system). Central banks are searching for other ways to restore liquidity of the financial system, e.g. guarantees (of the central bank or the government) for transactions on the interbank market. Central banks give up the Lender of Last Resort function (that is, providing liquidity to individual banks) in favour of the Market Maker of Last Resort (providing liquidity to the market).

The aim of **the crisis prevention function** is to eliminate possible causes of crises, which comes down (in a simplified way) to the following actions:

- at the macroeconomic level: ensuring monetary stability, pursuing „good" economic policy adjusted to the business cycle and taking into account „delays" and limitations in the economic policy - e.g. the trinity of impossible, pursuing a stabilization policy,
- at the financial system level: monitoring systemic risk, preventing the emergence of „speculative bubbles" on the real assets market and financial assets market, adjusting the safety net to the developing financial market,
- at the microeconomic level: preventing panic on the market, maintaining good management standards, creating order on the market, ensuring market discipline.

Thus, as the crisis prevention, the following three types of actions should be undertaken:

a) Correct identification and monitoring of instability symptoms,
b) Designing strategies aimed at easing crises,
c) Preventing causes of crises (building financial stability).

The causes of a financial crisis are usually accumulated and are impossible to eliminate by forces of the market mechanism itself. For the analytical purposes, the reasons for crises can be classified into several groups. However, when a crisis occurs, it is typically occasioned by numerous reasons, linked with feedback. The causes of financial crises are (Żukowska, 2007):

1) **Macroeconomic reasons, including these of the foreign character:**
   – Reasons at the international level – globalization of the financial market at the lack of global state institutions and global safety net, deregulation which enables creation of systemic risk, liberalization of capital flows, contagion of bank systems in other countries with the crisis,
   – Reasons at the macroeconomic level of a given financial system – an unfavourable macroeconomic situation, recession, the character of pursued economic policy, deficiencies in coordination of the economic policy (partial policies) in globalization conditions – the trinity of impossible, insufficient demand, contagion with financial crisis on the part of the economic crisis, a foreign exchange policy not adjusted to other areas of the economic policy and conditions of the economy, macroeconomic imbalances at the national and global level, separation of the financial sphere from the real sphere of the economy (global financial assets exceed almost tenfold real assets), inadequate market discipline, and others,
2) **Mezzoeconomic reasons, concentrated around the financial system (the financial market and its segments, financial instruments),** regulation of the financial system (insufficient or excessive), safety net institutions which are deficient or do not work properly, inadequate ownership supervision, inability to manage risk at the level of the whole financial system (systemic risk), unjustified decline or rise in assets prices (speculative bubbles), imperfections of the financial market (moral hazard, adverse selection and asymmetric information),
3) **Microeconomic reasons (at the level of individual markets, institutions and financial instruments)** – poor management of institutions from the real and financial sectors, inability to manage risk at the level of entities, innovations on the financial market (financial derivative instruments, securitization),
4) **Psychological factors, that is behaviour of the financial market participants affected by asymmetric information, moral hazard and adverse selection** (panic on the market, herd behaviour and imitation, lack of confidence in the financial system, greed, "casino" behaviour).

It appears that in fighting crises, both at the time of peace on financial markets (crisis prevention in the conditions of stability) and at war (crisis management), the state plays a major role. The state has to determine the conditions of the financial market's functioning, defend the established rules of the market's operation, and protect all market participants against imperfections and irregularities on the market. According to the New Institutional Economics, the role of the state in the social and economic life consists in establishment of efficient institutions (based on rules):

a) institutions creating the market (ownership protection, creating the conditions for fair competition, market discipline),
b) institutions stabilizing the market (safety net),
c) regulatory institutions (issuing regulations – formal law and common law),
d) protective institutions (defending the rights of the weakest participants of the financial market).

To sum up, it should be stated that there are no easy answers to the question about the reasons for financial crises. Neither the financial market nor its narrow segment – the mortgage market – can be identified as occasioning the crisis. The crisis of 2007-2008, a financial crisis on a global scale, has been caused by the accumulation of numerous reasons

paralyzing the financial market mechanism which – at a smaller scale of the reasons – would be able to neutralize disturbances on the financial market. Nevertheless, the financial market, frequently called „the risk market", must be organized once again with a considerable share of the state, in order to prevent materialization of systemic risk. The relation between the state (regulation) and the financial market must be shaped taking into account the experiences of the current crisis, but also bearing in mind that the market is the best mechanism of resources allocation in the economy and transformation of savings into investments. It is also essential to determine again the order on the market in the financial sphere. Let all participants of economic relations perform their duties as well as they can – citizens sell their work, entrepreneurs produce goods and render services, sellers trade in goods and services, financial institutions sell financial services (and not illusions) on the market, whose rules are formulated by the state. The state should establish clear rules of the financial market's operation, in regulations restricting the impact of market weaknesses (asymmetric information, moral hazard, adverse selection), ensure that the rules are observed and eliminate „fraudsters" from economic relations.

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M I S C E L L A N E A

CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 37-41

Michał Kolupa[*], Zbigniew Śleszyński[**]

SOME REMARKS ON COINCIDENCE OF AN ECONOMETRIC MODEL

Abstract
In this paper concept of coincidence of variable and methods for checking coincidence of model and variables are presented. Particularly Hellwig's hypothesis and methods for constructing model with difference compensators are described. It makes possible keeping non coincidentional variables in model.

Keywords: matrix, variables, vector, coefficient, econometric model, coincidence
JEL: C01

Problem of coincidence of an econometric model is very important. Usually lack of variable coincidence means lack of possibility for correct interpretation of structural parameters estimation. Many econometricians were working with this problem. This article describes the most important achievements concerning coincidence of variable and model.

In the paper an econometric model is considered

$$Y = \alpha_1 Z_1 + \alpha_2 Z_2 + \ldots + \alpha_k Z_k + e \tag{1}$$

Its variables are standardized.

Given is a matrix of observations and all variables of the model (1)

$$Q = [Z \quad y] \tag{2}$$

where matrix Z is of order $n \times k$ (its rank equals k) and y is an n – dimensional vertical vector.

Because variables of the model (1) are standardized hence:

$$\frac{1}{n} Z^T Z = R(k) \quad \frac{1}{n} Z^T y = R_0(k) \tag{3}$$

The matrix $R(k)$ and the vector $R_0(k)$ are matrix and vector of correlation coefficients between variables in pair respectively (Z_i, Z_j) and (Z_i, Y) $i, j = 1, 2 \ldots k$. In other words coefficients $r_{ij} = r(Z_i, Z_j)$ are elements of the matrix $R(k)$ and $r_i = r(Y, Z_i)$ are components of the vector $R_0(k)$.

[*] Technical University of Radom, Poland;
[**] Technical University of Radom, Poland; z.sleszynski@pr.radom.pl

Henceforth we shall talk about a pair of correlation $\left(R(k), R_0(k)\right)$. It is a regular pair if (see (Hellwig, 1976))

$$0 < r_1 \leq r_2 \ldots \leq r_k \tag{4}$$

The pair of correlation exists if and only if $r^2 \in [0,1]$ where (Hauke & Pomianowska, 1987)

$$r^2(k) = R_0^T(k) R^{-1}(k) R_0(k) \tag{5}$$

This coefficient is measuring "quality" of model (1) or the correlation pair $\left(R(k), R_0(k)\right)$.

Estimation of a_i of parameters α_i of the model (1) obtained by LSM are components of the vector $A(k)$ satisfying the system:

$$R(k)A(k) = R_0(k) \tag{6}$$

The problem of coincidence of the model (1) (or of the correlation pair $\left(R(k), R_0(k)\right)$) has been given by Z. Hellwig in his paper (Hellwig, 1976).

Definition 1
The explanatory variable Z_i $(1 \leq i \leq k)$ of the model (1) has the property of coincidence if

$$\operatorname{sign} a_i = \operatorname{sign} r_i \tag{7}$$

Where a_i and r_i are components of vectors respectively $A(k)$ and $R_0(k)$.

Definition 2
If the relation (7) is satisfied for all $I = 1, 2 \ldots k$ then the model (1) (or the correlation pair $\left(R(k), R_0(k)\right)$) has the property of coincidence.

Of course, if the pair $\left(R(k), R_0(k)\right)$ is regular then (7) leads to

$$\operatorname{sign} a_i = +1 \tag{8}$$

In other words the model (1) (or the correlation pair $\left(R(k), R_0(k)\right)$) has the property of coincidence if and only if all components of the vector $A(k)$ are positive. M. Kolupa has proved that the explanatory variable Z_i $(1 \leq i \leq k)$ of the model (1) has the property of coincidence if and only if

$$r_i > \rho_i R_{ii}^{-1} R_{0i} \tag{9}$$

Where ρ_i is the i – th row of matrix $R(k)$ without its i – th element, matrix R_{ii} is obtained by dropping the i – th row and i – th column of matrix $R(k)$ and the vector R_{0i} is created by dropping the i – th component of the vector $R_0(k)$ (Kolupa, 1980).
In order to utilize the inequality (8) we use a bordered matrix

$$U_i = \begin{bmatrix} R_{ii} & R_{0i} \\ \rho_i & r_i \end{bmatrix} \tag{10}$$

The matrix U_i is transformed into matrix U_i^* by elementary transformations as follows:

α - the matrix R_{ii} is transformed to an upper triangular one with its diagonal elements equal 1

β - the vector ρ_i is transformed to a zero vector

Hence

$$U_i \approx U_i^* = \begin{bmatrix} R_{ii}^* & R_{0i}^* \\ 0 & d_i \end{bmatrix} \tag{11}$$

where

$$d_i = r_i - \rho_i R_{ii}^{-1} R_{0i} \tag{12}$$

If $d_i > 0$ ($d_i < 0$) then explanatory variable Z_i has the property of coincidence (has not this property). The theory of bordered matrices and their applications is given in monograph (Kolupa & Szczepańska-Gruźlewska, 1991).

The property of coincidence of the model (1) allows to give a proper economical interpretation of estimators of the model's parameters. It explains the interest taken for the coincidence property. Z. Hellwig has defined an universal matrix in paper (Hellwig, 1976) as follows.

Definition 3

Matrix $G(k) = \lfloor g_{ij} \rfloor_{k \times k}$ where

$$g_{ij} = \begin{cases} 1 \quad for \quad i = j \\ r_i r_j \quad for \quad i \neq j \end{cases} \tag{13}$$

is called an universal one.

The properties of this matrix are given in (Kolupa, 1980). In 1976 Z. Hellwig has given the following hypothesis:

If

$$I(k) < R(k) < G(k) \tag{14}$$

where $I(k)$, $R(k)$, $G(k)$ are matrices of order $k \times k$ respectively unit, correlation and universal, then an econometric model described by a regular correlation pair $(R(k), R_0(k))$ has the property of coincidence.

Many interesting results concerned with Hellwig's hypothesis have been obtained and they are presented in (Kolupa, 1980). Hellwig's hypothesis was proved by M. Kolupa (see (Kolupa, 1996)).

Because the property of coincidence is very important for practice it is the reason for treating it. This property is reached by elimination from the model (1) of non – coincidentional variables. It is not good procedure as can be seen from the following example.

Let us consider a model given pair of correlations:

$$R(3)=\begin{bmatrix} 1 & 0 & 0{,}1 \\ 0 & 1 & 0 \\ 0{,}1 & 0 & 1 \end{bmatrix} \quad R_0(3)=\begin{bmatrix} 0{,}01 \\ 0{,}2 \\ 0{,}3 \end{bmatrix} \tag{15}$$

This model is non – coincidential, because:

$$\operatorname{sign} a_1 = -1 \quad \operatorname{sign} a_2 = +1 \quad \operatorname{sign} a_3 = +1 \tag{16}$$

The explanatory variable Z_i is eliminated from the model (15). We obtained a model described by a new pair:

$$R_1(2)=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad R_{01}(2)=\begin{bmatrix} 0{,}2 \\ 0{,}3 \end{bmatrix} \tag{17}$$

which has property of coincidence. The same result can be obtained by elimination from the model (15) of variable Z_3 which has the property of coincidence in the model given by the pair (14).

Z. Hellwig has introduced a new concept how to guarantee the property of coincidence of the model (1) without elimination of explanatory variables which have not the property of coincidence (Hellwig, 1987).

Without loss of generality we suppose the non – coincidental variables in the model (1) are $Z_1, Z_2 \ldots Z_f$ and the coincidental ones are $Z_{f+1} \ldots Z_k$. Among variables $Z_{f+1} \ldots Z_k$ we pick out one for example $Z_t \ (f+1 \le t \le k)$ and put:

$$v_i = Z_t - Z_i \quad \text{for} \quad \text{i} = 1,2 \ldots f \tag{18}$$

$$v_j = Z_j \quad \text{for} \quad \text{j} \neq \text{t},\ \text{j} = f+1, \ldots t \tag{19}$$

We obtain a new model described by the pair $\left(\overline{R}(k), \overline{R}_0(k)\right)$. Its explanatory variables are ones given in (18) and (19). The variables given by (18) are called Hellwig's difference compensators. For this reason the model described by the pair $\left(\overline{R}(k), \overline{R}_0(k)\right)$ is called a model with compensators (Kolupa & Śleszyński, 1989). Its quality is given by the coefficient $\overline{r}^2(k)$ where

$$\overline{r}^2(k) = \overline{R}_0^T(k)\overline{R}^{-1}(k)\overline{R}_0(k) \tag{20}$$

Let b_i $I = 1, 2 \ldots k$ denote components of the vector $B(k)$ satisfying the system

$$\overline{R}(k)B(k) = \overline{R}_0(k) \tag{21}$$

Hence (Kolupa & Marcinkowska-Lewandowska & Radzio, 1991), (Kolupa & Radzio, 1991) (Radzio, 1991)

$$b_i = -d_{it} a_i \quad i = 1,2 \ldots f \tag{22}$$

$$b_j = a_j \quad j \neq t,\ j = f+1, \ldots k \tag{23}$$

$$b_t = a_1 + \ldots + a_f + a_t \tag{24}$$

where

$$d_{it} = r(Z_t, Z_i) \quad i = 1,2 \ldots t \tag{25}$$

From (22) (23) and (24) it can be seen that the model described by the pair $\left(\overline{R}(k), \overline{R}_0(k)\right)$ has the property of coincidence if and only if

$$a_1 + a_2 + \ldots + a_f + a_t > 0 \tag{26}$$

Coefficients $r^2(k)$ and $\overline{r}^2(k)$ calculated for the correlation pairs respectively $\left(R(k), R_0(k)\right)$ and $\left(\overline{R}(k), \overline{R}_0(k)\right)$ are equal:

$$r^2(k) = \overline{r}^2(k) \tag{27}$$

At and, we shall give some remarks about literature concerned with the problem of coincidence of the model (1). The first paper was Hellwig's work (Hellwig, 1976) in 1976. It caused a great interest among many Polish econometricians. Today there exists over 50 works concerned with the problem of coincidence of the model (1). We have quoted only some of them which were directly involved in our problem.

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CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 42-48

Michał Kolupa[*], Zbigniew Śleszyński[**]

BORDERED MATRICES AND SOME THEIR APPLICATIONS

Abstract

In this paper bordered matrices and some their applications are presented. In particular we give information how can be found matrix $F = AB^{-1}C$ without calculation the inverse of matrix B (when B = I this way we obtain Cauchy's product of matrices A and C). We present how to find generalized inverse of the Moore'a-Penrose'a type too and finally calculate value of determinant of given matrix A of order $n \times n$.

Keywords: econometrics, matrix algebra, bordered matrices, variables, econometric model
JEL: C02, C01

Bordered matrices make it possible to homogenize matrix calculations. Thanks to bordered matrices matrix algebra is more approachable, easier and preferred for example by students.

This article focuses on main applications of bordered matrices, inter alia in econometrics.

We consider a matrix $A = \lfloor a_{ij} \rfloor$ of order $m \times n$. We divide it by p – 1 horizontal and q - 1 vertical lines into blocks order $m_i \times n_j$ where

$$\sum_{i=1}^{p} m_i = m \quad \sum_{j=1}^{q} n_j = n$$

Then we obtain

$$A = \begin{bmatrix} A_{11} & A_{12} & \cdots & A_{1q} \\ A_{21} & A_{22} & \cdots & A_{2q} \\ \cdots & \cdots & \cdots & \cdots \\ A_{p1} & A_{p2} & \cdots & A_{pq} \end{bmatrix} \tag{1}$$

The matrix given by formula (1) is called a block one. In particular case when the blocks matrix satisfies following conditions

[*] Technical University of Radom, Poland;
[**] Technical University of Radom, Poland; z.sleszynski@pr.radom.pl

1. block A_{11} is nonsingular matrix of order $s \times s$
2. blocks $A_{12} \ldots A_{1q}$ are s – dimensional vertical vectors
3. blocks $A_{21} \ldots A_{p1}$ are s – dimensional horizontal vectors
4. remaining blocks A_{ij} $i = 2, 3 \ldots p$ $j = 2, 3 \ldots q$ are numbers

it is called multiple bordered matrix. Henceforth the matrix A of order $m \times n$ written as bordered shape may be presented as following:

$$A = \begin{bmatrix} A_1 & f_1 & f_2 & \ldots & f_k \\ g_1 & & & & \\ \vdots & & Q_{rk} & & \\ g_r & & & & \end{bmatrix} \tag{2}$$

In formula (2) the matrix A_1 is nonsingular of order $s \times s$ one; f_j $j = 1, 2 \ldots k$ are s – dimensional vertical vectors, likewise g_i $i = 1, 2 \ldots r$ are s – dimensional horizontal vectors and the matrix $Q = [q_{tu}]$ of order $r \times k$.

On the rows of the bordered matrix given by formula (2) following elementary transformations are done:

α - the matrix A_1 is transformed to upper triangular one. Its diagonal elements are equal one,

β - the vectors g_i $i = 1, 2 \ldots r$ are transformed to zero ones.

Then the matrix $Q_{rk} = [q_{tu}]$ is transformed to the matrix $D_{rk} = [d_{tu}]$ where

$$d_{tu} = q_{tu} - g_t A_1^{-1} f_u \qquad t = 1,2 \ldots r \quad r = 1,2 \ldots k \tag{3}$$

For example the matrix:

$$A = \begin{bmatrix} 3 & 2 & 1 & 4 \\ 2 & 0 & 1 & 2 \\ 1 & 0 & -1 & 3 \\ 2 & 1 & 3 & 2 \end{bmatrix} \tag{4}$$

Will be put down as the bordered matrix :

$$A = \left[\begin{array}{cc|c|c} 3 & 2 & 1 & 4 \\ 2 & 0 & 1 & 2 \\ \hline 1 & 0 & -1 & 3 \\ \hline 2 & 1 & 3 & 2 \end{array}\right] \tag{5}$$

where

$$A_1 = \begin{bmatrix} 3 & 2 \\ 2 & 0 \end{bmatrix} \quad f_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \quad f_2 = \begin{bmatrix} 4 \\ 2 \end{bmatrix} \tag{6}$$

$$g_1 = [1 \quad 0] \quad g_2 = [2 \quad 1] \tag{7}$$

$$Q_{22} = \begin{bmatrix} -1 & 3 \\ 3 & 2 \end{bmatrix} \tag{8}$$

On the rows of matrix *A* given by formula (5) transformations α and β will be done. Hence

$$A \sim \begin{bmatrix} 3 & 2 & 1 & 4 \\ 2 & 0 & 1 & 2 \\ 1 & 0 & -1 & 3 \\ 2 & 1 & 3 & 2 \end{bmatrix} \sim \begin{bmatrix} 1 & 2/3 & 1/3 & 4/3 \\ 0 & -4/3 & 1/3 & -2/3 \\ 0 & -2/3 & -4/3 & 5/3 \\ 0 & -1/3 & 7/3 & -2/3 \end{bmatrix} \sim \begin{bmatrix} 1 & 2/3 & 1/3 & 4/3 \\ 0 & 1 & -1/4 & 1/2 \\ 0 & 0 & -3/2 & 2 \\ 0 & 0 & 9/4 & -1/2 \end{bmatrix}$$

$$D = \begin{bmatrix} -3/2 & 2 \\ 9/4 & -1/2 \end{bmatrix}$$

Currently, we verify the correctness of the results obtained. For:

$$A_1^{-1} = -\frac{1}{4}\begin{bmatrix} 0 & -2 \\ -2 & 3 \end{bmatrix}$$

we obtain:

$$d_{11}^{22} = q_{11} - g_1 A_1^{-1} f_1 = -1 + \frac{1}{4}[1 \quad 0]\begin{bmatrix} 0 & -2 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \frac{-3}{2}$$

$$d_{12}^{22} = q_{12} - g_1 A_1^{-1} f_2 = 3 + \frac{1}{4}[1 \quad 0]\begin{bmatrix} 0 & -2 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} 4 \\ 2 \end{bmatrix} = 2$$

$$d_{21}^{22} = q_{21} - g_2 A_1^{-1} f_1 = 3 + \frac{1}{4}[2 \quad 1]\begin{bmatrix} 0 & -2 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \end{bmatrix} = \frac{9}{4}$$

$$d_{22}^{22} = q_{22} - g_2 A_1^{-1} f_2 = 2 + \frac{1}{4}[2 \quad 1]\begin{bmatrix} 0 & -2 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} 4 \\ 2 \end{bmatrix} = -\frac{1}{2}$$

The formula (3) is basic in the theory of the bordered matrix. It has many various applications. Some of them will be presented in this paper.

First will be shown how we can find the matrix $F = AB^{-1}C$ without a calculation of the inverse of matrix B, where *A, B* and *C* are given and are respectively of order $m \times n, \quad n \times n, \quad n \times p$.

For this aim we construct the bordered matrix *M*.

$$M = \begin{bmatrix} B & c^1 & \dots & c^p \\ -a_1 & & & \\ \vdots & & O_{m\times p} & \\ -a_m & & & \end{bmatrix} \tag{9}$$

where c^j j = 1, 2 … p stand for the j – th column of matrix C,
a_i i = 1, 2 … m stand for the i – th row of matrix A.
On the rows of the matrix given by formula (9) elementary transformations will be done according α and β.

Then in place of the $O_{m\times p}$ block we obtain the matrix F.

If $B = I$ on the foregoing way we can obtain Cauchy's product of matrices A and C.

Likewise when $m = n,\quad p = 1$ and $A = I\quad C = c$ we can find vector X satisfying system equations $BX = c$ without calculation inverse of matrix B.

Next on the same way if $A = a$ and $C = c$; a and c are n – dimensional vertical and horizontal vectors respectively, we can find values x and y from:

$$x = aB^{-1}c$$

$$y = aB^{-1}a^T$$

(matrix B is non symmetric one).

The bordered matrix can be used to compute generalized inverse of the Moore'a-Penrose'a type.

For example if we are going to find the generalized inverse of matrix A of order $m\times n$ and of rank r $\left(r < \min(m,n)\right)$. ($A^+$) and we know that $A = BC$ (both matrices B and C have rank equal r) we can use following formula:

$$A^+ = A^T B\left(B^T AA^T B\right)^{-1} B^T \tag{10}$$

In this case we utilized the bordered matrix:

$$N = \begin{bmatrix} B^T AA^T B & q_1 & \dots & q_m \\ -p_1 & & & \\ \vdots & & Q_{n\times m} & \\ -p_n & & & \end{bmatrix} \tag{11}$$

where q_j j = 1, 2 … m stands for the j – th column of B^T and p_i i = 1, 2 … n stands for i – th row of A^TB. We avoid computing the inverse of matrix B^TAA^TB.

On the rows of the matrix N given by formula (11) we do elementary transformations according to α and β.

The bordered matrix can be used to calculate value of determinant of given matrix A of order $n\times n$. For this aim we put down this matrix $A = A^{(n)}$ as the bordered matrix:

$$A = A^{(n)} = \begin{bmatrix} D^{(n)} & f^{(n)} \\ g^{(n)} & d_{nn}^{(n)} \end{bmatrix} \tag{12}$$

where:

$$D^{(n)} = \left[a_{ij}^{(n)}\right] \quad i = 1,2\ldots n-1 \quad j = 1,2\ldots n-1$$

$$\left(f^{(n)}\right)^T = \left[a_{1n}^{(n)} \quad \ldots \quad a_{n-1n}^{(n)}\right] \tag{13}$$

$$\left(g^{(n)}\right) = \left[a_{n1}^{(n)} \quad \ldots \quad a_{nn-1}^{(n)}\right]$$

we suppose $a_{nn} \neq 0$. If this condition would not be satisfied we have to change rows and columns for reaching it. If this is impossible value of determinant of this matrix is equal zero.

If given the above condition is satisfied then we obtain:

$$\det A = \det A^{(n)} = a_{nn}^{(n)} \det\left(D^{(n)} - \frac{1}{a_{nn}^{(n)}} f^{(n)} g^{(n)}\right) \tag{14}$$

Using over and over again formula (14) we obtain:

$$\det A^{(n)} = a_{nn}^{(n)} a_{n-1n-1}^{(n-1)} \ldots a_{11}^{(1)} \tag{15}$$

where

$$A^{(k)} = \begin{bmatrix} D^{(k)} & f^{(k)} \\ g^{(k)} & a_{kk}^{(k)} \end{bmatrix} \tag{16}$$

$$a_{ij}^{(k-1)} = a_{ij}^{(k)} - \frac{1}{a_{kn}^{(k)}} a_{ik}^{(k)} a_{kj}^{(k)} \tag{17}$$

k = 2, 3, …,n, i, j = 1, 2, …, k-1.

For example we will calculate value of determinant of matrix A given by formula (4). According to formula (12) we have:

$$A = A^{(4)} = \left[\begin{array}{ccc|c} 3 & 2 & 1 & 4 \\ 2 & 0 & 1 & 2 \\ 1 & 0 & -1 & 3 \\ \hline 2 & 1 & 3 & 2 \end{array}\right] \tag{18}$$

but according to formula (14) we obtain:

$$\det A = \det A^{(4)} = 2\det\left(\begin{bmatrix} 3 & 2 & 1 \\ 2 & 0 & 1 \\ 1 & 0 & -1 \end{bmatrix} - \frac{1}{2}\begin{bmatrix} 4 \\ 2 \\ 3 \end{bmatrix}\begin{bmatrix} 1 & 0 & -1 \end{bmatrix}\right) = 2\det\begin{bmatrix} 1 & 2 & 3 \\ 1 & 0 & 2 \\ -1/2 & 0 & 1/2 \end{bmatrix} \tag{19}$$

Next the matrix

$$\begin{bmatrix} 1 & 2 & 3 \\ 1 & 0 & 2 \\ -1/2 & 0 & 1/2 \end{bmatrix} \tag{20}$$

will be presented as following bordered matrix:

$$\left[\begin{array}{cc|c} 1 & 2 & 3 \\ 1 & 0 & 2 \\ \hline -1/2 & 0 & 1/2 \end{array}\right] \tag{21}$$

The formula (14) will be utilized once more to the matrix given by formula (21). We obtain:

$$\det A = \det A^{(4)} = 2\det\left[\begin{array}{cc|c} 1 & 2 & 3 \\ 1 & 0 & 2 \\ \hline -1/2 & 0 & 1/2 \end{array}\right] = \tag{22}$$

$$= 2\cdot\frac{1}{2}\cdot\det\left(\begin{bmatrix} 1 & 2 \\ 1 & 0 \end{bmatrix} - 2\begin{bmatrix} 3 \\ 2 \end{bmatrix}\begin{bmatrix} -1/2 & 0 \end{bmatrix}\right) = \det\begin{bmatrix} 4 & 2 \\ 3 & 0 \end{bmatrix}$$

At present the matrix

$$\begin{bmatrix} 4 & 2 \\ 3 & 0 \end{bmatrix} \tag{23}$$

is presented as bordered matrix

$$\left[\begin{array}{c|c} 4 & 2 \\ \hline 3 & 0 \end{array}\right] \tag{24}$$

Formula (15) can't be directly utilized because $a_{22}^2 = 0$. Changing second row with first one we obtain

$$\left[\begin{array}{c|c} 3 & 0 \\ \hline 4 & 2 \end{array}\right]$$

Hence according to formula (14) we obtain:

$$\det A = \det A^{(4)} = \det\left[\begin{array}{c|c} 4 & 2 \\ \hline 3 & 0 \end{array}\right] = -\det\left[\begin{array}{c|c} 3 & 0 \\ \hline 4 & 2 \end{array}\right] = -2\det\left([3] - \frac{1}{2}[0][4]\right) = -6$$

Results, which were presented in this paper can be used in econometrics. In particular, bordered matrix can be used to find, without estimation of an econometric model, the value of coefficient r^2, theoretical values of endogenous variable and in many others econometric applications. Many of them are given in the works: (Kolupa, 1982), (Borowiecki & Kaliszyk & Kolupa, 1986), (Kolupa & Łukasik & Michalski, 1988), (Kolupa &

Marcinkowska-Lewandowska, 1987), (Kolupa & Nowakowski, 1987), (Kolupa & Szczepańska-Gruźlewska, 1991), (Kolupa & Śleszyński, 2010).

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BOOK REVIEWS

CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 49-52

Katarzyna Żukrowska
BUDŻET OGÓLNY UNII EUROPEJSKIEJ
Wydawnictwa Akademickie i Profesjonalne, Warszawa 2009, p. 385.

Finance is one of the most important elements of the European integration process. Broadly understood, the European Union finance includes the coordination process of budget policies and tax harmonisation, principles of the Eurozone functioning, uniform monetary policy in the Eurozone and, against this background – the budget policy of the European Union, the tool of which is general budget.

The general budget of the European Union is one of major instruments of the European integration development. Unlike integration processes based mainly on trade liberalisation and possibly the factors of production flow (e.g. NAFTA), from the very beginning, when the first European communities were established in the European Union, integration was of institutional not functional nature. Hence, active participation of governments of the integrating countries played a significant role. In these circumstances it was possible to create a common system, based on international solidarity in financing integration processes, whose elements are, among others, convergence of the regional development levels, production areas, stimulation of technological progress and scientific research, development of education and science and support for entrepreneurship.

The book by Katarzyna Żukrowska is a textbook consisting of 17 chapters dealing with the EU general budget. The author analyses the general budget of the European Communities from many angles - historical, institutional (legal foundations, principles and mechanism of budget functioning), political and prospective (the future of the general budget). Thus, the book reviewed analyses and discusses the EU general budget in a very broad context, going beyond the European Union, which is seldom attempted by the books concerned with the EU finance. This probably accounts for the chapter included in the book and entitled "*The EU budget in the global context*". Such a broad and multi-aspect approach to problems of the UE general budget is original and expanding the knowledge. It allowed the author to attain the objectives outlined in the introduction to the book. In her work the author showed the relevance of the implemented principles of the EU financing for the European integration development, strengthening of the EC international position, spreading international co-operation, stabilisation, development and democracy.

As the starting point for the discussion and analyses, the author uses the chapter devoted to the very concept of the EC finance *(Pojęcie finanse Wspólnot Europejskich*). It explains the basic terms against the historical background of co-operation financing and European integration. The author outlines the basic problems of the European Communities' finance which include: the European

finance crisis, its sources, competences of institutions versus general budget, the problem of budget imbalance, the problem of a gap between needs and possibilities of their financing in the European Communities. Subsequent chapters refer to the above mentioned problems and analyse them step by step.

Chapters 2 (*Reformowanie Finansów Wspólnot Europejskich – Reforming the EC Financial Framework)* and 3 (*Reformy w ramach pakietu Delorsa II – Reforms within the Delors Package II*) concern an important issue of the EU finance reform. Not only does this part comprise interesting factual material but also provides a valuable study of political aspects of compromising different interests of particular EC member countries and the mechanism of arriving at a consensus about relevant financial issues.

Chapter 4 (*Agenda* 2000) is a continuation of the two above summarised chapters devoted to Agenda 2000, where further actions adjusting the general budget to the EC needs and financial possibilities are presented. What is more, the adjustments were related to the adoption of the Lisbon Strategy, creation of the Economic and Monetary Union in 1999 and a prospect of introducing the Euro as well as the prospect of expanding the European Union by 10 new countries, including Poland.

The author shows that subsequent reforms of general budget and adoption of agreements within Agenda 2000 paved the way for the EU expansion by new member countries. Moreover, they were a response to the changing conditions of international environment of the European Communities and new challenges related to the economic, social and demographic processes within the Communities.

Chapter 5 (*Perspektywa finansowa 2007-2013 – Financial Framework 2007 - 2013)* deals with the budget plan called the financial framework for the period 2007-2013. It presents the premises of a new inter-institutional agreement as it was proposed by the European Commission and then approved for implementation. An analysis and evaluation of the financial framework 2007 -2013 in the first years of its implementation constitutes the last part of the Chapter.

Chapter 6 (*Podstawy prawne finansowania Wspólnot Europejskich - Legal foundations of the EC financing*) outlines the legal foundations and procedures of the EC financing. It is a very important Chapter and useful for readers who are not in touch with the Union's law on day-to-day basis.

The EC general budget has evolved since 1958. Eight phases of the evolution can be singled out. The evolution in question covered changes in the time span of the budget policy objectives, sources of financing and directions of budget spending. In a clear and orderly manner, the author shows this evolution in Chapter 7 (*Budżet Wspólnot Europejskich (perspektywa finansowa) – dyscyplina – The EC budget (financial framework) - discipline*).

Chapter 8 (*Składniki budżetu i ich ewolucja – Budget components and their evolution*) analyses the general budget structure, the burden of payments towards the budgets of particular EC member countries, flows between the general budget and member countries, structure of budget expenditure. The use of rich statistical and factual material deserves a special mention.

Political significance of the general budget is analysed in Chapter 9 (*Polityczne znaczenie budżetu – Political significance of the budget*). The author points to the lack of a symmetrical instrument to influence economies of member countries which could restrict the effect of negative external economic shocks and in this context she

gives the example of the recent financial crisis. Theoretically, the problem could be solved by the political integration and fiscal federalism, but is it possible? Considering the differences in national interests, the differences in the levels of economic development, linguistic and cultural barriers, it seems right to believe that the process of political integration will be a long-lasting one.

Chapters 10 and 11 (*Problem kursu, Problem stopy procentowej –The exchange rate and the Problem of the interest rate*) contribute immensely to the author's work. They deal with the exchange rate problem, interest rate problem and inflation, their effect on trade liberalisation and convergence processes. The Chapters are also a sort of introduction to the following Chapter 12 (*Budżet Unii Europejskiej a budżet państwa członkowskiego - The EU budget versus a member state budget*), which depicts the relationships between the EU general budget and a member state budget. It discusses the effect of the formation of the exchange rate against the Euro in the case of countries from outside the Economic and Monetary Union on the relationship between the real transfer value and payment appropriations towards the EU budget. Chapter 13 (*Problem rabatu brytyjskiego – The problem of the British discount)* deals with the controversial British discount. The author reveals here the contradictory interests between Great Britain and the remaining EU member countries. However, she emphasises the significance of the British discount as a means of disciplining budget expenditure, especially this in the area of the Common Agricultural Policy (CAP). The British connect concessions in the field of the discount with the necessity of reforms in the common agricultural policy. The British discount extorted reductions in spending on the Common Agricultural Policy in the 2007 budget structure.

Chapter 14 (*Budżet a interwencjonizm – Budget and interventionism*) analyses the effect of changes in the general budget structure on the changes in the nature of interventionism pertaining to the Union expenditure. The effect of expenditure from the Union budget and its structure on improved competitiveness of the member countries economies is the focus of Chapter 15 (*Budżet a konkurencyjność – Budget and Competitiveness*). This Chapter is supplemented by Chapter 16 (*Budżet ogólny Unii Europejskiej a polityka rozszerzenia –The EU general budget and the policy of expansion*), in which the author draws attention to the significance of transfers from the general budget for the new member countries characterised by lower levels of economic development and competitiveness in comparison to the "old Union" countries.

Chapter 17 crowns the author's discussion (*Budżet Unii Europejskiej w kontekście globalnym – The EU budget in the global context*). In it she proves that the EU general budget fulfils an important role in giving equal opportunities in access to global public goods to societies of different levels of economic development, which can be exemplified by the relationship between the "old Union" countries and post-communist countries (both, the ones belonging to the EU and those remaining outside it), and other countries aspiring to the EU membership.

The book uses extensive bibliography. Discussions and analyses are illustrated by numerous tables and figures.

The book reviewed testifies to the author's honest research effort. The book shows in an accessible way the evolution of the European Union's revenue and expenditure, budget principles and mechanisms, and the significance of the

general budget not only from the point of view of particular EU member countries, but also from the point of view of international economic and political cooperation. Definitely, as a textbook being a compendium of general budget presented in a very broad context, it provides useful assistance to students of economics and European and political studies as well as economic politicians and practitioners dealing with the problems of the European Union.

Sławomir I. Bukowski

CENTRAL EUROPEAN REVIEW
OF ECONOMICS & FINANCE
vol. 1, No 1 (2011) pp. 53-54

40TH ANNIVERSARY OF THE FACULTY OF ECONOMICS, TECHNICAL UNIVERSITY OF RADOM

21 October 2010, 40th anniversary of the Faculty of Economics, Casimir Pulaski Technical University of Radom, was celebrated in the Faculty auditorium under the motto 'History – Present – Future'. The anniversary brings back memories of the past, of facts, events, and people who have built the Faculty's history.

The Faculty of Economics was founded in 1969 as the first organisation providing studies of economics in Radom. The 40 years of its development have been varied. Its name had changed to the Institute of Economics and Organisation and then back to the original name. Its structure has also shifted.

The Faculty of Economics has expanded owing to the grit and perseverance of its staff and the successive deans. Its strategy, structure, and curricula of studies smoothly and easily adapted to the new conditions created by the post-Communist, free and democratic Poland and its market economy.

The subsequent deans and their deputies, heads of chairs, departments and Institutes, as well as generations of academic staff have laid the foundations for development of the Faculty of Economics, which was especially dynamic in the 1990s and 2000s. Systemic and democratic transformations of social and political life opened new opportunities for scientific and teaching activities, which have always fostered growth and ever new research and teaching achievements.

The Faculty has been based in the new complex at 31, Chrobrego Street with its modern auditoria, teaching rooms, a library, computer laboratories, and a commodity science laboratory. In 1993, the right to confer doctorates of economic science in the field of Economics was obtained.

Resources of full, associate, and assistant professors have steadily grown at the Faculty in 2002–2010. Research has intensified and curricula have been reformed and adjusted to requirements of the job market and state of the art in the field of economics. An extensive set of lectures in English has been introduced and enjoyed great popularity with students.

The Faculty has maintained the high 2nd scientific category with KBN (Scientific Research Committee), most recently confirmed with a decision by the Minister of Science and University Education dated 30 September 2010. Thus, the Faculty is among the best economics faculties in Poland with regard to scientific achievements and development. This is owing not only to the successive authorities of the Faculty, but also the entire personnel engaging in research, including heads of organisational units.

Leading research and didactic specialities pursued by the Faculty are worth mentioning. The rank of research conducted at the Faculty, which also translates into quality of teaching, can be measured by the plenty of national and international publications by the Faculty's staff.

The Faculty is known in Poland and internationally as a centre of commodity and quality sciences. It is also a major centre of research into economic growth and economic policy, international economic integration, foreign investment, finance and banking, financial markets, and insurance. Global and regional conditions of economic growth and development are a major focus of research. Dynamic expansion of research into international economic relations, international finance, and financial markets began at the Faculty in the late 1990s. Its achievements in respect of research into processes of European integration, in particular, functioning of the eurozone, and into international integration of financial markets are appreciated in Poland and internationally. Public relations and regional research expands markedly. Research into social and economic policies has evolved since 2002.

Scientific and teaching cooperation with foreign institutions, notably Universitá degli Studi di Perugia, Alexander TEI of Thessaloniki, has been intense. Staff of the Faculty teach abroad as well. International student exchanges are progressing apace.

Today, the Faculty of Economics, Casimir Pulaski Technical University of Radom, is an important and modern centre of economic thinking in the region of Radom and in Poland. The Faculty's resources have an immense intellectual and imaginative potential. The development mission formulated by the Faculty authorities says: *'Est innatus in nobis cognitionis amor et scientiae' (We have an innate desire for learning and knowledge)*.

On the occasion of the 40th anniversary, a monograph of the Faculty was published, edited by Maria Gagacka and Witold Rakowski with the assistance of Wiesława Banasiak. The anniversary celebrations were promoted by the President of Radom, Andrzej Kosztowniak. With outstanding economists from all the major scientific centres in Poland in attendance, Dean of the Faculty of Economics, Professor Sławomir Bukowski, was awarded commemorative medals by the President of Radom, Andrzej Kosztowniak, and Chief Administrator of the Masovian Province, represented by Piotr Szprendałowicz. Member of the Administrative Board of the Masovian Province. Wishes of continuing growth were also proffered by scientists, rectors, and public authorities.

During a seminar, Professors of the Faculty presented the staff's contributions to development of economic, commodity, regional, and social sciences. Principal directions of scientific work by the Faculty and the role of scientific community in the region were discussed.

In a moving touch to the ceremonies, three auditoria were named after renowned, late members of the Faculty's personnel: Dr. Wiesław Kudła, Professor Henryk Nurowski, and Dr. Stefan Witkowski, whose merits and attainments, as well as personal attitudes, are a model of scientific commitment, generosity, modesty, and pursuit of truth. Members of the patrons' families took part in the celebrations.

The Faculty of Economics, which educates graduates of three subjects and promulgates doctors of economic sciences, is undoubtedly a major university organisation in Poland and the region. The impressive achievements of its staff inspire continuing research and dynamic growth in order that responses to challenges of the 21st century are shared with the entire scientific community and the whole region.

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Central European Review of Economic & Finance
Kazimierz Pulaski Technical University of Radom
Faculty of Economics
ul. Chrobrego 31, 26-600 Radom, POLAND
www.cer.pr.radom.pl, cer@pr.radom.pl