Finance and Banking

SOVEREIGN DEFAULT ANALYSIS THROUGH EXTREME EVENTS IDENTIFICATION

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 Abstract. This paper investigates contagion in international credit markets through the use of a novel jump detection technique proposed by Chan and Maheu in 2002.This econometrical methodology is preferred because it is non-linear by definition and not a subject to volatility bias. Also, the identified jumps in CDS premiums are considered as outliers positioned beyond any stochastic movement that can and is already modelled through well-known linear analysis. Though contagion is hard to define, we show that extreme discrete movements in default probabilities inferred from CDS premiums can lead to sound economic conclusions about the risk profile of sovereign nations in international bond markets. We find evidence of investor sentiment clustering for countries with unstable political regimes or that are engaged in armed conflict. Countries that have in their recent history, faced currency or financial crises are less vulnerable to external unexpected shocks. First we present a brief history of sovereign defaults with an emphasis on their increased frequency and geographical reach, as financial markets become more and more integrated. We then pass to a literature review of the most important definitions for contagion, and discuss what quantitative methods are available to detect the presence of contagion. The paper continues with the details for the methodology of jump detection through non-linear modelling and its use in the field of contagion identification. In the last sections we present the estimation results for simultaneous jumps between emerging markets CDS and draw conclusions on the difference of behaviour in times of extreme movement versus tranquil periods.

Keywords: sovereign default; credit default swaps; jump detection; ARJI.

A brief history of sovereign defaults

Sovereign debt crises and the default of city states, governments and empires are common events, even with the onset of sovereign lending. The first historically documented default was that of the Greek temple of Delos (Winkler, 1933).

Most crises in antiquity have ended with a currency "downgrade", either through inflation or devaluation and rarely through debt restructuring. This last type of default outcome emerged in the 16'Th century. In a historical analysis published in 2003, Reinhart, Rogoff and Savastano conclude that the states that don't manage to pay their debts on time are plagued by a high degree of intolerance to external borrowing for decades and that their comeback is painful and slow, without the help of supranational lenders like the IMF or the EU.

It is at the beginning of the 19th century that credit events (defined as the failure of a debtor to honour its contractual obligations) have become more frequent. This was the effect of capital transfers between financially independent governments, through regulated financial markets (Reinhart & Rogoff, 2009).
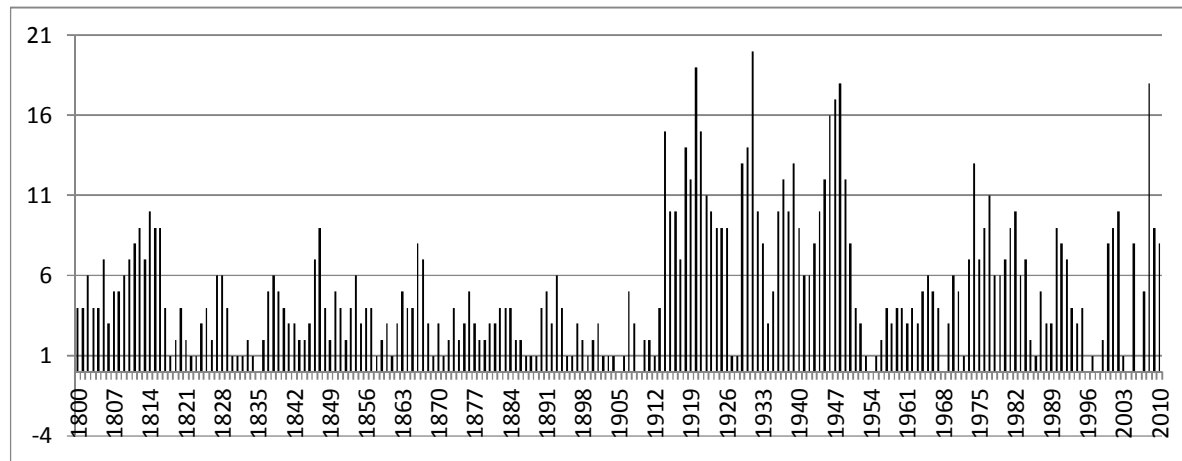
Figure 1: Number of credit events from the beginning of the 19'Th century to the present day (Reinhart & Rogoff, 2009)

During the past two centuries there have been hundreds of credit events and debt restructuring. The reasons for this have been wars, revolutions, civil wars, all of these eroding the government's capacity to repay. The suspension of debt payments to enemy countries during wars was common practice, like Turkey, Bulgaria and Austro-Hungary during the first world war, or Japan during the second world war (Sturzenegger & Zettelmeyer, 2006). Mexico (1914), Russia (1917), China (1949), Czechoslovakia (1952) and Cuba (1960) refused to pay their debts after the communist revolutions, decisions that triggered civil wars and economic collapses.

The dynamics of national economic tactics and shocks to the real sector have become more subtle since the 19'Th century with the advent of new phenomena like regional clustering, political instability and over expansion in consumption followed by collapse. In 1989, Lindert and Morton identify behaviour patterns in the lending business, of exuberance followed by default and subsequently reduction in credit availability, a pattern that repeats itself during the 18'Th century.

The impossibility of exercising coercion on debtors leads to fear and drying of credit to countries that have sound finances. The authors suggest that even if lending might be profitable in the long term, there are similar crisis like patterns ignored by investors, despite historical documentation about them. Also, creditors tend to forget the payment history of governments and don't penalize those that have defaulted in the past. According to economical historians Suter & Stamm (1992), eight boom-bust lending cycles can be identified starting with the 19'Th century, presented in the chart below.

Table 1. Boom-bust lending cycles in the 19'Th century

Year	Countries in default								
1820's	Latin America	Europe							
1830's	USA	Spain	Portugal						
1860-1875	Latin America	USA	Europe	Ottoman Empire	Egypt				
1880's	USA	Australia	Latin America						
1910's	Canada	Australia	South Africa	Russia	Ottoman Empire	Balkan States	Latin America		
1920's	Germany	Australia	Japan	Canada	Argentina	Brazil	Cuba		
1970's	Latin America	Spain	Yugoslavia	Romania	Poland	Turkey	Egypt	Indonesia	Africa
1990's	Latin America	Emerging Asia	Ex-communist countries						

The determinants of sovereign debt

The world is continuously modelled by the accession of new political powers. The fall of centralized blocks like the USSR and the victory of the market economy made people believe that some countries will be able to impose their financial hegemony upon the rest of the world. If it's China, the country with the biggest future GDP, or the western world, with an older population and a continuously rising debt, who will dominate the debt markets, remains to be seen (Fogel, 2010). In the United States, the collapse of the real estate market, coupled with a huge debt service, sustainable only through external borrowing, all of these factors only add to the global level of systemic risk.
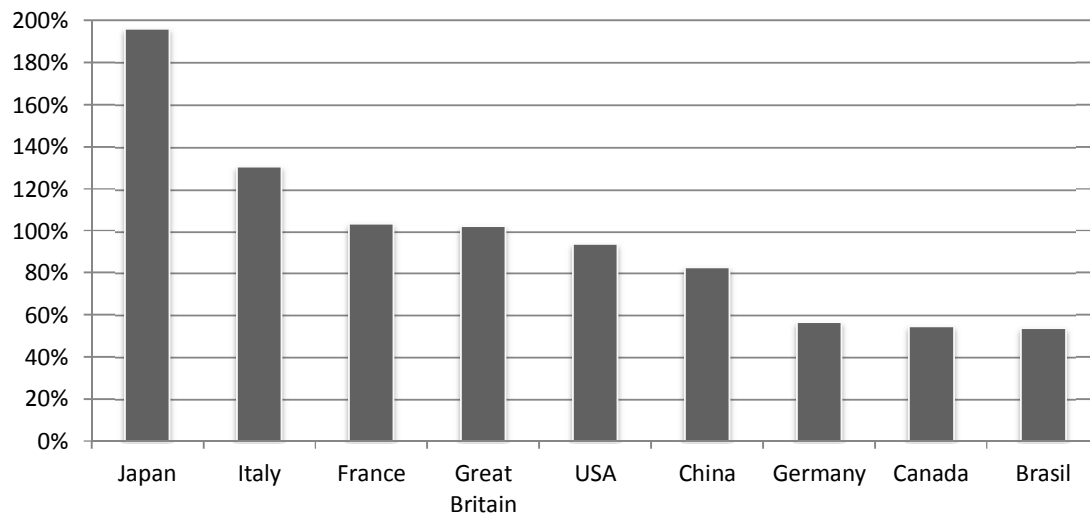

Figure 2. Gross debt as a percentage of gross annual GDP (World Bank, 2015)

The above chart, presents the level of sovereign gross debt as a percentage of gross annual GDP. From this point of view, Japan and Italy are the most indebted countries. If one would add the private debt to the sovereign one, then the most indebted countries would be Japan and Great Britain, at a level that is four times higher than their annual GDP.
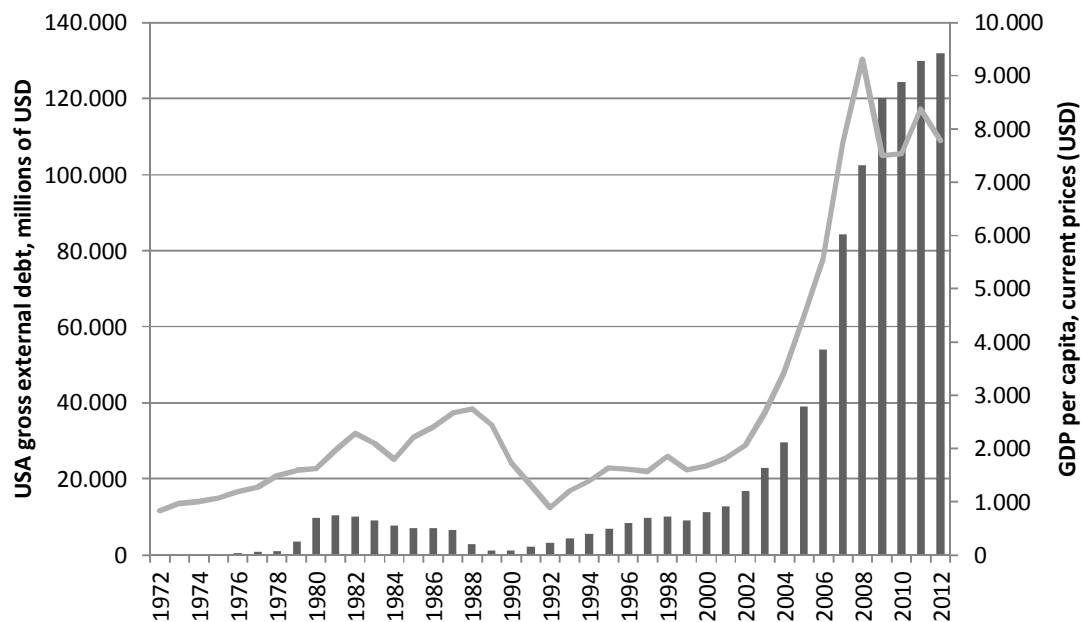

Figure 3. Bar chart: USA Gross External Debt; Line chart: USA GDP per capita (IMF, 2013)

Adam and Bevan (2005) studied the link between the fiscal deficit and GDP growth on 45 emerging economies between 1970 and 1999, using an agent model with overlapping generations. The authors found that the government deficit can generate growth if it is financed by moderate monetary mass creation, or it can inhibit growth if it is financed by internal borrowing. Their research also demonstrates that any increase in public spending financed by a tax increase can have a good effect, only if the public debt is at a low level. Saint-Paul (1992) shows by using a neo-classical model of endogenous growth that an increase of the government's public debt reduces future output for generations to come. Saint-Paul (1992) extends the model of Blanchard (1984) (economic agents with a finite time horizon, no endogenous growth), assuming that there are externalities from endogenous growth, implying a constant rate of return on capital, at an aggregated level.

In classical models, debt growth increases the welfare of the households and brings the economy closer to « **the golden rule** », that is, the level of savings that maximizes growth. In the model of Saint Paul (1992), it is proven that public debt is not the adequate instrument for welfare maximization, but investment subsidies.

Aizenman, Kletzer and Pinto (2007) study the optimal public policy for optimal public investment and spending for emerging economies where the tax level can inhibit growth, once a certain level is reached. The authors discover that countries cannot endure a higher tax level because it lowers the growth rate. Also, the reduction in total debt will accelerate GDP growth. The authors discover through their model that persistent differences in output might be the result of the way in which tax money flows to public spending or investment. Having a debt ceiling, the government should maintain the GDP to debt ratio constant and public spending should be financed only through tax increases.

Some theoretical contributions have been made by Krugman (1988) who defined the term "debt overhang", a context in which a countries reserve is smaller than its debt service. In this situation, the creditors have two possibilities: either to continue in supplying credit with a higher expected loss in the hope that fundamentals will improve, or accept a lower payment. Krugman shows that this choice can be improved through the addition of a dynamical condition, like adjusting the reimbursement condition to the price of a market commodity or to international lending rates.

Contagion

Contagion is a relatively new concept in the academic literature. The first concepts addressed the problematic of emerging economies, more specifically, about the Asian financial crisis in 1997-1998. In 2000, Bisignano, Hunter and Kaufman have published a series of speeches and articles presented at a conference sponsored by the World Bank, that were intended to find answers and solutions to the Asian crisis. These definitions were the result of worries about transnational propagation of financial distress, but the global financial crisis of 2007-2009 showed that contagion is not limited to emerging economies, but it first appears inside national borders.

The paper "A Primer on Financial Contagion", by Pericoli and Sbracia (2003), considers five possible definitions for contagion:
1) A significant increase in the probability of a crisis in one country, conditioned by a crisis in another country;
2) Contagion is present when market volatility heightens from one country to another;
3) Synchronous asset returns from different countries cannot be explained by fundamental economic factors;
4) Simultaneous high price movements and high volumes of trading in financial markets, given a crisis in one market;
5) Contagion appears when the transmission channel widens, after a shock in one market.

The speed with which contagion propagates is a critical element for Kaminsky, Reinhart and Vegh (2003) who find that a financial distress can spread in multiple countries in an interval of days or hours. Studying a large database of capital market crises, speculative foreign exchange attacks or sovereign

state defaults between 1980 and 2000, the authors define the term of "unholy trinity", a set of essential conditions for contagion to appear: an abrupt change in capital flows direction, surprise news and a common over indebted creditor.

As a first prerequisite, contagion builds on an accelerate capital inflow and the initial shock bursts this temporary bubble. During the second phase, the announcement that triggered the chain reaction has to come as a surprise for investors. The difference between anticipated and unanticipated ones is critical, because rational investors adjust their decisions and portfolios in anticipation (Didier, Mauro & Schmukler, 2008). As a last phase, the over indebted creditor (commercial banks, speculative funds, mutual funds, etc.) retires from the market under the pressure of its own clients, unable to correct the disequilibria created.

For other economists, a change in the correlation between economic variables is the key to understanding contagion. In 2002, Forbes and Rigobon, consider that price volatility biases correlation indices if one believes that there is a common factor influencing those variables. For example a shock to a market increases volatility, and subsequently the volatility increases the correlation. This is not to be confounded with contagion. The authors suggest filtering the volatility and deciding afterwards if the correlation indicates contagion or interdependence. Based on this definition, Forbes and Rigobon (2002) conclude that the devaluation of the Mexican peso in 1994 and the crash of the US capital market in 1987 were not contagious events, even though most researchers consider them so.

Other researchers followed this intuition too: Bekaert and Harvey (2003) define contagion as an excess of correlation, beyond economic fundamentals. Choosing the fundamental factors is up to the analyst along with the model calibration that can deterministically explain asset returns. By studying the residuals, contagion appears when the correlations expected by the model are surpassed. The authors choose as factors the aggregated return of the US capital market and a regional aggregated market return. If two different markets are integrated for most of the observation period, but the correlation index is subject to short jumps during a crisis, then the null hypothesis of lack of contagion is rejected. On the other side, if these two markets have as a common determinant a regional market index, then the increased correlation can be explained by excess volatility.

The data

We used data on the probability of default derived from credit default swaps, provided by Deutsche Bank Research department. The probabilities were derived assuming a recovery rate of 40%. The data represent daily observations spanning from the 1'st of July 2014 to the 1'st of January 2015. The CDS premiums from which the probabilities are derived were provided by Bloomberg (2015). For the scope of this paper, we used a dataset on fourteen emerging economies that have liberalized financial markets and are present on international bond markets. Because the path of the implied probabilities of default was not stationary, we continued this study on the first difference of each time series.

Table 2. Descriptive statistics of the data

country	probability variation mean	probability variation kurtosis	Augmented Dickey-Fuller test
Argentina	4.25%	22.751	stationary
Brazil	3.08%	6.331	stationary
Croatia	1.68%	23.226	stationary
Hungary	2.30%	6.382	stationary
Indonesia	3.08%	3.696	stationary
Italy	4.29%	5.374	stationary
Portugal	4.64%	7.926	stationary
Russia	3.67%	4.932	stationary
Slovenia	3.35%	7.452	stationary
Spain	4.86%	4.727	stationary

Thailand	2.66%	8.757	stationary
Turkey	2.89%	4.956	stationary
Ukraine	2.64%	6.016	stationary
Venezuela	1.56%	3.672	stationary

Jump identification methodology

Identifying jumps in a time series can be done parametrically or non-parametrically. Non parametrical methods have the advantage of low computation time and are less restricted by underlying assumptions: Lee and Mykland (2008) use intraday returns as proxies for volatility, Barndorff-Nielsen, Shephard and Winkel (2006) define bi-power variation extendable to a multipower level, Andersen, Dobrev and Schamburg (2012) define the concept of realized volatility.

In the parametric field of jump identification one of the first models for asset returns was that of Press (1967) in which he proposes a Poisson process with constant intensity (jump frequency) and fixed jump size. In Merton (1976) a mixing of pure jumps with a diffusion process was considered an answer to capturing the continuous and the discrete nature of returns, an intuition that was subsequently used by Jorion (1988) to identify jumps in the foreign exchange market. Latter on, Chan and Maheu (2002) proposed a model that would account for ARCH (autoregressive conditional heteroskedasticity) effects in the return path and would also explain the residuals, which were assumed to be jumps, by an ARMA (auto regressive moving average) process. In this paper we will only highlight the equations concerning the jump component:

$$P(n_t = j) = \frac{exp(-\lambda_t)\lambda_t^j}{j!}$$

The probability of observing a jump between periods t-1 and t follows a Poisson distribution. The intensity of the process is time varying and has to be estimated each period.

$$\lambda_t = \lambda_0 + \sum_{i=1}^{r} \rho_{i\lambda_{t-i}} + \sum_{i=1}^{s} \gamma_i \xi_{t-i}$$

The intensity itself is modelled by an autoregressive moving average. This characteristic allows for mean reversion in the case of irrational or unexpected events in the market, or for momentum when traders reach consensus and exhibit herding behaviour.

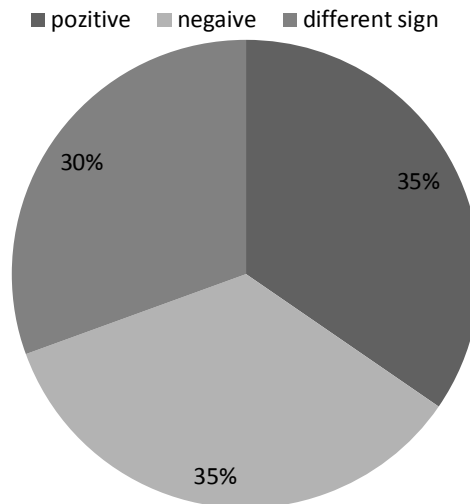$$\theta_t = \eta_0 + \eta_1 R_{t-1} D(R_{t-1}) + \eta_2 R_{t-1}(1 - D(R_{t-1}))$$

Theta is the jump size which is made to depend asymmetrically on previous returns through the function D(Rt-1) which takes the values of zero or one for positive or negative past returns respectively.

This paper replaces the returns used in the initial methodology of Chan and Maheu (2002) with the first difference of probabilities of default. A visual inspection of the series shows that there are no ARCH effects, and statistical testing using the Engle test for residual heteroscedasticity confirms this with a lack of ARCH effects for 10 of the 14 series, but after filtering the jumps, only one series is left with ARCH effects, which motivated me to suppress the continuous component of the model, in favour of a pure jump process.
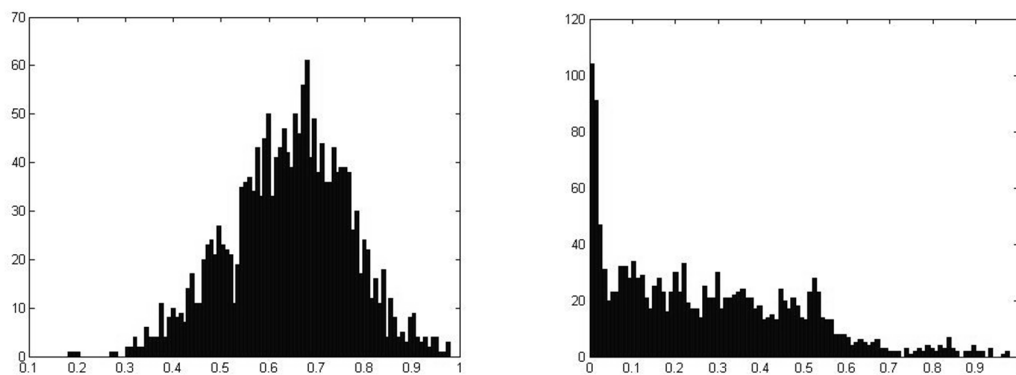
Results

Table 3. Total number of co-jumps between countries

	Brazil	Croatia	Hungary	Indonesia	Italy	Portugal	Russia	Slovenia	Spain	Thailand	Turkey	Ukraine	Venezuela
Brazil	39	21	38	62	43	67	71	48	39	24	54	92	96
Croatia		28	37	36	33	58	67	25	31	18	45	78	76
Hungary			28	28	29	36	40	19	23	12	36	48	47
Indonesia				32	40	51	55	28	35	12	46	68	63
Italy					48	68	74	39	40	21	58	86	88
Portugal						66	65	31	45	17	47	78	76
Russia							92	40	65	21	66	107	114
Slovenia								45	62	22	90	130	128
Spain									21	17	39	55	61
Thailand										12	44	67	68
Turkey											17	31	33
Ukraine												100	97
Venezuela													147

The countries that have the most variable default probabilities are in descending order, Venezuela, Ukraine and Russia. It seems that countries that are at war or have autocratic regimes are the most feared by international investors and therefore, most at risk of default. Countries inside the EURO present higher stability. Even if Indonesia is not part of the EURO area, its experience of the Asian crisis and the measures it took, makes it a much more stable country. Portugal and Italy are the most exposed countries to CDS variation, and both react to each other's financial distress. One explanation could be the concentration of the economic activity in specific overdeveloped areas, like the banking sector, as studied by Treapat (2011). From the matrix above, we can see that international creditors cluster their beliefs into groups of countries with different risk profiles: high risk (Russia, Venezuela) or low risk (Thailand, Hungary, Indonesia).

Table 4. Number of positive co-jumps between countries

	Brazil	Croatia	Hungary	Indonesia	Italy	Portugal	Russia	Slovenia	Spain	Thailand	Turkey	Ukraine	Venezuela
Brazil	12	3	13	14	12	18	24	12	11	5	19	25	31
Croatia		9	19	8	8	19	30	4	14	7	17	29	31
Hungary			9	11	11	14	16	4	11	3	14	18	15
Indonesia				15	14	16	25	7	14	4	20	22	20
Italy					18	21	28	11	15	7	23	31	22
Portugal						25	25	10	17	5	18	26	25
Russia							36	11	29	5	22	33	37
Slovenia								14	26	8	42	61	49
Spain									6	4	9	16	17
Thailand										3	17	23	23
Turkey											4	10	9
Ukraine												36	32
Venezuela													55

Table 5. Number of negative co-jumps between countries

	Brazil	Croatia	Hungary	Indonesia	Italy	Portugal	Russia	Slovenia	Spain	Thailand	Turkey	Ukraine	Venezuela
Brazil	12	6	15	26	17	27	19	16	12	12	19	21	31
Croatia		13	13	15	11	20	28	9	6	5	22	25	23
Hungary			13	13	10	17	18	9	7	2	15	19	17
Indonesia				12	15	20	21	14	10	5	18	23	17
Italy					16	31	26	19	14	8	26	24	28
Portugal						34	19	13	23	10	20	24	19
Russia							28	23	28	11	28	37	36
Slovenia								18	14	3	34	42	31
Spain									10	5	19	16	24
Thailand										5	14	18	19
Turkey											7	10	8
Ukraine												33	25
Venezuela													32

Table 6. Number of different sign co-jumps between countries

	Brazil	Croatia	Hungary	Indonesia	Italy	Portugal	Russia	Slovenia	Spain	Thailand	Turkey	Ukraine	Venezuela
Brazil	15	12	10	22	14	22	28	20	16	7	16	46	34
Croatia		6	5	13	14	19	9	12	11	6	6	24	22
Hungary			6	4	8	5	6	6	5	7	7	11	15
Indonesia				5	11	15	9	7	11	3	8	23	26
Italy					14	16	20	9	11	6	9	31	38
Portugal						7	21	8	5	2	9	28	32
Russia							28	6	8	5	16	37	41
Slovenia								13	22	11	14	27	48
Spain									5	8	11	23	20
Thailand										4	13	26	26
Turkey											6	11	16
Ukraine												31	40
Venezuela													60

Figure 4. Distribution of co-jumps by direction

When simultaneous extreme events appear in the sovereign bond market, they tend to have the same direction in 65% of cases. This shows that contagion can be inferred in the extreme movement spectre.

Figure 5. Correlation index between jumps (left) and between normal probability variations (right)

Are extreme movements more correlated than normal ones? The two charts above show the histogram of correlations between all the combinations of two-pair time series in the dataset. The chart on the left clearly indicates that most of the correlation coefficients for extreme movements only have values around 0.65 and that the correlation coefficients for normal movements are uniformly distributed with a tendency to cluster around the value of zero. This means that jumps in CDS or in default probabilities have a different behaviour than normal movements and indicate the existence of abnormal correlation.

Conclusion

The constant integration of international financial markets has made credit more available to sovereign states. Simultaneously, the consolidation of sovereignty renders most republics immune to outside coercion in the business of honouring their debt payments. These two factors have contributed to the multiplication of defaults for governmental debt in the past century as investors panic and credit dries up. In the absence of a supranational lender of last resort, new models for risk assessment must be devised that take into account not only the current capacity of a nation to reimburse its debt, but also the impact of investor sentiment regarding its credit worthiness and credit availability once panic or exuberance overcomes fundamental economics. Contagion needs to be accounted for in any macroeconomic forecast because econometric models that are based on annual or quarterly data cannot

cope with the almost instantaneous developments in credit markets and possible multiple equilibria outcomes, once a crisis unfolds.

Investor behaviour in international credit markets can be split into two different spectrums: business as usual and herding behaviour. Whether the herding behaviour is triggered by consensus, panic or unexpected news, it determines the clustering of opinions about certain sovereign state debtors. Consequently, the CDS premiums suffer violent corrections of nonlinear nature (discontinuous jumps) that are similar in change direction and rarely offset each other. Emerging markets with poorly liberalized economies or which indicate high political instability have the most volatile probabilities of default. Countries that benefit from the protection of a supranational entity like the EU or IMF, or those that have in place prudential financial policies, remain unaffected by international turmoil. Given the coincidence between the high degree of jump correlation between Russia, Ukraine, Venezuela and Turkey and the international setting in the analysed period, we could conclude that those countries that are perceived as politically unstable or that are subject to international sanctions, those countries face not only high volatility but also extreme changes in their CDS premiums. This behaviour could be explained by the effort of markets to reach equilibrium or consensus when robust financial analysis based on macroeconomic factors is constantly perturbed by news about political unrest. These observations could be used by investors to make a profit in the CDS markets because in the case of large economies with sound financial indicators, a jump beyond explained volatility should be followed by a return to a fundamental equilibrium level or by a more extreme movement in the opposite direction.

Jumps in asset returns, foreign exchange rates or CDS spreads can serve as an indicator of contagion because by definition, a jump is an unexpected and extreme movement. The econometrical framework proposed by Chan and Maheu (2002) distinguishes the jump component from the linear movements in the time series and from volatility clustering effects therefore isolating that movement which cannot be statistically explained. One possible way of testing if jump identification can serve as a mean for contagion testing is to compare the results of parametrical and non-parametrical jump models against the methodology of Forbes and Rigobon (2002) which eliminates the volatility bias and has already proved that previous episodes of contagion were actually manifestations of interdependence. Because contagion between financial markets becomes more rapid as electronic trading and news availability increase, jumps might serve as an efficient tool for contagion identification because classical correlation analysis loses meaning for high frequency time series.

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ON SO-CALLED "RANDOM WALK THEORY" AT THE GLOBAL FX MARKET

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Abstract. *This paper presents a numerical disproof for one of the well known "theories" of global financial markets such as "random walk theory". We had processed both tick and daily FX quotation records giving preference to number-theoretical approaches in opposite to the econometrical ones and, then, dealt with logarithmical modification of so-called binormalized randomness parameter S, the invariant of Russian academician V.I.Arnold, to estimate real "randomness" of both FX in general and some other assets of a special interest like precious metals (Au, Ag, Pt, Pd) and commodities (Brent Crude Oil, WTI). As known, that S tends to the two asymptotically for random configurations in question and to the one or infinity, otherwise. Once FX daily and intraday records since 1968 are processed, currencies' randomness rating is done with putting S into the order, one may conclude that "random walk theory" of the FX is false and must be declined. Strategically, it means that a floating rate ideology of 1968 is failed.*

Keywords: *financial markets; binormalized randomness parameter of Arnold; Kolmogorov theorem; Smirnov test; FX currencies' and precious metals' randomness rating.*

Introduction

Export of global risks and crises in recent years grows like an avalanche. The dark side effects of fatal volume of speculative transactions at the financial markets are almost impossible to be estimated in general. Forecasting of forthcoming financial turbulence, analysis of ongoing crisis, as well, is getting to be an essential geopolitical and social challenge. Solving such a problem, we have to identify and clarify all the mistakes done with local monetary authorities last decades, and no doubt then, to revise and decline some false economical theories as a primary source for such errors. This paper presents a recent result of unbiased test for one of such "theories" done by means of independent FX, global and local, and precious metals data series processing.

Data series

We have deal with official sources of the global and local financial markets OHLC data – global currencies as of 12:00 EST from FED, Central Bank of Russia (2014) official daily rates of RUB with respect to USD and EUR, London PM fixing rates of precious metals from LBMA (2014) and LPPM (2014). This collection consists of about 230000 records for daily FX and, approximately, of 100000 daily records for metals (gold, silver etc.) and commodities (Brent Crude) since 1968 by now. Also, we processed 51815 ticks of Russian ruble's devaluation show of 16 Dec'14 (FINAM, 2014) in attempt to get a real randomness.

Types of variables

In sufficient contrast with huge amount of econometrical methods and tools known for to confirm random walk theory of the asset rate dynamics at the global financial market, say as FX, we decided to apply here some another scheme either to prove or to disprove this hypothesis given. First, we have to introduce time series of variables to be analyzed.

Quotations as integers

Let us consider a subset of major currencies at global FX market quoting with unit step in bid-ask rates, and let time series p_t^k be the reference rates for asset k of trading date t (Federal Reserve, 2015). If we take only, say, 4 significant digits of these datasets, taking in mind our goal to test the randomness, we should expect a higher chance to get the real chaos in rate series which should follow a uniform distribution of p_t expected for distribution of integers at the circle of length 10^4. So, let $p_t^* = \{0000, 0001, \dots, 9999\} \in N$ be such modified time series of integer quotations and we consider now integer sequences with a set of corresponding arcs of different lengths at unit circle. In some special cases JPY, KRW, RUB we have two representations in points of price, i.e. USDRUB=57.6125 represents as both 6125 and 76125 depending of the sample volume with respect to 10^4, as well as USDJPY=365.57 transforms into 5570 or 6557, not into 5700, due to FX specifications.

General population of general populations

For every $k \in \{USD, AUD, EUR, GBP, JPY\}$ we put p_t^k into the order and, then, arrange general populations for assets of k with respect to each other and consider new variables

$r_k = 100\left(\frac{p_{t+1}^k}{p_t^k} - 1\right)$, if $k \in \{USD, \ JPY\}$ and

$r_k = 100\left(\frac{1/p_{t+1}^k}{1/p_t^k} - 1\right)$, if $k \in \{AUD, EUR, GBP\}$.

Merging general populations together, we arrange new joint population of the daily rates of return for assets of k and may apply necessary tools for the randomness estimation.

Quotations as logarithmical measure of FX

The third set of parameters is a set of the natural logarithms of the currencies (precious metals etc.) for official spot quotations which are ordered with respect to the US dollar, with USD itself included, namely *ln(USD), ln(Au), ln(JPY),…, ln(RUB)*.

Notations *Au=XAUUSD, RUB=USDRUB, JPY=USDJPY etc.* follow FX codes for financial instruments. USD self-quotation in a form of distance in R^1 is as follows
$$d(USD,USD)=ln(USD)-ln(USD)=ln \ 1=0.$$

We consider that origin as a service for putting assets into the order by their mutual distance in R^1. Cross-rate of GBPJPY, say, may be presented, thus, as usual sum in R^1
$$d(GBP,JPY)=ln(JPY)-ln(GBP)=[ln(JPY)-ln(USD)]+[ln(USD)-ln(GBP)]=$$
$$d(GBP,USD)+d(USD,JPY).$$

With normalizing of an obvious equation for $x_i \in \{USD, AUD, EUR, GBP, JPY\}$
$$\sum_{\substack{i,j=1 \\ j \geq i}}^{N} d(x_i, x_j) = d(x_1, x_N),$$
we come to a set of new independent variables over the unit interval
$$d_{ij} = \frac{d(x_i, x_j)}{d(x_1, x_N)} \in [0,1].$$

With Figure 1–3 we have illustrated all the three of our transformations to be discussed.
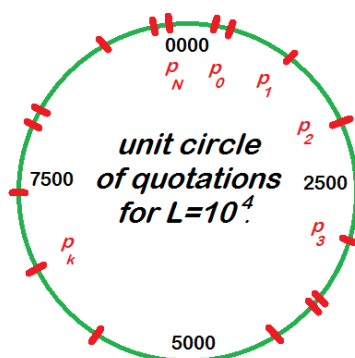
Figure 1. Unit circle of integers as the FX quotations $p_t^* = \{0000, 0001, \dots, 9999\} \in N$
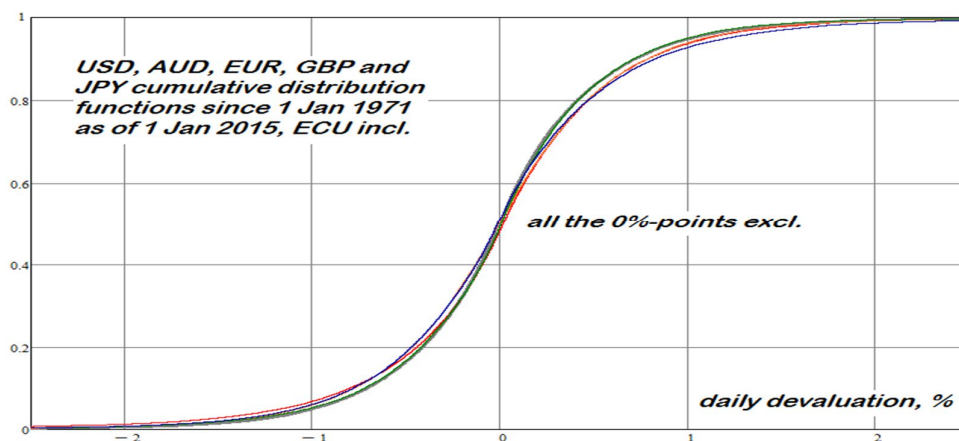
Figure 2. Cumulative distribution functions of r_k, $k \in \{USD, AUD, EUR, GBP, JPY\}$
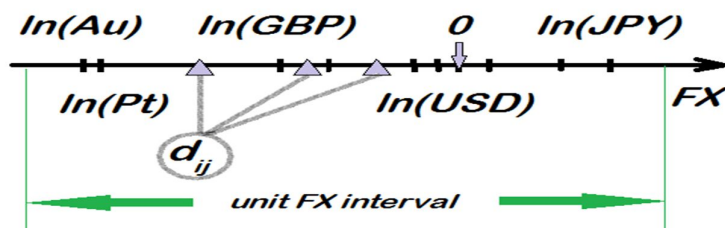
Figure 3. Scheme of putting into an order all the global currencies, commodities and precious metals.

Research tools

Theorem of V. I. Arnold

Academician V. I. Arnold presented the *binormalized randomness parameter* (Arnold, 2005, 2009)

$$s = T \sum_{i=1}^{T} \left(\frac{x_i}{L}\right)^2, L = \sum_{i=1}^{T} x_i$$

for studying random distribution of $x = \{x_1, x_2, \dots, x_n\}$ in the *(T-1)*-dimensional simplex

$$\sum_{i=1}^{T} x_i = 1, 0 \leq x_i \leq 1.$$

He proved that the mean of s is equal to $s_1 = \frac{2T}{T+1}$ as $T \to \infty$ [8]. Obviously, $1 \leq s \leq T$. So, if we substitute s with its logarithm, $s^* = \log_T s$, we get a measure of randomness at the unit interval, $0 \leq s^* \leq 1$. According to the theorem, the test for the FX randomness should be arranged as follows. Let $Data^{\langle k \rangle}$ be time series of N daily records since 1971 for asset k (Federal Reserve, 2015), modified as the abovementioned series of $p_t^* \in \{0000, 0001, \dots, 9999\}$, $t=1,\dots,N$, where N and k are listed in Table 1.

Table 1. Trading days since 1971 and arc length samples for FX

k, FX code	N, trading days	Arc lengths of the GBP		Arc lengths of INR (BRICS)	
AUD	11042	1	2453	1	0
EUR	8930	2	1043	5	6
NZD	11033	3	429	7	1
GBP	11049	4	119	10	2
BRL	5031	5	417	13	1
CAD	11055	6	17	20	22
CNY	8489	7	17	25	15
DKK	11048	8	17	30	19
HKD	8549	9	16	38	1
INR	10541	10	46	40	2
JPY	11043	11	1	45	1
KRW	8435	12	1	50	59
MYR	11027	13	1	60	1
MXN	5317	14	1	62	1
NOK	11048	15	14	70	6
SEK	11048	19	1	75	2
ZAR	8792	20	6	80	3
SGD	8548	22	1	100	45
LKR	10189	25	3		
CHF	11049	27	1		
TWD	7562	29	1		
THB	8468	30	1		
VEB	5024	35	2		

Let $x_i = Data_{i+1}^{\langle k \rangle} - Data_i^{\langle k \rangle}$ for $i=0\dots,N(k)-1$. For $L=10000=const$, we have finite set of arcs with different lengths $x_i^* \in \{0, 1, \dots, 9999\}$ for every k. The arc length histogram is that we have to verify for real randomness with parameter $s^* = \log_T s$ with respect to $L = \sum_{i=1}^{T(k)} x_i^*(k) h_i(k)$, where $h_i(k)$, $i=1,\dots,T(k)$ – a discrete function of the histogram for individual currency of major FX basket.

In the case of testing FX basket of 23 currencies in general with the abovementioned logarithmic variables $d_{ij} \in [0,1]$ we apply this technique to the unit interval directly, and obtain $s_1(t) \in [0, \infty]$ as randomness sensitivity function of FX intraday evaluation.

Λ-parameter of A. N. Kolmogorov and method of N.V. Smirnov

Academician A.N. Kolmogorov (1992) presented well known statistic, which offers us to arrange test for randomness as follows. Let $D_n = \sup_x |F_n(x) - F_0(x)|, -\infty < x < +\infty$ be a distance between theoretical $F_0(x)$ and empirical cumulative distribution functions, where $F_n(x)$ is done for the variational series $x_1 \leq x_2 \leq \cdots \leq x_N$ of random variable x. It was proved, in the famous theorem of Kolmogorov, that

$$\lim_{n \to \infty} Prob\left\{ \sqrt{n} * \sup_{|x|<\infty} |F_n(x) - F_0(x)| < \lambda \right\} \to K(\lambda) = \sum_{k=-\infty}^{+\infty} (-1)^k e^{-2k^2\lambda^2}, \lambda > 0.$$

Here, $K(\lambda)$ and λ are known as Kolmogorov distribution function and λ-parameter respectively.

Distribution of D_n does not depend on $F_0(x)$. $K(\lambda)$ is tabulated. As soon as probabilities of getting $0.4 > \lambda > 1.8$ are both less than 1/3 per cent, it was proposed by Arnold (2005) to use λ as a measure of the real randomness for x. Other words, result of FX data processing, where λ is such that $\{\lambda < 0.4; \lambda > 1.8\}$, means a confirmation of non-randomness for variables in question. The creative idea on to exploit the Kolmogorov's theorem for measuring a degree of randomness provided and discussed in details by Arnold (2005). We apply this idea to major cumulative distribution functions for the variables r_k above.

To avoid difficulties with both getting and using of the theoretical distribution function $F_0(x)$, we apply the method of Smirnov which allow us to get the randomness test result for FX variables by using of additional set of mutual coefficients according (Smirnov, 1939a, 1939b). Table 2 contains the intervals for empirical counting functions $F_n(r_k)$ presented in Figure 2.

Table 2. Intervals for cumulative distribution functions $F_n(r_k)$ as of 01 Jan 2015.

r_k	AUD	EUR	GBP	JPY	CHF	CAD	MXN	CNY
Min=x_1	-0.1766	-5.9617	-4.4848	-9.0670	-4.85	-4.945	-16.447	-2.400
Max=x_N	3.8803	4.8524	5.0916	6.4553	9.29	3.880	22.340	49.999

N.V. Smirnov (1939a, 1939b) strengthened the result and proved that we may replace unknown $F_0(x)$ with the pair of the different empirical cumulative distribution functions $F1_{n1}(x)$ and $F2_{n2}(x)$ for our goals. Smirnov statistic $D(n1,n2) = \sup_{|x|<\infty} |F1_{n1}(x) - F2_{n2}(x)|$ is very suitable for the randomness testing with $K(\lambda)$ for $F_n(r_k)$ which are taken from the same FX general population introduced above. In that case we should replace D with a slightly modified parameter, $D^* = D\sqrt{\frac{n1*n2}{n1+n2}}$, and apply the test as follows

$$\lim_{n1,n2\to\infty} Prob\left\{ D^* = D\sqrt{\frac{n1*n2}{n1+n2}} < \lambda \right\} \to K(\lambda) = \sum_{k=-\infty}^{+\infty} (-1)^k e^{-2k^2\lambda^2}, \lambda > 0.$$

We have to underline here that our target is not the econometrical hypothesis testing but getting the mean value for λ-parameter, random itself, of different assets to estimate the randomness level of the FX in general. If one get $D^* \in [0.4; 1.8]$ we would confirm the random walk ideology instantly. Table 3 consists of the results for main currencies. We have especially separated into positive and negative parts the Smirnov distance to visualize its dynamics with Figure 4 below. Indexed constants mean the multipliers for the mutual distances of the USD={1}, AUD={2}, EUR={3}, GBP={4}, JPY={5}. We have got a very short list of EURJPY={53} and GBPUSD={41} (green, Figure 4) which might be declared as random in average. But λ-parameters of all mutual rates destroy this quasi-positive for a random walk theory result. Numbering {6} through {15} means "tournament table" for the five currencies listed.

Table 3. Smirnov statistic for $F_n(r_k)$ and mean values for D_n as of 01 Jan 2015

Indicator	Value
Smirnov statistic	$\max(|\min(\text{Data}^{\langle 6\rangle})|, |\max(\text{Data}^{\langle 6\rangle})|)\cdot a51 = 4.02387$ $\max(|\min(\text{Data}^{\langle 7\rangle})|, |\max(\text{Data}^{\langle 7\rangle})|)\cdot a52 = 4.332227$ $\max(|\min(\text{Data}^{\langle 8\rangle})|, |\max(\text{Data}^{\langle 8\rangle})|)\cdot a53 = 2.352339$ $\max(|\min(\text{Data}^{\langle 9\rangle})|, |\max(\text{Data}^{\langle 9\rangle})|)\cdot a54 = 3.88335$ $\max(|\min(\text{Data}^{\langle 10\rangle})|, |\max(\text{Data}^{\langle 10\rangle})|)\cdot a41 = 2.584036$ $\max(|\min(\text{Data}^{\langle 11\rangle})|, |\max(\text{Data}^{\langle 11\rangle})|)\cdot a42 = 3.677186$ $\max(|\min(\text{Data}^{\langle 12\rangle})|, |\max(\text{Data}^{\langle 12\rangle})|)\cdot a43 = 4.250064$ $\max(|\min(\text{Data}^{\langle 13\rangle})|, |\max(\text{Data}^{\langle 13\rangle})|)\cdot a31 = 4.109176$ $\max(|\min(\text{Data}^{\langle 14\rangle})|, |\max(\text{Data}^{\langle 14\rangle})|)\cdot a32 = 4.246819$ $\max(|\min(\text{Data}^{\langle 15\rangle})|, |\max(\text{Data}^{\langle 15\rangle})|)\cdot a21 = 4.433258$

Mean value for D		$D(6)\cdot a51 = 2.465398$	$D(11)\cdot a42 = 1.844253$
		$D(7)\cdot a52 = 2.031727$	$D(12)\cdot a43 = 2.370529$
		$D(8)\cdot a53 = 0.739006$	$D(13)\cdot a31 = 2.485779$
		$D(9)\cdot a54 = 2.495688$	$D(14)\cdot a32 = 1.446978$
		$D(10)\cdot a41 = 0.642034$	$D(15)\cdot a21 = 2.378987$

Parameter of the market Efficiency

As for tick-by-tick analysis of the official intraday records, we considered recently (Prelov, 2012), without loss of generality, the daily trading period S_k, $k \in Z$ for the financial market with unit step in bid-ask rates and the variational series $p_i^k = p_0^k + i, i = 0...N_k, N_k \to \infty$ where we used a notation p_0^k and $p_{N_k}^k = p_0^k + N_k$ for interval bounds of the asset given. We denoted with D_k the total number of the anonymous transactions done with the FX asset during S_k. The FX non-randomness immediately follows our result for E (Prelov, 2012). Indeed, let tick $t_j = (p_{t_j}, V_{t_j}, T_{t_j}), j = 1...D_k$ be a standard vector record for every deal done for asset given, where $p_{t_j}, V_{t_j}, T_{t_j}$ – tick price, volume and turnover respectively. The cash and volume turnovers were introduced as $T^{S_k} = \sum_{t_j} T_{t_j}$, $V^{S_k} = \sum V_{t_j}^k$, and nominal rate of at-the-moment return as $R_k = N_k / p_0^k$. Then, at-the-moment rate of return is obviously equals to the value $r_k = T^{S_k} / \sum_{\leq \mu_k} p_i^k V_i^k - 2$, where $V_i^k = \sum_{t_j} V_{t_j}^k \delta(p_i^k)$, $i = 0...N_k$, $\delta(*)$ - standard δ-function and μ_k - median of V_i^k distribution within a trading range. Finally, the Efficiency we defined with parameter E, $\overline{E} = \lim_{k \to \infty} \sum_k E_k$, $E_k = r_k / R_k$. For this E the following theorem is valid (Prelov, 2012).

Theorem (the thermodynamic invariant of the global market)

$$\overline{E} = \int_0^1 \int_0^1 \int_0^1 \frac{[(\beta N - \ln \frac{e^{\beta N}+1}{2}) - e^{-\beta N} \ln \frac{e^{\beta N}+1}{2}] \cdot d\ln N \cdot dp^2 \cdot d\beta}{(\beta(p-N) + \ln \frac{e^{\beta N}+1}{2}+1) - e^{-\beta N}(\beta(p+N) - \ln \frac{e^{\beta N}+1}{2}+1)} \approx 0.37816720 \text{ where}$$

$\beta \in [0;1]$ – parameter of the Boltzmann distribution.

Proof

To get r we have to obtain V_i distribution of the maximal probability, i.e. we meet a standard problem to minimize $\sum_i V_i \ln V_i$ under conditions $\sum_i p_i V_i = T$, $\sum_i V_i = V$ with well known Boltzmann's result $V_i = \alpha e^{-\beta p_i}$, $i=0...N$, where α, β – const, $\beta \in [0;1]$. Let micro-state of the market be fixed now. To get median μ we have to solve an equation (our discrete market replaced with continuous one for a moment)

$$\int_{p_0}^{p_\mu} e^{-\beta x} dx = \frac{1}{2} \int_{p_0}^{p_N} e^{-\beta x} dx$$

and, then, to get the intermediate parameter

$$\mu = N - \frac{1}{\beta} \ln \frac{e^{\beta N} + 1}{2}.$$

After substitution μ in r and routine transforms we obtain the integrand of Theorem. To get $\overline{E}$, we permit T and V to be floating in the first quadrant, i.e. we consider the floating right-hand sides of the Boltzman's conditions $T = T(S_k), V = V(S_k), k \to \infty$. Taking into account an evident fact that *card* $S = card\,\beta$ we have, trivially,

$$E_k = \frac{\sum_{\geq \mu_k} p_i^k V_i^k \Big/ \sum_{\leq \mu_k} p_i^k V_i^k - 1}{N_k / p_0^k}.$$

Just after normalization in (p, N, β)-axes and the unit cube averaging we get an explicit expression for our constant E. We have to note that the result does not depend on asset or market in question. If the FX asset were really random, we should expect any other result for such a parameter but not the invariant proved. This supports once more the non-randomness hypothesis of global markets behavior from the thermodynamic point of view.

Results

Theorem (the non-randomness of the global market)

Data processing for major FX currencies done with three different special mathematical tools adapted for the randomness testing has rejected the "random walk" hypothesis for both single asset and market as pool of assets, for three types of independent variables.

Proof

The visualization of theorem presented at Figure 5-7, and Figure 4 accompanied with Table 3. So, it becomes clear from Figure 4 that neither USD itself nor set of other major currencies fit the randomness assumption for the variables of Type II. Direct calculations done for all λ and Smirnov test for cumulative distribution functions of r_k show that the distances of our interest are much higher than 2 and, as well, there are no chances to get it inside the [+/-0.4; +/-1.8] intervals marked with yellow belts at Figure 4. Randomness hypothesis failed for all $D(n1, n2) = \sup_{|r_k| < \infty} |F1_{n1}(r_k) - F2_{n2}(r_k)|$, $k \in$ {USD, AUD, EUR, GBP, JPY}.
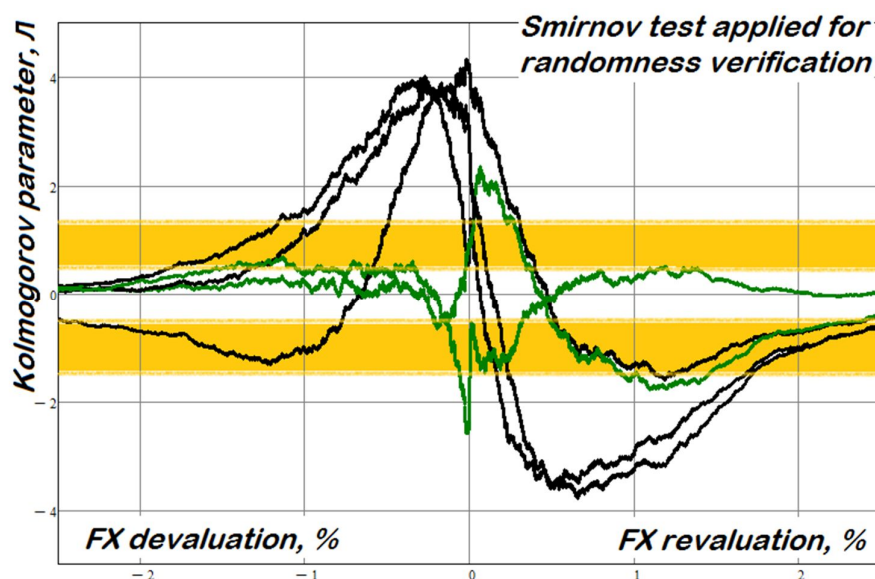
Figure 4. Verification of the FX randomness by the Kolmogorov parameter λ and Smirnov test

Figure 5 presents our result in a form of the rating for global currencies, Russian ruble and precious metals done for variables of Type I based on the Arnold theorem and values of $\log_T s$ for currencies listed in Table 1. We follow the slang of (Arnold, 2005, 2009) and name the parts of the "non-randomnesses" as "attraction" and "repulsion" in corresponding with a type of the non-randomness. Intermediate positions we would call as "bifurcation zone" (1/3 of unit interval) and "quasi-randomness zone" (the last 1/3). It is easy to see that "real randomness", +/-1/33 of $s^*(k), k \in$ {FX, commodities, precious metals etc. }, we met just once in intraday tick-by-tick data of 16.Dec.14 while turbulence at "Russian forex". The only asset which has been detected as random one with no doubt is XAGUSD spot. Divergence between the theoretical and practical values of $s^*(Ag5D)$ is only 0.0390 %.
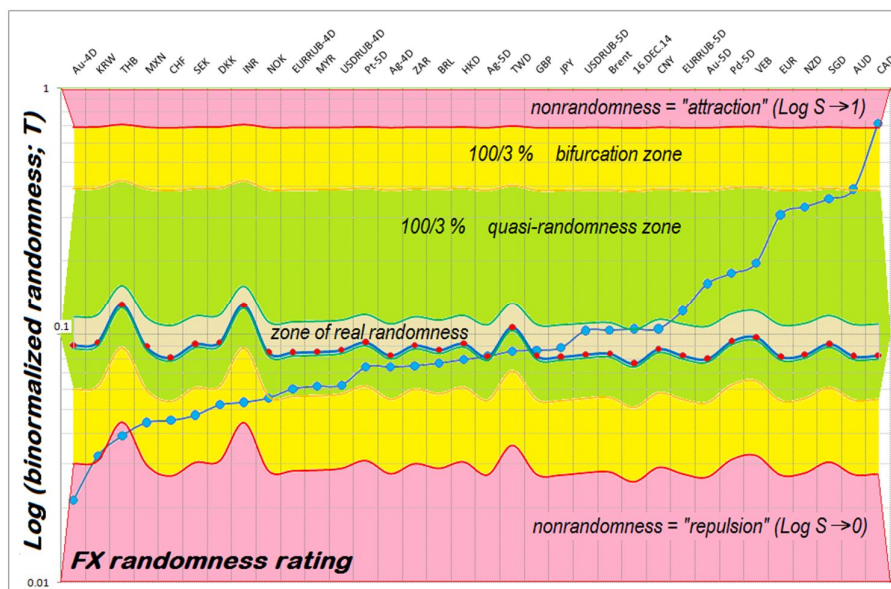
Figure 5. Result of the randomness rating for global currencies, Russian ruble and precious metals

We see, through the rating presented, that there are no chances to accept the randomness hypothesis for all single assets. If the randomness were valid in reality we might expect some about the constant as rating line. So, the second attempt to get fair randomness at the global FX is failed. As well as an attempt to get it through the Smirnov test at Figure 6.
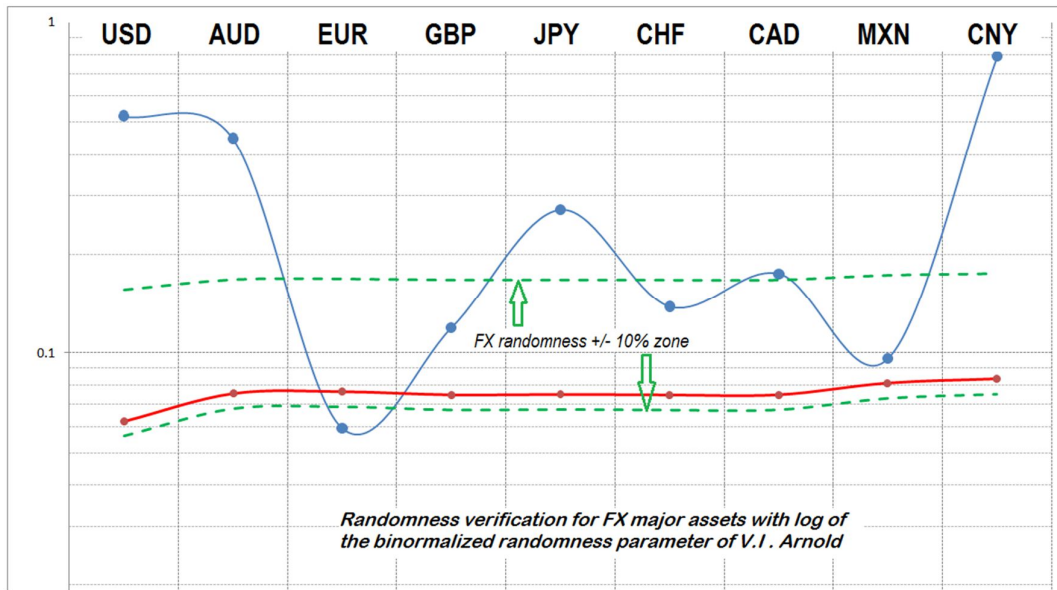
Figure 6. Result of the randomness verification for general populations of the major FX currencies.

Finally, the result for testing the FX as a basket of assets is shown with Figure 7. We have tested the FX with logarithmical variables of Type III, $d_{ij} = \frac{d(x_i, x_j)}{d(x_1, x_N)} \in [0,1]$. As of Jun 2014, FX has reached just once the value of 2.615, 30% higher than 2, in 2001, thus, the final attempt to confirm the "random walk hypothesis" for markets in general is failed.
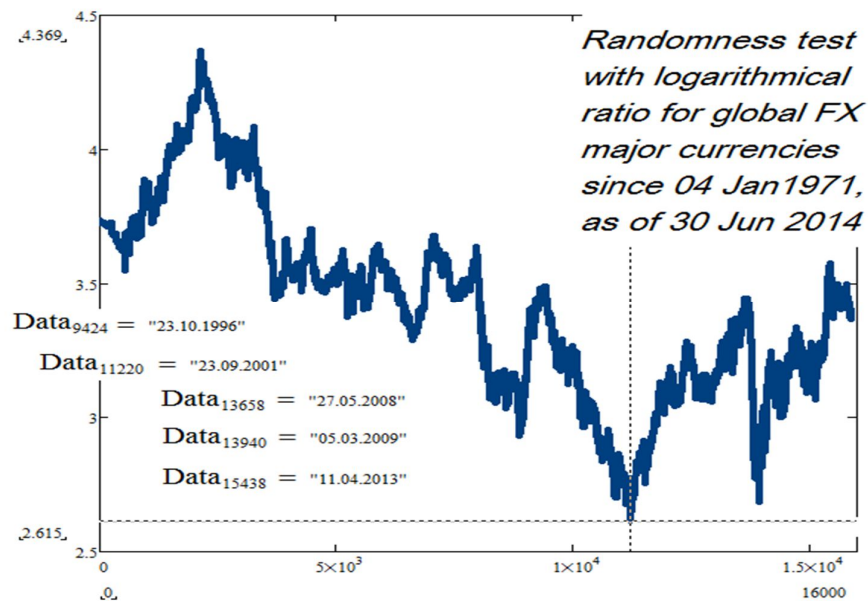
Figure 7. Result of the randomness verification for major FX currencies with logarithmical ratio

The numerical disproof of randomness is completed.

Remarks:
• The behavior of financial markets is not random and might be predictable in the terms of estimating the check points. But the adequacy of tools and time of the FX regulators' decisions (CBRF in Dec'14 or SNB in Jan'15) became the main challenge in this point.

• As financial markets are not random, so the problems to foresee financial crises and to predict the financial market dynamics seem equivalent, i.e. the analysis of the financial markets behavior hidden details looks like a key for giving forecasts of both geopolitical and macroeconomic turbulence.
• Of the particular scientific interest is the problem of classification of individual trading instruments and their baskets with the degree of randomness. We found that a currency basket of BRICS countries, on a 20-year horizon since 1995, gives us the value of the above parameter S equals to 1-1.5, i.e. S is very close to unity, thereby, disproving once more the theory of "random walk" in dealings for the high-frequency trading at markets.

Discussion

One could pay attention that theorems both pure practical and mathematical one had deals with datasets collected of tick-by-tick records with different vendors. In a context of the global markets, the distribution of information is asymmetrical and not equally available to all the participants. Economical development in such conditions becomes unstable, and the markets themselves are the goal and object for manipulations by the FX gamblers with the most complete information. This means, by the way, the reason to accept "non-randomness" as an intrinsic attribute of all financial markets at the globe. Nevertheless, understanding the "non-randomness" of global financial markets in spirit of the both theorems above as well as the essential role of the FX as a modern "risk & crisis export" media makes it necessary to design some high-scientific tools to foresee the timetable and magnitudes of the forthcoming economical problems. In such a case, prediction of financial disasters means finding a tool to solve two sub-problems, such as:
• analysis of both goals and timetables of financial manipulation with dealers interested in, and risks associated;
• scenario analysis and verification of forecasting methods to prevent such manipulations.

We have to note that the main risks and threats in this regard are represented with a set of risks associated with using the modern arsenal of so-called "psi-weapons", such as
• "currencies' wars" accompanied with "related analytical materials" and some other advanced NLP technology;
• "wars of the ratings" for to obtain significant preferences during the global financial turbulence and volatility;
• development, promotion and implementation of pseudo-scientific theories (e.g., "rational expectations" and "efficient market hypothesis") over the world;
• implementation of the false tools & targets (e.g., so-called "inflation targeting");
• "the inflation contagion" by dealing with a long list of pseudo-assets (e.g., futures/options/ADR etc.)
.
On the sovereign level, therefore, what seems extremely urgent is that pivotal problem of scenario modeling and calculation of real-time algorithms for efficient management of foreign reserves to neutralize all the possible on-line actions of the outside dealers. Thanks to modern powerful supercomputers, this problem does not seem hopeless.

We present within the table below some of basic tasks and tools clarifying a scheme of further scientific researches in crisis forecasting methodology in application to markets.

Table 4. Tasks proposed and achieved

List of targets and tasks	The methods to get the results	The results expected
Acquisition and processing of all available tick-by-tick information. Analysis of the reliability and quality of the datasets.	Synchronization of the foreign exchange records, frequency analysis of the information and news flows, marking all the misinformation and synergistic effects. Verification of all the known methods of the technical analysis of the financial markets.	Development of the generalized repository of the tick-by-tick databases for the total combinatorial etc. studying of extra-long time and data series.
Getting the characteristics of the	Searching the anomalies within time	Verification of partial models

individual events. Analysis of characteristics. The integral results of the analysis of the similarities.	series corresponding to the single event. Identification of resonance features in the action of various precursors. Searching the properties both general and singular events. Application of the number theory, information theory, theory of catastrophes.	of precursors, hypothesis about the genome properties of the crisis precursors.
Design of Proto-System for identification the syndrome of crisis or other external event. Analysis of the anticipated goals of the outside FX participants.	Applying the methods of the synchronized targets and of the parametrical resonances for the normalized parameter of the efficiency for a collection of tick-by-tick transactions. Using the theory of direct and reflected waves of efficiency, geometric probabilities and their dynamics in the system of entropy indices.	Giving forecasts for the crisis events have already taken place, i.e. fine-tuning of the proto-system on-line.
Presenting both the numerical and theoretical disproof for the false economic concepts and theories.	Retro analysis of the financial markets and a comparison of all the practical and theoretical results on the available time horizon. Total combinatorial analysis with supercomputers.	Development of the real-time system to identify the timetable and magnitude of the forthcoming crises.

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A FRAMEWORK FOR ANALYZING THE ROMANIAN BANKING MARKET BY NEW ENTRY INSTITUTIONS

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Abstract. *The banks, as institutions that attract the saved resources for investments by mediating the relation between the savers and the investors, are essential for the proper functioning of the economy. However, for the newcomers, the entry on the Romanian banking market involves targeting the opportunities for corporate growth and achieving sustainable advantages compared to the competitors, particularly that, the entry of a newcomer on the Romanian banking market also means entering the EU banking market, as well. Based on this hypothesis, the current study proposes a perspective on the strategic options available to new entries, by analyzing the banking potential and the risks while taking into account the regulations, the local resources and the specific regional and global context. The paper takes into account the economic and social dimension of the banking business, given that, the pressure for democratization and improved living standards contributes to the emergence of new social guidelines. The analysis of past events for identifying a set of early warning indicators (namely the research method used in this paper) is only a starting point. So, we take into account the efficiency and profitability of some of the banks that went through periods of difficulty. In making the decision about if and how to enter the local banking market in Romania, the potential newcomers should analyze a large series of indicators and their evolution trends in time, this being possible with a help of a working instrument called Target Evaluating Model for avoiding the failure on a new banking market. But not only this, because the newcomers must understand the local perspectives of this market. The Romanian banking sector proved to be, over time, stable and strong enough, that was not deeply affected by the global financial crisis and even has a significant potential for growth nowadays. Nevertheless, in the current work we made a deep research upon the ratios that should have given early signs to the risk management systems in some banks that did not survive on the Romanian banking market in the past and, consequently, bankrupted. The competition among the banks is beneficial for the customers and also for the national banking system. It is equally beneficial for the regional or global competition among the national banking markets to attract the investors to the banks and to provide better services to the natives.*

Keywords: risk management; banking analysis; target evaluation model; supervision; financial stability.

Introduction

There are many models for analyzing the financial risks, models that can be used by the universal banks as institutions that attract the saved resources for investments, as it was demonstrated (Benink, 1995). In mediating the relation between the savers and the investors, the banks are essential for the proper functioning of the economy.

By using the financial intelligence, the banking analysts are responsible with providing an overview that is particularly tailored for the management of the risks. However, for the newcomers, the entry on the Romanian banking market, involves targeting the opportunities for corporate growth, achieving sustainable advantages compared to the competitors, but in the same time, risk taking.

This paper aims to complete the existing methodologies by establishing a comprehensive framework for the decisions assessment regarding the difficulties to be faced by the new entry banks, not only by using the financial data but also by considering the informational system for banking knowledge.

From the credit institution's point of view, the features of the banking success in relation with this subject also refer to depicting the factors that are specific for the banking activity, factors that contribute to the development of the banking risks. They also include an analysis from the perspective of the bankruptcy risks that are summarized by the elements of the economic cycle and of the economic crises that happened within the environment the banks activate in.

We argue that, even if the bank`s behavior is adverse towards risk, the costs that are associated with possibility of bankruptcy make them act against taking excessive risks that can increase the probability of failure.

This paper uses and promotes a series of methods and principles focused on the banking risk assessment methodologies, by using a synthesis of positive and negative experiences, as a result of the growing recognition of the capital adequacy standards importance. In particular, we recognize the utility and the importance the semiotic analysis has, as a decision basis in relation with the development of banks, because what really matters is making the best decision regarding the management of the banks. And this can be solved either by investing in development or by investing in solving the difficulties.

Macroeconomics banking awareness. Why do the banks fail, and how to avoid failure? Should we trust evaluation models?

We know that the traditional banking analysis is based on a range of quantitative supervisory tools regarding the liquidity, the solvency, the loan portfolio quality, the large exposures and the open foreign exchange positions (van Greuning & Bratanovic, 2009). Although these are extremely useful, they are not an adequate indication for the banking financial condition or about its perspectives. This particular contradiction we will clarify in the present work and by the new calculating model for forecasting the chances of survival for the newcomers on the Romanian banking market.

In the same time, the picture reflected by financial and prudential indicators also depends on the opportunity, the completeness and on the accuracy of data used for calculations (van Greuning & Bratanovic, 2009). On the contrary, an in-depth analysis as proposed by the current paper includes important qualitative factors and places the financial indicators within a broad framework for assessing and managing the risks as well as the changes or trends in evaluating if the bank environment is a viable one. Also, it allows us to know whether the bank`s operations are or aren't likely to jeopardize the safety of the banking system as a whole.

In order to respond to the public pressure, worried about the viability of one on another bank in a certain market, there was developed a system of technical methods for making a financial diagnosis of the lending and savings institutions, also to ensure compliance with the regulations in force for the general activity of the banking system.

Analyzing the economic opportunities and the circumstances that are typical to the banking activities, as well as the issues related to the transition, we may conclude that the research activity which was the basis of this paper leads towards the consideration that in fact, canceling the evaluation of certain parameters by the central financial-banking supervisory institutions, does not mean only that those parameters are not interesting from the bank's stability and viability point of view, anymore.

The diagnosis focuses on the role the analysis plays in detecting the signs of risk for the banks, starting from the necessary knowledge in the activity of a credit institution, including the use of the prediction models. For a better assessment of the possible risks associated with bank failure, we studied the cases of the banks that faced difficulties and the ways of solving them, for all such situations that occurred in Romania after 1990.

Since the space allocated for this presentation does not allow a dissemination of all the materials, we selected the part describing the evolution of the most important indicators in some of the analyzed cases, out of a paper which is in progress and prepared to be published in a scientific journal.

Practically, this work has as main objective creating a Target Evaluation Model (TEM), able to offer support to any bank that would like to enter the Romanian market. This new coming player on the local market will have the opportunity to use this TEM, meaning that it will introduce the indicators that are characteristic for its own activity in the last 5-10 years and will get an overall image and a perspective of how it will succeed in adapting itself to the Romanian business and banking environment. The TEM relies both on the statistical (historical) comparison and also on analysis and forecast. The calculation system used within the TEM is two-dimensional, combining the results of the analysis upon the new coming bank characteristics (prudential ratios) and the ones of the economic, business and banking environment in the host market. When it is ready, the TEM calculation system will rely on the multiple criteria analysis model as elaborated by Altman (1968), this being in fact a correlation function in which the value of the variable is determined in relation with the value of 13-14 independent variables and with the correlation coefficients that are assigned to each criterion. As we have previously stated, creating this TEM is the final objective of a wider research, that it is still ongoing. Presently, we are working on defining the quality of the business environment of the host country (Romania) and on identifying the most relevant indicators that will be used in the next research phase, for building the TEM matrix that will provide the users with information that help them avoid a potential bankruptcy or major difficulties in a banking market that is new for that player.

In what the Romanian banking system concerns, currently, it presents an increased liquidity degree and a corresponding level of capitalization (approximately 10 billion RON), with a tendency to withdraw and redirect some capital resources towards some mother-banks, particularly when it is acknowledged that, the withdrawn resources can be replaced/substituted. The Romanian banking system reflects a gradually diminishing volume of non-performance loans (NPL), from 21,9% (in December 2013) to 13,9% (in December 2014), with a reduction tendency of under 12% by the end of 2015, while, their coverage with provisions maintained, in time, to a weight of approximately 70%. In 2013, Romania got out from the excessive deficit procedure and, by the end of 2014 it was acknowledged that the national economy functioned within the parameters according the Maastricht Criteria, with an average annual inflation of 1,2%, the average annual long term interest rates of 4,1%, the maximum variation of the RON towards EURO exchange rate being between $+2,1\%$ and $-3,5\%$, the consolidated budgetary deficit under 1,8% from the GDP and the public debt being under the limit of 40% (39,8%). All these improvement and consolidation trends for some macroeconomic indicators encourage some new players on the international banking market to analyze the opportunity to enter the local market, that, slowly but surely, makes its path towards Euro (Isărescu, 2015a).

The evolution (in percentages) of the main efficiency and profitability indicators for some of the banks that passed through difficult periods are presented in the Tables 1 to 3. These indicators provided the respective banks' management with early warning signals, but were not considered. Introducing the following indicators into TEM will give solid clues to the risk managers in the banks that will use the TEM in the decision making process for correctly determining if the time is right for accessing a new banking market.

The minimum set of prudential indicators is the following:
1. ROA = Profit After Taxes / Total Assets (The Return On Assets)
2. ROE = Profit After Taxes / Own Capital (The Return On Equity)
3. Rr = Total Operating Income / Total Operating Expenses (The Profitability of the Main activity)
4. L = Total Loans Portfolio / Deposits From Clients (The Liquidity)
5. Lr = Net Assets / Total Debts (The Quick Liquidity)
6. E = Own Capital / Total Assets (The Leverage Effect)
7. C = Own Capital / Social Capital (The Capital Adequacy)

8. Ca = Total Loans Portfolio / Total Assets (The Quality of Assets)
9. Cr = Impaired Loans/ Total Loans Portfolio (The Impaired Loans Ratio in The Total
        Loans)
10. Cra = Impaired Loans / Total Assets (The Impaired Loans Ratio in Total Assets)
11. Crc = Impaired Loans / Own Capital (The Impaired Loans Ratio in Total Capital)
12. Pcv = Personnel Expenses / Operating Income (The Personnel Expenses Ratio in the
        Operating Income)
13. Rpc = Profit After Taxes / Personnel Expenses (The Profitability of the Personnel
        Expenses)

This minimum set of indicators can be extended with further relevant ones, we will think about along the analysis and research completing process, analysis that we have initiated in the current paper.

The set of indicators that will be the essence of the TEM, are considered to have proven their efficiency through the warnings they coud give, if the risk managers in those banks had owend a multi dimenssional analysis instrument, as we intend this TEM to be. Wishing to verify how relevant the early signals would have been if using the TEM in the case of some banks in Romania that bankruped in the past, we proceeded to the following analyses:

Table 1. International Bank of Religions

Year Indicator	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ROA	3.9	4.3	2.9	2.6	1.7	2.9	-58.3	-23.7	-256.2	-280.0
ROE	23.3	38.9	15.9	22.0	14.8	-54.6	x	x	x	X
Rr	164.6	184.6	126.1	672.5	491.2	115.1	309.9	170.9	129.9	80.9
L	222.5	540.9	2.928.7	102.5	63.7	81.1	34.7	23.1	31.5	32.3
Lr	89.8	106.7	90.4	93.6	90.5	92.9	87.4	100.0	-253.7	-232.9
E	16.9	10.9	17.9	11.6	11.8	5.5	-47.3	-103.2	-233.5	-215.1
C	144.7	393.4	477.3	207.9	341.5	0.9	-398.5	-518.4	-590.0	-590.0
Ca	13.7	21.6	36.6	56.5	38.4	54.4	82.0	54.5	125.7	125.2
Cr	18.3	12.9	17.9	21.0	53.6	32.4	39.2	99.9	100%	100%
Cra	2.5	2.8	6.6	11.9	20.6	17.6	32.1	54.4	125.7	125.2
Crc	14.9	25.6	36.6	101.9	175.0	323.3	-67.9	-52.8	-53.8	-58.2
Pcv	8.8	7.4	7.3	8.4	10.9	7.2	13.2	23.1	40.9	35.5
Rpc	443.9	615.9	226.1	107.3	66.8	-114.2	-1.048.9	-306.1	-2.117.1	-3.5

Table 2. Credit Bank

Year Indicators	1995	1996	1997	1998
ROA	3,99	2,50	0,13	-18,18
ROE	38,70	31,90	1,56	-176,17
Rr	116,71	105,65	88,14	92,64
L	149,87	117,41	127,55	92,97
Lr	94,61	95,56	96,18	76,50
E	10,30	7,84	8,36	10,32
C	357,28	448,71	396,05	252,52
Ca	71,02	63,94	72,04	50,87
Cr	9,90	8,01	x	69,94
Cra	7,03	5,12	x	35,58
Crc	68,27	65,37	x	3,45
Pcv	7,96	8,42	7,96	12,37
Rpc	142,06	77,84	2,80	-427,10

Table 3. Turkish-Romanian Bank

Year Indicators	1995	1996	1997	1998
ROA	7,11	0,56	-27,35	-195,85
ROE	28,95	30,47	-238,96	1490,99
Rr	6,52	3,17	189,65	115,92
L	93,40	48,06	117,52	1,11
Lr	93,18	88,71	59,77	6,73
E	24,55	15,64	11,44	-131,36
C	205,34	311,95	105,21	-214,29
Ca	2,86	21,42	25,03	0,52
Cr	0,01	0,98	14,00	1,96
Cra	0,002	0,003	3,50	0,38
Crc	0,09	0,18	30,62	-0,29
Pcv	8,06	17,12	23,93	36,86
Rpc	344,84	162,49	-275,18	-1.023,45

An efficient use of the banking risk analysis is essential and requires a good knowledge of all the elements of the controllable and uncontrollable activities, all the limitations and the possible outcomes, to provide control for the quality and quantity of the data and for the information management system used in the bank.

Basically, the entire banking system, from basic operations to decision making, relies on information that are structured in a certain form and for certain activities, after their volumes, the type of incomes and expenses, the potential occurrence of losses, the level and the quality of the assets, as well as on the information regarding the investments for development according to in the economic environment in which the bank activates.

The Romanian banking environment

Peng (2000) showed that in their attempt to enter into a new banking market and to design strategies to overcome challenges, an important barrier is the propriety of information about the clients, starting from the uncertainty of the environment they activate in. The bank must identify the greatest strengths for the lenders or investors and how the bank could use the money in order to develop the markets that are specific to these, in Romania.

The increasing competition on the banking market gives responsibility to the key actors to coordinate the focus on the identified areas, according to the institutional development plan and to manage all the categories of financial business and operational risks, together with event risks associated to these.

For planning and defining the risk tolerance levels, the management board, in their decision making process, analyze the major risks coming from the banking environment. Consequently, by analyzing the policies at the macroeconomic level, we acknowledge that Romania has a low inflation rate and a significant decrease in the fiscal deficit as, well as prudent monetary and financial policies.

The banking management mainly considers that an important result of the evaluation is given by ranking the major changes in the national economy (Tochkov & Nenovsky, 2011). The public infrastructure projects reflect a quality strategic priorities plan for a faster growth of the investments on a medium term, as Romania has the lowest infrastructure density in the EU.

On the other hand, the analysis upon the indicators illustrates why Romania still keeps the vulnerabilities to external shocks and also the internal and external imbalances although widely reduced, but not totally yet.

Based on this hypothesis, the study proposes a strategic perspective upon the available options for the new entries, by analyzing the changes towards the last year's evolution, for thus offering a dynamic view upon the banking potential and its risks, while taking into account the regulations, the local resources and also the specific regional and global context.

The paper takes into consideration the economic and social dimension of the banking activity, given that, the pressure for democratization and improved living standards contributes to the occurrence of new social guidelines. They can help the analysts to evaluate the trends and to project the structured activities and resources, to better respond to the development needs.

In addition, the analysis upon the past events is only a starting point. We can say that the advantages the banks that developed on the Romanian market have may change or disappear. Therefore, in addition to the modern marketing techniques used to get the necessary information for penetrating the local banking market, when choosing between the possible alternatives to entry on the market, the new entries must aim a fundamental understanding of the local perspectives.

Important structural reforms move the banking sector forward, to the market-based systems within the transition from socialism to capitalism and democracy. So, the process began with an environment transformation into a market economy, with prices liberalization, with building the private sector (many state-owned enterprises having been privatized) and also the necessary institutions to support a market economy (Pettis, 2001). But many state-owned enterprises only gave the illusion that were able to survive, due to the fact that their arrears were reduced with 1% from the GDP by the end of 2014, while the Romanian state-owned enterprises sector became profitable only after several years of loss producing, as stated in International Monetary Fund Country Reports (2015).

Romania widely reduced the internal and external imbalances, the inflation is well below its target and the incomes slowly convergence to the EU level. This was achieved by an impressive fiscal consolidation and by prudent monetary and financial policies. In the same time, Romania remains vulnerable to global and Euro area shocks, given its relatively high level of external debt, compared with its sustainable force of macroeconomic growth. While the fiscal gap and the foreign exchange reserves provide a buffer and the non-performance loans were substantially reduced, the financial and foreign exchange balance sheets in the private sector still need to be strengthened further on. Some of these macroeconomic environment indicators for Romania, as presented in the Table 4, were issued and published by the General Division for Economic and Financial Affairs (DG ECFIN) on February, the 5th, 2015 and revised by The International Monetary Fund within The Country Report No. 15/79.

Table 4. The Level of the Forecast for Romania 2013 – 2015 (Directorate General for Economic and Financial Affairs, 2015; IMF, 2015)

Indicators	Year	2013	2014	2015
GDP Growth (%)		3.4	2.9	2.7
Inflation Rate (%)		3.2	1.4	1.2
Unemployment (%)		7.1	6.8	6.7
Public Budget Balance (% of GDP)		-2.2	-1.8	-1.5
Gross Public Debt (% of GDP)		38.0	38.7	39.1
Current Account Balance (% of GDP)		-1.2	-0.5	-1.1
Gross National Saving (%)		21.6	21.2	24.3
Gross Domestic Investment (%)		24.5	23.0	23.7
Gross Official Reserves (%)		24.6	23.6	22.7
NBR Policy Rate (%)		4.0	2.7	2.2
Exchange Rate: RON per EURO (end of period) (%)		4.5	4.5	4.4

The GDP grew with 3% in 2014 and is foreseen to remain strong in 2015 as well, at a level of 2.8 – 3%. The annual inflation rate slowed down by the end of 2014, decreasing with/to??? 0.83%, and to 0.41% in January 2015. As stated by Isărescu (2015b), the inflation is predicted to remain low in 2015 as well,

reaching an average annual value of about 1%.

The external position was consolidated while the current account deficit was reduced to a historic level of 0.5 % of GDP, in 2014. As Timu (2014) demonstrated, Romania continued to improve its presence on the international capital markets, thus generating significant buffers. In May 2014, Standard and Poor's upgraded Romania's investor grade level to "investment grade" and the country continued to successfully activate on the international capital markets. The public deficit was reduced to 1.9% of GDP in 2014, due to the fiscal consolidation process. Romania's banking system is strong, the non-performance loans ratio decreased, adequate buffers were granted and no public funds were necessary to support the banking sector during the global financial crisis. But, in the same time, there persists the dramatic decrease in the respect of the lending activity for the private sector.

The Romanian Central Bank international reserves level was of 34.3 billion Euro by the end of January 2015 and exceeded the required standards for covering the imports on a period of 3 months. Yet recently, the growth of the economic activity led to an improvement in the respect of the labor force market, the unemployment decreasing to 6.8%. The improvement of the financial performance by sustainable macroeconomic policies needs fiscal adjustments for a good management of the public debt and for improving the UE funds absorption.

A special attention is given to identifying and ensuring the security of banking business cycle and to the level of correlation between the bank liquidity and the credit availability, for thus anticipating and preventing the information asymmetry. Even if we recognize that The Central Bank acted by adjusting and adapting the norms and consequently the market did not prove itself to be perfectly free, we can see that the banking investors were able to effectively monitor and respond to the imposed rules, even if the progress are only partially recognized. Moreover, under the exactness of the regulations and considering the possible changes of the market risks in the banking field, the depositors and the borrowers may be affected, as it will be impossible for them to renegotiate their contracts with the banks.

The Romanian banking sector proved itself in time, to be stable and strong enough, so that it was not deeply affected by the global financial crisis and even has a significant potential for growth. The competition among banks is beneficial to the customers and for the national banking system. It is equally beneficial for the regional or global competition between the national banking markets, in their aim to attract investors for the banks and to provide better services to the population.

The banking sector in Romania has prudential reserves of capital and liquidity to face a high intensity shock resulting from possible adverse internal and external macroeconomic developments. Within the Romanian banking system, there operate 40 banks, out of which 24 are with private foreign capital, 4 with private Romanian capital, 2 banks have the State as the majority stockholder, 9 are branches of foreign banks and one is a credit cooperative.

The bond between the Romanian banking system and the European banking system is strong, as demonstrated by the share of foreign capital in the total banking net assets, of 364.4 billion RON. Out of these, 91.2% are assets belonging to private capital credit institutions and 89.9% are assets belonging to institutions with foreign capital, more than 80% being of European origin.

The vulnerability of the Romanian banking sector, judged by a too strong dependence on the external financial resources, has significantly diminished. The mother-banks continued to reduce the volume of the financing lines granted to subsidiaries in Romania. The de-leveraging continued to manifest itself in a more methodic manner. The exposure of mother-banks towards their subsidiaries in Romania has decreased. In the same time, the ratio of customers' loans and the deposits related to the private sector in Romania has consistently adjusted to 92 % (which no longer generates a pressure level, from the macro-economic point of view).

The probability of default for the non-financial corporate sector remains on a downward trend (the average value for December 2014 was of 5.4% compared with 6.9 % in December 2013). The banking institutions in Romania continued restructuring the business by reducing the number of banking units (the number of banking units decreased with 229 units in 2013 and with some additional 142 units in

the first half of 2014) and also by reducing the number of employees (the number of employees in the banking system decreased with 3157 in 2013 and with 603 in the first half of 2014), in an attempt to optimize the operational costs. Related to the development of territorial networks, the profitability rate of the bank's core business is of 181 % (calculated as the ratio between the operational income and operational expenses).

Conclusions and outlook

In conclusion, the activities that were the basis for the elaboration of the current paper point out that, to inform themselves about the risks, the credit institution evaluate the risk as being higher than the limit of the financial risks that is associated to the loss, as generated by an opposite evolution compared with the optimistic previsions (what we see in the sensitivity analysis). Consequently, for stimulating the capacity of the banking institutions to resist to shocks, we have to examine a series of parameters and to use the semiotic analysis model, for deciding accordingly. For this, it is necessary to have some correct information, including the financial inter banking arrangements regarding credit line for special and emergency situations.

The low level of the bank lending activity characterized the most of the Member States of the EU-28, the identified factors being both cyclical and structural. Thus, on the supply side, there were identified the capital constraints and the persistent financial market fragmentation. On the demand side, the influence factors were the gap in the relation with the business cycle and the credit risk adjustment within the current balances of the non-financial companies.

The paper may be used for highlighting and eventually solve a macroeconomic paradigm, for recognizing a good and appropriate environment for administrating the banking investments, for overcoming the difficulties and for improving the corporate governance. Another plus of the current paper is the construction of a new model that explains the national banking fluctuations, recesses and cycles. Therefore, taking into account the settled prerequisites, we propose a management framework model (TEM) for analyzing the complex banking risk and also the macroeconomic risk model that gives us a realistic solution and which indicates that, the substandard environment indicators can determine losses and distortions in terms of long-term competitiveness of the banking market.

The theoretical analysis upon respecting the capital adequacy standards is important because obliges the bank to take an as small as possible social risk in the host market. Generically, the new banks must seek new customers for loans, which are a category of borrowers with a higher degree of risk, which initially were not credited, resulting in a surplus of funds in the market (Dell'Arriccia, 1998). This is the motivation for which, a medium degree of caution in riskier conditions, may lead to a decrease of investment appetite. We can appreciate why, when the economy falls into recession, there is no clear presumption about the investors' decisions. Our future estimation model (TEM) could respond to the worries about the small interest of the newcomers in the Romanian banking market when the decrease of the lending activity is sure. But even if, it is necessary to grant the compliance with the capital adequacy standards, we have to realize that these are not perfect for thus to respond to the risk adjustments, the banks having an incentive to go for the riskiest assets within any risk category (Mishkin, 2001). This minus will be solved by the model (TEM) we created at the completion of this research.

The analysis driven by the TEM should not focus only on the macroeconomic variables that reflect the structure of the national economy but, in general, on the issues such as the degree of banks capitalization, the degree of concentration and the competition in the credit market structure, the market liquidity and the inter banking bond market, the shareholders structure (public or private) as well as on other regulatory aspects for supervising the quality of the banking activity, that can also be operatively forecasted and controlled.

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TACKLING THE COMPLEX PROBLEM OF FOREIGN CURRENCY LOANS AND SYSTEMIC RISK - ROMANIAN CASE STUDY

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Abstract. *Foreign currency loans are predominant in Europe and generate a substantial exchange-rate-induced credit risk to European banking sectors. Especially, Swiss Franc (CHF) denominated loans, widespread in Eastern European countries, could cause simultaneous bank failures if depreciation of the domestic currencies prevents unhedged borrowers from servicing the loans. The systemic risk is considerable in the non-euro area, whereas it is relatively low in the euro area. In May 2008, a Hungarian family sued a bank for the way in which the exchange rate is calculated. The contract stated that the Forint was calculated monthly at the rate charged by the bank at the day before each due. Since Swiss Franc has appreciated strongly, the monthly rate has increased considerably. Customers complained that the calculation of the exchangerate was unfair because it allowed the bank to use a different exchange rate than the one used when the loan was granted. The case reached the Supreme Court of Hungary (Kuria), which then requested the viewpoint of the European Court of EU. On April 30th, 2014, the European Court pronounced its decision. The European Court declined to give a clear solution to the problem, saying that it was the attribute of the national courts to decide whether a contractual stipulation was or not abusive. On January 15th, 2015, the Swiss National Bank removed the 1.2 CHF/EURlimit (implemented in September 2011), which had as consequence the instant and considerable appreciation of the Swiss Franc against the Euro, the US Dollar and other currencies. Hence, the CHF appreciation against the RON was inevitable, although the domestic currency had a comparatively stable evolution against the reference currency (Euro). In Romania, this issue triggered the reaction of several stakeholders namely,the clients, the Romanian Association of Banks, the National Bank, and the Government, but they failed to agree on a mutual strategy that would enable the diminishing the effects of this real social problem. This paper attempts to measure the systemic risk in the Romanian banking sector arising from foreign currency loans and the ways to tackle this risk by implementing realistic solutions: a) customized solutions, negotiated between the parties directly involved in the credit agreement (i.e. the credit institution and the borrower) differentiated by specific situations related to client profile (income level, behaviour payment etc.), abnormal credit exposures of banks, such as: maintaining, for a period, of a fixed exchange rate favourable customer (i.e. December 31st 2014); reduction of interest by early application of a LIBOR index values favourable to the borrowers; reducing or eliminating the fees; rescheduling / restructuring the loans. b) putting into practice a debt rescheduling scheme, with the award of a compensation by the State, which means a burden-sharing approach among creditors, borrowers and the State, by taking into account three objectives: respecting the free market principles; state support for vulnerable household groups (ex: with gross monthly incomes of up to RON 3,000); the carrying out by the Central Bank of its legal tasks on safeguarding financial stability. Also, the current paper underlines the importance of the financial education for the population that can help people to take the right investment decisions by taking into account the risks of borrowing money in a foreign currency and prevent in the upcoming years the arise of a systemic risk menacing to distress the stability of the national economy.*

Keywords: *currency risk; systemic risk; Swiss Franc; double-entry accountancy.*

Introduction

Historically, the interest for finance and accounting has arisen from immemorial times, together with the subsistence economy within the primitive commune, some of the drawings in the prehistoric caves suggest that they are "calculations" on how many animals were hunted and eaten, how many skins were skinned and how many clothes resulted, as Dragan (2008) argued.

Being extremely advanced in science, fortune and democracy, the Venetian and Genoan medieval traders used of a double entry evidence of the business in foreign currencies they were dealing with other citadels. In order to diminish the foreign exchange risk and also the risk of cash transportation, they enhanced the bill of exchange (ital. cambio = change) as an exchange and debts transferring tool, for thus ceaselessly have capital support.

According to Dunlop (1985), in 1494, namely 2 years after the discovery of America by Columb, *t*he Franciscan monk Luca Bartolomeo di Borgia was writing and offering to the mankind, for a whole eternity, in Venice, a famous mathematics compendium-Summa de Arithmetica, Geometria, Proportioni et Proportionalita (SA), that included a 27-page essay on bookkeeping, Particularis de Computis et Scripturis, which reveals the secrets of the contemporary merchants in following the existence and the movement of the capitals.

It was a synthesis of the mathematical knowledge of his time and contained the first published description of the method of bookkeeping that Venetian merchants used during the Italian Renaissance, acknowledged as the double-entry accounting system. He explained the use of journals and ledgers, and warned that "a person should not go to sleep at night until the debits equaled the credits". He explained how accounts worked and the significance of assets, liabilities, capital, income, and expenses (Sangster, Stoner & McCarthy, 2008 p.111-134).

His advice that nobody should remain with unpaid debts, as the debts create troubles and fights, is valid more than always. Regrettably, some of the contemporarians were not aware of this advice and got indebted over their refund limit and accepted risks unknown to them. For this reason, we would like to connect the history of sciences and the father of accounting on one hand and the way in which, after one half of a millennium, by not admitting or deliberately ignoring the foreign currency risk, lead many people to higher debts than the ability to pay back.

In this paper we will focus on analyzing the facts in their historical evolution and to state opinions and optimisation proposals concerning the foreign exchange rate risk management, can could be useful to the decision makers (the regulation institutions, Parliament, Government, banks, public, etc) but also to the students, the tomorrow's professionals.

The exchange rate risk management measures of the Swiss National Bank in 2011 and 2015. Reactions of the European Union authorities to tackle the systemic risk

On September 6, 2011, in a press release, the Swiss National Bank announced the setting of a minimum exchange rate at CHF 1.20 per euro, aiming for a significant and sustained weakening of the Swiss franc (Swiss National Bank, 2011). The reasons for this decisions were:
-the fact that the Swiss franc was substantially overvalued
-threats to the Swiss economy
-the risk of a deflationary development.

This exceptional and temporary measure protected the Swiss economy from serious harm, but it affected other economies and, especially borrowers.

On January 15, 2015, the Swiss National Bank removed the 1.2 EUR/CHF floor, having as result the instant and noteworthy appreciation of the Swiss franc against the euro, the US dollar

and other currencies. The explanations given by the Swiss national bank where that "euro has depreciated considerably against the US dollar and this, in turn, has caused the Swiss franc to weaken against the US dollar. In these circumstances, the SNB concluded that enforcing and maintaining the minimum exchange rate for the Swiss franc against the euro is no longer justified." (Swiss National Bank, 2015).
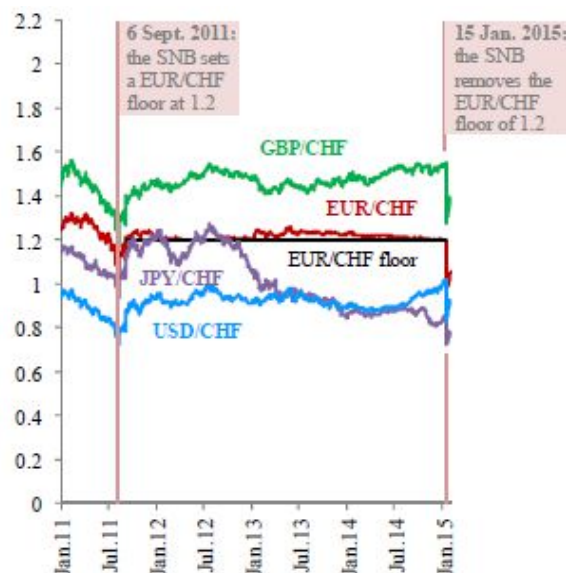
Figure 1. Fluctuation of exchange rates of main currencies in January 2015 (Bloomerg, 2015)

The decision of Switzerland's central bank led to the Swiss currency appreciating considerably against the currencies of Central Europe. Instantly, the Croatian kuna has lost 14% of its value against the Swiss franc; the Bulgarian lev, 13%; the Polish zloti and the Romanian leu, 12%; and the Hungarian forint, 10%. The Leu, the Romanian currency, has appreciated drastically (from 3.7415 Leu/CHF in January 2014 to 4,3287 Leu/CHF), even if the domestic currency had a fairly constant evolution against the reference currency (euro).
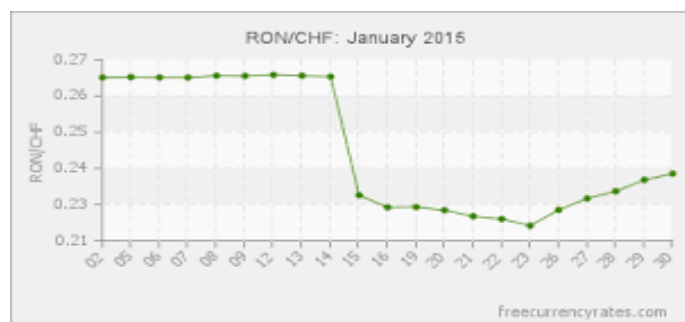
Figure 2. Fluctuation of RON/CHF exchange rates in January 2015 (European Central Bank)

Unwarranted foreign currency lending can generate noteworthy systemic risks for the Member States of the European Union and cross-border spillover effects especially because of the potentially affected asset prices, of the market risk for all unhedged borrowers, with increased instalments caused by negative developments of the exchange rates. Risks are amplified sometimes, by the dependence of local branches to the parent banks that are affected by the foreign currency swap markets evolutions and foremost by the high level of integration of financial groups. There are at least three types of risks that can affect the banking systems of the countries activating in E.U.:

1) exposure to credit, liquidity and market risks;
2) excessive foreign currency credit growth;
3) asset price bubbles.

Many theoreticians and practitioners have tried to warn stakeholders in 2007 and 2008 about the dangers that global financial system will face in the future years, but they were not listened. But what is *systemic risk* anyway? We can define it in many ways, but perhaps a good explanation would be that the systemic risk the risk of fall down of an whole financial system, as contrasting to risk associated with any one individual entity, or constituent of a system, that can be restricted therein without damaging the entire system, caused by different risk components and accelerated because of *interlinkages* and *interdependencies* in a system, where the malfunction of a single entity or group of entities can cause a cascading failure. In fact, George Kaufman warned as early as in 1997 that "a sharp depreciation in exchange rates may trigger defaults by private borrowers, including banks, and by sovereign governments on their foreign-currency-denominated debt and even on their domestic currency debt, if the costs of their foreign currency debt increase sufficiently." (Kaufman, 2013, p.10).

For these reasons, o*n 21 September 2011,* the European Systemic Risk Board *issued first recommendations on lending in foreign currencies for setting onward measures that would ensure borrowers can repay their debts.* (European Systemic Risk Board, 2011). The recommendations included: (i) increasing borrowers' awareness of risks of foreign currency lending, by guaranteeing that they are given enough information; and (ii) ensuring that new foreign currency loans are extended only to borrowers that are creditworthy and able of resist severe shocks to the exchange rate. Therefore, the recommendations for national authorities was to closely supervise and, if needed, consider imposing limits on funding and liquidity risks associated with foreign currency lending. Another requirement was to hold adequate capital, under the Second Pillar, for foreign currency lending due to the non-linear relationship between credit and market risks.

A press release of the Court of Justice of the European Union (2014), reveals that on 29 May 2008, a Hungarian couple concluded a contract for a mortgage denominated in a foreign currency with a Hungarian bank. The bank granted the borrowers a loan of 14 400 000 Hungarian Forints (HUF) (approximately €47000).   The contract specified that the fixing in Swiss francs of the amount of the loan was to be made on the basis of the buying rate of exchange of that currency applied by the bank on the day the funds were advanced. Hence, the amount of the loan was fixed at CHF 94 240.84. Yet, under the contract, the amount in Hungarian forints of each monthly instalment to be paid was to be determined, on the day before the due-date, on the basis of the rate of exchange applied by the bank to the sale of Swiss francs. Customers complained that the calculation of the course is unfair because it allows the bank to use a different course than the one used for loan repayment grant. The case reached the Supreme Court of Hungary (Kuria), which then requested the views of the European Court. On 30 April 2014, the European Court has pronounced its decision (Court of Justice of the European Union, 2014). This decision was important including for customers in Romania. In addition, the European Court has given some further clarifications with regard to the context in which courts can change exchange contracts:
- Consideration of an unfair term should not weigh the price / remuneration of services. But the difference between the exchange rate used to sign the contract and used to repayment cannot be regarded as remuneration for a service rendered by the bank;
- A term which defines the main object of the contract cannot be considered an abusive clause, when presented in a clear and understandable language. If the deletion of an unfair term renders the contract unenforceable, the European directive does not preclude the national court from substituting the contested term with a supplementary provision of national law.

So, the national courts have to judge whether the average consumer may realize – by reading the promotional materials made available by the bank and contractual terms - that the rate of credit will differ from the exchange rate used for loan repayment.

The issue of CHF-denominated loans in Romania

In Romania, the reference currency is euro, because of the strong trade ties with EU states, the status of membership of the European Union and objective to adopt the euro as soon as possible. Therefore, the CHF/RON exchange rate is set indirectly, since CHF/RON exchange rate is determined indirectly depending on the EUR/RON and EUR/CHF exchange rates. Romania has no means of control over the CHF, because the developments in the EUR/CHF exchange rate are interconnected with the foreign currency demand and supply between the euro area and Switzerland.

The principal factor of success for the CHF lending during 2007-2008 is in close was the fact that CHF borrowing costs were inferior at the credit agreement date in comparison with credits denominated in other currencies, and this fact encouraged both borrowers with lower income, and higher income borrowers to access larger loans. Unfortunately, given the unfavourable exchange rate of CHF versus Leu, has had after 2009 a bad impact on debtors, who, growingly, failed to repay the loans. It is true that the number of CHF borrowers declined in 2015 with approximately one third in comparison to 2008, thanks to loan reimbursement and loan conversion into another currency.

Between 2007 and 2008, 11 banks granted loans in CHF in Romania, when the Swiss Franc registered considerable lower interest rates in comparison with those in Euro. This kind of credits were appealing for people with very small salaries, who had, otherwise, little chance to get a credit in Euro or RON. Unfortunately, after 2008, the CHF rate increased sharply while the reference interest rates abruptly decreased, for all currencies. Over 75,000 individuals have loans in Swiss francs and 95 % of loans are concentrated in six banks. In total, 14 credit institutions granted credits in Swiss francs. Of all borrowers with loans in francs recorded in banks' balance sheets , almost a third (32%) are found at Bancpost , 24% at Volksbank , Piraeus Bank 20% , 11% to Raiffeisen , 7% and 2% Romanian Bank to OTP Bank. One third of the loans in Swiss francs (35 %) were allocated to purchase housing, 58 % were consumer loans with mortgage and other 7% were other consumer loans.

EURIBOR, the index for EURO, reached close to 0,05% in present, whereas LIBOR for CHF reached negative levels, of almost − 1%, after The Central Bank of Switzerland has decreased the reference interest rate to − 0,75%, just the once they gave up on the fixed exchange rate that determined the hasty appreciation, with 20%, of the CHF. This situation leads to negative interest rates that the Romanian banks apply for the credits in CHF, because they are determined pending on the LIBOR index for CHF plus a fixed margin adjusted once in 3 or 6 months; for instance, if a loan has a fixed margin of 3 % plus LIBOR CHF (-1%), then the interest rate will be 2%.

Up till now, when we are elaborating this paper, the 11 banks in Romania apply the old value of the LIBOR index, valid for the end of 2014, of about 0%, and maintain the clients' interest rates high. Even so, the interests paid by the Romanian clients with loans in CHF are currently higher than the ones in RON. For instance, at Raiffeisen Bank, that has almost 9.000 loans in Francs, amounting 360 million EURO, the average interest for these loans is of 6%.

Incongruously, the average interest rate for the mortgage loans in RON is 4,9% according to BNR, whereas the annual effective interest rate (DAE), that also includes the commissions, is of only 5,25%. Therefore, in order to have solvent clients, the banks should diminish the interest rates for loans in CHF, because they are already very affected by the depreciation of the RON towards the CHF with 20%.

In Romania, the population have loans in Swiss Francs of about 10 billion RON, out of which 3,5 billion are loans for houses (35%), the rest being either consumption loans, or for other destinations. As the Credit Bureau reveals, the delays of more than 30 days for the loans in CHF loans amount 1,6 billion RON (16% from the total CHF loans), in a noteworthy decrease comparing with the 2,4 billion RON amounted the last year.

In January and February 2015, Romanians with loans in Swiss francs protested in front of Parliament and five other cities. They requested a legislative solution from the Parliament. The parties involved in the "Swiss franc crisis" had opposite positions. Customers wanted a law that would have given them the possibility to convert foreign currency loans in lei at the rate valid at the time when the loan was taken plus maximum 20% (Mediafax, 2015).

On the other hand, banks and the National Bank raised the lack of constitutionality ground of such a measure, and also the potential of collapse for the credit institutions. In turn, customers complain that the solutions offered by the banks were only declarative, whereas in reality the submitted variants that are to the disadvantage of the debtors, triggering additional costs for the whole service debt. Moreover, some credit institutions have demanded additional guarantees for converting customers credit in lei, given that the value of real estate brought as collateral has depreciated by almost half compared to the moment when the loan was taken. The clients were supported by the National Authority for Consumer Protection.

The reaction by policymakers was restrained. Despite street protests by debtors, finance minister ruled out forced conversion and said government measures would be limited to widening tax credits for borrowers. The Parliament members also debated the franc loans issue in several meetings of the Budget- Finance and Banking Commission together with all parties concerned, without reaching a conclusion.

In May 2015, Gorj Court decided as a family that has a loan in Swiss francs contracted in 2008 to pay exchange rates on the date of signing the contract. The court decided freezing the CHF exchange rate; the judges ordered the calculation and payment of the loan repayment at the value of the Swiss franc in lei valid on the date of concluding the contract. This decision could become in Romania a juridical milestone in the issue of the loans in Swiss franc.

The analysis of the alternatives of the various CHF loans "stakeholders" in Romania

We will try to analyse the alternatives that stakeholders have in Romania, in order to reduce the negative effects of the CHF exchange rate increase towards RON. For tackling the complex problem of foreign currency loans, one can imagine several alternatives:

a) *Customized solutions, negotiated between the parties* directly involved in the credit agreement (i.e. the credit institution and the borrower) differentiated by specific situations related to client profile (income level, behaviour payment etc.), abnormal credit exposures of banks, such as: maintaining, for a period, of a fixed exchange rate favourable customer (i.e. December 31st 2014); reduction of interest by early application of a LIBOR index values favourable to the borrowers; reducing or eliminating the fees; rescheduling / restructuring the loans as an agreement between the bank and the borrower. The clients advocate for the loans' conversion to RON, at the exchange rate that was valid at the date of signing the lending contract. The outcome would be that the 11 banks that granted loans in CHF would book in their accounts a loss of the equivalent of 950 million EURO. The value in RON of the 75.000 loans in CHF is at present of 2 billion RON. The majority of the loans can be found in Bancpost (32%), Volksbank (24%), Piraeus Bank (20%), Raiffeisen Bank (11%), Banca Romaneasca (7%) and OTP Bank (2%), and the rest of 4% are with the other 5 banks. The National Bank of Romania has not imposed any relief measures on the banks and did not apply populist administrative measures, for working out the problem of the CHF loans, an approach that, otherwise, we also share. Instead, NBR encouraged banks to negotiate individual solutions with the clients. This approach was also supported by the Ministry of Finance. However, since CHF appreciation which made the loans in Swiss currency very expensive, many politicians have continued to advocate for adopting a law for conversion at a convenient rate for the borrowers, for populist reasons. After the pressure of many clients and lawyers, the Government takes into account a law project meant to save the clients that deal with exchange rate risk; the contract holder should have a maximum income of 3,000 lei, while the maximum amount of credit provided after conversion should not be higher 300,000 lei.

b) *Sharing the burden between the bank, State and the borrower*, which means putting into practice a debt rescheduling scheme, with the award of a compensation by the State, which equivalents with a burden-sharing approach among creditors, borrowers and the State, by taking into account three objectives: respecting the free market principles; state support for vulnerable household groups (ex: with gross monthly incomes of up to RON 3,000); the carrying out by the Central Bank of its legal tasks on safeguarding financial stability.

This implies a conversion of the ongoing loans for a rate of approximately 3 RON for a CHF, rate placed somewhere in the middle, between the rate of 2 RON at the moment of granting the loans, in 2007 – 2008, and the one that exceeds 4 RON for a CHF, currently. The European Directive regarding the loans specifies that bankers cannot agree with the conversion at another rate than the current one for the day when the conversion is done. In the Directive, there is clearly stipulated that. The states can make changes, but as long as they do not apply retroactively.

Some politicians support the so-called "electo-rate", by which the banks will support a Governmental program for loans restructuring, that aims to reduce the monthly instalments for a period of 2 years. This is accomplished by granting a salary tax exemption, but only for the ones with monthly incomes under a certain amount (2200 RON or 3000 RON, the amount has not been settled yet). Since banks started to face the misfortune of non-performing loans, they had to adjust their policies to the reality and offer their clients more convenient payment conditions. For instance, Volksbank Romania and its parent group, Banca Transilvania, finalised in the first semester of 2015 the biggest loan conversion program in Romania. The two banks persuaded approximately 15,000 borrowers to switch from Swiss franc (CHF)-denominated loans to other currencies, namely RON or Euro, in order not to lose them or face a long series of trials. The campaign lasted three months. The offer provided a 22.5% discount for those who accepted to convert their loans in Swiss francs into Romanian currency or euro.

Many people, including financial analysts, politicians and, surely, borrowers, believe that this solution would be efficient because it can help costumers to have extra-money for consumption, that can help the economy, or to help those who are really needy, having small incomes, because the burden is easy to be carried when it is shared by three parts (debtors, banks and State).

Taking into account the discrepancies between categories of borrowers, it is impossible to adopt one solution valid for all borrowers' that encounter debt-servicing problems. There are different individual specific circumstances that impose customized solutions. Therefore, it is essential for bank regulators not to harm the financial and banking system stability, that is a precondition for economic growth, job creation triggering higher household income for the credit repayment and, foremost, maintaining depositors' confidence in the banking sector. According to a press release of NBR, *"credit conversion at the historical rate + 20% would generate losses worth around lei 4.5 billion for the entire banking sector, while three credit institutions would see their solvency ratio fall below the minimum regulated threshold. The solvency ratio across the banking sector would diminish from 17.1% to 14.6%."* (Isărescu, 2015). In the same press release, the NBR advocated the implementation of customised and realistic solutions, negotiated between the parties directly involved in the credit agreement. Among the alternatives envisaged by NBR, the one that was seen as recommended was implementing a debt rescheduling scheme, with the award of compensation by the State.

Our opinion, as authors and neutral analysts, is that in the matter of loans in CHF, changing the law and applying it retroactively, would be absolutely unconstitutional, against any juridical principle, and would also infringe the European Directive regarding the loans, would create an unbalance towards other currencies. As a consequence, it would cause the so called moral hazard, as it is not moral that a solidarity fund or all the contributors in one country to pay part of the goods of personal use that some of the banks' clients got CHF loans for. At least in Romania, the case that we have studied more closely, usually, the contractual clause

regarding the foreign currency risk was not negotiated between bank and borrower, the signed contract being a pre-formulated standard contract. In fact, there was an unequal position for the advantage of the bank and the in the client's disadvantage, the latter representing the weaker contracting party, breaking the fairness and trustfulness principle. In the period of time when the majority of loans were granted (2007-2008), the Romanian Civil Code from 1864 was still in force. In the Art. 1578 in what the lending concerns, the "nominalism principle" was stated; accordingly, the debtor must pay back the nominal received amount, regardless its variation.

Conclusions, opportunities and solutions for circumventing in the future years the negative circumstances generated by the foreign exchange rate risk

The surprising announcement of the National Bank of Switzerland to remove the minimum level of the EURO/CHF exchange rate, caused significant financial losses for especially for the families that borrowed money for buying a house or an apartment. The authors of the present paper consider that, access to information and financial education are crucial and that we, as members of the academic community, have to advocate for rising the awareness of the public about the exchange rate risk.

Opportunities and Solutions for circumventing in the future years the negative circumstances Generated by the Foreign Exchange Rate Risk:
1. Transposing the Directive of the European Parliament and of EU Council no. 17/2014 regarding the loan contracts into the Romanian Legislation, represents a very good occasion to legislate in this field. In Chapter no. 9, art. 23, the Directive obliges the member states to adopt an appropriate framework, and to allow "limiting the foreign exchange rate risk the client is exposed to, as a result of the credit contract", by converting the loan into an alternative currency or by establishing another mechanism for adapting the contract, applicable only in future.
 2. All the players on the financial and foreign currency market have to be acquainted with and apply the protection instruments towards the foreign exchange rate risk and towards the interest rate risk. The foreign exchange risk and the interest rate risk act jointly as, buying or selling foreign currency at term, generates foreign exchange rate risk, and placing the thus obtained capital, also generates the interest rate risk. For instance, a client who buys foreign currency at present for paying its future instalments that are payable next month, generates foreign exchange rate risk. The use of this amount, until the due date, for the lending process in foreign currency, is a fact that generates the interest rate variation risk (Treapăt & Gheorghiu, 2015). Surely, risks cannot be entirely eradicated, but, they can be diminished by the diversification of the portfolio of assets and liabilities in foreign currency and also using certain techniques for reducing the risk, techniques that were developed on the derivatives market, by using some hedging instruments for compensating the risk. The derivate instruments action as FORWARD, FUTURES, OPTIONS, SWAP, FRA operations, t are used both as hedging instruments against the interest rates risk and also against the foreign exchange rate risk. The authors of this paper who acquainted with banking practice, that these protection instruments against the risk were almost unknown and not used prior to the methodological framework took place in Romania, and they started to be used more after the issuing of the norms regarding the derivate financial instruments, as it is shown by Treapat (2011, pp.39-40). Once more, we underline that, it should be a commitment for scholars or practicians in the field of the financial management to promote, these protection instruments towards the risk: the hedging, the forward/future contracts, the SWAP, the Currency Options (call/put), etc.
3. Individuals will have to be more resolute when negotiating with the banks for neutralizing the negative effects of the foreign exchange rate risk, by asking for some more favourable contractual clauses to be introduced in the loan contract. In the credit-boom period, the loan contract clauses were imposed to the borrowers by the banks in the form of a standard contract, by following the „take it or leave it" principle.
4. Introducing or broaden the curricula of economic sciences, of general management, of risk management, audit, entrepreneurship, finance, accounting, etc, in the Romanian education institutions not only with economical universities but also for technical ones or with other profiles, both for pre-university and university courses. These subjects have to be studied, in order to raise for the future generations their awareness about the opportunities but also risks

involved by credits. The consciousness of the importance of financial education has to lead to the growth of the number of tailored national strategies for financial education.

5. All actors of the financial environment need to demonstrate responsibility in decision making. Accordingly, shareholders of banks need to cautiously select talented and savvy managers, train highly qualified personnel, and implement corporate governance principles, internal procedures based on separation of the board of directors and bank management. The board should supervise the management activity and ensure its correct reporting to shareholders and implement coherent, operational policies and ensure the proper functioning of banks. Audit committees and auditors (both external and internal ones) should assess the banks' control systems, principally in accounting and information technology domains. For specific risk management, international banks have to set up risk management committees, to settle on a certain risk profile and to institute objectives and strategies for each significant risk, including for the outsourced activities. Bank's risk management strategy ought to establish the best possible s balance between risk and profit. Undoubtedly, the public should anticipate the effects of investment decisions they make and properly assess their degree of solvency they have. (Gheorghiu, 2011, p.255)

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EUROPEAN TAXATION – BETWEEN FLAT AND PROGRESSIVE TAX

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Abstract. *The paper presents the tax rates applied in the European Union, with a comparison between the progressive and the flat tax. In the first part, we discuss about general characteristic regarding the tax system in Europe, fiscal policies applied and about particularities of the two tax rates: progressive and proportional. We started specifying the reasons that brought to the forefront the flat tax in the European tax system and then we countinued by highlighting the advantages and disadvantages of progressive taxation on the one hand and of proportional taxation on the other hand. Making this comparison and analyzing different relevant opinions, we think that the choice of the right tax system can not be the same for each Member State because there is no general valid answer. Moreover, this choice has a fairly large political implication and this idea may be a possible interpretation of the fact that the flat tax has been embraced in Europe by the post communist countries. Further, we analyzed the effects on the budget revenues brought by the flat tax in the fiscal enivronment and we correlated them with the tax structure of each mentioned country. Theoretically, if we consider that the flat tax brought benefits in the tax system, Member States should record growth in the budget revenues, due to the reduceed tax evasion and increased foreign investments.So, we compared the volume of the budget revenues in two different periods of time: before and after introducing the flat tax. We observed that the flat tax didn't had the expected effects because the budget revenues had not suffered a positive evolution by changing the way tax percentage is applied We also brought the discussion current European fiscal approaches regarding the tax rates and we found that starting with 2013, some post communist countries had returned to progressive tax system. In the end, we emphasized the conclusions obtained with this paper.*

Keywords: flat tax; progressive tax; fiscal policy; budget revenues.

Introduction

The tax system is one of the main elements of international economic relations established between states. More broadly and looked through a simplistic approach, the tax system is expressed by all taxes of a state. But beyond the main aim on public expenses generated by the public needs, the tax system should be regarded as a major tool in creating a favorable area of economic growth and sustainable development.

The European Union and the euro zone expanded gradually and the progress of macroeconomic harmonization process was obvious in the last decade. However, as Rozmahel, Grochova and Litzman (2014) had been shown, significant differences regarding monetary and fiscal policy of the European countries are remarkable: while the European Central Bank applies the same measures of monetary policy for all countries, waiting also the countries that wants to adhere to adjust their policies in accordance with criteria convergence supported by the pact of Maastricht, fiscal policies are still controlled by national authorities.

At the European Union level, the fiscal policy is based on the principles of the single market; each country is free to adopt its tax regime, closely related to the degree of economic, social and military development.

The tax rates in European Union

Developments and differences in terms of taxes in European Union countries outlined through graphical representations and interpretations of different points of view, are due to the application of tax rates. In this sense, the two methods represented by the single rate tax or progressive rates of taxation, managed to make their mark directly on each fiscal policy and indirectly on the degree of fiscal requirements, level of economic and social development .

There is no secret that the fiscal policy often can not be neutral , but more than this can divide the people into two social categories. Although, formally, we are all paying taxes, M.N. Rothbard (2006) argues thate there are social categories that contribute more to the state budget, and here we refer to those who earn incomes in the private sector, compared to those that are paid from the public budget. Over time, hoping to unite the population in terms of fiscal matters, the authorities had chosen different methods of taxation.

Over time, the tax sustem had sufferd significant legislative interventions, manifested in different forms in each country, in order to put their mark on the economic and social space. In recent decades there have been many tax reforms in Europe, especially if we consider the recent economic crisis triggered worldwide. A tax form drew the attention especially in the last ten years: the flat tax .

Around the world, the debate between progressive and proportional taxation started, in 1983, by Hall and Rabushka's theories. The two economists had promoted and defined flat tax as the simplest and most beneficial thing for a market economy: the same tax rate applied no matter the income of an individual or a corporate profit. Even when launching this theory, the flat tax rate was not implemented, represented the subject of many academic and political debates worldwide.

In Europe, the effect of this theory became increasingly felt in the past 10 years, when many post-communist states adopted the flat tax. The main purpose of this implementation was to reduce tax evasion. The supporters of the flat tax, considered it a fair tax system, which encourage the consumption, the aim being to stimulate the supply. In most states, as in the case of Romania, this has not happened: the flat tax led to accelerated growth of consumption with the widening of the current account deficit.

On the other hand, progressive taxes are designed to collect a higher proportion of tax revenue from the rich to the poor, thus reducing income inequality compared to the taxable available. This policy was supported for a long time by economists as Karl Marx and Adam Smith. In the same time, Duncan and Peter (2012) demonstrated that the proponents of liberal doctrine considered that this tax system can only deacrese the income level, because people are forced to turn to other states, with different fiscal policy and with a more relaxed tax system.

These different fiscal approaches and the gradually increase of the European Union area , encouraged the presence of a more active tax competition. The phenomenon of tax competition between states occurs when there is a variation in tax rates and people can choose between them; in this situation there are two types of reaction from Member States: reducing the tax burden by reducing tax rates, which involves also the reduction of the government revenues or keeping the same level of tax rates and use the accumulated resources to enhance the attractiveness of the national territory by offering a rich package of public goods and services. In both cases, the state is seen limited, forced to give up to some revenues not to lose some categories of taxpayers which can migrate or invest the money somewhere else, while the companies are using the tax competition as an opportunity (Vuta & Lazar, 2008).

This „speculative" behavior in terms of tax, was also encouraged by the expansion of the Euro Zone and was a well known consequence of the single European market creation. Both approaches for

taxation, progressive or proportional, presents obvious advantages and disadvantages whose effects were felt over time in European economies.

In Table 1 are shown relative advantages and disadvantages of progressive taxation. Progressive taxes rates are often essential for a fair distribution as a "tax burden". In this regard the imposition of differentiated rates can be done taking into account the economic strength of the taxpayer (income / wealth), but also of the social background (the taxpayer is maintaining a large family, it is part of a disadvantaged group etc.). But in the same time, excessive differentiation can create difficulties regarding collecting system, and sometimes can encourage the tax evasion.

Tabel 1. Advantages and disadvantages of progressive tax

Advantages of progressive tax	Disadvantages of progressive tax
Encourages people with low income	Discourages people with high income
Encourages consumption	May cause increase in tax evasion
May increase the fiscal budget	Encourages the companies to migrate in states with a relaxed tax system

Although the flat tax was heavily promoted worldwide in the `80, in Europe entered with small steps and was adopted especially in the Eastern European countries, which believed in the benefits of this system supported with famous economic theories .

Tabel 2. Advantages and disadvantages of flat tax

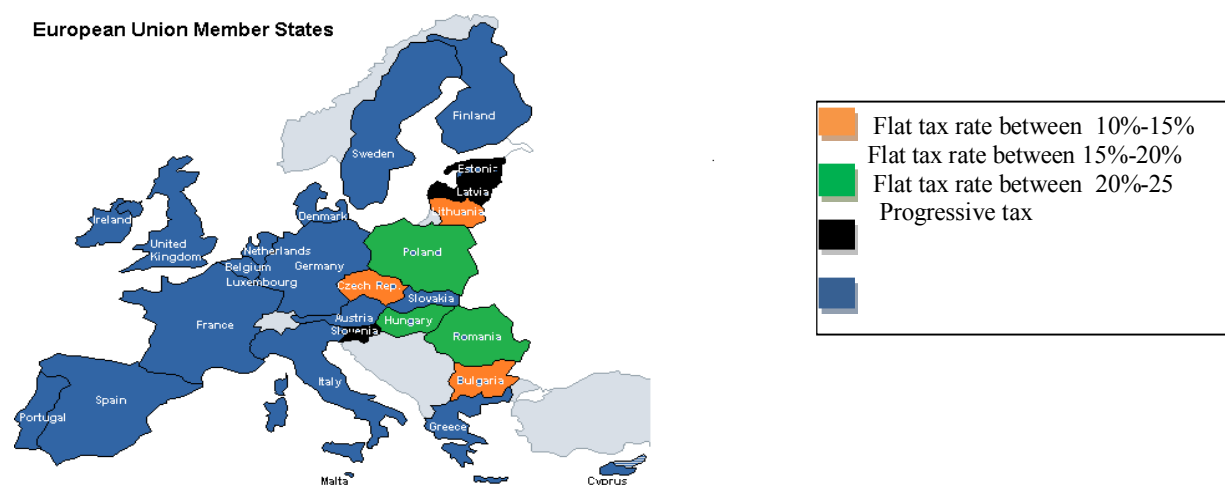| Advantages of flat tax	Disadvantages of flat tax
Decreases the tax evasion	Discourages small enterprises
Promotes a simplified tax system	Promotes a regresive tax system
Creates favorable business environoment	Causes reduced fiscal flexibility

Numerous debates and financial analysis on tax rates were based on a simple question, but with no clear answer up to now: "What kind of tax system is more appropriate: progressive or flat?". After long research and different approaches some economists think that the choice of the tax system can not be the same for each state, there is no generally valid answer. Moreover, this choice has a fairly large political implication. This may represent a relevant explanation for the fact that the flat tax was strongly adopted in the last decade by post-communist countries that have followed in the `90 similar fiscal and monetary trends .

In fact, as Marinescu (2009) had been shown, not how taxes are collected is the most important thing for a state, but the income obtained by applying the tax rates, because through the dimension of this level may or may not be covered budgetary costs, may or may not be ensured social security, can or can not be increased the degree of economic development.

The flat tax in European Union

As we highlighted above, the tax system based on a flat tax has grown in Europe in the last decade. The first country that introduced a flat tax (26%) in Europe was Estonia, in 1994. In 2009, the rate was reduced to 21%. Figure 1 represents the European Union Member States, where states are divided by the applied tax system.

From Figure 1, it can be seen that the countries with the lowest tax rates are Bulgaria (10%), Lithuania and the Czech Republic (both 15%). In contrast, there are Latvia (25%), Slovenia and Estonia (both 21%). Romania, Hungary and Poland practice an average tax rate, of 16% and 19% respectively. It is worth to mention that other European countries such as Russia, Macedonia, Munetnegru, also post-communist countries, still practice a proportional tax system introduced after 2000. Slovakia, dropped the progressive tax rates in 2004, but in 2013 returned to the same system.

European Union Member States

Flat tax rate between 10%-15%
Flat tax rate between 15%-20%
Flat tax rate between 20%-25
 Progressive tax

Figure 1. European Union Member States, divided by the applied tax system

The main reasons why these countries have decided to adopt proportional tax rates were: reducing tax evasion and attracting foreign investments. States in Central and Western Europe were not faced with these two problems to a such high degree, considering the best alternative the progressive taxation.

The motivation of adoption the porporțional tax system was an appropriate one in terms of tax, but the question raised by economists was: "The flat tax had the expected effects?". To try to find out the answer to this question, we will compare the budget revenues in times of progressive taxation to the level of budget revenues after switching to flat tax. Theoretically, if we consider the benefits of proportional tax system, Member States should record growth from changes due to the reduced tax evasion and increased foreign investment.

In Figure 2 are plotted the budget revenues levels as a percentage of gross domestic product in four European countries that have introduced flat tax after 2000 year: Romania, where the flat tax was introduced in 2005, Bulgaria and Czech Republic, where the flat tax replaced the progressive one in 2008 and Hungary, where the tax system changed in 2011.
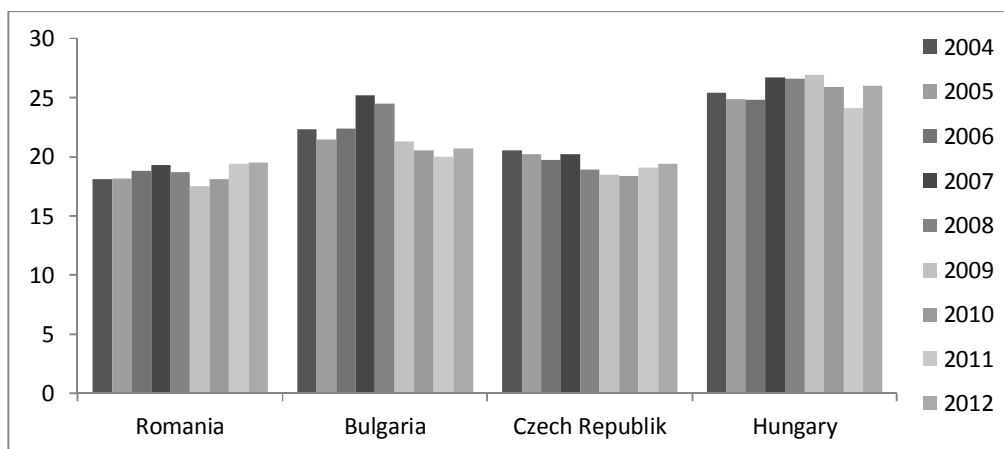
Figure 2. Total taxes as percentage of total taxes in GDP (Eurostat, 2013)

In Romania, after introducing the flat tax in 2005, there has been a slight increase in 2006 and 2007 (with 0.03% and 0.06%). Then followed a downward trend in the next two years, and in 2011 and 2012 registered again an increase of 0.06% and 0.07% compared to 2004.

In Bulgaria, we can observe a decrease of the level of income taxes after the introduction of the flat tax in 2008. One explanation might be the time when the tax system was changed (when the economic crisis hit) but also the low tax rate adopted in comparison with other countries (10%). However, it is observed in the last two years analyzed, 2011 and 2012 a slight increase, but without reaching the level collected in 2007.

Like Bulgaria, also the Czech Republic adopted the flat tax system in 2008, but the income level did not decrease so visible. Moreover, in 2011 and 2012, the collected revenues are close to those collected before the crisis.

Hungary is the last country that gave up to the progressive tax, in 2011. It can be seen that showed a visible decline in 2011 but then in the following year reached a higher level of revenues than in 2010, the last year of the progressive tax system.

Through an analysis of the whole, we can say that the flat tax did not had the expected effects. If the tax evasion would have been decreased or the mentioned countries would have benefit for foreign investment, the budget revenues should have been increased, but that did not happen.

Of course, an extremely important factor of this was the economic crisis, which brought salary cuts, decreases in consumption and in companies profits. And this can also be seen in Figure 2, because in all Member States captured graphically, starting with 2009, when the financial crisis was the most strongly felt in Europe, there was a decrease in revenues. In the lasts years we can see a recovery regarding the level of the collected taxes ans it is worth to mention that all analyzed countries recorded higher revenue share of taxes in GDP in the last two years analyzed in comparison with previous years.

One of the reason may be the changes brought in the indirect tax system; regarding the structure of European tax systems, it's known that the Eastern European states largely based their budget revenues by collecting indirect taxes, while the countries of Central and Western Europe turns its majority share to social contributions collected from employees / employers, and to direct taxes.

Proving that it is not random for these four countries to base their tax system structure on indirect taxes, in Table 3, can be viewed standard VAT rates applied in 2009, 2011 and 2012 in Romania, Czech Republik, Bulgaria and Hungary.

*Tabel 3. Standard VAT rates available in 2009-2012 period (European Commision, 2014)*

Country	2009	2011	2012
Romania	19%	24%	24%
Bulgaria	20%	20%	20%
Czech Republik	19%	20%	20%
Hungary	25%	25%	27%

It is noticeable that Romania and Hungary have increased the rates of value added tax in the years 2011 and 2012. This change had a positive impact on tax collection, leading to their growth as percentage in gross domestic product. Czech Republic also increased in 2010 VAT rate by 1 percentage point, but like Bulgaria, also modified the reduced VAT rate by 4 percentage points in 2010, as shown below.

Tabel 4. Reduced VAT rates in 2009-2012 period (European Commision, 2014)

Country	2009	2011	2012
Romania	5%/9%	5%/9%	5%/9%
Bulgaria	7%	9%	9%
Cehia	9%	10%	14%
Ungaria	5%/18%	5%/18%	5%/18%

The change of the value added tax rates is most visible in the analysis of indirect tax share of GDP. In the analyzed period is observed their upward trend in the four Member States of the European Union. This is shown in Figure 3.
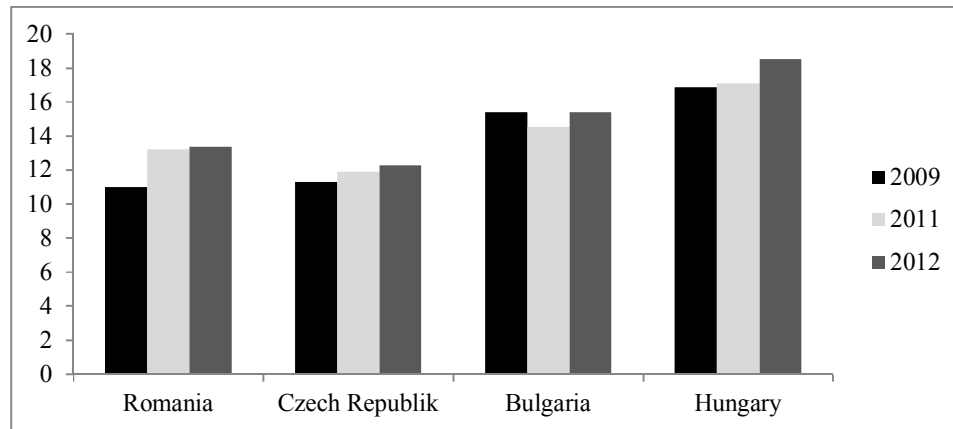
Figure 3. Inidrect taxes as percentage of GDP (Eurostat, 2013)

Looking at the chart above, we see that the budget revenues increased along with the the increase of the VAT rate. Romania increased its standard VAT rate from 19% to 24% in 2010 and Hungary in 2011 from 25% to 27%. Czech Republic had a significant increase in the VAT reduced rate in 2012 from 10% to 14% and Bulgaria in 2010 from 7% to 9%.

These observations lead to the conclusion that the introduction of the flat tax has not had the beneficial effects antcipated for post-communist states. The "underground economy" was not discourgaed by introducing the flat tax and the attracted foreign investment by charging reduced rates of taxation were probably overshadowed by the financial crisis of years. However, we could see an increase in revenue collected from the state budget in the past two years analyzed, but it comes after measures to increase the share of indirect taxes.

Current aproeaches for European taxes

Although the proportional tax system began to be present in Europe quite late, enough time has passed so that we can interpret the effects of the flat tax in the european fiscal environment. If it were to relate only to this change , we can say that the effects on fiscal and economic matters were not so visible.

Moreover, there are some European countries that gave up to the proportional tax system. The latest change in this regard was made by Slovakia. If in 2004, the fiscal system was aligned to the model adopted by most of the East European states, in 2013, Slovakia has returned to progressive taxation system. The main argument for the change was the regressive character of the flat tax (regardless of income is applied the same rate). As Peichl (2013) mentioned, this change came along with changes in the political class. Also, Iceland, Serbia and Ukraine gave up to the proportional tax system in 2010-2011 period, because its effects were not positive in tax policies.

Also in Romania there are discussions about giving up to the flat tax and adopting again the progressive taxation since 2016. Authorities believe that this change will be beneficial to increase revenues, which will reduce the budget deficit.

It is possible that after an attempt to stabilize the tax system by adopting the flat tax, Eastern European countries to resort to the methods of previous tax? This may be possible if we take in consideration that the proportional system effects were not as expected, the economic crisis has destabilized the fiscal policies of states and not least the objective of economic development following the model of the countries of Central and Western Europe is becoming more pronounced.

Conclusion

After the analysis made with this paper, we can say that it was not discovered yet a single tax system which should be applied in all Member States. Every fiscal policy and each type of tax rate applied comes with advantages and disadvantages, but countries have to choose the best option adapted to the financial and social needs of the economy.

Regarding the comparison between progressive and proportional tax, we can conclude that the flat tax concept was embraced by European post-communist countries, expecially during the last decade. Their main expectations were reducing tax evasion on the one hand and attracting foreign investments on the other hand. Following statistics, we observed that the effects were not as expected, or the changes occurred in a very small number, too small to stabilize the fiscal and economic environment. This might be explained by the fact that the adoption of a tax system may not be enough to stabilize the economy of a state.

After the crisis, countries that have adopted the flat tax, started to take in consideration a return to progressive taxation. In this respect, in the European Union, Slovakia has made this change after other European countries such as Ukraine and Serbia did the same. Currently, such a change is expected in Romania, starting with 2016, in order to try to achieve two important objectives: fiscal stabilization and reduction of the budget deficit.

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