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## CONTENTS

- 2**    **INTRODUCTION**
- 3**    **JÁNOS SZÁZ** Our deficits  
GUSZTI (1930–2014)
- 8**    **IVÁN BÉLYÁ CZ** Financial crisis, random walk, market efficiency
- 33**   **ANNAMÁRIA ÓNODI KAZAI** The financial stability and access  
to financing of SMEs in Hungary
- 52**   **ISTVÁN GÁRDOS** Some thoughts on the foreign currency debt relief act
- 66**   **BÁLINT BOTOS** A hedged carry trade strategy on the Hungarian,  
Polish and Czech markets

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## OUR DEFICITS

### GUSZTI (1930–2014)

*János Száz*

Last Wednesday, fifth-year students majoring in finance at Corvinus University, as part of their course in Quantitative Finance, arrived at the topic of *The Balance of Cash-Flow Relations (BCR)* created by Mária Augusztinovics (Gusztí). On Friday of the same week, Gusztí passed away. Tomorrow's seminar with students will be the first time we analyze the mysterious operation of the monetary credit system through BCR as the work of an economist who is no longer with us.

Among Hungarian economists over a certain age who were involved to some degree in the current of domestic economic thinking between 1960 and 2000, everyone knows the name of Gusztí. The wider public knows the name of *Mária Augusztinovics* from her works related to pension schemes, but this was not the only area in which she was an internationally recognized expert. Her works on the quantitative theory of money had a strong direct and indirect influence on the thinking of those who played a leading role in the series of financial and economic reforms that began in the 1960s, or on those who taught finance at universities.

Through elaborating BCR, Gusztí was the first to apply input-output analysis in the field of finance. Together with her followers, she attempted to quantify how a sector generates income from another sector receiving a loan, how much credit is paid back by a third sector as a result of the chain of spending thus begun, how much money is accumulated by yet another sector, and so on. By means of linear algebra, these wide-reaching, repeatedly connected, infinite multi-sector financial chains can be arranged into easily interpretable, simple correlations. For example, the 1,000-forint note in my pocket may only exist in today's credit-based monetary system if somewhere in the economy there is a bank debt to this same amount of 1,000 forints as its antiparticle. In the economy as a whole, more money means more debt. The money stock increases by exactly the same amount as the stock of money-creating credit:

$$p^*1 = v^*1$$

In a breakdown by sector, the relationship between money stock growth ( $p$ ) and debt growth ( $v$ ) is shown by:

$$p = \langle p' \rangle (E - K - \langle t' \rangle)^{-1} v,$$

where  $p'_j$  and  $t'_j$  show the percentage of income depositing as money stock at the  $j^{\text{th}}$  sector and spent on repayment. Matrix  $K$  presents how many units of income

the  $i^{\text{th}}$  money owner generates from one unit of income of the  $j^{\text{th}}$  money owner.<sup>1</sup> It is surprising that the structure of correlations between monetary deficits and surpluses in the economy can be embraced so concisely. We no longer encounter BCR in the Hungarian specialist literature. Today's financial PhD theses deal more with the milliseconds of stock exchange trading strategies.

Augusztinovics belonged to the generation of economists who believed, or had the capacity to believe, that the economic situation in Hungary would be improved through their ideas and calculations. At that time the goal was not merely to publish as much as possible in the hippest possible foreign journals in order to obtain an assistant professorship at some domestic faculty. The topic of research was not decided by what was trendy or easy to sell in foreign trade journals.

Gusztí's generation believed that if we better understand the functioning of the specific economy in which we live, then the "economic mechanism" can be reformed in the right direction and living standards may rise. The activity of Hungarian professors of finance considered as pioneers in the Eastern bloc (*Riesz, Hagelmayer, Bácskai*), alongside the generation of theoretical economists hallmarked by the trio of *Augusztinovics, Bródy and Kornai*, set a direction for domestic thinking about money, the banking system and securities markets that was fundamentally different to that common in the other socialist countries.

I remember the imbroglio that ensued when, as a young assistant professor of Karl Marx University of Economic Sciences, *Márti Sulyok-Pap* presented the BCR theory of Augusztinovics in Bulgaria in 1978. From among the older generation of Russians, East Germans and Bulgarians, a few strongly attacked Márty and Augusztinovics's BCR, arguing that in socialism there are no bank notes that can be created merely by lending, but Marx himself already said that money was capable of fulfilling monetary functions as a result of its relationship with gold. Then in a break in proceedings, two young Bulgarians told us how great it was for us that we could teach such things. And this happened in 1978!

Today, input-output models have almost completely disappeared from the teaching of economics in domestic higher education, despite the fact that the accreditation curriculum of the MAB (Hungarian Accreditation Committee) theoretically includes Sydseater and Hammond's standard international textbook *Mathematics for Economic Analysis*, which contains the Leontiev matrices. These are now missing from teaching in practice, however. Three of us tried to find the possible reasons for this last year in our article entitled: "Where have the rows and columns disappeared?" With the death of Gusztí, it is likely that

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<sup>1</sup> Discussed in more detail in: AUGUSZTINOVICS – KIRÁLY – SZÁZ: *Where have the rows and columns disappeared?* (In: *Matematikai közgazdaságtan*, Budapest Műszaki Kiadó)

analyses of the operation of the economy arranged in calmly logical rows and columns will become even rarer.

But what do arguments about gold and money have to do with the lives of millions of people? More than you would think. For example, the management of the National Bank of Hungary (MNB) purchased large quantities of cheap gold (at USD 200) on international markets around the end of the 1960s and early 1970s, whereafter the price of gold soon leaped to USD 600-800.<sup>2</sup> As early as 1966, MNB leaders (*János Fekete, Miklós Pulai*) conducted exploratory negotiations with the International Monetary Fund in London about our potential accession, in order to make any possible future difficulties with our balance of payments easier to surmount. It is wrong to think that all this depends solely on the decisions of politicians and their flexibility. Just as the making of the 1969 Hungarian movie “The Witness” primarily required people who were capable of creating a film of outstanding quality and bravery which politicians were eventually forced to swallow sooner or later, the same also entirely applies to finances and economic reforms.

The best-known reform workshop was the Financial Research Institute headed by István Hagelmayer in the 1970s and 1980s. Hagelmayer gathered together a research team and discovered hitherto unknown young talents at the start of their careers, a dozen of whom would later become ministers, presidents and vice presidents of the central bank, or chiefs of the State Financial Supervisory Authority: *László Antal, Mihály Kupa, Katalin Botos, László Asztalos, Lajos Bokros, György Surányi, Werner Riecke, István Szalkai, István Csillag, György Matolcsy, Éva Várhegyi* and many more. Only a few people know that the supervisor of István Hagelmayer’s PhD thesis was Mária Augusztinovics.

“*Finances in Socialism*” by Mária Augusztinovics was published as a slender booklet in 1963. Its content was a crystal-clear and concise concentration of what we can find elaborated in detail in “*Money in Socialism*” by Hagelmayer (1964) and “*Money Circulation and Credit*” by Riesz (1970). These professional books, which were absolutely free of ideology, served as refreshing counterpoints to successive tomes of the “szoc. pg.” thought of the time.<sup>3</sup>

The *inverse matrix* that shows spiraling effects plays a central role in Augusztinovics’s BCR (as is typical in I/O models). All the elements of the matrix are economic multipliers: the original intervention multiplied equals the accumulated effect on a given point of the economy. Summarizing the elements of the matrix of the BCR model  $(E-K)^{-1}$ , we see how much income is generated in all the sec

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<sup>2</sup> For decades, the price of an ounce of gold was fixed at USD 35 for issuing banks, and the fixed exchange rates of convertible currencies were also based on this from World War II until the beginning of the 1970s.

<sup>3</sup> Szoc. pg. was a popular abbreviation of “political economics of socialism” at the time.

tors if each sector receives one unit of credit.<sup>4</sup> I have not the faintest idea how one could create an inverse matrix that would summarize the inspiring impact made by Guszti.

Guszti also liked to ask fundamental questions concerning our profession during private conversations after dinner. For example, long before the appearance of bitcoin and such, she initiated discussions on several occasions about how the concept and nature of money had changed as a consequence of new electronic methods of payment, securities trading technologies that were previously inconceivable, and other new developments. After her death, I have started to wonder how I would answer the question: “*Has the world moved forward due to economists?*” I would say something along the lines of: Certainly, but this discipline has definitely also caused at least two serious injuries, mainly in the hands of naïve amateurs. To name but two examples of thoughtlessness that occur all the time:

1. “*A loss-making company or project is bad – it must be terminated, or must not even be started.*” At first glance, this is tautologically true, but if we consider external factors, then we might incur much higher costs at other points of the economy by terminating such a company or project than the amount of the loss we must face.<sup>5</sup> I suspect that before the accountant’s view conquered the world, our ancestors with their common sense approach instinctively viewed the world in a much more complex way, in the days when an endless series of partial analyses had not yet filled economic journals (I am guilty of a few of these myself...)

2. “*Competition, the market and the ‘Invisible Hand’ will solve everything.*”<sup>6</sup> Adam Smith surely did not mean this to apply to situations where corruption or even the mafia rules the market. But even in an ideal case, he says nothing about the speed of the solution beyond the tendency itself. From mathematics, however, we know exactly that the speed of convergence is a decisive issue. In the case of an approximate calculation, it certainly does matter whether it is sufficient to sum up a few members to obtain a given accuracy or whether millions of members should be added up. We learned in geography class that erosion carries mountains and fills up plains. A proof of this, for example, is that Heinrich Schliemann found eight other cities above the city of Troy before finding what he was looking for at the lowest, ninth level. Despite this, the Alps and the Carpathians are holding up

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4 The strongly discounted loans of the latest Growth Credit Programme of the MNB are based precisely on the hope that the sum of the elements of the inverse matrix is a very high figure, much higher than one.

5 A metropolitan public transport system can easily operate at a loss anywhere in the world. If a financial balance can be attained by increasing ticket prices and cutting services, then you can take it for granted that the whole enterprise does not fulfil its fundamental purpose. But no one reckons with this, for example because there is no available data.

6 Even the problems of healthcare or higher education...

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quite well. It seems that supply and demand do not always come together through love at first sight – not to mention that both are always changing capriciously.

Unfortunately, I cannot now know whether Guszti would agree with my thinking.

\* \* \*

In her calculations related to pension schemes and the BCR, Guszti examined the correlations between *deficits* and *surpluses* – their interrelations through sectors, years and decades. But right now I can only see one big deficit.

Guszti was a clever, cheerful, pleasant but rather angular personality. Her way of thinking was disciplined and reached to the core of the problem. She did not like confusing, ambiguous things. When I first had the chance to talk and argue with her at length on a specific professional matter as a young university teacher, she confidently scolded me after a while: “*Stop saying ‘if it pleases’ me! Either address me in the polite form, or let’s speak on a first-name basis.*” She was like that. Our relationship of several decades would stay on a first-name basis from the moment we shared a pear brandy together that day, although at that time it was not common for a young man to be on a first-name basis with a woman almost a quarter-century older than him – nor for a freshly appointed assistant teacher to address a doctor of sciences in this way.

It is November. And it keeps growing colder.

Budapest, 25 November 2014.

## **FINANCIAL CRISIS, RANDOM WALK, MARKET EFFICIENCY**

*Iván Bélyá cz*

### **ABSTRACT**

In financial theory, we can accept as a basic standard that the variation of prices over time on financial markets can be described using the “random walk” principle. Random walk means that price movements do not follow any trend or tendency and past price movements are unsuitable for speculating about future price variations. On the other hand, there exists another paradigm that is based on the “ergodic axiom.” This claims that the probability distribution of the past and the present determines the probability distribution which dictates future market price outcomes. In theory, the random walk hypothesis and the ergodic axiom are polar opposites. While the concept of uncertainty is linked closely to the first, the latter asserts the possibility of forecasting. Empirical proof is obtainable with respect to the random walk hypothesis, but the ergodic axiom can be regarded as an endeavour to resolve uncertainty. The present paper examines how the theory of efficient markets, and the efficiency of the market itself, provides this contradiction a means of passage.

*JEL* code: G10, G17

*Key words:* financial crises, ergodic axiom, fundamental uncertainty

### **THE FINANCIAL CRISIS REFLECTED IN THEORETICAL FUNDAMENTALS**

Often remarked upon, but seldom emphasized, is the similarity (indeed, the common origin) between the great global economic crisis and the international financial crisis of 2007–2009, since in both cases the main cause was the deregulated free financial market. Regarding the causes of the latter crisis, Oxford mathematician Jerome Ravitz wrote the following in 2008:

“Yet the term ‘faith’ is believed by these competent present observers to be relevant to the mathematics at the heart of the multi-dimensional pyramid game that has led to our present [credit crunch] catastrophe. Combined with the corruption of quality and the abuse of uncertainty in mathematical models, blind faith



in [classical] economics and mathematics forms the third element of the toxic mix that has enabled greed and irresponsibility to wreak their destructive way as never before. Mathematics first provided an enabling technology with computers; then with a plausible theorem it offered legitimation for the runaway speculation; and finally, with models of their value, risk and quality, it framed the quantitative specifications of its fantasized products. Mathematics thereby became uniquely toxic, what Warren Buffet has called ‘weapons of mass destruction.’”

This concise “charge sheet” at once directs criticism at the credit bubble that occurred under loose lending conditions, the theory of efficient markets, risk transfer based on computer models, speculation, the synthetic products of financial markets and toxic financial products. A single study is obviously too narrow a framework to formulate a comprehensive “plea for the defence”; however, what we can undertake is to construct a more nuanced picture of the crisis itself, and of its theoretical context. The first strand of this four-part exposition deals with the role of the random walk hypothesis on financial markets; the second part with the position of the ergodic axiom; the third part discusses market efficiency; and the fourth part analyzes the real importance of uncertainty.

Before we embark on our main train of thought, let us quote from a statement made during the most critical days of the global financial crisis. In a hearing before Congress in 2008, Alan Greenspan admitted that he had overestimated the ability of free financial markets to self-correct, and that he had missed spotting the possibility that deregulation might unleash destructive forces in the economy. Greenspan confessed: “I still do not fully understand why it happened, and obviously to the extent that I figure out where it happened and why, I will change my views.” He stated the following: “This crisis, however, has turned out to be much broader than anything I could have imagined [...] In recent decades, a vast risk management and pricing system has evolved, combining the best insights of mathematicians and finance experts supported by major advances in computer and communications technology. A Nobel Prize was awarded for the discovery of the [free market] pricing model that underpins much of the advance in [financial] derivatives markets. This modern risk management paradigm held sway for decades. The whole intellectual edifice, however, [has] collapsed.”

## **RANDOM WALK AS THE BASIS FOR RISING PRICES ON THE SECURITIES MARKET**

In what follows, we need to demonstrate why the intellectual theories behind risk management collapsed in this way, and then to explain which axioms ruptured at the foundations of this “edifice.” Since the middle of the 20th century, two im-

portant questions have been awaiting an answer with respect to the behaviour of prices on financial markets: one concerns the course that prices follow over time, the other the predictability of future securities prices.<sup>1</sup>

Early empirical investigations into the behaviour of prices on financial markets revealed that a random walk pattern can be assigned to the path prices follow. This happens when prices change in a random way and are distributed independently of each other. This recognition was demonstrated particularly in the work of Maurice Kendall (1953:13) with respect to a broad range of commodity and stock markets.<sup>2</sup> In modern economics, the first more thorough application of the random walk hypothesis to financial markets is associated with Paul Samuelson (1965a); his contribution is concisely expressed in the title of his article, which states it can be proven that properly anticipated prices fluctuate randomly. In an informationally efficient market, price changes must be unforecastable if they are properly anticipated, i.e. if they fully incorporate the expectations and information of all market participants. In this regard, Fama (1970) convincingly proved that on an active market that includes many well-informed and intelligent investors, securities will be appropriately priced and reflect all available information. If a market is efficient, there is no information or method of analysis that can be expected to result in outperformance of the market according to an appropriate benchmark.

The random walk hypothesis, the theory of efficient markets and the predictability of financial market prices were closely intertwined from the very beginning. Samuelson (1965a) once provided a verbal demonstration of random walk as the inevitable path that prices follow, and secondly a formalized proof of the superfluous nature of forecasting. He stated that randomness<sup>3</sup> comes about with the active participation of many investors striving to increase their wealth. Proving unable to temper their greed, an army of investors aggressively swoop on even the smallest available informational advantage, and by acting in this way incorporate their information into

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1 DAVIDSON (2012) believes that forecasting the future, while it may be useful as a tool of a certain scientific methodology, cannot be the end of the science itself. Even the sum total of scientific theories is not enough to provide the basis for preparation of precise forecasts. In the best-case scenario, forecasting can be regarded as a useful side-product, accessible on the basis of a given theory.

2 KENDALL found that spot prices of wheat (i.e. current market prices) follow the random walk pattern. In contrast, SAMUELSON (1965a) took the view that this is by no means the necessary outcome; it is easy to imagine a run of good weather resulting in favourable grain production and prices consequently remaining depressed through several successive periods. Conveying the phenomenon in a technical sense, a serial correlation in weather may easily induce a serial correlation in grain supply and prices.

3 Merely as a matter of interest, it is worth noting that, unlike in economic science, some error in randomness almost always manifests itself in the natural and life sciences, due to the absence of a natural alternative.

market prices and quickly eliminate the very profit opportunities which provoked their aggression. If this happens in an instant, as expected in the idealized world of “friction-proof” markets and cost-free trading, then prices will necessarily always fully reflect all available information, and no profit will be earned even from information-based trading (given that this profit has already been earned). What we see here is counterintuitive and palpably contradictory: the more efficient the market, the more random the successive price changes generated by this market, and of all these markets the most efficient is the one on which price changes are completely random and unpredictable.

Samuelson found that prices of assets fluctuate randomly around an optimal course that can be grasped mathematically. He proved that under certain conditions, futures (forward) prices – in the case of raw materials – can display the characteristics of random walk. Samuelson’s formalized proof rests on one of the fundamental characteristics of conditional expectation. If we prepare forecasts of price behaviour in consecutive moments in time, then these forecasts are conditional expectations, and consequently the expectation preceding the next forecast is the same as today’s forecast. On intuitive examination, although information available tomorrow improves the forecast, it is still best if the information is already incorporated into today’s forecast. Accordingly, the best solution for tomorrow’s forecast today is simply today’s forecast. Samuelson bases his proof on the random fluctuation of futures prices; for his part, the fundamental assumption is that the market renders futures prices equal with the conditional expectation of spot prices, with respect to the time of the futures contract.<sup>4</sup> Samuelson proves that *the expected profit from holding a futures contract will be zero*. Essentially, today’s forecast already incorporates the best solution, which will be tomorrow’s forecast, and consequently no profit can be expected to be made on the price change.

If we take an impartial view of the above-presented results of Samuelson’s formalized argument, then we may come to the conclusion that this proof can be more readily regarded as a corroboration of the theory of efficient financial markets and the superfluous nature of price forecasts on financial markets than as a proof of the random walk paradigm. With his finding that futures prices are conditional expectations of future spot prices, Samuelson took a major step toward confirming the theory of efficient financial markets, although he also raised questions that reveal his doubts: “I have not here discussed where the basic probability distributions are supposed to come from. In whose minds are they *ex ante*? Is there any *ex post* validation of them? Are they supposed to belong to the market as a whole?” Although theoretically well-grounded answers to these questions have

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<sup>4</sup> In theory, SAMUELSON connects the spatial (spot price) with the temporal (current futures prices) in order to find a solution for the relationship of prices: current futures prices = future spot prices.

not really been found, what can be firmly stated is that both the theory of efficient markets and random walk have emerged as the paradigm of financial markets in the past half-century. Fama (1965, 1970, 1976) accomplished much in this regard, combining the theoretical foundations formulated by Samuelson with empirical evidence.

The theory of efficient markets states that it is very difficult – indeed improbable – to profit from the forecasting of price movements. The main driver behind price changes is *the arrival of new information*. A market can be considered “efficient” when price corrections occur rapidly, when the response to new information is free from distortion in the ordinary sense. As a result, the current price of securities – at any point in time – reflects all the available information. It follows from this that there is no reason to feel that prices are either too high or too low. The correction of securities prices occurs even before the investor has time to trade and earn a profit with the assistance of a new, additional dose of information.

The main reason for the existence of efficient markets is strong competition among investors in the interests of profiting from new information. The ability to identify undervalued or overvalued stocks is a very valuable skill (permitting investors to acquire certain stocks below their “real” value or to sell others for more than they are worth). Consequently, a great many investors devote a lot of time and resources to unearthing incorrectly priced stocks. Naturally, as more and more analysts vie with each other, doing their utmost to gain an advantage through overvalued or undervalued stocks, the slimmer the chance that they will be able to find and exploit such incorrectly priced securities. In a state of equilibrium, a comparatively small number of analysts will be able to profit from discovering incorrectly priced stocks, while the majority will succeed only by chance or not at all. For the overwhelming majority of investors, gains from information analysis probably do not surpass transaction costs. (For more on this topic, see Clarke – Jandik – Mandelker, 2001.)

*Random walk indicates that price movements do not follow any trend or pattern, and past price movements are unsuitable for drawing conclusions on the future evolution of prices.* Securities markets are full of well-informed, well-paid and highly trained investors, who search for undervalued and overvalued securities depending on whether they wish to buy or sell. The more players on the market, and the more rapid the dissemination of information, the more efficient the market may become.

The paradox of efficient markets is that if every investor feels a market is efficient, then it is possible this market is not efficient after all because no one is analyzing the stocks therein. In reality, efficient markets depend on market players who feel that the market is inefficient, and who trade in securities in order to outperform the market. Markets are in truth neither perfectly efficient nor entirely inefficient. All markets are efficient to a certain extent, only some more than others.

Efficiency cannot be demonstrated in contrasting black and white, but is instead characterized in shades of grey. It is on markets where efficiency is seriously lacking that investors with greater knowledge may outperform the less well-prepared. The theory of efficient markets and the random walk of prices on securities markets have occupied a central place for decades both in financial theory and market practice. Nevertheless, views have also been expressed which cast doubt upon the temporal independence of price changes. Lo and MacKinlay (1999) contend that the value of the serial correlation of a share price is not zero. Accordingly, in the case of a given stock at a given time, a yield can be earned on share prices in the short term as a consequence of the movement of investors in a single direction, or the so-called herd effect. Shiller (2000) believes that this was the effect which led to the irrational exuberance of the “dot-com boom” in the mid-1990s. Fama (1998) asserts that investors initially either overreact or underreact to information, and the aforementioned serial correlation is attributable to a full reaction to this information over time. The phenomenon can also be attributed to the “herd instinct” effect. Shleifer (2000) identified three important arguments besides the theory of efficient markets and the random walk. First, investors are rational, and therefore value securities rationally. Second, some investors are irrational, but because their trading is random they cancel each other out. And third, although certain investors are irrational, rational arbitrageurs eliminate their influence on prices. If all these conditions apply, then both efficient markets and share prices are unpredictable and thus follow the random walk pattern.<sup>5</sup>

Samuelson (1965b) considered an optimal path at the centre of fluctuation of the random walk, around which securities market prices fluctuate in random manner. In the theory of efficient markets, prices in the case of liquid assets traded on the market fluctuate around the actuarial value, and the deviation of the current price from the actuarial value is known as “noise.” *Noise is simply the weighted average of probabilities that all share prices may shift in the ensuing period.*

Just how big a role is played by noise in general – and by noise trading in particular – in prices on the securities market and the formation of random walk is convincingly demonstrated in the study on noise by Fischer Black (1986). The fundamental importance of this work lies in the fact that, in contrast to the implicit proof of Samuelson (1965a), it provides an explicit argument pertaining to the central role of random walk. Noise is one of the formative components of securities prices, by nature related to returns. Black (1986) gives an astonishing answer to the question

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<sup>5</sup> The martingale improves on the random walk model. A martingale is a stochastic variable  $X_t$  which has the property that given the information set  $\Omega_t$ , there is no way an investor can use the information set  $\Omega_t$  to profit beyond the level which is consistent with the risk inherent in the security (ELTON et al, 2002). The martingale is superior to the random walk because stock prices are known to go through periods of high and low turbulence.

of what really motivates noise trading. In his view, noise traders are individuals who trade based on something they believe to be information, but which in reality is merely noise. More generally, at any given time there are investors who trade on information for varying reasons – for example, based on unexpected liquidity demand – and these investors would be willing to “overpay” for the privilege of being able to carry out trades immediately. It is important for us to recognize that noise is the opposite of information: market participants ordinarily trade by relying on information, and although noise promotes the functioning of financial markets, it is at the same time a source of confusion in the operation of the market.

The very important recognition by Black (1986) is that “*both price and value will look roughly like geometric random walk processes with non-zero means.*” The reason for the unpredictable fluctuation of prices is that “the means [averages] of percentage change in price and value *will change over time.* The mean of the value process will change because tastes and technology and wealth change. [This mean] may well decline when value rises, and rise when value declines. The mean of the price process will change because the relation between price and value changes (and because the mean of the value process changes). Price will tend to move toward value.” Black also stresses that “the short-term volatility of price will be greater than the short-term volatility of value. Since noise is independent of information in this context, when the variance of the percentage price moves caused by noise is equal to the variance of the percentage price moves caused by information, the variance of percentage price moves from day to day will be roughly twice the variance of percentage value moves from day to day. Over longer intervals, though, the variances will converge. Because price tends to return to value, the variance of price several years from now will be much less than twice the variance of value several years from now.”

“Volatilities will change over time,” Black continues. “Anything that changes the amount or character of noise trading will change the volatility of price.” (See Black (1986), p. 533.)

From all this, we can reach the conclusion that securities prices follow a random walk pattern, and that this is closely tied to the theory of efficient markets. The basis for this assumption is that because investors react immediately to all kinds of information, no profit can be realized from information-based trading, and prices thus always fully reflect the available information. This leads to the random walk hypothesis, which states that the more efficient the market, the more random the successive price changes. Random walk can be defined in terms of price changes that are independent of each other in time.

## THE ERGODIC AXIOM AND THE FUTURE MOVEMENT OF SECURITIES PRICES

For financial market players, the question of how to recognize the future evolution of prices has always been an exciting one, since instant riches await those who know the future prices on financial markets. The theory of efficient markets and the random walk process examined in the foregoing provide an agnostic answer to this question, entailing the unpredictable fluctuation of prices and the superfluous nature of making predictions.

In financial theory specifically, and in economics more broadly, another paradigm exists based on the *ergodic axiom*. The ergodic axiom claims that the probability distribution of the past and the present determines the probability distribution which dictates future market price outcomes. Accordingly, the future is never uncertain, but merely risky in terms of probability, although these things cannot technically be guaranteed. Referring to Keynes' well-known concept of uncertainty (1936), the post-Keynesian Paul Davidson (1982–1983) has argued in his writings for decades against the applicability of the ergodic axiom. (A detailed discussion of the latter can be read in Davidson's work: 2007: 30–35; 102–103; 110–112). So how did the ergodic axiom become one of the basic principles of economics and financial theory?

Ergodic theory describes the *behaviour of dynamical systems* when operative for a long period. This theoretical foundation holds that – under certain conditions – the time average of a function exists almost everywhere along the trajectory and is related to the space average. Birkhoff (1931, 1942) and Neumann (1932), as well as Kolmogorov (1934), started from the premise that generally the time average and space average may differ from each other. If, however, the transformation is ergodic, and the measure is invariant, then the time average is equal to the space average almost everywhere.<sup>6</sup> If we take any integrable function of our space, pick a point in the space at random (according to the ergodic distribution), and calculate the average of the function along the point's universe (the entire population), then we obtain the *time average*. As the time extends to the infinite, then the time average converges to a limit; that limit is equal to the weighted average of the value of the function at all points in the space (with the weights provided by the same probability distribution), and this is the *space average*. The classical ergodic theorem is one version of the law of large numbers, which states that a sufficiently

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<sup>6</sup> In a dynamical system, a transformation maps a space into itself. The set of points we get from applying the transformation repeatedly to a given point is called its trajectory or orbit. Some dynamical systems are "measure preserving," which means that the measure of a set is always the same as the measure of the set of points which map to it.

large sample (i.e. an average over a long time) is representative of the whole population (i.e. the space average).

If we equate the individual points of the universe with the progression of securities market prices, the averages derived from prices over the investment time horizon with the space average and time average, all the price changes over the time horizon with the population (universe), and the sample taken from the universe as a sample of the market price changes, then there was no obstacle to the ergodic axiom's securities market analogy. Samuelson (1969) wrote that if we hope to move economics from "the realm of history" into "the realm of science," then we must impose the ergodic hypothesis on our theory (Samuelson, 1969: 12). In other words, he made the ergodic axiom the sine qua non for the scientific method in economics. Lucas and Sargent (1981) similarly claimed that the principle behind the ergodic axiom is the only scientific method of pursuing economics. In their view, "the characteristics of a science require rigour, consistency and mathematics. So, if economics is to be a science, it must display these characteristics." Samuelson additionally claimed that economists must accept the ergodic axiom in their models in their pursuit of economics as a science on a par with physics, astronomy and chemistry. The theory of efficient markets possesses all these characteristics. Samuelson, Lucas and others adopted the ergodic axiom because they wanted economics to enjoy the same status as the "hard sciences" such as physics or astronomy.<sup>7</sup>

The foregoing scarcely leaves any doubt that the raising of the ergodic axiom to the rank of paradigm might more likely be seen as an avowal of scientific theory than the reaching of any realisation resting on empirical observation, while simultaneously representing opposition to Keynes' concept of uncertainty. At the time Keynes wrote his *General Theory* (1936), he could not have known of the ergodic stochastic theory. Nevertheless, in his critique of Tinbergen's econometric method, Keynes (1939) noted that Tinbergen's method is not valid for any economic forecast as economic data are "not homogeneous" over time. The lack of homogeneity is a sufficient condition for *non-ergodicity* in processes. Therefore, using post-Keynesian terminology, Keynes' concept of uncertainty about the economic future is based on the requirement that the economic system be *controlled by non-ergodic stochastic processes*.

The ergodic axiom assumes that the economic future is already predetermined, given that the economy is governed by an existing ergodic stochastic process. It is

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7 "For example, the science of astronomy is based on the presumption of an ergodic stochastic process that governs the movement of all the heavenly bodies from the moment of the 'Big Bang' to the day the universe ends. Accordingly, probability analysis using past measurements of the movements of heavenly bodies permits astronomers to predict future solar eclipses within a few seconds of when they actually occur." (DAVIDSON, 2012)



enough merely to calculate probability distributions regarding future prices and output to be able to state important and reliable statistical information about the future. Davidson (2009) provides a technical explanation of the difference between ergodic and non-ergodic stochastic processes. The ergodic axiom imposes the condition that the future is already predetermined by existing parameters (market fundamentals). Consequently, the future can be reliably forecasted by analyzing past and current market data to obtain the probability distribution governing future events. In other words, *if future events are assumed to be generated by an ergodic stochastic process* (in the language of mathematical statisticians), *then the future is predetermined* and can be discovered today by proper statistical probability analysis of past and present data regarding market fundamentals. If the system is non-ergodic, then calculated past and current probability distributions do not provide any statistically reliable estimates regarding the probability of future events.

If we perceive the economy as a stochastic process, then future outcomes are determined by the probability distribution. Davidson (2012) uses a distinctive argument to refute the knowability of future data. Logically, in order for income generators to prepare statistically reliable forecasts of future parameters, decision-makers must draw a sample from the future for analysis. Given that this is impossible, the economy is assumed to be a stochastic process, permitting the analyst to claim that samples drawn from the past and present are equivalent to a sample drawn from the future. In other words, *the ergodic axiom implies that the outcome at any future date is the statistical shadow of existing market data*. Since drawing a sample from the future is impossible, efficient market theorists must presuppose that probabilities have been calculated from already existing market data, and that this is equivalent to data deriving from a sample of the market in the future. This presupposition is embodied in the ergodic axiom, which in essence contends that the future is merely the statistical shadow of the past. As Davidson says: “Only if this ergodic axiom is accepted as a universal truth will calculating probability distributions (risks) on the basis of historical market data be statistically equivalent to drawing and analyzing samples from the future. Only under the ergodic axiom is the past, the present and the future all rolled up into one!”

This approach contrasts sharply with the viewpoint of Keynes, who saw an economic system proceeding through calendar time from the unalterable past to an uncertain, statistically unpredictable future, where individuals make decisions on spending their income in the awareness that they cannot know future outcomes. If Keynes – in his own time – had known of the classical ergodic axiom, then he would have rejected it, since this approach specifies that all future events are probably certain and that the future can be precisely known or reliably predicted based on analysis of existing market data. One of the relevant fundamental propositions of today’s neoclassical economics presumes that there are

large numbers of rational decision-makers on the market who, before making a purchase or sales decision, collect and analyze reliable information on both the probability of events that have already occurred and on the probability of events that can be expected to occur in the future. On an efficient market, it is assumed that this important information on the past and future is available to all decision-makers. Under the profound paradigmatic influence of the ergodic axiom, *the theory of rational expectations* typically plays a defining role. Neoclassical theory presumes that market players have “rational expectations” regarding all future possible outcomes of any decision made today. The theory of rational expectations advanced by Lucas (1998) asserts that although individuals presumably make decisions based on their own subjective probability distributions, if expectations are to be rational then these subjective distributions must be equal to the objective probability distributions that will govern all possible outcomes at any particular future date. In other words, somehow today’s rational market participants must possess statistically reliable information regarding the probability distribution of the universe of future events that may occur on any specific future date.

In projecting back upon Keynes’ analysis of the ergodic concept, the post-Keynesian Davidson (1982–1983, 2007) presumes that the financial system is not determined by ergodic stochastic processes. *In a non-ergodic world, present or past probability functions are not reliable guidelines for the probability of future outcomes.* If future outcomes cannot be reliably predicted on the basis of existing past and present data, then there is no actuarial basis for insurance companies to provide holders of these assets protection against unfavourable outcomes. Accordingly, it is not surprising that insurance companies have experienced billions of dollars more in losses on assets traded in these failing securitized markets than the companies had previously estimated (Morgenson, 2008). *In a non-ergodic world, it is impossible to actuarially estimate insurance payouts in the future.* Keynes and the post-Keynesians that followed him reject the assumption that the individual can know the economic future, since this is not predetermined. Instead, they assert that the individual “knows” that the future outcomes of critical economic decisions taken today cannot be known. In their view, *the future is truly uncertain* and not just probabilistically risky. Let us now quote three more sources with respect to doubts over the precise knowability of the future. An article by Taylor and Shipley (2009), written at the time of the financial crisis, has this to say on the subject of predictability:

“Probability and statistics just don’t feel right for many problems [...] They give the impression of allowing fairly for the eventualities [...] and then something unexpected happens. [...] Those of a more pragmatic nature would want some measure of credibility such as the extent of applicability to a theory or a problem. In complex systems, the predictability that is so successful in the controlled worlds of the lab and engineering has not worked and yet theories claiming predictability have

misled policy makers and continue to do so. [...] We may even have to own up to not having an appropriate model at all, surely a modern-day heresy.”

Hicks (1977: vii) makes the following observation: “One must assume that the people in one’s models do not know what is going to happen, and know that they do not know just what is going to happen.” According to Hicks, who accepted the framework Keynesian conditions, people under conditions of true uncertainty often recognize that they do not possess, and cannot possess, an indication of what constitutes rational behaviour. In Keynes’ world, for businesses and households alike, the maintenance of *liquid status* is of prime importance.

Davidson (2008) explains why, as long as the future is uncertain and not just probabilistically risky, the price that liquid assets can sell for at any future date in a free market can vary dramatically and almost instantaneously. In the worst-case scenario, liquid financial assets can become unsaleable as the market collapses, creating toxic assets. This is what happened with mortgage-backed securities, particularly in the case of subprime mortgage derivatives.

From all this, it may appear that the *random walk* hypothesis and the *ergodic axiom* are *polar opposites* in the theoretical sense. While the concept of uncertainty is linked closely to the first, the latter asserts the possibility of forecasting. Empirical proof is obtainable with respect to the random walk hypothesis, but the ergodic axiom can be regarded as an endeavour to resolve uncertainty. In the following we examine how the theory of efficient markets, and the efficiency of the market itself, provides this contradiction a means of passage.

## MARKET EFFICIENCY IN TIMES OF CRISIS

In the world of efficient financial markets, holders of traded assets can in theory easily liquidate their positions at a price close to the previously announced market price whenever they hope to reduce their position with regard to a given asset. If the theory of efficient markets is applicable to today’s world, then we might ask how the failure of so many securitized markets can be explained, in the sense that investors have found themselves locked into investments from which they cannot cash out.<sup>8</sup>

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<sup>8</sup> A number of accounts attest that representatives of several investment banks told clients these assets were “cash equivalents” (KIM – ANAND, 2008). Many holders of auction-rate securities believed that the assets they held were highly liquid, given that the market was set up by major financial institutions such as Goldman Sachs, Lehman Brothers and Merrill Lynch as dealers, who provided normal “price talk.” *The New York Times* of 15 February 2008 reported as follows: “Some well-heeled investors got a big jolt from Goldman Sachs this week: Goldman, the most celebrated bank on Wall Street, refused to let them withdraw money from investments that they had considered as safe as cash. [...] Goldman, Lehman Brothers, Merrill Lynch and other banks have been telling investors the market for these securities is frozen – and so is their cash.” (ANDERSON – BAJAJ, 2008, p. D4).

George Soros (2008) put forward a characteristic argument in awakening doubts over the prevalence of market efficiency. In explaining why the theory of efficient markets is not applicable to financial markets in the real world, he reasoned using terminology a little different from that of Keynes, but conceptually his method is the same. Soros wrote that we must abandon the prevailing theory of efficient markets as it pertains to the behaviour of the market. In his view, there is a direct connection between market prices and the underlying reality, which he calls *reflexivity*. What is reflexivity? Earlier (in 1997), Soros had already objected to Samuelson's insistence on requiring that the ergodic axiom prevail in order for economics to be considered a science. Soros argued that the ergodic axiom does not permit "the reflexive interaction between participants' thinking and the actual state of affairs" that characterizes real-world financial markets. In other words, the way people think about the market today can influence and alter the future path the market takes, but the financial and economic future is not predetermined by any law of nature. Soros's concept of reflexivity is thus equivalent to Keynes' rejection (with hypothetical hindsight) of the ergodic axiom. *Reflexivity means that people's thoughts and actions shape the future*, while neoclassical economists assume that the future is predetermined (as with the movement of heavenly bodies in the science of astronomy).

After so much criticism of market efficiency as a theory, it is worth examining more closely the efficiency of the dominant globalized financial markets. Today's financial world has a capacity for collecting and disseminating information on an unprecedented scale. Why should information technology have such a great transformational impact? Information systems can supply information on the state of financial markets in greater detail than ever before, strengthening the financial markets' ability to rapidly identify abnormal profit-making opportunities, i.e. those which offer a risk-adjusted rate of return higher than normal. Strong buying of such assets returns prices to a normal course.

As Greenspan (2008) described it, the "intellectual edifice" of risk management is what – in his opinion – helps the investor calculate probability distributions pertaining to future market prices, offering important and reliable current statistical information on the future of market assets. Financial managers were advised to base their decisions on "risk management" computer models. These complex models would theoretically enable investors to know with "actuarial certainty" the future effects of any portfolio decision taken today. Risk management models were based on a scientific methodology which presumed that probabilities (calculated from past data) can be pooled, managed and tamed to reliably predict the future. Once self-interested investors have this reliable information about the future at their disposal, then – through their actions on free markets – they can optimally allocate capital resources into activities which promise the highest pos-

sible future returns. In a world like this, markets can only be efficient; however, it turned out instead – as the crisis erupted – that these computer models are *weapons of maths destruction*. We must search deeper for the roots of efficiency problems. But before we do this, let us look at the implications for the future operation of global financial markets.

In the wake of deregulation and increasing innovation (with dramatically reduced communication costs, decreasing delivery costs and a strong stimulus everywhere towards cross-border securities trading), the barriers to trade and investment have been lowered. Greenspan (2007: 366) recalls that the dramatic growth that began in the early 1980s brought with it advances in technologies which enabled financial markets to revolutionize the spreading of risk. Three or four decades earlier, financial markets dealt in “plain vanilla” high-quality stocks and safe bonds. Financial derivatives were simple and scarce. However, with the arrival of 24-hour “real-time” trading on markets interlinked at the global level came an expansion in the market for derivatives, CDOs and other complex products, which are able to distribute risk across financial products, both geographically and in time.

A more significant financial innovation appeared in the form of the credit default swap (CDS). This construction – classed as a derivative – is used generally in the case of a debt instrument to transfer the credit risk to a third party for a given price. Given that the credit transaction itself entails an appropriate profit, the transfer of the default risk is favourable for banks and other financial intermediaries, which employ strong leverage on their financial balance sheets in order to attain an adequate rate of return on equity. At the same time, these same institutions – during unfavourable periods – generally also run into *the problem of bad debt*, which leads in turn to reduced lending. Long before the financial crisis, Greenspan (2007: 371) warned of the danger that market mechanisms which transfer risk away from these highly leveraged loan originators to other players can have a critical influence on economic stability, especially in a global environment.<sup>9</sup>

*Since computers can bring together many more buyers and sellers globally than before, the size of the sample of market-trading participants in the computer age will rise dramatically.* If we believe in the theory of efficient markets, then we can permit computers to organize the market, radically reducing variance and therefore increasing the probability of a better-organized, more orderly market – or in any event, a better-organized one – than existed in the pre-computer era. Those who push only for computer-based organization of the market are assuming that

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<sup>9</sup> In this respect, the invention and arrival of the CDS on the market caused a storm. As GREENSPAN notes (2007: 371–372), the notional value of CDS agreements rose from 6 trillion dollars equivalent at the end of 2004 to 20 trillion dollars by mid-2006 at the global level.

the computer will always search out and find enough participants to buy a security whenever a large number of holders of that security want to sell. In theory, therefore, there can never be a shortage of participants on one side of the market or the other.

Financial market trading – mainly of necessity – is becoming increasingly computerized, with the “open outcry” trading of the stock exchange floor being replaced by the use of computer algorithms. Davidson (2008) justifiably reasons that the holders of a market-traded asset must be sure of being able to liquidate their position at a market price close to the last publicly quoted price. In other words, *financial market orderliness* is necessary to maintain liquidity in these markets. Regrettably, modern adherents of the theory of efficient markets believe that in this computer age there is no need for peculiar institutional solutions such as the specialist (market maker) who *ensures equilibrium*. In the environment of computers and the internet, it is implied that meetings of huge numbers of buyers and sellers can be handled easily and efficiently in virtual space. Consequently, these theorists believe there is no need for the human intervention of specialists who keep the books and also initiate trading when participants must be assured that the market is well-organized and orderly. The computer can keep the books on buy and sell orders, they argue, matching them in an orderly manner, more rapidly and cheaply than the human participants who handled these transactions in the past.

Davidson (2008) strenuously asserts that in a world of non-ergodic uncertainty, where an orderly, liquid resale market operates, there must also be an equilibrium-ensuring “market maker” who assures market participants that he will swim against any torrent of sales orders. This market maker – if necessary – must have access to significant liquid resources, necessary because even the deepest reserves can be exhausted if the market maker is battling a flood of sale orders from securities holders. Liquidity can be guaranteed even under the severest market conditions, but only if the market maker has direct or indirect access to central bank resources to obtain all the funds needed to preserve financial market orderliness.<sup>10</sup>

When markets behave rationally, as they almost always do, then market participants visibly commit themselves to accepting the “random walk,” taking the view

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10 Observations pertaining to potential illiquidity on public markets suggest that the main cause is the lack of a reliable market maker. In the past quarter of a century, major financial underwriters of securities have created public markets which, through securitization, have converted long-term debt instruments (some of them very illiquid, such as mortgage loans) into the virtual equivalent of money-market funds and other short-term deposits promising high yields and high liquidity. Investors have been led to believe that they could liquidate their positions at an orderly varying price close to the clearing price announced at the last public auction.

that the past gives no better indication of the probable future direction of share price changes than the toss of a coin. From time to time, however, this random walk is interrupted by panic on the market. When fear takes hold, the investor flees commitment and the share price starts to slide. But when euphoria overcomes investors, then prices are pushed up to absurd levels. Greenspan (2007: 177) asks how we can know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions. Generally it is said that the richest investors are those who observe people's psychological shifts, rather than preparing forecasts of the expected profits of a share-issuing company. Those who go against the tide of investment are known as "contrarians." These investors trade based on the view that irrational exuberance will eventually cease and share prices will begin to fall; that precisely when prices are unjustifiably inflated, and when this fact has become certain, then a feeling of fear will grip the market and prices will return to normal. Trading against the mass psychological factor can be very profitable indeed in the longer term.

Humans have an innate – and seemingly permanent – propensity to swing from euphoria to fear and back again: generations of experience do not suggest that this propensity can be tempered. When we seek to answer the question of what worrying imbalances and problems await on the forecast time horizon, the conventional reply is that financial crises that can be predicted by market participants occur only rarely, the reason being all-pervading uncertainty. If bulging prices on equity markets are perceived as a sign of market collapse, then we may know that investors and speculators have already tried to sell. This pushes the bubble back down and a market catastrophe can be avoided. *A sudden outbreak of fear or euphoria is a phenomenon that no one can anticipate.*<sup>11</sup>

Never in the history of financial markets has global financing played a part as comparable to today's as it has in the past one or two decades. The expansion reflects the opening up of international markets, and likewise the exploitation of advantages deriving from communication capabilities; this inspired certain opinion-formers to write about "the death of distance." Entirely new forms of financing, credit derivatives, various asset-backed securities and other synthetic instruments have rendered trading on financial markets more efficient. The progress of global financial markets has appreciably improved the efficiency

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<sup>11</sup> With his wealth of financial market experience, GREENSPAN (2007: 467) states that continuously investing successfully is a difficult task. The story of the most successful investors, such as Warren Buffett, proves that they understood early on the well-documented anomaly that the rate of return on stocks – even adjusted for risk – exceeds that of risky bonds and other debt instruments, and that this strengthens their inclination to buy and hold on to stocks for a very long time. In one interview, Buffett said that his "favourite holding period is forever." The market pays a premium to the investor willing to endure the ordeal of watching the net worth of their investments fluctuate beyond what is known on Wall Street as the "sleeping point."

with which accumulated savings are invested worldwide, indirectly contributing to productivity growth on a global scale. (According to Greenspan, a significant portion of the world's accumulated savings is wasted, in the sense that much of it finances unproductive capital investments, particularly in the public sector.) Many believe that – excluding the financial market crises of the past one and a half decades (especially the shocking and destructive financial crisis of 2007–2009) – financial markets have made a smooth transition from one state of equilibrium to another, meaning that Adam Smith's invisible hand has done its job on a global scale.

What happens, then, if millions of securities traders worldwide endeavour to purchase undervalued assets or stocks, while selling those which turn out to be overvalued? This is the process which continually improves efficiency in directing limited savings toward financing the most productive investments. At the same time, the never-ending jockeying for advantage apparent in the struggle between market players continuously *rebalances supply and demand*, accommodated at a pace that is too rapid for people to grasp.

The need to face up to realities prompts Greenspan (2007: 489) to give his opinion in his memoirs, written before the onset of the latest financial crisis. In his view, markets have become too big, complex and rapidly changing, but it with this market that the 20th century concept of financial market supervision and regulation must deal. It is no surprise that these globalized behemoths lie beyond the comprehension of even the most sophisticated market players. Professional opinion requires financial regulators to oversee a system which is significantly more complicated than the one that existed when the regulations which still govern financial markets today were originally framed. Given that markets have become too complex for effective human intervention, the most promising policy to ward against crisis may be one which maintains maximum *market flexibility* – i.e. freedom of action for key market players such as hedge funds, private equity funds and investment banks. The elimination of inefficiencies on financial markets enables free markets to redress imbalances.

Thanks to their inherent potential efficiency, financial markets enjoy the protection of free-market adherents, while on the other side critics of the theory of efficient markets see the tightening of regulations as an effective means of taming markets. Particularly in the wake of the most recent financial crisis, a clamour has arisen for unbridled markets to be regulated. How can unregulated global financial processes and the inherent potential chaos be controlled if not through significant government intervention? If daily cross-border transactions can be measured in trillions of dollars, of which only a few are recorded publicly, then how can we be sure that the unregulated global financial system actually works? Its operation is continuous from day to day, and its operational efficiency largely



depends on the status and activity of balancing forces. Greenspan (2007: 372) uses the example of hedge funds to illustrate the inexpediency of tightening regulation. If governments strive to rein in hedge funds, it increases the possibility that market liquidity will be undermined, awakening doubts over the advantages of other government regulation. Hedge funds change the composition of their investments so rapidly that regulators would need to scrutinize a new structure on an almost daily basis. Any government restriction on the fund's investment behaviour would reduce the risk-taking that is an integral part of hedge funds' contribution to the market.

Just how difficult it is to pass judgement on the matter of financial market efficiency may be confirmed via a comparison of two opinions that are definitive in every respect. Already cited several times in the foregoing, Greenspan (2007) – a staunch believer in the operation of the free market – had the following to say about financial deregulation and its effects:

“It is not uncommon to see legislators and regulators rush to promulgate new laws and rules in response to market breakdowns, and the mistakes that result often take decades to correct. I had long argued that the Glass-Steagall Act, which in 1933 separated the business of securities underwriting from commercial banking, was based on faulty history. Testimony before Congress in 1933 was filled with anecdotes that gave the impression that inappropriate use by banks of their securities affiliates was undermining overall soundness. Only after World War II, when computers made it possible to evaluate the banking system as a whole, did it become evident that banks *with* securities affiliates had weathered the 1930s crisis better than those without affiliates. A few months before I took up my duties at the Fed, the Board introduced a proposal that would again allow banks to sell securities through affiliates, under very restrictive conditions. The Board continued to encourage easing of the restrictions, and I testified many times for legislative change. It took until 1999 for Glass-Steagall to be repealed by the Gramm-Leach-Bliley Act. Fortunately, Gramm-Leach-Bliley, which restored sorely needed flexibility to the financial industries, is no aberration.”

By contrast, writing in *The New York Times*, Paul Krugman (2009) blamed deregulation of the financial system, which he saw as one of the main causes of the financial crisis:

“America emerged from the Great Depression with a tightly regulated banking system. The regulations worked: the nation was spared major financial crises for almost four decades after World War II. But as the memory of the Depression faded, bankers began to chafe at the restrictions they faced. And politicians, increasingly under the influence of free-market ideology, showed a growing willingness to give bankers what they wanted. [...] And the bankers – liberated both by legislation that removed traditional restrictions and by the hands-off

attitude of regulators who didn't believe in regulation – responded by dramatically loosening lending standards. The result was a credit boom and a monstrous real estate bubble, followed by the worst economic slump since the Great Depression.”

At the same time, we cannot omit to mention that in the opinion of Davidson (2008), for example, the appearance of a toxic combination of instruments is closely linked to the deregulation that is subject to the above contradictory assessments. For him, securitization is the main cause of market degeneration. In times before securitization, when a bank extended credit – particularly a mortgage loan – the credit agreement was basically an illiquid asset, appearing on the asset side of the bank's balance sheet. What value could be assigned to such an asset on the bank's balance? If there was no market for such illiquid assets, then no indication of market value could be put on the asset. Consequently, these assets were generally entered on the balance sheet at the value of the issued loan, until it was paid off or subject to default. Later, with the repeal of the Glass-Steagall Act, the dividing wall between commercial and investment banks was removed, leading to more and more illiquid assets being securitized, but without any credible financial market maker. Securitization may have provided the basis for these illiquid assets to appear liquid, but they did not always prove to be liquid, and could even turn toxic when some unforeseeable event occurred.

The arguments outlined above do not provide confirmation that, in the age of the computer, we should harbour fundamental doubts about the validity of the theory of efficient markets, and neither do they confirm that tightening financial market regulations would lead to enhanced efficiency in the operation of financial markets. Despite all this, we are still entitled to ask where the problem actually lies, and what factors can bring about a financial market collapse accompanied by a recession in the real economy. We may attempt to answer this question by determining the true role that uncertainty plays on the market.

## **THE RE-EMERGENCE OF KEYNESIAN UNCERTAINTY**

One motif running through our train of ideas is the question of how successfully people are able to predict outcomes on financial markets. Proponents of the theory of efficient markets claim that all publicly available information that can induce changes in securities prices is already efficiently factored into the current price of a security by the market. For this reason, unless a given investor has access to special or inside information not available to the market as a whole, then each investor will be able to anticipate price changes. In Keynes' theory, contrary

to the classical theory of efficient markets, people recognize that the future is uncertain. According to Keynes, if market participants believe that the future is more uncertain today than it was yesterday, then they will reduce their cash-flow commitments today in order to strengthen their liquidity positions. Keynes writes of the pervasive power of uncertainty: “The hypothesis of a calculable future leads to a wrong interpretation of the principles of behaviour” (Keynes, 1937: 122). Therefore, the more time elapses between a choice and the appearance of its consequences, the more likely individuals will suspect that they must reach their decisions in an environment of true uncertainty. Relying on our analysis so far, we provide here a list of uncertainty-related arguments which investors may encounter:

- A “black swan” occurrence, which indicates very rare, unexpected events.
- Any kind of deficiency in awareness of the external reality.
- An occurrence with the appearance of an uncertain event, which people lack sufficient cognitive powers to correctly classify.
- When we know little with certainty about the future payoff outcomes of investment decisions taken today.
- We cannot know in advance when exits from the market will escalate to mass proportions (interrupting circulation on the financial market).
- We cannot know when the stock market liquidity situation will become critical due to the absence of a market maker.
- Mortgage-backed derivatives were advertised as being “good as cash,” though this claim turned out to be false.
- Panic on the financial market might trigger an unforeseeable cascade effect.
- The investor can never know with certainty which liquid assets are worth choosing from the many available.
- One source of uncertainty is that the rate of return realized over the lifespan of a financial asset can only be known ex post.
- The financial future is also uncertain because it is not predetermined by any natural law.
- Another source of uncertainty is when the investor(s) is/are afraid of unfavourable events taking place.
- Securitization leads to a huge amount of uncertainty in the financial system because it is built on illiquid assets.
- Investment packages created from illiquid assets can become toxic, making uncertainty a destructive element.
- It can never be known in advance that a debtor might suddenly be unable to fulfil their repayment obligations.

- Investors could not have known ahead of time that there was no well-organized, orderly functioning market for securitized assets.
- The theory of liquidity preference presumes that the economic future is uncertain.
- One source of uncertainty can be that the market maker's higher level of liquidity can "dry up."
- Uncertainty is increased if computers are unable to find a sufficient number of buyers.
- Can it be known in advance what price investment banks will offer at the preliminary price talk before the market opens?
- Did investors know that the major market actors do not put money on a flotation which people are talking about?
- Can investors know when the big financial moguls might declare the market for a given security to be frozen?
- Do investors know that securities deriving from transactions on private financial markets are traditionally illiquid assets?
- Were investors aware that certain players have created public markets for long-term illiquid debt instruments?
- Were investors warned that a given market (on which they are present) is not regulated?
- Does the investor know that following securitization, certain investors create a public market for assets which originally came into being on private markets?
- One source of uncertainty is that dramatic changes can occur – even in a single moment – in the prices of assets traded on financial markets.
- It can never be known with total certainty if a market – or the investments circulated thereon – is overvalued or undervalued.
- Can it be known that hedge funds eventually become unmanageably overvalued and their pulling power decreases?
- Uncertainty can be reduced by using hedge funds to eliminate abnormally high profit spread on the market.
- Credit default swaps transfer the credit risk, which may nevertheless lead to the accumulation of bad debt.
- Hedge funds are at once risk-bearing and hazardous – and yet the tightening of regulation here would reduce market liquidity.
- Can investors have predicted that one day markets hitherto trading only in high-quality stocks would eventually buy and sell all kinds of assets indiscriminately?

- Uncertainty is intensified when there are increasing numbers of noise traders among financial market investors, and increasingly few market players who rely on information and forecasts.
- An ever-increasing proportion of investors are holders of securities who commit only in the very short term, leading to the spread of “short-termism” and intensifying uncertainty on the financial market.

Almost without exception, the scenarios listed above provide examples of fundamental uncertainty. Their main characteristic is that they are qualitative in nature, and can be expressed in numbers only to a very small extent, if at all. Contrary to the opinion of Ravitz (2008) quoted in the introduction, the financial crisis has neither disproven the theory of efficient markets, nor verified the unsuitability of risk management models. The train of ideas in this study was assembled in an attempt to prove that we must search deeper for the causes of destructive financial crises. What we can state is that the consequences of the crisis have once again set neoclassical notions of financial markets at sharp loggerheads with the Keynesian and post-Keynesian approaches. While the former interprets financial market events in the context of rational expectations → ergodic stochastic processes → predictability, the latter places financial market processes within the connected system of random walk → non-ergodic stochastic processes → fundamental uncertainty.

The random walk hypothesis is amply supported by empirical proof, and the view that prices and rates of return at consecutive points of time are unpredictable is widely accepted, as is the conclusion that these series of values are not correlated in time in the vast majority of cases. This explains why the non-ergodic stochastic progression of these series of values in time is closely linked to the random walk hypothesis. From this, it directly follows that not only can the future be seen as risky, but we must also count on the appearance of fundamental uncertainty at any moment. There are few observations to be drawn from the operation of financial markets that would suggest that prices behave in an ergodic manner. We can more readily view the ergodic axiom as the declaration of a scientific paradigm embodying a high degree of abstraction than as a basic principle proven by empirical facts as they relate to the operation of financial markets.

The financial crisis did not disprove the theory of efficient markets, but magnified and illuminated its weak points. The lack of equilibrium-ensuring market makers, the extremes of investor behaviour and the unrealistically large proportion of noise traders all suggest that market efficiency has been greatly influenced by the behaviour of market participants. The information asymmetry among players on financial markets of the past 15–20 years, the influence on decisions of the moral hazard effect, and the swelling of conflicts of interest in the case of one defining

institution or another (credit rating agencies, investment banks), has taken on such huge proportions that uncertainty can no longer be managed. Risk management models are surely suitable for transferring, spreading and rapidly reducing risk, but they have proven powerless against fundamental uncertainty. Ultimately we may reach the conclusion that the problem is not with predictability, but with the failure to reckon with uncertainty – or with the actions of financial market players heightening that uncertainty.

## REFERENCES

- ANDERSON, J. – BAJAJ, V. (2008): New Trouble in Auction-Rate Securities. *The New York Times*, 15 February, p. D 4.
- BIRKHOFF, G. D. (1931): Proof of the Ergodic Theorem. *Proceedings of the National Academy of Sciences*, Vol. 17, pp. 656–660.
- BIRKHOFF, G. D. (1942): What is the Ergodic Theorem? *American Mathematical Monthly*, Vol. 49 No 4, pp. 222–226.
- BLACK, F. (1986): Noise. *Journal of Finance*, Vol. 41 No. 3, pp. 529–543.
- CLARKE, J. – JANDIK, T. – MANDELKER, G. (2001): The Efficient Markets Hypothesis. In: ROBERT C. ARFFA (ed.): *Expert Financial Planning: Investment Strategies from Industry Leaders*. New York Wiley and Sons
- DAVIDSON, P. (1982–1983): Rational Expectations: A Fallacious Foundation for Studying Crucial Decision-Making Processes. *Journal of Post-Keynesian Economics*, Vol. 5 No. 2, pp. 182–198.
- DAVIDSON, P. (1996): Reality and Economic Theory. *Journal of Post-Keynesian Economics*, Vol. 18 No. 4, pp. 479–508.
- DAVIDSON, P. (2008): Securitization Liquidity and Market Failure. *Challenge Magazine*, Vol. 51, May/June p. 12
- DAVIDSON, P. (2009): Risk and Uncertainty in Economics. Conference on "The Economic Recession and the State of Economics", Westminster, London, 6 February.
- DAVIDSON, P. (2012): Is Economics a Science? Should Economics be Rigorous? *Real-World Economics Review*, No. 59, 12 March, pp. 58–66.
- ELTON, E. J. – GRUBER, M. J. – BROWN, S. J. – GOETZMANN, W. N. (2003): *Modern Portfolio Theory and Investment Analysis*. 6<sup>th</sup> Ed., John Wiley & Sons, Inc.
- FAMA, E. F. (1965): The Behaviour of Stock Market Prices. *Journal of Business*, Vol. 38, January, pp. 34–105.
- FAMA, E. F. (1970): Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, Vol. 25 No. 2, pp. 383–417.
- FAMA, E. F. (1976): Efficient Capital Markets: Replay. *Journal of Finance*, Vol. 31 No. 1, pp. 143–145.
- FAMA, E. F. (1998): *Market Efficiency, Long-Term Returns and Behavioural Finance*. Oxford: Oxford University Press.
- GREENSPAN, A. (2007): *The Age of Turbulence: Adventures in a New World*. Penguin Books
- GREENSPAN, A. (2008): Congressional Hearings. *The New York Times*, B1, 24 October.
- HICKS, J. R. (1979): *Causality in Economics*. New York: Basic Books.
- KENDALL, M. G. (1953): The Analysis of Economic Time Series. *Journal of the Royal Statistical Society, Series A* Vol. 96, pp. 11–25.
- KEYNES, J. M. (1936): *The General Theory of Employment, Interest and Money*. New York: Harcourt, Brace and Company.
- KEYNES, J. M. (1937): The General Theory of Employment. *Quarterly Journal of Economics*, Vol. 51 No. 2, pp. 209–223.
- KEYNES, J. M. (1939): Professor Tinbergen's Method. *Economic Journal*, Vol. 49, pp. 558–568.
- KIM, J. J. – ANAND, S. (2008): Some Investors Forced to Hold 'Auction' Bonds Market's Freeze Leaves Them Unable to Cash Out Securities That Were Pitched as 'Safe'. *The Wall Street Journal*, 21 February.
- KOLMOGOROV, A. N. (1960): *Foundations of the Theory of Probability*. New York: Chelsea. (1934: Zufällige Bewegungen [Zur Theorie der Brownschen Bewegung], *Annals of Mathematics* 35, 116–117.)

- KRUGMAN, P. (2009): Disaster and Denial. *The New York Times*, 13 December
- LE ROY, S. F. (1989): Efficient Capital Markets and Martingales. *Journal of Economic Literature*, Vol. 27, pp. 1583–1621.
- LO, A. W. – MACKINLAY, A.C. (1999): *A Non-Random Walk Down Wall Street*. Princeton: Princeton University Press
- LUCAS, R. E. (1978): Asset Prices in an Exchange Economy. *Econometrica*, November, pp. 1429–1445.
- LUCAS, R. E. – SARGENT, T. J. (1981): *Rational Expectations and Econometric Practice*. Minneapolis, University of Minnesota Press.
- MORGENSON, G. (2008): Arcane Market is Next to Face Big Credit Test. *The New York Times*, 17 February, p. A 1
- NEUMANN, J. (1932): Proof of the Quasi-Ergodic Hypothesis. *Proceedings of the National Academy of Sciences*, Vol. 18, pp. 70–82.
- RAVITZ, J. (2008): Faith and Reason in the Mathematics of the Credit Crunch. *Oxford Magazine*.
- SAMUELSON, P. A. (1965a): Proof that Properly Anticipated Prices Fluctuate Randomly. *Industrial Management Review*, Spring, pp. 41–49.
- SAMUELSON, P. A. (1965b): Rational Theory of Warrant Pricing. *Industrial Management Review*, Spring, pp. 13–32.
- SAMUELSON, P. A. (1969): *Classical and Neoclassical Monetary Theory*. In CLOWER, R. W. (ed.): *Monetary Theory*. Penguin Books, London
- SHEFFRIN, S. M. (2013): *Rational Expectations*. In Chapter 4, Efficient Markets and Rational Expectations. Cambridge Books Online, pp. 99–132.
- SHEFFRIN, S. M. (2013): *Rational Expectations*. Cambridge Books Online, Cambridge University Press.
- SHILLER, R. J. (1981): Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends. *The American Economic Review*, Vol. 71.
- SHILLER, R. J. (2000a): *Irrational Exuberance*. Princeton: Princeton University Press
- SHILLER, R. J. (2000b): Measuring Bubble Expectations and Investor Confidence. *Journal of Psychology and Financial Markets*, Boston, MA: Harvard Business School Press.
- SHLEIFER, A. (2000): *Inefficient Markets: An Introduction to Behavioural Finance*. Oxford: Oxford University Press
- SOROS, G. (1997): Letters to the Editor. *The Economist*, 15-21 March.
- SOROS, G. (2008): The Crisis and What to Do About It. *The New York Review of Books*, 4 December.
- TALEB, N. N. (2010): *The Black Swan*. 2<sup>nd</sup> edition, New York Random House.
- TAYLOR, P. – SHIPLEY, D. (2009): *Probably Wrong – Misapplications of Probability and Statistics in Real-Life Uncertainty*. Oxford University.



## **THE FINANCIAL STABILITY AND ACCESS TO FINANCING OF SMES IN HUNGARY**

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### **ABSTRACT**

The present study was prepared within the framework of cooperation between the Competitiveness Research Centre, operating within the Institute of Business Economics of Corvinus University of Budapest, and the National Association of Entrepreneurs, based on a commission from the latter. The goal of the study was to survey the self-financing capabilities and borrowing opportunities of majority Hungarian-owned small and medium-sized enterprises (SMEs), and to identify potential problems. The results of the research revealed that the high proportion of owner's equity in the financing structure is not due to difficulties with borrowing, but because enterprises that cover their financing primarily from their own resources have other financing opportunities at their disposal. Although general satisfaction with banks shows a diminishing tendency, it can still be interpreted favourably. The majority of companies have not encountered serious borrowing difficulties. With regard to the system of competitive tenders, company managers have sensed some improvement, but general satisfaction is still lacking. Although the research results suggest that the primary obstacle to growth in 2013 was not the lack of credit or external funding, it is important to emphasize that start-ups, young enterprises and micro-enterprises, which struggle the most with financing worries, were not represented in the analysed database.

*JEL code:* G2 and G3

*Keywords:* corporate finance, capital structure, banking services, borrowing, tendering system

### **INTRODUCTION**

The present study was prepared within the framework of cooperation between the Competitiveness Research Centre, operating within the Institute of Business Economics of Corvinus University of Budapest, and the National Association of Entrepreneurs, based on a commission from the latter. We sought answers to the questions of what characterizes the financing structure of the Hungarian SME sector; what are its self-financing capabilities; what are the available borrowing or EU funding opportunities; and what problems are experienced by domestic enterprises in the area of capitalization and financing. The basis for our research

was the 2013 corporate competitiveness research database, the fifth element of the Competitiveness Research Centre's "In Global Competition" research programme series. The survey was carried out between May and November 2013, with the cooperation of staff from the TÁRKI institute for social research.

## RESEARCH METHODOLOGY

In examining the financing structure and capitalization of enterprises, it is particularly important for us to be clear about the characteristics of the circle of companies under examination. In the 2013 corporate competitiveness survey that serves as the basis for our research, incorporated companies employing more than 50 people and operating for at least four years were sought, ensuring a representative sample in terms of both size and geographical distribution. The sample of 300 companies was dominated by medium-sized enterprises (72.7%), while the proportion of large companies was 16.7%. The majority of companies (45%) operated in the processing industry, but commerce (20%), construction, other services, agriculture and the food industry were also represented. Most of the companies were domestically owned (71.3%), while the proportion of state-owned firms was 5.7%, and the proportion of those in foreign ownership 23%. (For a detailed description of the sample, see Chikán – Czakó – Wimmer, 2014.)

Our investigation focused on SMEs in majority domestic ownership. The proportion of majority domestic-owned small enterprises within the sample as a whole was below 10% (29 companies), while more than half of the companies in the sample (170 companies) were domestically owned medium-sized enterprises. Our population for the purposes of this study, therefore, was 199 companies. The willingness to provide answers to the various questions in the questionnaire varied between 100% and 18% (in the case of borrowing goals). It follows from this that we were able to draw conclusions from samples of varying size for each of the groups of questions. The average number of employees in the examined sample was 81. Less than half of the companies were engaged in export activity, while 24% revealed an export intensity of above 50%.

In order to conduct a more nuanced analysis of capital structure, credit practices and banking relations, we applied a cluster analysis to classify the companies in three groups based on capital structure and frequency of borrowing, thereby permitting – among other things – a comparison of domestic-owned SMEs financed primarily from owner's equity with those characterized by frequent borrowing.

## THE FINANCING STRUCTURE OF ENTERPRISES

Examining the financing and liabilities structure of enterprises, we observed that within the sample, some 46.7% of majority domestic-owned small and medium-sized enterprises (SMEs) never or only rarely took advantage of bank loans. Frequent borrowing characterized 36% of the companies (see Table 1). These findings are in keeping with the 2009 Monitoring Report laying the foundations for SMEs' strategy, which states that enterprises finance their developments primarily from their own resources, and secondarily from bank loans. Between 2000 and 2005, some 20–25% of enterprises held credit, reflecting increasingly active borrowing in the SME sector after 2000, which was subsequently halted by the impact of the 2009 economic crisis (see Gál 2013, Ganczer 2010, Monitoring Report 2009). The borrowing activity of the Hungarian SME sector falls short of the European Union average (see Monitoring Report 2009).

**Table 1**  
**Frequency of borrowing by majority domestic-owned SMEs in 2013**

	No.	%
Never (1)	41	32.0
Rarely (2)	19	14.8
To a moderate degree (3)	22	17.2
Frequently (4)	16	12.5
Very frequently (5)	30	23.4
Total	128	100.0

Source: Competitiveness database

For a more detailed analysis of the liabilities structure, we carried out a cluster analysis, in which we relied on both 2012 financial data and the frequency of borrowing according to enterprises' own self-assessments. As a first step, we established indebtedness categories based on balance sheet data. We listed companies in six groups based on whether they had long-term liabilities or short-term outstanding loans as of 31 December 2012, as well as on the proportion of owner's equity within their total liabilities. Table 2 contains the average data of financial indicators of those companies, which proved satisfactory at a preliminary financial reliability examination (the assets / liabilities equation), or which did not have negative equity. Within the sample as a whole, five companies had negative equity, representing less than 3% of the sample.

*At 44% of the examined companies, the proportion of long-term external liabilities was significant (14.28%), alongside the ratio of short-term credit (15.56%). (See Table 2, indebtedness category 6.) This is partly in keeping with the results of the 2003 survey by Sinkovics, who revealed a 13% proportion of long-term credit at small enterprises and a 36% ratio of short-term loans based on analysis of 2002 balance sheet data. At medium-sized enterprises, his calculations showed that the proportion of long-term liabilities was 72%, while the ratio of short-term loans was 23%. Based on our investigation, in the most indebted company category the average proportion of owner's equity was 35.8%, which is below the 2002 average 41% ratio showed by Sinkovics. Although the companies belonging to category 5 had long-term external liabilities, the average proportion of owner's equity was 75%. A high proportion of owner's equity also characterized companies falling into indebtedness categories 1 (79.8%) and 3 (77.67%). Companies in category 1 had neither long-term liabilities nor short-term credit, while the proportion of accounts payable to suppliers was below 6%. Although enterprises falling into category 3 held short-term credit, its ratio did not reach 6% on average. Overall 41% of the examined companies had a ratio of owner's equity to total liabilities higher than 75% (categories 1, 3 and 5). The liabilities structure of enterprises belonging to categories 2 and 4 was not unequivocal based on the supplied financial data, the calculated indicators showing a low proportion of owner's equity (32–33%). In category 2, besides owner's equity, financing derived mainly from accounts payable, while in category 4 both accounts payable (24.8%) and short-term credit (20%) played a strong role in financing. The obtained results are comparable with the results of Gál's 2013 cluster analysis. In the latter survey, the proportion of companies financed almost exclusively from owner's equity was 27%, which approximately tallies with the proportion of 24.5% for the first two categories in the classification employed by us.*

**Table 2**  
**Financing structure of domestic SMEs broken down by indebtedness categories (indicators calculated from balance sheet data after financial cleaning)**

Indebtedness category	Distribution of companies	Owner's equity/ Balance sheet footing 2012	Long-term liabilities / Balance sheet footing 2012	Short-term credit / Balance sheet footing 2012	Accounts payable/ Balance sheet footing 2012
n= (25)	16.34%	79.82%	<b>0.00%</b>	<b>0.00%</b>	5.77%
n= (11)	7.19%	33.71%	<b>0.00%</b>	<b>0.00%</b>	19.80%
n= (7)	4.58%	77.67%	<b>0.00%</b>	5.73%	6.92%
n= (11)	7.19%	32.35%	<b>0.00%</b>	<b>20.05%</b>	<b>24.83%</b>
n= (31)	20.26%	75.23%	3.74%	4.18%	6.61%
n= (68)	44.44%	35.81%	<b>14.28%</b>	15.56%	13.91%
Total n = (153)	100.00%	52.50%	7.11%	11.06%	11.99%

The formation of clusters took place based on the indebtedness categories presented above and the frequency of borrowing by enterprises (see Table 1), thus identifying three principle groups (see cluster sample sizes in Table 3). The first group contained companies essentially financing from their own resources. In 2012, the average proportion of self-financing at these companies was 70%, with no long-term liabilities based on 2012 balance sheets and a ratio of short-term credit of 2.3% (see Table 4). More than half of these companies (51.5%) did not take out loans at all and 15% only rarely, while some 30% typically borrowed to a moderate degree (see Table 5). In the other two clusters, the proportion of owner's equity was below 50%, the ratio of long-term liabilities 8–9%, and the proportion of short-term credit 12–16%. Despite the fact that the financing structure of the two clusters of companies appears similar based on financial data, there is a significant difference in their frequency of borrowing. Based on self-assessments in the second cluster, borrowing is relatively rare, while all companies in the third cluster declared that they had often made use of credit. (For detailed data, see Tables 3, 4 and 5.)

**Table 3**  
**Sample sizes and proportions of financing structure clusters within the sample as a whole, and among domestic SMEs**

Financing structure clusters	Frequency in sample as a whole		Frequency among domestic SMEs	
	No.	%	No.	%
Dominance of owner's equity	52	29.5%	33	27.70%
External financing present, borrowing rare	67	38.1%	44	37%
External financing present, borrowing frequent	57	32.4%	42	35.30%
Total	176	100%	119	100%

**Table 4**  
**Characteristics of financing structure clusters among domestic SMEs (indicators calculated from balance sheet data)**

Financing structure clusters	Owner's equity / Balance sheet footing 2012	Long-term liabilities / Balance sheet footing 2012	Short-term credit / Balance sheet footing 2012	Accounts payable / Balance sheet footing 2012
Dominance of owner's equity (n=26)	70.5%	0.0%	2.3%	10.9%
External financing present, borrowing rare (n=38)	45.8%	9.4%	16.8%	14.5%
External financing present, borrowing frequent (n=35)	48.6%	8.3%	12.1%	11.5%

**Table 5**  
**Frequency of borrowing among domestic**  
**SMEs broken down by financing structure clusters**

	Dominance of owner's equity		External financing present, borrowing rare		External financing present, borrowing frequent	
	No.	%	No.	%	No.	%
Never (1)	17	51.5%	21	47.7%	0	0.0%
Rarely (2)	5	15.2%	12	27.3%	0	0.0%
To a moderate degree (3)	10	30.3%	11	25.0%	0	0.0%
Frequently (4)	0	0.0%	0	0.0%	15	35.7%
Very frequently (5)	1	3.0%	0	0.0%	27	64.3%
Total	33	100.0%	44	100.0%	42	100.0%

Beyond analyzing the 2012 financial data, we were able – based on the assessments of company managers – to fashion a comparative picture of the 2013 corporate financing structure which corroborated the earlier findings. At companies primarily financing from owner's equity, the proportion of external resources was around 20%, while the ratio of short-term resources was the lowest (17%), within which the most significant element was the stock of accounts payable. The proportion of external resources was highest (35.47%) within the group characterized by frequent borrowing, as was the ratio of short-term resources (44%), within which the two most decisive elements were short-term bank loans (42%) and the stock of accounts payable (30%).

To gain a closer understanding of companies' financing policy, it helps to examine the priorities of their financial strategy. Company managers were asked to evaluate 11 possible financial priorities based on how much these characterized their own corporate practice. The most striking difference was that *the maintenance of liquidity was the most important consideration in the financial strategies of companies which borrow frequently*, preceding profitability in second place. In the other two clusters, the most important priority was to reduce costs. In the case of companies primarily financing from owner's equity, this was followed by the observance of payment commitments and deadlines; while in the case of companies borrowing only rarely, profitability came second, but the maintenance of liquidity did not even feature among the five most important priorities. Fac-

tors that potentially contribute to the liquidity problems of frequently borrowing companies – in their own assessment – are their weaker self-financing capabilities and profitability below the industry average. By contrast, companies which did not borrow frequently assessed their profitability at around or above average. In his 2013 survey, Gál likewise determined that higher profitability was paired with a higher ratio of owner's equity.

## CREDIT PRACTICES AND BANKING RELATIONS

Among the examined companies, on average more than half of the credit taken out (55%) was in the form of short-term forint loans, followed by a proportion of long-term forint loans of above 40%. Credit provided by owners was seen to the greatest extent (30%) at companies primarily financing from owner's equity, while the lowest proportion in this regard (9.9%) was observed at regularly borrowing companies. Companies financing from owner's equity did not take out foreign currency credit, the proportion of which was highest at companies borrowing only rarely (25.9%).

Among majority domestic-owned SMEs, *the most common goal of borrowing was to purchase machinery, equipment and vehicles*. The same can be said of *companies characterized by frequent borrowing, where typically there was almost no settlement of bank debts or purchase of real estate*. Of companies primarily financing from their own resources, only four companies answered this question (4%), and for these companies – besides the purchase of machinery, equipment and vehicles – the purchase of materials and payment of tax debts featured with close to the same frequency (see Table 6).

Generally speaking, the managers of domestic-owned SMEs *did not perceive borrowing as a significant problem*. Loans of less than a year's maturity were easier to access than long-term credit (statistical tests corroborating the difference). Some 22% of companies felt it was difficult to take out loans of less than one year, while this ratio was 27% for loans of more than one year. Some 40% of the SMEs questioned reported no problems either borrowing for less than one year or for more than one year (see Table 7).



**Table 6**  
**Borrowing goals**

Borrowing goals	Financing structure clusters			
	Domestic-owned SMEs (n = 36)	Dominance of owner's equity (n=4)	External financing present, borrowing rare (n=13)	External financing present, borrowing frequent (n=41)
Purchase of machinery, equipment and vehicles	3.17	3.50	2.31	3.82
Purchase of real estate	1.83	2.25	1.46	1.64
Purchase of materials	2.61	3.50	2.38	2.30
Wage payments	1.94	2.50	1.62	2.20
Payment of debts to suppliers	2.09	2.00	1.69	2.55
Payment of bank debts	1.97	2.75	1.54	1.80
Payment of tax debts	2.00	3.25	1.54	2.20

On a 5-grade Likert scale – 1: did not occur at all, 5: was very frequent

**Table 7**  
**Access to credit – opinions of the domestic-owned SME sector**

	Loans of up to one year		Loans of more than one year	
	No.	%	No.	%
Unable to access loan	8	6.5	13	10.7
Difficult to access loan	20	16.3	20	16.5
Moderately difficult	43	35.0	39	32.2
Easy access to loan	24	19.5	26	21.5
Very easy access	28	22.8	23	19.0
Total	123	100.0	121	100.0

Regular borrowers found securing loans the easiest, while those financing primarily from owner's equity found it moderately difficult. This means that a high proportion of owner's equity at a company cannot be attributed to borrowing difficulties, but may rather be explained by the fact that such companies have other financing options at their disposal and are not obliged to take out credit.

The obtained results are in keeping with the 2009 Monitoring Report, where – among other things – participants were questioned about factors hindering growth. In 2009, companies saw high tax and social security burdens, the unpredictability of economic regulations, insufficient demand and intense competition as the factors most hindering growth. On a scale of 100, they rated insufficient capital at 31 and a shortage of credit at 15, compared to a value of 76 assigned to high taxes, for example (see Monitoring Report 2009). A 2006 survey by the European Commission also revealed no serious financing problems, with 86% of companies declaring themselves satisfied with their financing situation (cited by Ganczer T., 2010). We can thus assume that in 2013, *it is not a lack of credit which has primarily hindered the growth of Hungary's SME sector.*

Despite the fact that accessing loans is not a serious problem for the majority of SMEs, *opportunities for accessing credit were seen as deteriorating compared to the years preceding the crisis.* Overall, no statistically significant difference was apparent in the assessment of short or long-term loans. Less than 15% of companies sensed improving tendencies, while the majority (43–47%) experienced no change in borrowing opportunities and more than 40% saw deteriorating tendencies (see Table 8). Examining the question according to financing structure clusters, the situation gives even greater pause for thought. On the one hand, the average opinion in all the clusters indicated a deteriorating tendency, while on the other hand frequent borrowers – as the companies with the greatest amount of experience of taking out credit – gave the most negative assessment of the direction of change. In this cluster of companies, we experienced a statistically significant difference with regard to the difficulty of accessing short or long-term loans. In the case of long-term credit, the change was seen as even more unfavourable. These deteriorating borrowing opportunities are corroborated by several other studies.

**Table 8**  
**Changes in opportunities for accessing credit compared to the pre-crisis period – opinions of the domestic-owned SME sector**

	Loans of up to one year		Loans of more than one year	
	No.	%	No.	%
Significantly deteriorated	16	12.8	14	11.8
Deteriorated	38	<b>30.4</b>	36	<b>30.3</b>
No change	54	<b>43.2</b>	56	<b>47.1</b>
Improved	13	10.4	8	6.7
Significantly improved	4	3.2	5	4.2
Total	125	100.0	119	100.0

Despite the assessment of companies that borrowing opportunities have deteriorated compared to the pre-crisis situation, *the general level of satisfaction with banks can still be seen as favourable*. This is also apparent in the fact that *the majority of enterprises said they do not intend to change their bank*. The likelihood of changing banks was greatest at companies that borrow frequently, 21% of whom regarded this as conceivable in future.

Some 75% of majority domestic-owned SMEs had accounts at a single bank, this proportion being even higher (83%) in the case of companies primarily financing from their own resources. However, among frequent borrowers this figure was only 59% (in this cluster, 29% of companies had accounts at two banks, and 8% at three banks). The majority of companies had relationships with two or three banks. Frequently borrowing companies had dealings with significantly more banks (2.28) than those primarily financing from owner's equity (1.74). (See detailed data in Table 9.)



Companies gave a favourable assessment of cooperation with their most important bank (a grade of 4 on a 5-grade scale). No statistically significant difference could be shown between the general assessments of frequent borrowers and companies primarily financing from owner's equity; however, differences could be observed regarding individual elements of the banking relationship. In general, companies evaluated the flow of obligatory or requested information the most favourably (grade above 4). While frequent borrowers felt that the flow of information from their company to the bank was stronger (4.61 compared to 4.16), companies primarily financing from equity regarded the bank's supply of information more favourably (3.91 in the case of voluntary supply of information) than frequent borrowers (3.55). The least favourable assessments were given for notification of changes in the financial environment (3.46) and the solving of problems beyond obligatory tasks (3.49), but even in these two cases we can speak of neutral rather than negative assessments. A comparison of banking assessments also confirms the earlier conclusion that the reason companies primarily financing from equity do not generally take out bank loans is not that they would not be granted them, or that they have a bad opinion of banks, but rather because they have different financing policies. It is important to add to this conclusion that, as a basic principle in conducting research into competitiveness, incorporated companies employing more than 50 people and operating for at least four years were sought in forming the sample.

*In the case of more than 70% of companies in the examined sample of domestic-owned SMEs, there was no request to reschedule loan repayments or interest payments, nor any payment default.* Frequent requests for rescheduling arose at only 12% of the companies borrowing most frequently, while no companies did so in the other two clusters. Companies regarded default on payment as even less typical. Around 20% of frequent borrowers declared that default on loan repayments or interest payments was moderate, while – in their own assessment – this was not typical at all of 78% of these companies. (See Tables 10 and 11.)

**Table 10**  
**Frequency of requests to reschedule loan repayments or interest payments**

Frequency of rescheduling requests	Financing structure clusters			
	Domestic-owned SMEs (n = 90)	Dominance of owner's equity (n=13)	External financing present, borrowing rare (n=24)	External financing present, borrowing frequent (n=41)
Never	71.1%	69.2%	70.8%	75.6%
Rarely	11.1%	7.7%	12.5%	12.2%
Moderate	10.0%	23.1%	16.7%	0.0%
Frequent	7.8%	0.0%	0.0%	12.2%
Very frequent	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

**Table 11**  
**Frequency of default on loan repayments or interest payments**

Frequency of default on payment	Financing structure clusters			
	Domestic-owned SMEs (n = 92)	Dominance of owner's equity (n=14)	External financing present, borrowing rare (n=24)	External financing present, borrowing frequent (n=41)
Never	77.2%	92.9%	79.2%	78.0%
Rarely	8.7%	0.0%	20.8%	2.4%
Moderate	12.0%	7.1%	0.0%	19.5%
Frequent	0.0%	0.0%	0.0%	0.0%
Very frequent	2.2%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

## COMPETITIVE TENDERS

Of the surveyed domestic-owned SMEs, 65% did not take part in any tenders at all between 2009 and 2013. The greatest number of companies participated in tenders within the framework of the New Széchenyi Plan, followed in popularity by the New Hungary Rural Development Programme and support programmes financed purely from domestic sources (ministries, local governments, foundations). (The values in Table 12 must be treated with caution as the proportion of those responding to questions related to tenders was 51%. In the case of tenders, the distribution ratios were determined in proportion to the number of companies filling out the questionnaire, but in assigning values to all the tenders we presumed that companies not filling out the questionnaire had not taken part in any tenders at all.) However, a comparative evaluation of the tenders concerned provides us with a relatively reliable picture. The companies' own assessments are in harmony with the actual frequency of participation in tenders. In terms of improving the competitiveness of companies, the New Széchenyi Plan was regarded as the most important, followed by the New Hungary Rural Development Programme and support programmes financed purely from domestic sources (ministries, local governments, foundations). (See Table 13.)

Some 43% of questioned companies sought help in writing applications for all tenders, while 35% had no help at all. On average companies worked with a collaborating partner in a little more than half of tenders (53.2%). More than half of respondent companies (54.4%) proved successful in all their tenders, while the proportion of those whose tender participation was always unsuccessful was less than 10%. Some 61.4% of enterprises declared their intention to participate in various tenders in future.

Overall companies regarded tenders as useful in terms of improving their competitiveness. The greatest number agreed with the contention that without support through tenders they would not have been able to implement investments in an economical manner. The financing from tender funds of investments already decided upon earlier was typically more prevalent than the initiation of new investments in response to tender opportunities. The assessment of company managers was that investments realized through tender funding enhanced their company's competitiveness, although they did not see tenders contribute to increasing the number of employees. (See Table 14.)

Approximately half the companies not taking part in tenders gave their reasons for non-participation. The primary reason for not participating in tenders (48%) was that they had no need for additional funding. Some 22% of companies did not have enough information about the tender conditions, 35% regarded the process as too complicated, and 25% did not satisfy the tender conditions.

Despite the fact that companies have sensed a small improvement in the tendering system in the last five years, complete satisfaction is still lacking. Company

managers agreed only moderately that the tendering system focuses on the right areas and groups of companies, at the same time still sensing problems with the transparency of the system. (See Table 15.)

**Table 12**  
**Frequency of participation in tenders**

Tenders	Number of tenders						
	0	1	2	3	4	5	6 or more
New Széchenyi Plan (n=84)	47.6%	22.6%	9.5%	8.3%	4.8%	3.6%	0.0%
New Hungary Rural Development Programme (n=78)	61.5%	20.5%	9.0%	5.1%	2.6%	0.0%	1.3%
Support provided from EU funds through individual government decisions (n=62)	88.7%	6.5%	3.2%	0.0%	1.6%	0.0%	0.0%
Other tenders co-financed by EU (n=70)	75.7%	10.0%	7.1%	4.3%	0.0%	1.4%	1.4%
Other foreign-financed tenders (n=57)	94.7%	1.8%	1.8%	0.0%	0.0%	1.8%	0.0%
Support programmes financed purely from domestic sources (ministries, local governments, foundations) (n=65)	72.3%	15.4%	4.6%	3.1%	1.5%	1.5%	1.5%
All tenders (n=199)	65.8%	9.5%	8.0%	3.5%	3.0%	4.0%	6.0%

**Table 13**  
**Tenders seen as most important in terms of competitiveness**  
**(opinions of majority domestic-owned SMEs)**

	No.	%
New Széchenyi Plan	24	38.10%
New Hungary Rural Development Programme	15	23.80%
Support programmes financed purely from domestic sources (ministries, local governments, foundations)	13	20.60%
Other tenders co-financed by EU	9	14.30%
Support provided from EU funds through individual government decisions	2	3.20%
Other foreign-financed tenders	0	0.00%
Total	63	100.00%



**Table 14**  
**Impact of tenders on operation of companies**

	Mean	No.	Standard deviation
Tenders created a significant source of financing for investments already decided upon earlier.	3.57	76	1.389
Tender opportunities motivated our company to carry out new investments, which we would not have otherwise initiated due to a lack of capital.	3.54	76	1.418
Developments and investments realized through tender funding enhanced our company's competitiveness.	3.65	78	1.375
Developments and investments implemented through tenders could not have been carried out in an economical manner without the support thus obtained.	3.78	76	1.282
The number of employees has increased significantly in the wake of investments realized with the help of tenders.	2.75	77	1.339

On a 5-grade Likert scale – 1: do not agree at all, 5: agree entirely

**Table 15**  
**Assessment of tendering system**

	Mean	No.	Standard deviation
The tendering system is transparent and public, and the results in keeping with evaluation criteria.	2.92	115	1.125
The transparency of the tendering system has much improved in the last five years.	3.12	116	1.12
The tendering system focuses on the right areas and groups of companies.	3.09	114	1.052
The goals of the tendering system and its power to boost the economy have much improved in the last five years.	3.20	115	1.053
Our company can gain access to tender funding more easily than our most important competitors.	2.18	119	2.049

On a 5-grade Likert scale – 1: do not agree at all, 5: agree entirely

## SUMMARY

During our research we have gained a *relatively positive picture* of the financing situation of enterprises. At the same time, we must be aware that start-ups, young enterprises and micro-enterprises, which struggle the most with financing worries, were not represented in the analysed database.

Overall *borrowing activity remains below the European Union average*, but not due to difficulties in taking out loans. The majority of enterprises have had no problem borrowing, although they have sensed deteriorating opportunities to access credit compared to the period before the crisis. It has proven harder to access long-term credit than loans of less than a year's maturity – or enterprises have experienced less favourable tendencies in this regard.

The *most common goal of borrowing* was to purchase machinery, equipment and vehicles. Even among companies which typically borrow frequently, the settlement of debts was not a characteristic borrowing goal, although the picture is clouded by the fact that for these enterprises one of the most important financial goals has been to preserve liquidity, while their profitability does not reach the industry average.

In keeping with earlier results, the *general level of satisfaction with banks* is still favourable, as also apparent in the fact that most companies do not intend to change their bank.

Our investigation corroborated the results of earlier research showing that *higher profitability went hand in hand with a higher ratio of owner's equity*. Our research results suggest that a high ratio of owner's equity in a financing structure does not conceal difficulties with borrowing, but rather the availability of other financing options for enterprises that finance themselves primarily from their own resources, so that they are not obliged to borrow.

Our presumption is that a lack of credit or external funding was not a primary obstacle to growth among the examined companies in 2013.

Of the surveyed domestic-owned SMEs, 65% did not take part in any *tenders* at all between 2009 and 2013. The greatest number participated in tenders within the framework of the *New Széchenyi Plan*, and these tenders were regarded as the most important in terms of improving competitiveness. Some 54% of respondent companies were successful in all their tenders, while the proportion of those whose tender participation was always unsuccessful was less than 10%. In around half of all tenders, companies sought help from a collaborating partner in writing applications. Although companies have sensed a small improvement in the tendering system in the last five years, general satisfaction is still lacking, with problems experienced primarily with regard to the transparency of tenders.

## REFERENCES

- CHIKÁN – CZAKÓ – WIMMER (2014): Struggling through rugged terrain. Flash report on the results of the 2013 questionnaire-based survey. [http://unipub.lib.uni-corvinus.hu/1528/1/BCE%20VKK%20GYORSJELENTES%202014\\_2.pdf](http://unipub.lib.uni-corvinus.hu/1528/1/BCE%20VKK%20GYORSJELENTES%202014_2.pdf)
- GÁL, V. (2013): Distinctive features of the capital structure of Hungarian small and medium-sized enterprises. Dissertation. [http://www.gtk.ke.hu/files/tiny\\_mce/File/doktori/disszertacio\\_gal\\_veronika.pdf](http://www.gtk.ke.hu/files/tiny_mce/File/doktori/disszertacio_gal_veronika.pdf)
- GANCZER, T. (2010): Characteristics of the SME sector and its financing options under the economic crisis, compared with the expansion seen at the turn of the millennium. Budapest Business School thesis. [http://elib.kkf.hu/edip/D\\_15039.pdf](http://elib.kkf.hu/edip/D_15039.pdf)
- NÉMETHNÉ, G. A. – SINKOVICS, A. (2007): An empirical study of the funding and capital structure of non-financial enterprises operating in Hungary, 1995–2003. *Közgazdasági Szemle*, April, 2007 pp. 350–375. <http://epa.oszk.hu/00000/00017/00136/pdf/5nemethne-gal-sinkovics.pdf>
- Monitoring Report (2009): Development strategy of small and medium-sized enterprises, 2007–2013. Annual interim monitoring report 2009.
- SINKOVICS, A. (2003): Changes in the capital structure of enterprises in Hungary, 1995–2002.

## **SOME THOUGHTS ON THE FOREIGN CURRENCY DEBT RELIEF ACT**

*István Gárdos*

### **THE ANTECEDENTS**

Since the current government came to power in 2010, the goals of “rescuing foreign currency debtors”<sup>1</sup> and “holding unfair banks to account” have been high on the political agenda (probably not independently from the devaluation of the forint in the same period). However, this battle has not produced a comprehensive outcome to date, as neither early debt repayments nor the exchange rate cap proved miracle cures. Following several attempts and high-sounding promises, in the last year doubts have emerged, such as: “Why should forex debtors end up better off than those who borrowed in forints?” or “Why should citizens who took out loans receive greater support than those who endeavoured to do without?” Interestingly – and in an unprecedented way – the government began citing legal problems, taking the standpoint that no further measures were possible on its part until Hungary’s supreme court, the Curia, had adopted a position on issues relating to foreign currency loans. From this point on, enormous pressure was brought to bear on the Curia to reach a so-called “uniformity decision” to ensure uniform application of the law as soon as possible.

It should be noted that there was nothing compelling the Curia to reach any such decision. The Curia is a court of record in the sense that it rules primarily on individual cases; with each individual decision, it settles the given legal dispute on the one hand, while on the other hand providing guidance to the lower courts. Besides this, the Curia also serves to ensure that the courts pursue uniform practices by making uniformity decisions pertaining to matters of principle, which are binding on the lower courts. The Curia will make such a decision if it discerns an inconsistency in judicial practice on some matter related to a specific case coming before it. However, no foreign currency loan lawsuits have yet come before the Curia – with the exception of the well-known Kásler case, in which the subject of the dispute was the legality of application of the exchange rate margin – and for this reason the necessity of issuing a uniformity decision did not strictly even arise in this regard. Despite this, the Curia saw the writing on the wall and adopted its decision no. 6/2013 PJE last December. This decision truly established an unequivocal position with regard to several fundamental questions of so-called for-

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<sup>1</sup> See LEVENTE KOVÁCS: The Fundamentals of Lending in Foreign Currency. *Hitelintézeti Szemle* (2013:3).

eign currency-based loans, while also dispelling a number of misconceptions that were motivated partly by political, partly by individual interests, and which exploited the opportunities presented by meagre public knowledge of finance and law. Consequently, the Curia declared that a foreign currency-based loan is basically a forex loan, because the obligations of both the lender and the debtor are expressed in foreign currency; the fact that the actual disbursement and repayment of the loan is made in Hungarian forints does not change the content and nature of the transaction. This is a valid transaction in keeping with Hungarian law which inevitably entails an exchange rate risk – theoretically for both parties. A transaction of this kind is not in itself unlawful or unfair, and is neither usurious nor misleading. The Curia added that, while it is naturally necessary for the contracting parties to be fully aware of the content of the transaction, and particularly important that consumers receive adequate information regarding the risks the transaction entails, such information need not extend to the actual size of the risk as no such prognosis can realistically be provided.

At the time this uniformity decision was reached, the Court of Justice of the European Union (EU Court) was in the process of reaching its preliminary ruling in the *Kásler* case. Mindful of this, the Curia indicated that it would return to issues regarding the perceived unfairness of certain conditions of foreign currency loans only after the EU Court had reached its decision. The latter needed to adopt a position in the *Kásler* case on questions related to the alleged unfairness of the exchange rate margin. This question arose because Hungarian law pertaining to unfairness in contractual conditions is based on EU regulations, where “unfairness” is a special concept in the legal sense which is not applicable to every clause of a contract. Regulations pertaining to unfairness essentially govern terms of a contract that are subsidiary to its essential content (i.e. the “small print”), to which the parties – and particularly the non-professional consumer – do not attach great weight. For this reason, they are typically included in a contract without any detailed negotiation, often revealed to the contracting party as an unexpected surprise at the most awkward moment as they discover that the contract places this or that obligation upon them, or denies them this or that right. By contrast, as a general rule, unfairness cannot enter into the equation when it comes to the terms that comprise the essential content of the contract and the substance of the business agreement between the parties, terms which also determine the object of the service provided and the fee to be paid for that service. A fundamental condition for the conclusion of a contract is that the parties should actually reach an agreement on such substantive terms, and as a consequence of contractual freedom – barring certain exceptional cases – it is not the task of the law to review the parties’ agreement or its essential business content. With these considerations in mind, the EU Court adopted the position in the *Kásler* case that the clause relating to the exchange rate margin should not be qualified as unfair in itself, but

primarily only in the event that its formulation is unclear, or if its operation in practice and financial impact is not transparent to the consumer.

In the wake of the EU Court's ruling, the Curia adopted its decision no. 2/2014 PJE extraordinarily quickly, which dealt with the following three issues: first, it confirmed that the foreign exchange risk does not render the contract unfair unless the customer is unaware of the existence of such risk; second, it invalidated the clause relating to the exchange rate margin in foreign currency-based loans; and third, it set the requirements to which clauses governing the unilateral amendment of contracts must conform.

It is my firm belief that the Curia adopted a hasty and erroneous stance on questions relating to the foreign exchange margin and the unilateral amendment. The court based its invalidation of the clause pertaining to the exchange rate margin on the conclusion – albeit correct in itself – that no actual exchange occurs in the case of foreign currency-based loans, and for this reason the value of the service that the exchange rate margin represents is neither clear nor comprehensible.

In reaching this conclusion, the Curia delivered an unacceptably broad interpretation of the EU Court's stated requirement pertaining to the clarity and transparency of the clause in question. Clauses relating to the exchange rate margin are generally unequivocal in contracts, increasing the cost of borrowing for the customer by a precisely determinable degree. Moreover, in the vast majority of cases the exchange rate margin is based on objective market data which are entirely in the public domain and applied uniformly by the lending banks to all their customers. The Curia evaluated the clause in question on the basis of the sole proviso that no actual money exchange occurs, but neglected to examine whether there is any element of the lending service – or any cost incurred in connection with it – which justifies the application of this “charge.” It also failed to take into account that the exchange rate margin is an element of the counter-value of the service provided by the lender, the removal of which can upset the balance in the value of the entire service and the consideration paid for it. Ultimately, by examining the justification for one element of the value of the service, thereby overriding the business agreement between the parties and erasing a charge which is clearly specified in the contract and of which every customer was aware, the Curia committed precisely what the regulations governing unfair clauses prohibits.

In framing the requirements relating to the contractual clause enabling unilateral amendment of a contract, the Curia likewise rendered the EU Court's requirements absolute. It prescribed requirements pertaining to the unilateral amendment of a contract which, in content, the EU Court had specifically formulated with respect to the exchange rate margin. The mechanical extension of clearly interpretable, appropriate requirements relating to the exchange rate margin to clauses enabling unilateral amendment of a contract essentially makes the enforcement of such – other-

wise legally recognized – clauses impossible. With respect to both the exchange rate margin and the unilateral amendment, the upshot of the Curia’s adopted stance is that the practice pursued for years by all banks collectively and uniformly, known to all and approved by the competent supervisory bodies, now qualifies as unlawful, and the relevant contractual clauses are rendered null and void. The Curia also disregarded the fact that the issues in question – particularly the unilateral amendment of contracts – were governed by specific legal provisions; that the clauses now rendered invalid actually conformed to these laws, and that every interested party proceeded in the knowledge that their course of action was legal. An overwriting on this scale of such commonly used contracts is in no way reconcilable with the principle of legal certainty.

In its first uniformity decision, the Curia thus explicitly rejected efforts to legally denounce foreign currency-based lending as a whole. In its second decision, however, it invalidated two fundamental contractual clauses pertaining to the pricing of loans.

In this way, foreign currency-based loans themselves did not prove legally untenable, thereby freeing both legal authorities and politicians from the question – difficult to manage from both the legal and practical aspect alike – of what to do in the event of a contract becoming invalid in its entirety. The government thus escaped from the trap it itself created by asserting the invalidity of foreign currency-based loans as a contract type. At the same time, the Curia’s second decision provided substantial assistance to political endeavours by specifying that a more favourable rate of exchange must be applied retroactively for debtors, while hikes in interest and charges must be taken as if they had never happened.

In the wake of the second Curia decision, Act XXXVIII of 2014 – passed via an urgent procedure which, though extraordinary, has become increasingly the norm in recent years – essentially granted the court’s decision statutory force, declaring null and void the contractual clauses pertaining to the exchange rate margin and unilateral amendment. This so-called “act of invalidity” thereby led to a further deterioration in the situation created by the Curia’s second decision, because, while previously there was still hope that the Curia’s errors could be remedied via individual lawsuits and the competent courts could take circumstances into account which the Curia had not considered, this option was effectively terminated pursuant to the act of invalidity.

Also aggravating the situation was the act of invalidity’s retroactive redrafting of the statute of limitations in the Civil Code, extending its power to cases where outstanding claims would otherwise have already lapsed. With regard to unilateral contractual amendments, the act of invalidity seemingly provided banks with the opportunity to preserve the relevant clauses since the act only declared them invalid based on a legal presumption, and the banks applying these clauses could file suit in order to overturn this presumption. However, the act determined spe-

cific deadlines and procedural rules for any such lawsuit which render successful litigation an illusion. These special rules are of grave concern from a constitutional viewpoint as they infringe on the right to due process and the independence of the judiciary, fundamental elements of a state governed by the rule of law.

### **Is there a reason for a separate debt relief act?**

One constitutional concern arising in connection with the act of invalidity was that it held out the prospect of a separate act being passed some time in the autumn governing debt relief obligations arising from the invalidation of the clauses in question. It follows from this that the banks had to decide on initiating lawsuits without being able to know exactly what consequences would result from the invalidity established by the act. Adding to the uncertainty was the issuing by the National Bank (MNB) of a directive which, based on an “unorthodox” interpretation of the law, would result in losses for the banks exceeding all expectations. Subsequently, Act XL of 2014 (the “debt relief act”) was duly passed earlier than expected in September. Neither the debt relief act itself nor the Bill containing the preamble to the legislation offer any explanation as to why the law declaring invalidity needed to be separated from that determining the method of debt relief. One can only surmise that the legislation was split in two due to political considerations, or in order to speed up the process. Obviously more time was needed to draw up detailed rules for the debt relief procedure than to declare the clauses null and void initially. However, even now we have still not reached the end of the regulatory process as the debt relief act further empowers the MNB to determine rules with respect to numerous matters of detail.

As a jurist, the analogy of the declaratory and obligatory judgement inevitably springs to mind. It is a basic principle that a petition, or statement of claim, to initiate a civil action must contain an explicit request seeking a judgement which actually determines the rights and obligations of the parties. The plaintiff must declare what they are seeking from the defendant, and generally it is not possible to initiate a lawsuit which by itself merely resolves some legal question. The goal of the court procedure is to settle an actual legal dispute, and it is only in exceptionally justified cases precisely circumscribed by law that an opportunity exists to submit a petition which is aimed not at imposing an obligation on the defendant but merely at establishing a fact or legal state of affairs.

This strict, closed system was breached some years ago by an amendment to the law which – clearly with foreign currency loans primarily in mind – made it possible to request that the invalidity of a contract be established in itself, without determining the legal consequences. This amendment triggered wanton litiga-



tion, and an unprecedented proliferation of forex loan lawsuits as a consequence. Numerous judgements were reached in which the court determined the invalidity of some clause of a contract without ruling on the legal consequences thereof. The parties thus effectively made little progress, and only at the censured bank in question would serious questions be raised about how the given decision affected its situation, its portfolio of loans and related revenues and obligations. A similar degree of uncertainty was created due to the separation in time of the act declaring invalidity from the regulations determining the relevant legal consequences. At the same time, the interesting aspect of the situation is that the debt relief act precludes the use of the option introduced by the aforementioned legal amendment in the case of foreign currency loans, prohibiting petitions aimed exclusively at establishing invalidity; moreover, it extends this prohibition to procedures already under way, ordering these to be discontinued (§37).

### **The law's retroactive effect**

As already mentioned, one of the fundamental problems with the act of invalidity is that it annuls a set of contractual terms which were commonly applied and believed valid by all concerned parties at the time the contracts were concluded. At the same time, likewise with retroactive effect, it alters the rules pertaining to the term of limitation and the procedure for enforcing rights. The debt relief act, just like the act of invalidity, is a piece of legislation with retroactive effect, since it defines rules for contractual relationships established before it entered into force, and – as we discussed above in relation to the prohibition on declaratory petitions – alters standard rules pertaining to procedures already in progress. In an entirely unprecedented fashion, the debt relief act puts into practice a qualified instance of retroactive legislation by generally extending the debt relief obligation prescribed in the act to contracts that have been previously subject to legally binding court decisions (§6). The law's preamble declares as a natural matter of course that the law “does not respect judgements already reached,” but overwrites the content of those judgements; it does not deem it necessary to provide any meaningful justification or explanation for the legality of this – or, given that this task seemed impossible to complete, has not even made any attempt to do so (preamble attached to §6).

In light of its retroactive effect, a fundamental question of the act is whether it effectively only codifies the existing law or actually amends it. To put it another way, the question is whether, even in the absence of the act, the same or different rules should be applied in settling debts with customers. In essence, this is what determines whether the prohibition on retroactive legislation, one of the

fundamental prerequisites of constitutionality, is breached in content as well. The preamble to the law offers a contradictory response to this question.

“The Bill regulates the rules for settling debts with consumers in harmony with the Civil Code.” (General preamble, point 4.) “The Bill lays down the general rules for settling debts which the court would apply in individual lawsuits based on an interpretation of the Civil Code.” (General preamble, point 5.) The earnestness of these declared objectives, though obviously aimed at conforming to the requirement of constitutionality, is called into question by the preamble itself.

Such doubt is primarily raised by the statement that “for the settlement of past overpayments of this nature, there is currently neither a valid binding uniformity decision nor an individual court ruling expressly settling this matter. For this reason, the legislator [...] needed to determine the general principles for settling debts through a more abstract interpretation of the law.” (General preamble, point 5.) According to the legislator, therefore, there is no established legal practice in this matter, so that the law effectively precedes the clarification of the legal situation, deciding by means of codification how to proceed in such cases. This is one possible procedure looking to the future; however, in the case of settlement with retroactive effect, it inevitably raises the possibility – or risk – that instead of codifying a law that is already prevailing, a new law is being created, thereby altering the previous legal situation. While the courts state what is law in circumstances deemed normal from the point of view of constitutionality, meaning that the courts decide what rules are applied in answering a given question or resolving a legal debate, the legislator – in creating this act – has now removed the matter from the hands of the courts. And this, once again, is problematic because settlement takes place not with respect to the future, but to existing contractual relationships. With regard to the future, the legislator can create rules that endorse their own political preferences, and the parties must enter contracts – and fulfil contractual and other obligations – in knowledge and consideration of these rules. In a state governed by the rule of law, the legislator has no power to legally adjudicate on existing contractual relationships, as establishing the content of the law governing a given legal relationship falls within the sole remit of the courts. Courts must operate independently of the government and of politics in general, acting exclusively on the basis of laws governing contracts and the relevant established legal practice. Retroactive legislation breaches this division of powers, allowing the legislator access to an area they have no business entering in a constitutional state.

Though not touching on the principle of the matter, it is very doubtful whether there is any truth to the preamble’s assertion that there is no established legal practice on the issue to be regulated. What are we actually talking about here? Pursuant to the act of invalidity, the clauses of loan contracts pertaining to the exchange rate margin and the unilateral amendment of contracts are null and void; as a consequence,

we must proceed as if the contracts never contained these clauses from the outset; it follows that the parties violated the terms of their contracts when they fulfilled their payment obligations by heeding these invalid clauses (both in disbursing and paying off the loans). Due to this performance breaching the terms of the contract, the act states that “overpayments occurred to the credit of consumers” (General preamble, point 1); accordingly, “one of the main goals of the Bill is to settle overpayments occurring to the credit of consumers due to invalid contractual terms” (General preamble, point 5). It is not clear what is so extraordinary about this to necessitate an abstract interpretation of the law, as quoted above. It is easily understood that it is no rare occurrence when the parties – either knowingly or inadvertently – fail to correctly fulfil the terms of the contract, and it may also easily occur that an overpayment appears to the credit of one or other party as a result. A significant number of legal disputes in civil law are precisely about drawing the legal conclusions from failure to fulfil the terms of a contract and settling accounts between the parties accordingly. It is scarcely credible that, with a more thorough examination based on legal practice in cases of breach of contract, it would not be possible to adopt an unequivocal position on the matters to be regulated here. What is more credible is that by claiming legal uncertainty the legislator wished to give themselves greater scope to determine the rules for settling debts to their own liking. This, however, is difficult to reconcile with the legislator’s objective – if indeed it really was their objective – that the act should not amend, but only codify the existing law.

This supposition is supported by the declaration in the preamble itself that: “Given that this methodology of calculation is the most favourable for debtors, then it is this which must be set down in law. An important consideration from the point of view of legal policy is that the legislator should choose the calculation method most favourable to the consumer.” (General preamble, point 6.) With this the legislator makes two assertions: first, that the legal situation is not clear-cut, meaning that an unequivocal outcome cannot be reached purely via an interpretation of the laws and legal practice; and second, that in the position of choice arising from this legal uncertainty, the interests of debtors are regarded as of prime importance and the rules for settling debts are formulated accordingly. The upshot of all this is that the legislator’s true goal – having paid polite lip service to the principle of constitutionality – is to determine a set of rules which are as favourable as possible to debtors. From a political point of view, this could be a legitimate goal of legislation; however, only if this legislation, in keeping with normal rules defining spheres of authority, is aimed at the future. In the case of retroactive regulation, the enforcing of political goals to the detriment of legal considerations inevitably leads to a violation of the requirements of a state governed by the rule of law.

### **Settling overpayments**

According to the most important regulation of the act from the point of view of civil substantive law, the amount to be paid to debtors must be calculated as if the overpayments were originally made as early repayments (paragraph (2) of §5). Based on what was discussed in general in the preceding paragraph, the question can effectively be put thus: In the absence of special regulations in the debt relief act, would this really be the method of settling debts to be applied on the basis of Hungarian law? In other words, in deciding on the legal dispute brought before it, would a court proceed according to this rule? Naturally no one can say what ruling a court would reach in any given lawsuit (and for this reason it is certainly problematic if the legislator assumes the constitutional role of the court); nevertheless, it is possible to scrutinize how reasonable the legislator's position is in this regard, and how much doubt can be cast over the standpoint represented by the act. The significance of the matter is that the more questionable the validity of the position enshrined in the act, the greater the doubt over whether the act conforms to the requirements of a constitutional state.

What do we mean by early repayment? Early repayment occurs when a debtor fulfils their obligation before it actually falls due (paragraph (2), §282 of the old Civil Code; §6:36 of the new Civil Code). It follows from this definition that early repayment is a conscious and intentional action by the debtor. Both the consciousness and intent of the debtor must extend to providing the given service – in our case payment – as a fulfilment of their debt, and also to the awareness that they are not obliged to honour it before the due time specified in the contract. Early repayment does not occur, for example, if a debtor accidentally leaves his wallet at his creditor; or if, before travelling or due to a sudden outbreak of fire at home, he takes his money to his neighbour for safe-keeping, to whom he otherwise has an outstanding debt only due to be paid later; or if, of his two creditors, he accidentally transfers money to the one to whom his debt has not yet fallen due. In the same way, we cannot talk of early repayment in the event that the debtor pays in the belief that he owes a due debt of the given amount. The intentional nature of early repayment is clearly confirmed by the above-cited provision of the old Civil Code, which expressly makes the option of early repayment dependent on the consent of the entitled party, as well as by the aforementioned provision of the new Civil Code, which speaks of payment being both offered and accepted. In keeping with this, general practice holds that loan contracts permit early repayment on condition that the debtor informs the creditor of their intention in advance; such a statement of intent effectively amends the provision of the contract specifying the maturity of the debt, and from this point on the date indicated in the statement is the new due date for repayment of the debt. In cases regulated by the debt relief act, what happens is that the debtor has fulfilled his payment obligation according to the clause of the contract becoming

void on the basis of the act of invalidity. To the best of his knowledge, the debtor has thus fulfilled his contractual obligation, while the creditor has accepted the payment by the same token. Subsequently, pursuant to the act of invalidity, and based on an interpretation of the contract in keeping with this act, it turns out that the debtor has paid more than he actually needed to pay. Obviously the surplus payment has occurred under a misapprehension (the debtor believing that this was the amount of his due debt), and not with the intention of paying off the debt before maturity. The creators of the law are also fully aware of this fact, referring not to the actual, but rather to the hypothetical intent of the debtor. “It corresponds to the [debtor’s] presumed intent if this overpayment is rendered as [a repayment of] the principal” (General preamble, point 6). If this is truly the most favourable option for the debtor, then it can also be assumed that the debtor would now like to settle the amount of overpayment in this way. What the debtor wants now, however, is not relevant – or at least would surely not be relevant to a lawsuit brought before a court – precisely because he will always be inclined towards the solution most beneficial to him. The sole relevant question is what the debtor’s intention was when he made the payment. It is clear that the debtor wanted nothing more than to fulfil his due payment obligation. If he had known that he owed less, then he would have paid less, and if he had become aware after completing the payment that he had overpaid, then in most cases it is highly likely that he would have reclaimed the surplus. The surplus here is nothing other than an erroneous payment. The majority of debtors obviously wanted to take advantage of the available borrowing opportunity, and only wanted to repay as much as they absolutely had to. Whoever wished to make early repayment of their debt would not have been repaying the amount of the overpayment arising from the voiding of the aforementioned clauses, but instead a different amount which was as much as appeared possible and advantageous in light of their prevailing financial situation. Viewed realistically, there is no basis to the supposition in the preamble to the debt relief act that debtors, if aware of an overpayment, would have intended to have this rendered to their accounts as an early repayment.

It appears that the legislator, too, was uncertain on this matter. In one place it states that “overpayment must be rendered as an early repayment of the principal,” and it is irrelevant that the early repayment was unintentional since “voluntary early repayment cannot even occur here” (General preamble, point 6). Elsewhere it states that the law “chose a more subtle solution [...] not prescribing the use of the early repayment construction, since in this institutionalized form it would genuinely have no requisite legal basis, but instead the creation of a legal situation for the consumer at the time of settling the debt which implies that the overpayments were made as early repayments at the time they occurred” (preamble attached to §5). In other words: It isn’t like this, but we’ll carry on as if

it were anyway. Here there is no word of legal considerations; the Bill openly acknowledges that the conditions for being able to verify early repayment are not in place, but despite this – for political considerations – it decides that it will resolve the contractual relationship as if the debtor had actually made early repayment of their debt: “The essence of settlement by early debt repayment is that the gains deriving from the earlier favourable exchange rate should benefit the debtors” (General preamble, point 6). After this, the only remaining question is on what basis did the preamble as quoted above state that the act determines rules which a court would also apply in the conduct of a lawsuit. If they do so at all, courts exercise great caution in applying any analogy similar to that described in the act, and certainly not in order to maximize the benefits appearing in favour of one particular party.

So what would the court do? The most likely option would be for it to apply the classic institution of unjust enrichment, which expressly serves to settle cases of this kind in which some kind of special legal title (e.g. compensation) cannot be established. The law of unjust enrichment is a general regulation for any instance where someone unduly gains a financial advantage, and is thus obliged to provide restitution to the party at whose expense they became enriched (§361 of the old Civil Code; §6:579 of the new Civil Code). A typical case of unjust enrichment is mistaken payment, which is when someone pays another party to whom they are not actually in debt. According to the submitter of the debt relief act, however, “the overpayment defined in the above cannot be regarded as *solutio indebiti* [undue payment]” since the lending bank has an outstanding claim against the debtor. Here, however, the fundamental question is whether the circumstance of the debtor’s debt not yet being due is relevant from the point of view of assessing the payment; in other words, the question is what happens in the event that the debtor mistakenly fulfils his payment obligation prior to the maturity of the debt. Is he then entitled to reclaim the amount paid in this way, or merely to request that the payment be credited to him as an early repayment of his debt?

The latter solution, on which the provision of the act is based, would run counter to both the contractual intent of the parties and the essence of a loan contract. In a loan contract, the parties agree that the creditor will disburse a specified sum to the debtor, which the latter is obliged to repay at a later time; or, to put it another way, the loan contract entitles the debtor to use the creditor’s money for a stipulated period of time. An unintentional repayment is not a legal action which would in any sense overwrite the agreement between the parties; the loan contract is still effective, and the debtor is still entitled to use the given sum accordingly. Unless some event has occurred in the meantime leading to termination of the contract, the creditor cannot refuse to make the mistakenly repaid sum available to the debtor once more. This situation can only be interpreted as

*solutio indebiti* resulting in unjust enrichment of the creditor, obliging the latter to refund the given sum to the debtor. It is my conviction that on this basis the situation could be resolved in a legally well-grounded, financially correct manner. In any event, it is sad how casually the legislator is willing to depart from a classic legal solution based on very weak reasoning, even in a case where the declared goal and constitutional requirements alike would demand that it adopts the most conservative legal position possible.

### **Amendment of the act of invalidity**

Although there is no scope here to present and analyze the debt relief act in detail, it would be a mistake to omit mentioning how this law has amended several points of the act of invalidity, itself passed only a few months previously.

One such essential amendment specifies that the assumption of invalidity of the contractual clause enabling unilateral amendment of contracts does not apply to clauses applied after 27 November 2010 with respect to a specific range of forint and forex loan contracts (paragraph (9) of §52). One of the key objections to the act of invalidity was that in formulating the requirements with respect to contractual clauses enabling the unilateral amendment of contracts, the act completely disregarded the fact that special prescriptions of the law, changing several times over the years, applied to such contractual clauses. The law now justifies this amendment precisely by noting that it was at this time that the legal regulations pertaining to these contractual terms were amended, which supports the opinion that the changing legal environment cannot be disregarded in applying these requirements.

This is also a fundamental change because one of the most significant constitutional objections to the act of invalidity was expressed with respect to just the making of this presumption and the resulting reversal of the burden of proof. As a consequence of the amendment, it is not the credit institution which must initiate a lawsuit in order to protect the contract, but the MNB which is entitled to sue the institution if it judges a contractual condition to be unfair. Critics of the act of invalidity have objected to the law precisely due to what they see as unjustified retroactive redrafting of the earlier rules, since the legislator's desired goal – even without the injury caused by the act – would be achievable by means of a so-called suit in the public interest initiated by the MNB or other entitled body. With this legal amendment, even the legislator has now acknowledged that this is a genuinely viable route, which in itself confirms that related constitutional concerns were well founded. At the same time, the amendment has resulted in the creation of an ambiguous situation whereby different rules apply to contracts falling within the scope of the amendment and to those which fall outside it, which is

to say that different presumptions prevail regarding the same contractual clause depending on what kind of contract contains the clause. In this way, the act has created a confusing situation that cannot be reconciled with the concept of legal certainty. As a consequence of this, proceedings may be launched in connection with the same contractual condition based on entirely different rules, which in itself carries the risk that different judgements are delivered in different procedures regarding the same contractual clause.

Although it does not appear thus in form, in terms of content the provision which prohibits banks from raising interest and charges until 30 April 2016 (§45) can likewise be regarded as an amendment of the act of invalidity. In proceedings initiated on the basis of the act of invalidity, the clause enabling unilateral amendment thus proves valid to no avail as the bank is not entitled to assert this right. This amendment of the law thus overwrites the valid agreement between the parties, despite the fact that the legislator set requirements that are very hard to fulfil with respect to the validity of such an agreement. The banks are not entitled to raise interest rates even when they conform to the relevant legal requirements, and even if the conditions are otherwise in place rendering a raise justified and lawful. With this amendment the debt relief act encroaches on the principle of private autonomy, violating the freedom of contract and the binding power of contracts that derives from this.

Finally, we draw attention to one more very significant change from the point of view of constitutionality. The debt relief act states that there is no scope for a retrial in suits aimed at overcoming a presumption of unfairness made in relation to contractual clauses enabling unilateral amendment (paragraph (11) of §52). A retrial is classified as an extraordinary remedy, which – within the strict framework regulated by procedural law – permits a binding judgement to be reviewed in light of a given circumstance, unknown at the time the judgement was reached, becoming known after the event.

Retrial is an institution of fundamental importance which ensures that a judgement founded on the bearings of a case which do not actually correspond to the relevant facts should not remain in force, provided that the omission of the given facts was not the result of negligence on the part of the party initiating the retrial.

A special instance of a retrial occurs when, after the judgement is made, the law serving as the basis of the judgement is declared void by the Constitutional Court due to contravention of the Fundamental Law. In such a case, it is obviously not the fault of the litigant that legislation contravening the Fundamental Law was applied in the legal action at hand. At such times, a spanner is thrown into the works of state justice when it emerges that a law created by the state should not have been applied. In instances like this, it is thus especially reasonable that there should be a legal remedy available to the affected party with which to correct this error.



Retrial is therefore a fundamental tool ensuring the lawful functioning of justice, provided to litigants by practically every legal system operating on the terrain of constitutionality. This is particularly true of a case of a retrial where the annulment of the applied law enables the legal dispute to be judged anew. Moreover, this amendment also runs up against the prohibition on retroactive legislation since it deprives the party in a procedure already in progress of the extraordinary remedy guaranteed by law; it excludes the parties from a forum of legal remedy which was still open to them when the procedure began, and which otherwise remains available to the parties in all other civil suits. We can see no sensible justification that would legitimize this step or refute its arbitrariness.

We can only gauge the real significance of this legal deprivation, however, if we also take into account that the dispute in the lawsuits in question concerns not the factual background to the case, but instead a purely legal issue. The court is examining whether a contractual condition applied by the bank conforms to the requirements specified by the law. For this reason, with respect to these suits, the option of retrial will arise primarily in the event that the Constitutional Court annuls the act of invalidity. Each bank that has initiated legal action has argued that the act contravenes the Fundamental Law, and accordingly has requested the acting court to suspend the lawsuit and to request the Constitutional Court to review the act. Regrettably, a majority of judges on the Metropolitan Court of the first instance rejected this request, finding that the application of the act was not a source of concern. This is especially painful because a major portion of the constitutional concerns over the act expressly touched upon fundamental elements of constitutionality, namely the prohibition on retroactive legislation, the right to due process and the independence of the judiciary. There is the suggestion of something fundamentally amiss if a judge is insensitive to these matters, if even damage to the independence of the judiciary fails to disturb them. Luckily, there were still a few judges opposing the majority opinion who have turned to the Constitutional Court, and hopefully there will be other judges sitting on the Metropolitan Court of Appeal of the second instance who will proceed in the same way. The act of invalidity has thus come before the Constitutional Court, while it is also possible that lawsuits will reach legally binding conclusions in the meantime. In these cases, the option of retrial would arise should the Constitutional Court accede to the petitions. The amendment of the law is thus explicitly aimed at preventing the lawsuits being tried again, or at invalidating judgements in the event that the law which serves as their basis is annulled. This tiny, barely noticeable amendment is therefore essentially designed to ensure that the extraordinary situation introduced by the act should prevail even in the event of the Constitutional Court qualifying it as contravening the Fundamental Law. In other words, the debt relief act – in respect of the act of invalidity – effectively eliminates the possibility of constitutional oversight.

## **A HEDGED CARRY TRADE STRATEGY ON THE HUNGARIAN, POLISH AND CZECH MARKETS**

*Bálint Botos*

### **Absract**

The main goal of this paper is to present, through three East European currencies and the EUR/USD currency-pair, carry trades built on differences in the interest-rates on the Hungarian forint (HUF), Czech koruna (CZK) and Polish złoty (PLN) against the euro (EUR). The presented transactions are partly hedged with a position of similar amount assumed in another currency-pair, in our case the EUR/USD, in order to reduce exchange-rate exposure and thereby risk. After presenting the underlying theories and the hedging transaction, we carry out an empirical examination of the yield on the strategy we have thus established, and then compare this with the yield on standard carry trades. Use of the strategy resulted in abnormally high yields on all three currency-pairs. The annual average yield was 7.8% in the case of the HUF, 4.8% for the PLN and 4.0% for the CZK, each higher than yields on pure carry trades. The time spent trading with a carry trade strategy based on pairs trading was 41%, 34% and 34%, respectively.

*JEL codes:* G17, G15, F31

*Keywords:* carry trade, currency hedge, pairs trading, cointegration, safe haven

### **INTRODUCTION**

In the carry trade transaction, we borrow in a low interest-rate environment and then convert the obtained funds to another currency at current exchange rate, gaining a profit by investing the money at a higher rate of interest. By holding the position, a continuous interest income can be earned on the difference in interest-rates on the two currencies, i.e. the difference between the interest paid and the interest received. A constant income can be maintained while the strategy is applied, even using a significant leverage; however, our exchange rate exposure represents a continuous risk, as the capital invested at a high rate of interest must be changed back at a future spot exchange rate. If this later rate imposes unfavourable exchange conditions, we generate a loss.

Prior to the 2008 crisis, typical carry trade currencies for borrowing included the Japanese yen (JPY) or the Swiss franc (CHF), while the New Zealand dollar (NZD) and Australian dollar (AUD), similarly to the HUF, were used to generate interest income. The opportunities inherent in carry trade declined following the

crisis, since interest-rates in most countries came close to zero and the interest-rate differentials thus became negligible.

According to theories pertaining to exchange rates, it is likely – or rather normal in the long term – that our profit from the interest margin is reduced to zero when changing a currency back, and, taking costs into account as well, it will eventually turn into a loss. The strategy particularly contradicts the theory of uncovered interest rate parity, which states that two different currencies must offer an identical yield, taking interest and exchange rate movements into account. The exchange rate of the low-interest currency appreciates, thus causing a loss when changing back from the higher-interest currency. Contrary to the theory, numerous studies have presented empirical investigations confirming that uncovered interest rate parity is unrealistic in practical terms and unsatisfactory in the short term (Burnside, Eichenbaum and Rebelo, 2007).

Choosing the point at which to enter can be a key factor in the success of the strategy. In the course of their investigation, Christiansen, Rinaldo and Söderlind (2010) showed that carry trade strategies entail a significant exposure to equity markets, and typically retract to the long-term average of parity in the case of major market volatility.

In a floating exchange rate regime, the prevailing exchange rate is a value determined by market participants based on the performance of the underlying economies. The price level observed in the two countries, any changes in this level, the interest rate environment and several other monetary and fiscal factors all play a role in the evolution of the exchange rate. In the following, as a foundation for our empirical investigation, we will briefly summarize the most important theories pertaining to the formation and development of exchange rates.

Interest rate parity creates a connection between the current exchange rate (spot,  $S$ ), the future exchange rate (forward,  $F$ ) and interest rates.

$$\frac{F}{S} = \frac{(1 + r_{FC})}{(1 + r_{DC})} \quad (1)$$

According to the principle of parity, the ratio between the forward and spot exchange rates is equal to the ratio between the interest rates on the two currencies. To simplify the formula, the difference between the forward and spot exchange rates is equal to the difference between the two interest rates:

$$f \approx r_{FC} - r_{DC} \quad (2)$$

Under interest rate parity, what we gain on interest rate differences we lose on the forward exchange rate, so that the carry trade strategy cannot be hedged. Pursu-

ant to uncovered interest rate parity, our expectation is that the depreciation or appreciation of a currency must be offset by the interest rate differential. This means a position in which the currency exposure is not hedged with a forward transaction, as happens in a carry trade strategy.

Purchasing power parity describes the relation between current exchange rates and inflation. The foundation of the theory was laid by Cassel (1918), and re-examined by Rogoff (1996), studies which found that the current exchange rate ( $S_0$ ) depreciates by the end of the period ( $S_1$ ) by the quotient between the foreign inflation rate ( $I_{FC}$ ) and the domestic inflation rate ( $I_{DC}$ ).

$$\frac{S_0}{S_1} = \frac{(1 + I_{FC})}{(1 + I_{DC})} \quad (3)$$

Finally, under the Fisher model, formulated by Irving Fisher (1930), the differences in interest rates in the two economies must be equal to the differences in inflation. According to Fisher, real interest rates observable in economies (the difference between nominal interest rates and expected inflation) remain stable with the passing of time, so that the change in nominal interest rates can be explained by the change in inflationary expectations, and not by the change in real interest rates. Pursuant to the model, real interest rates are likewise constant for the different economies. Otherwise, certain currencies would be more valuable than others.

$$\frac{1 + r_{FC}}{1 + r_{DC}} = \frac{(1 + E(I_{FC}))}{(1 + E(I_{DC}))} \quad (4)$$

A number of economists have taken issue with the theory, arguing that economic cycles, liquidity, risk and other factors can alter real interest rates both in time and between countries, as Dornbusch, Fischer and Startz (2001) have suggested, for example.

The above theories do not always stand up to empirical investigation. As we have already mentioned with respect to the work of Burnside, Eichenbaum and Rebelo (2007), or the study of Dornbusch, Fischer and Startz (2001) refuting the Fisher model, empirical investigations prove the errors in uncovered interest rate parity and the Fisher model. The carry trade-based, covered currency position presented in the following likewise takes the short-term errors of the above theories as its basis.

### **Pairs trading**

The currency trading strategy outlined in the following displays substantial similarities with the strategy now widely known as pairs trading, which is typically based on trading in stocks and bonds. As we may know from the works of Botos, Nagy and Ormos (2013), Elliott, van der Hoek and Malcolm (2005), Andrade, Pietro

and Seasholes (2005), and Vidyamurthy (2004), pairs trading is a market-neutral statistical arbitrage strategy that takes the convergence of prices as its basis. In pairs trading, we form pairs of stocks that show a long-term correlation in movement; then, when a short-term, abnormal shift in prices between the paired stocks occurs, we form a zero-sum portfolio by taking out long and short positions of matching amounts. The method applied in pairs trading, instead of the perfect market of the Black-Scholes-Merton model that appeared in the 1970s, is an investment strategy, developed by quantitative analysts Gerry Bamberger and Nunzio Tartaglia of Morgan Stanley, which builds on corrections in market mispricing resulting from the convergence of prices and their reversion to historical trends. Earlier results show that the strategy leads to a significant positive abnormal yield.

The similarity of the pairs trading strategy lies in the movement of the basic assets concerned, either together or in opposite directions. The combined movements can be exploited to build a portfolio, which carries a lower risk and lower standard deviation than that of the market, but a higher yield. A major difference between equity and currency trading is the rate of interest, which fundamentally influences the direction of trading of each currency pair, signifying constant income but also an exchange rate risk. In the case of equities, shorting costs and the cost of potential leverage result in continuous expenditure, irrespective of the direction the position is taken. A similarity can also be observed in terms of mean reversion, which is the essence of the pairs trading strategy, and which Christiansen, Ranaldo and Söderlind (2010) presented when applying the carry trade strategy in periods of high volatility. The key factors in pursuing both strategies are the correct selection of equity or currency pairs, and finding the right points at which to enter and exit.

## **Trading strategy**

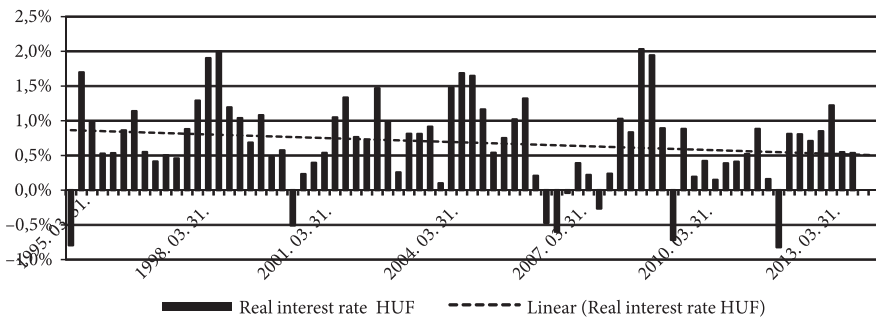
### *The EUR/HUF carry trade with EUR/USD hedging*

In the case of the Hungarian currency, decisions on monetary policy fall within the authority of the National Bank of Hungary (MNB), which has applied an inflation-targeting policy since 2001 in order to achieve price stability. The central bank aims to achieve its publicly announced inflation target of 3% using a variety of tools, the most important being to set interest levels. The basic idea is that the central bank can help form economic policy and stable, sustainable long-term economic growth through predictable monetary policy and stable price levels.

From 2002 onwards, the exchange rate of the forint against the euro moved in a fixed band of +/-15%, which was eventually scrapped in 2008, allowing a freely moving currency to evolve. Prior to the crisis, the exchange rate was therefore

able to move between HUF 240 and 282; then, immediately before the onset of the crisis and following the abolition of the exchange band, the rate dipped below HUF 228, before rising to cross the HUF 330 boundary as the crisis took hold. Emerging from a long, more than decade-long period within the fixed band, the forint exchange rate converged to the expected average of inflationary differences, just as described in pairing theories and in the article by Christiansen et al. (2010). The central bank's interest rate policy certainly contributed to the evolution of a prolonged crawling exchange rate band by allowing investors to obtain significant real interest, and thus driving up demand for the forint. This real interest has declined in recent years, but is still noticeable.

**Figure 1.**  
**Real interest on the forint**



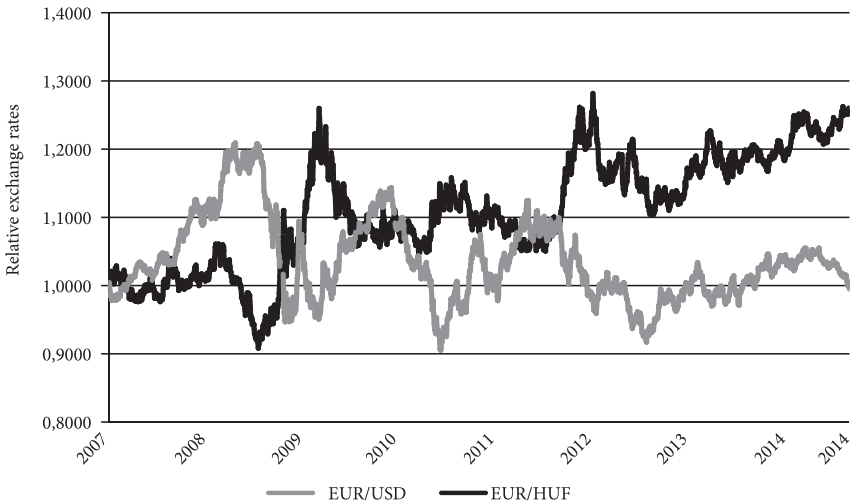
The decline in the level of real interest is clearly discernible in the above diagram, contradicting Fisher's theory of stable real interest rates over time. The reduction in interest occurred in parallel with a change of regime at the MNB in 2012–2013, after which it became the central bank's unequivocal goal to create a low interest rate environment, with price stability as its primary consideration but with the goal of helping the real economy also in mind. At the same time, the interest premium against the euro did not disappear with the regime change, but continues to characterize the currency pair, albeit to a lesser extent.

As a consequence of the crisis, however, investors have increasingly spurned risk, withdrawing their capital from developing countries seen as risky, including Hungary (Ormos and Joó, 2014). This inclination to withdraw has arisen regularly over the ensuing years as "turbulence" has appeared in Hungary or the world at large. Among pricing anomalies appearing globally, the appreciation of the USD and depreciation of other currencies such as the EUR and HUF has typically been observed. A strong negative correlation has characterized these periods as far as

the EUR/USD and EUR/HUF are concerned. The movement of the two currency pairs can be observed in Fig. 2.

**Figure 2.**

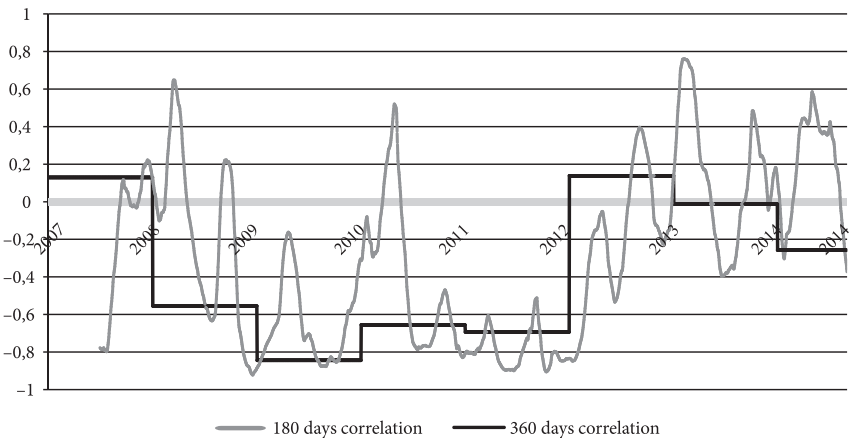
**Relative movement of EUR/HUF and EUR/USD exchange rates**



We can describe the typically opposing movement of these exchange rates with values that correlate. The 180-day moving average correlated value of closing daily exchange rates and the value of 360-day correlations seen in various years, which varied between +0.13 and -0.84, with an average of -0.35, can be seen in Fig. 3.

**Figure 3.**

**Correlation of EUR/HUF and EUR/USD exchange rates**



As illustrated in the above diagram, or as discernible from earlier described data, there is a strong negative correlation, whereby the EUR/HUF and EUR/USD exchange rates typically move in opposite directions in response to various market events. This correlation accurately characterizes the direction of shifts in daily exchange rates, but does not give an unequivocal answer regarding the long-term trend, which – as described by Botos, Nagy and Ormos (2013), Erdős and Ormos (2012a and 2012b) and other studies dealing with the correlation, such as Alexander and Dimitriu (2002) – can be better characterized through cointegration. We ran a cointegration test with the EUR/HUF and an inverse EUR/USD pair, ruling out the null hypothesis – which would claim no cointegration relationship between the pairs – with the following results.

**Table 1.**

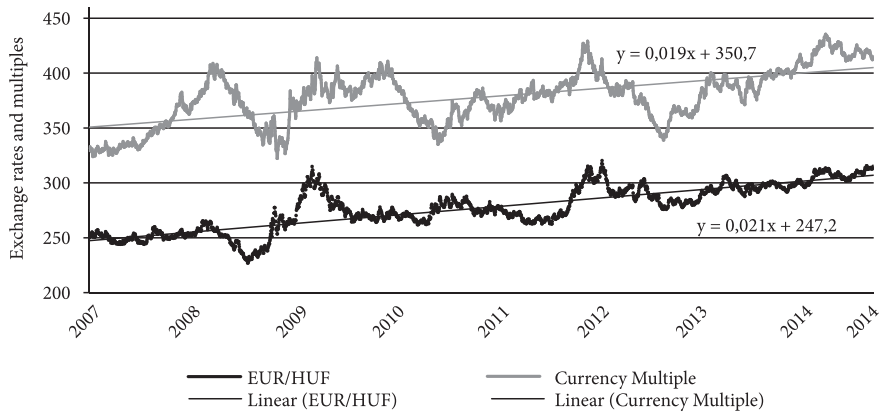
**Cointegration test of exchange rates of currency pairs**

	EUR/HUF	EUR/CZK	EUR/PLN
EUR/USD	2.7346	2.229	2.992
EUR/HUF	0	2.324	3.103
EUR/CZK	0	0	2.203

For the analysis, we applied an augmented Dickey-Fuller (ADF) test. From the table it can be seen that the results of the test statistics generally exceed the threshold value of 2 belonging to the 90% significance level, so that the null hypothesis is rejected with 90% confidence.

Both the correlation-based and cointegration tests show a negative relationship between the exchange rate movements of the EUR/HUF and EUR/USD currency pairs. This connection cannot derive from the shared exposure to the euro, since in both cases this is the borrowing foundation, and consequently would induce a significant positive, rather than a negative connection. The two currency pairs counteract each other's price movements, so that they might prove suitable for building hedging positions for the examined period. This could be achieved by borrowing two units in EUR, then buying one unit in HUF and one unit in USD. The portfolio thus created would offer the high interest on the forint typical between 2007 and 2014, but the EUR/USD side would partly compensate for the risk deriving from the exchange rate exposure. In the examined period, the EUR/USD paid interest in a variable direction, with the level of net interest over the entire period at -0.42% (Fig. 15, interest rate differentials). We present the portfolio containing the EUR/USD and EUR/HUF currency pairs with a solid grey line in Fig. 4. The portfolio is represented by the multiple of the currency pairs.



**Figure 4.****EUR/HUF and EUR/USD currency multiple and EUR/HUF exchange rate**

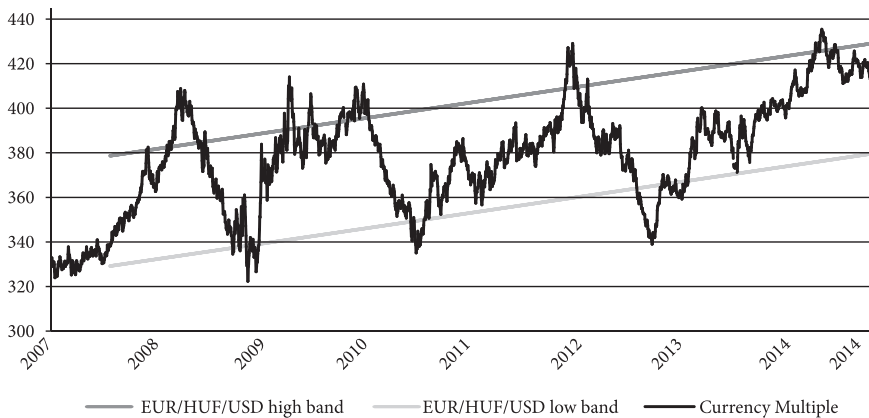
Examining the currency multiple-curve, we can draw two important conclusions. On the one hand, the steepness of the curve is less pronounced than the steepness of the EUR/HUF exchange rate curve. Taking the trend as a long-term average, a depreciation of 15,7% could be observed over the entire period in the case of the multiple, while this figure was 23,5% in the case of the EUR/HUF currency pair. This means an annual depreciation of 1,9% and 2,79%, respectively. Overall, this means that in shorting the EUR/HUF and EUR/USD, the movement of the exchange rate over the entire period was smaller, and thus our resulting exchange rate loss was also less. This is one of the most important results of this strategy: we obtained a position with a lower risk than a pure short position. The price of this position is the shorting cost of the EUR/USD currency pair, which is marginal, but negative over the examined period (Fig. 15, EUR/USD interest rate differentials). Comparing the plain EUR/HUF chart to the portfolio, the 2,8% price shift (exchange rate loss) – also taking into account the 4,71% interest yield – resulted in a smaller total yield (1,91%) than the 1,9% exchange rate loss and 4,29% interest gain on the portfolio. The profit on a portfolio formed in this way is an annual 2,39%, taking the trend into account.

The other conclusion that can be drawn from Fig. 4 is that the standard deviation of the multiple is more significant (24,7 forints) than that of the simple EUR/USD exchange rate (20,5 forints). This can be regarded as an unfavourable feature for a speculator employing a long-term carry trade strategy, but as the study of Christiansen et al. (2010) suggests, an important aspect of applying the strategy is determining the entry and exit points, since the exchange rate continues to be characterized by the exposure of the currency pairs to general market volatility. Determining the correct entry and exit points, on the other hand, becomes easier

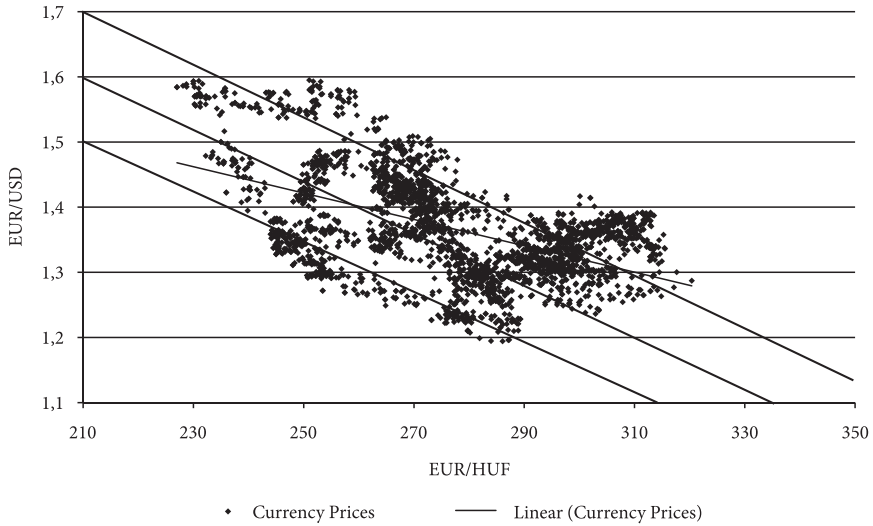
the more common and frequent the extreme values are. This part of the strategy is likewise manageable with the entry and exit points described for pairs trading strategies. The trading strategy presented in the study by Gatev, Goetzmann and Rouwenhorst (2003) can be applied here too with modified parameters, whereby in the case of an entry occurring at a Z-score of 1 above the mean and a Z-score of -1 below the mean, we spend an appropriate time in the position that results in an interest income and reduces the risk of exchange rate movements, or may even make an exchange rate gain. The above strategy is illustrated in Fig. 5.

**Figure 5.**

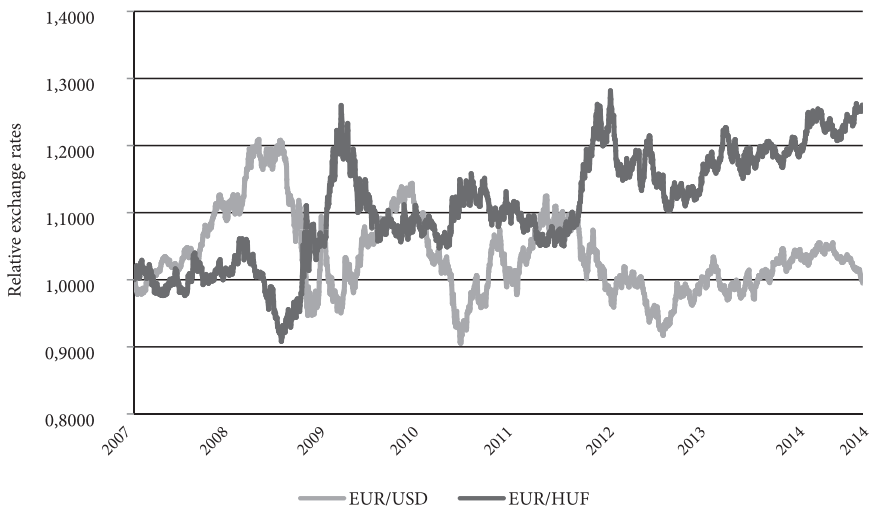
**The exchange rate curve of the portfolio formed from EUR/HUF and EUR/USD positions and the trading levels**



A similarly suitable means of presenting the strategy is to depict daily exchange rates within a system of coordinates. We obtain a set of points where each point signifies a EUR/HUF and EUR/USD exchange rate. The dimensions of the set of points show the entire range of movement of the currency pair over the examined period. The dotted lines featured on the diagram are isoprofit lines, shifting along which does not change the value of the multiple, so that no yield or loss is generated. The favourable entry position is found in the north-eastern corner of the diagram, from where the multiple can be expected to move towards the origin (mean reversion), or to stagnate along the isoprofit line and simultaneously generate interest. It is clearly apparent that the set is flatter at the isoprofit curves. Consequently, the truly extreme multiple values are to be found in the eastern part of the set, from where the reversion generates an exchange rate gain.

**Figure 6.****Daily exchange rates between 1 January 2007 and 31 August 2014**

The above description is designed to help understand the train of thought and to illustrate the calculations – methods we also apply in the case of the other two currency pairs, the EUR/CZK and EUR/PLN.

**Figure 7.****Relative movement of EUR/PLN and EUR/USD exchange rates**

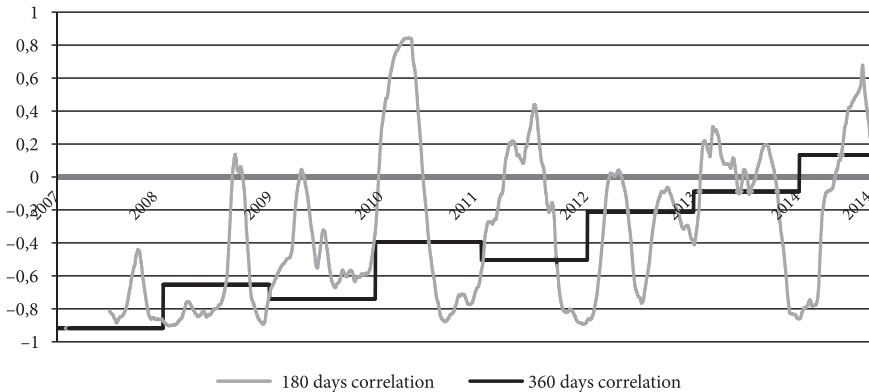
### Examination of EUR/PLN and EUR/USD

Similarly to the objectives of the Hungarian and Czech central banks, Poland's national bank regards the preservation of price stability and inflation targeting as its primary tasks. Since 2004, its goal has been to maintain inflation within a band  $\pm 1$  percentage point of 2.5%. In order to attain its goal, the central bank has operated with interest rates of between 6.8% and 2.7%, with an interest premium against the EUR between -0.06% and 4.7%, average 2.59%.

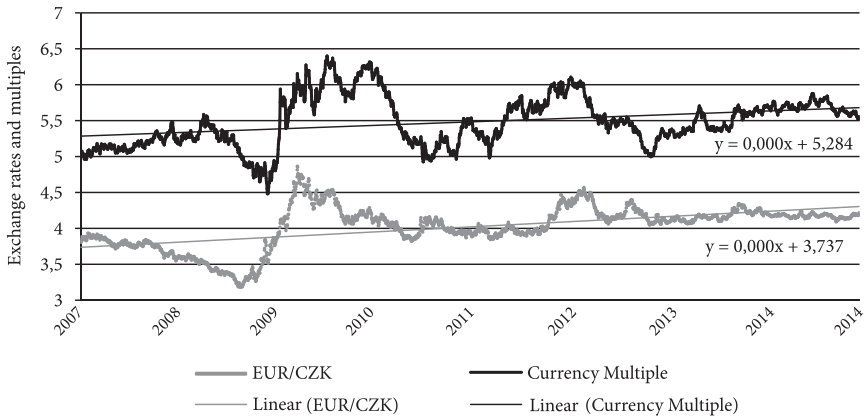
The negative correlation observed in the case of the EUR/USD and EUR/HUF pairs can also be perceived with the EUR/USD and EUR/PLN pairs. The relative movement of the currency pairs is illustrated in Fig. 7. Similarly as we experienced with the HUF, the two currency pairs respond to changes in international mood with movements in opposing directions: in a period of decreasing inclination to take risks, the EUR/USD exchange rate declines, while the EUR/PLN exchange rate rises. These opposing movements are confirmed by the correlation and cointegration tests carried out on the EUR/USD and EUR/PLN exchange rates.

**Figure 8.**

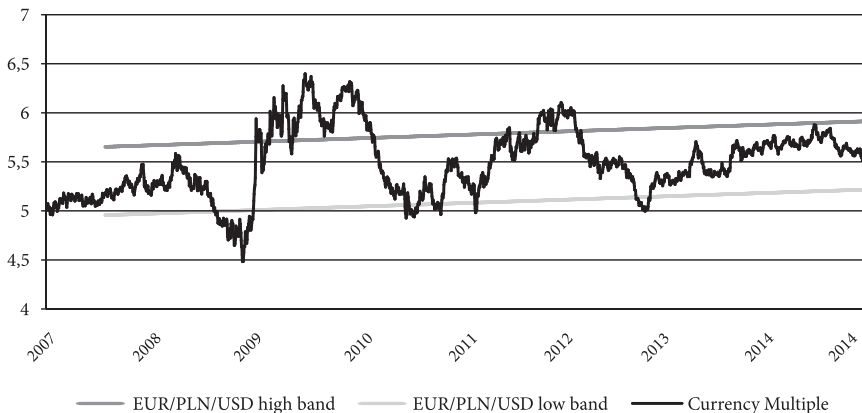
#### Correlation of EUR/PLN and EUR/USD exchange rates



In Fig. 8 we can see that the annual correlation of the EUR/USD and EUR/PLN exchange rate pairs was between -0.92 and 0.13, with an average of -0.42. The average 180-day correlation over this period was -0.34. A cointegration test of the pair shows a similar result, whereby the two exchange rates (EUR/PLN inverse) were characterized by the cointegration value shown in Table 1. Accordingly, we also prepare our portfolio for the PLN based on borrowing in EUR and gaining interest on investing in USD and PLN, for which the exchange rate movements are shown in Fig. 9

**Figure 9.****EUR/PLN and EUR/USD currency multiple, and EUR/PLN exchange rate**

Similarly to the other two exchange rate pairs presented in our study, and compared to the exchange rate built purely on shorting EUR/PLN, the steepness of the entire EUR/PLN and EUR/USD portfolio declined from 15% to 7,5% over the examined period, which is favourable from the point of view of the carry trade. This means an annual average depreciation of 1.84% and 0.95%, respectively. Both figures are lower than the interest that can be gained, but the profit is greater in the case of the portfolio, and so it is this that dominates the pure carry trade strategy. For the portfolio assembled in this way, we apply the strategy known from pairs trading, for which the entry and exit points are illustrated in Fig. 10.

**Figure 10.****The exchange rate curve of the portfolio formed from EUR/PLN and EUR/USD positions, and the entry and exit levels**

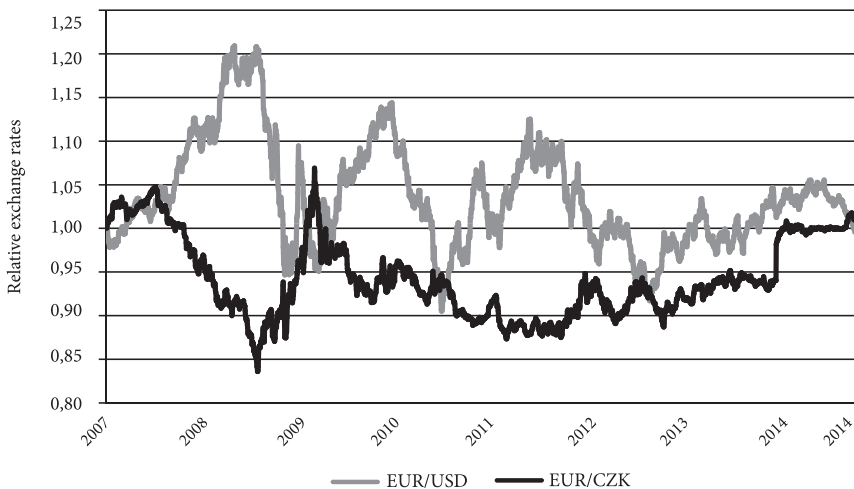
### Examination of the EUR/CZK and EUR/USD currency pairs

The primary task of the Czech National Bank, similarly to the other two central banks discussed here, is to maintain price stability and to aid the government's economic policy. The inflation target between 2006 and 2009 was 3%, decreasing to 2% from 2009, until entry to the euro zone. The 3-month Pribor reference rate moved between 4.25% and 0.35%, with an average of 1.76%; on average this falls 0.05% short of the 3-month Euribor rate. The Czech koruna is the only one of the examined three currencies to yield lower interest than the euro, albeit minimally.

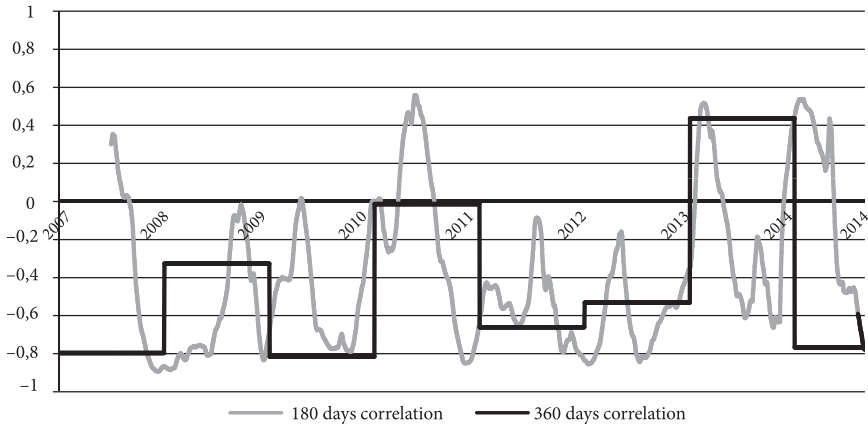
A negative correlation characterizes the EUR/CZK compared to the EUR/USD exchange rate, similarly to the exchange rate movements of the EUR/HUF, EUR/PLN and EUR/USD. These movements take place in the vicinity of "turbulence" in the global economy, at which times the EUR/USD exchange rate declines and the EUR/CZK exchange rate rises. The relative exchange rate movements can be seen in Fig. 11.

**Figure 11.**

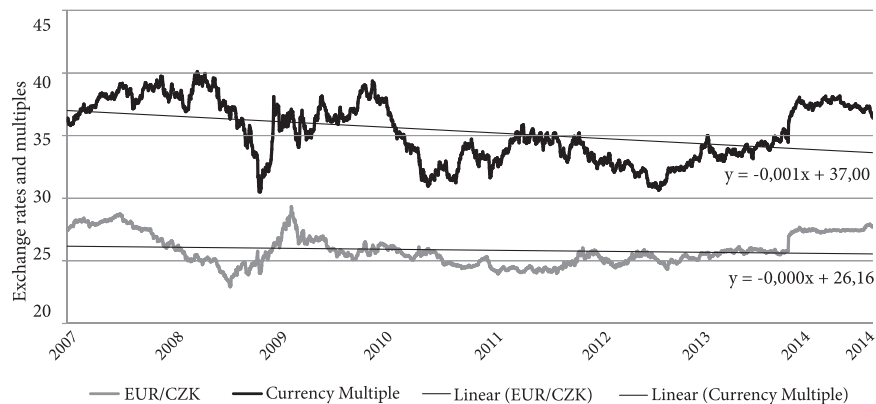
#### Relative movement of EUR/CZK and EUR/USD exchange rates



The exchange rate movements generally occurred in opposite directions, so that the negative correlation observed in the case of the EUR/HUF and EUR/PLN is also typical here. The 180-day correlation between the two exchange rates was between -0.89 and 0.54, with an average of -0.38, while the scale of the annual correlation ranged between -0.81 and 0.43, with an average of -0.43. The 180 and 360-day correlations can be seen in the following Fig. 12.

**Figure 12.****Correlation of EUR/CZK and EUR/USD exchange rates**

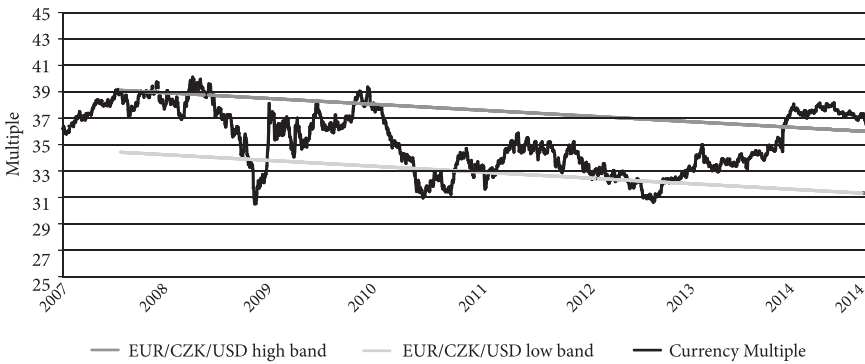
The result of the significant negative correlation is that the movement of the portfolio is more favourable from the trading point of view, and the trend of the currency multiple-curve flatter than the EUR/CZK trend, as illustrated in Fig. 13. The portfolio, in the event of shorting the two currency pairs contained therein, appreciated by 8.1% over the entire period, while this figure for the EUR/CZK currency pair was a mere 2.2%. This means an annual appreciation (CZK strengthening) of 1% and 0.28%, respectively, both figures higher than the interest loss suffered.

**Figure 13.****EUR/CZK and EUR/USD multiple and EUR/CZK exchange rate**

The standard deviation of the EUR/USD and EUR/CZK portfolio also grew here compared to the exchange rate, changing from 1.24 to 2.34, which is negative from the point of view of the pure carry trade, but positive in the case of a pairs trading strategy. The nature of the strategy to use exchange rate movements results in several entry points, greater exchange rate movements and greater yield. The lower and upper band illustrating trading levels, as projected onto the above multiple-curve, can be seen in Fig. 14.

**Figure 14.**

**Exchange rate curve of the portfolio formed from EUR/CZK and EUR/USD positions, and the entry and exit levels**



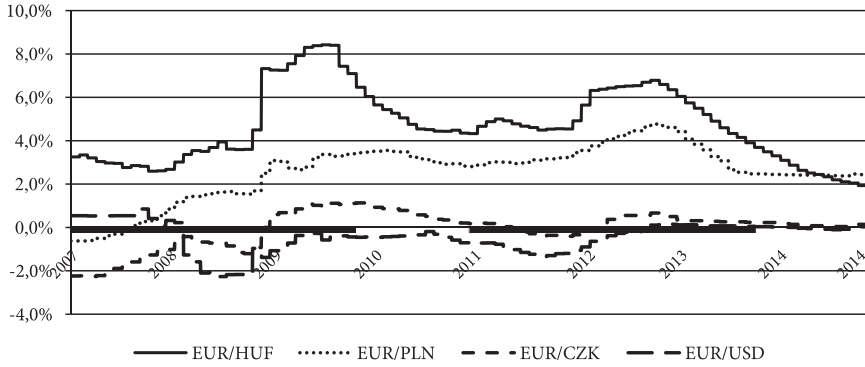
## Empirical investigation

### *Data*

During the investigation, we analysed daily closing currency exchange rates between 1 January 2007 and 31 August 2014. We downloaded the exchange rates from oanda.com on 10 September 2014. The examined currencies were as follows: American dollar (USD), euro (EUR), Hungarian forint (HUF), Polish złoty (PLN), and Czech koruna (CZK). When selecting the currencies it was necessary that each should yield higher interest compared to the euro with respect to the period 2007–2014, enabling the use of the carry trade. We downloaded the values of the 3-month Libor, Euribor, Bubor, Wibor and Pribor reference rates pertaining to the currencies from the websites of the respective countries' national banks, and calculated with average monthly interest. The interest rate differentials of the currency pairs are shown in Fig. 15. Of the four currency pairs presented, only the EUR/USD currency pair used for hedging had a negative average interest rate differential, at  $-0.45\%$ . The EUR/CZK showed a zero interest result, while the EUR/PLN showed a positive yield of  $2.6\%$  and the EUR/HUF a positive yield of  $4.71\%$ .



**Figure 15.**  
**Interest rate differentials of currency pairs**



### Strategic parameters

We have based the trading of currency pairs on the aforementioned study by Gátek et al. (2003), forming the portfolio using the algorithm described and further developed by Botos, Nagy and Ormos (2013).

Trading consists of two parts:

- Selection of the pairs used in the portfolio. In our case, these are the three main currencies of Eastern Europe and the EUR/USD pair. The selection was made on a regional basis and not sorted according to cointegration, although we did examine the correlations and cointegration of the selected currencies, as already presented above.
- Determination and application of the trading strategy, which we present in the following section.

Using the currency pairs presented under the preceding heading, we will attempt to trade at a profit.

As the next step in further developing the strategy, we calculate the  $Z^{(i)}$  values of the currency pairs and the EUR/USD multiple, estimate the  $Z^{(i)}$ ,  $i \in \{1, 2, \dots, n\}$  density functions with the help of the Gauss kernel function, and examine the periodograms.

$$Z_t^{(i)} = \frac{S_t^{i,1} - \beta_i S_t^{i,2} - \mathbf{E}(S_t^{i,1} - \beta_i S_t^{i,2})}{\sigma(S_t^{i,1} - \beta_i S_t^{i,2})} \quad (5)$$

With the help of the  $Z_t^{(i)}$  values, we determine the locations of the position's opening and closing;

- If in the case of the pair  $i$ . at the time  $t$ .  $Z_t^{(i)} > 1$ , then according to Caldeira (2013) we open a position, taking out a short for the  $S_t^{(i,1)}$  currency pair, and a similarly short position for the  $S_t^{(i,2)}$  currency pair.
- If in the case of the pair  $i$ . at the time  $t$ .  $Z_t^{(i)} < -1$ , then we do not open a position. Currencies then are traded exclusively according to the carry trade, in the direction of the currency yielding high interest. Determining the entry and exit triggers is likewise a key question. In the specialist literature (Gatev, Caldeira, etc), a widespread entry trigger is the Z-score of 2, and the exit value either a complete reversion to the mean or a Z-score of 0.5. In order to spend as much time in the position as possible, we modified this to respective Z-scores of 1 and  $-1$ .
- If in the case of the pair  $i$ . at the time  $t$ .  $-1 > Z_t^{(i)}$ , then we close the position.
- In the case of currency pairs, we do not apply a stop-loss order. Trading launched from an extreme position and the constant interest generate a continuous yield, and an exit may only occur when the  $-1$  Z-score is crossed.
- Likewise we do not apply a time limit, as our goal is to hold the position for as long as possible.

We compare the yield on the currency positions and portfolio managed in this way with the yield on the pure carry trade.

## Results

In our study we aim to compare the results of three portfolios assembled using three East European currencies and the EUR/USD pair with the results of a pure carry trade strategy applied to the three currencies.

### Carry trade on the HUF, PLN, CZK currencies

In carrying out a vanilla carry trade with an entry of 1 January 2007 and exit on 31 August 2014, we were able to achieve the following results.

**Table 2.****Carry trade yields on the EUR/HUF, EUR/PLN and EUR/CZK currency pairs**

	Exchange rate effect	Interest effect	Total yield	Annual yield
EUR/HUF	0.798	1.435	14.1%	1.7%
EUR/PLN	0.905	1.219	10.4%	1.3%
EUR/CZK	0.990	0.996	-1.3%	-0.2%

The above data clearly reflect the significant real interest on the HUF, the moderate real interest on the PLN, and the minimal real interest on the CZK, which is also apparent in the interest rate differentials on the EUR/HUF, EUR/PLN and EUR/CZK currency pairs. In the case of all the currency pairs, we experienced negative exchange rate movements (minimal in the case of the CZK), which support pairs trading theories: the high interest-rate differential of the EUR/HUF was accompanied by significant depreciation, the medium interest rate differential of the PLN by a similar degree of depreciation, and the interest surplus of the CZK by an opposing but almost zero depreciation.

**Carry trade on a portfolio made up of EUR/USD and local currencies following a pairs trading strategy**

In the manner presented earlier, by combining the advantage of currency trading, i.e. the interest gains, with the benefits of pairs trading, namely the determining of the right times for trading, we employed a portfolio and trading method which substantially increased the yield on the above-mentioned, purely carry trade-based trading. Besides the high yield, the risks in trading decreased due to brief trading times and lower standard deviation.

We compared yield curves to benchmark carry trade yield curves. A significantly lower maximum drawdown was observable, signifying decreasing risk. In the case of the HUF portfolio, the maximum drawdown of the carry trade was 23.5%, while this figure was only 9.5% for the currency pairs trading portfolio. The two yield curves can be seen in Fig. 16.

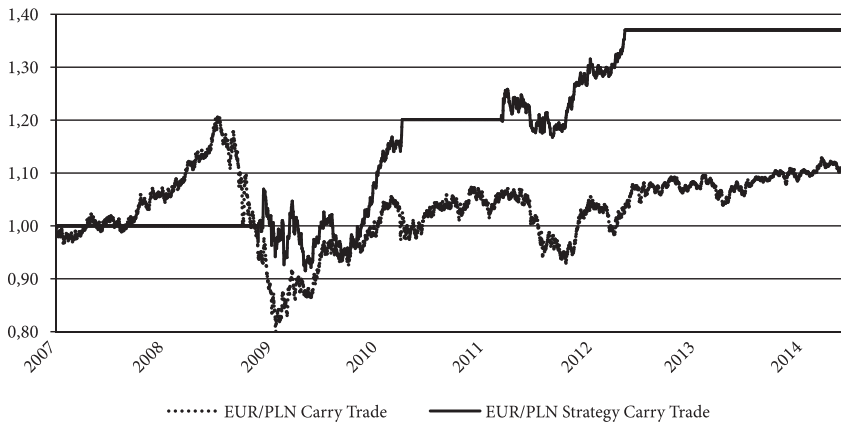
**Figure 16.****EUR/HUF and EUR/USD portfolio yield curves**

We obtained the above yield and risk by using two-time leverage. Two-time leverage applied to a pure carry trade strategy would cause such a great oscillation in the portfolio that the entire capital would be put at risk. For the portfolio, however, we can apply fivefold or even more leverage, which, due to entering at an extreme value and the continuous flow of interest, does not cause oscillation on the scale seen in the base strategy.

In the case of the HUF portfolio, we spent 41.6% of the time in trading, while for the remainder of the time we had no market exposure and hence no risk; accordingly, we did not calculate a yield and the capital remained available.

Similar results can be observed in the case of the portfolio containing the EUR/PLN and EUR/USD pairs. Both in yield and in maximum drawdown, the portfolio provides more favourable results than a pure carry trade strategy. A return on portfolio of 37% could be observed for the entire period, compared to 10.5% on the carry trade, combined with a respective 10.4% and 33.3% maximum drawdown. The yield increased threefold, with maximum drawdown a third of this.

**Figure 17.**  
**EUR/PLN and EUR/USD portfolio yield curves**



In the case of the PLN portfolio, we spent 34% of the time in the position, while for the remainder of the time we had no risk and posted no yield.

The yield curve for the third portfolio, comprising the EUR/CZK and EUR/USD currency pairs, is shown in Fig. 18. The EUR/CZK represents the exception among the three examined currency pairs. Although showing a high negative correlation with the EUR/USD currency pair, it is not suitable for the carry trade given that the CZK has a lower rate of interest than that of the EUR. Over a seven-year average, the interest rate differential hovered around zero. For pairs trading, however, the significant opposing movement could make the pair interesting, and so we examined its properties. We obtained similar results to those obtained for the portfolios using the HUF and PLN currencies. The yield received for the entire examined period was 30,5%, significantly exceeding the -1,3% yield received on the carry trade.

**Figure 18.**  
**EUR/CZK and EUR/USD portfolio yield curves**



With respect to the maximum drawdown, the CZK carry trade yield curve shows a result similar to the two other currencies, with a maximum drawdown of 21.5%. The pairs trading strategy shows a significantly lower maximum drawdown here as well, at 7.7%. The time spent in trading was similar to that of the PLN portfolio, at 34.3%.

Summarizing the yields on the above currency pairs, we can display the following results.

**Table 3.**

**Yields on the presented carry trade strategy  
for the EUR/HUF, EUR/PLN and EUR/CZK currency pairs**

	<b>Time spent in trading</b>	<b>Total yield</b>	<b>Annual yield</b>
EUR/HUF	41.6%	59.0%	7.8%
EUR/PLN	34.0%	37.1%	4.8%
EUR/CZK	34.3%	30.2%	4.0%

## CONCLUSIONS

In our study, we presented the interest rate differentials of the three main currencies of the CEE region compared to the euro, and the significant real interest rate of the HUF. During the crisis, this substantial interest premium was paired with exchange rate movements on a significant scale. There is a perceptible connection between the 7-year trend of all three currencies concerned and economic theories of parity. In order to illustrate this, we presented the carry trade yields over the examined period, which resulted in minimal profit. Annual yields in the case of the EUR/HUF, EUR/PLN and EUR/CZK were a respective 1.7%, 1.3% and -0.2%. Even so, compared to the -0.2% yield on the CZK, the 1.7% yield on the HUF signifies a significant and lasting interest premium, contradicting Fisher's model.

We established a trading system, which exploits the negative correlations between the EUR/USD and the three EUR/local currency pairs. This strategy is built on the pairs trading method and helps determine the trading points occurring within an extreme range. Using the above trading strategy, we attained significant positive abnormal returns, generating annual yields of 7.8%, 4.8% and 4.0% on portfolios containing the HUF, PLN and CZK currencies, respectively, far outstripping the yields attainable on the pure carry trade.

When calculating the results, the yields deriving from shifts in exchange rates are significant, helped only to a small extent by the rate of interest. The carry trade applied to currency pairs thus falls somewhere between a straightforward carry trade and pairs trading. During a carry trade, parity theories hold that the movement of the exchange rate works against profitability in the long term; in the case of pairs trading, however, we are effectively obliged to trade at a negative rate of interest due to continuous shorting and leverage costs, so that (contrary to the carry trade) our goal is to reduce the time spent trading. With this goal in mind, we have modified the entry points compared to the study by Botos, Nagy and Ormos (2013).

A typical everyday aspect of the above strategy in the CEE region has been foreign currency borrowing, which has seen the population run up debts mostly through EUR, CHF and JPY loans, the latter two currencies typically featuring on the credit side of the carry trade strategy prior to the crisis. After borrowing, as described by Christiansen et al. (2010), the currency would converge on the long-term average during periods of high volatility experienced under the crisis. The convergence was not total, since in the case of the HUF annual interest of 1.7% remained in the exchange rate looking at the period beginning from 2007. “Everyday carry-traders” experienced this significant exchange rate movement in the loss of their homes and cars. However, assuming that interest on bank loans follows market rates, then even in this convergence period a carry trade speculator would not emerge from a currency transaction with a loss. The problem was typically caused by the investment side: everyday carry-traders typically invested borrowed credit in rapidly amortizing investments that do not generate a yield (cars), or in low-liquidity assets that are sensitive to changing economic cycles (real estate, investments). If these assets had brought them close to the examined 3-month BUBOR rate, then everyday carry-traders would still be in profitable trading to this day. If these everyday carry-traders had taken up their carry trade positions within the extreme range as described above, then the value of the portfolio would typically exceed the hedging point.

It is important to note that the strategy also draws attention to the evolution of extreme exchange rate levels, which may help currency speculators and even companies engaged in the international trade of goods. A combined examination of the EUR/USD and the local currency may point out and isolate the domestic or international causes of exchange rate shifts. The currency market view as seen in the pairs trading strategy, and even simply the hedging of the exchange rate at the local maximums, is a practice missing among small domestic enterprises, and yet it could have a considerable bearing on profitability.

We have not examined the results of the carry trade and the examined strategy with regard to the CHF and JPY, even though it was to these two currencies that

the Hungarian population had the greatest exposure after the EUR. Another interesting aspect of the CHF was its pegging to the EUR in 2011, while it may also be interesting to examine the extent to which the regional currencies can be traded against each other, particularly the low-interest CZK against the other two examined currencies. As can be seen from the cointegration matrix, the synchronous movement of these currencies is considerable.

## REFERENCES

- ALEXANDER, C., DIMITRIU, A. (2002). The Cointegration Alpha: Enhanced Index Tracking and Long-Short Equity Market Neutral Strategies. ISMA Discussion Papers in Finance 08. ISMA Finance.
- ANDRADE, S. C., PIETRO, V., SEASHOLES, M. S. (2005). Understanding the Profitability of Pairs Trading. *Economics Bulletin* preprint.
- BOTOS, B., NAGY, L., ORMOS, M. (2013). Pairs Trading Arbitrage Strategy in the Old and New EU Member States. International Conference of Finance and Banking, Ostrava, Czech Republic.
- BURNSIDE, C., EICHENBAUM, M., REBELO, S. (2007). The Returns to Currency Speculation in Emerging Markets. NBER Working Paper, No. 12916.
- CALDEIRA, J. F., MOURA, G. V. (2013). Selection of a Portfolio of Pairs Based on Cointegration: A Statistical Arbitrage Strategy. Federal University of Rio Grande do Sul, Federal University of Santa Catarina, Brazil.
- CASSEL, G. (1918). Abnormal Deviations in International Exchanges. *The Economic Journal*, Vol. 28, pp. 413–415.
- CHRISTIANSEN, C., RANALDO, A., SÖDERLIND, P. (2011). The Time-Varying Systematic Risk of Carry Trade Strategies. *Journal of Financial and Quantitative Analysis*, Vol. 46, No. 04, pp. 1107–1125.
- DORNBUSCH, R., FISCHER, S., STARTZ, R. (2001). *Macroeconomics*. McGraw-Hill.
- ELLIOTT, R. J., VAN DER HOEK, J., MALCOLM, W. P. (2005). Pairs Trading. *Quantitative Finance*, Vol. 5, No. 3, pp. 271–276.
- ERDŐS, P., ORMOS, M. (2012a). Natural Gas Prices on Three Continents. *Energies* 5: (10), pp. 4040–4056.
- ERDŐS, P., ORMOS, M. (2012b). Pricing of Collectibles: Baedeker Guidebooks. *Economic Modelling*, Vol. 29: (5), pp. 1968–1978.
- FISHER, I. (1930). *The Theory of Interest*. Philadelphia: Porcupine Press. ISBN 0-87991-5.
- FRÖMMEL, M., SCHOBERT, F. (2006). Monetary Policy Rules in Central and Eastern Europe. Discussion Paper No. 341. Leibniz Universität Hannover.
- GATEV, E., GOETZMANN, W. N., ROUWENHORST, K. G. (2006). Pairs Trading: Performance of a Relative-Value Arbitrage Rule. Working paper, Yale University.
- ORMOS, M., JOÓ, I. (2014). Are Hungarian Investors Reluctant to Realize Their Losses? *Economic Modelling*, Vol. 40: (June 2014), pp. 52–58.
- RANALDO, A., SÖDERLIND, P. (2009). Safe Haven Currencies. *Review of Finance*, Vol. 14, No. 3, pp. 385–407.
- ROGOFF, K. (1996). The Purchasing Power Parity Puzzle. *Journal of Economic Literature*, Vol. 34, pp. 647–668.
- SÖDERLIND, P. (2001). Monetary Policy and the Fisher Effect. *Journal of Policy Modeling*, Vol. 23, No. 5, pp. 491–495.
- VIDYAMURTHY, G. (2004). *Pairs Trading: Quantitative Methods and Analysis*. John Wiley & Sons, Inc., Hoboken, New Jersey.