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FINANCIAL AND ECONOMIC REVIEW

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Limitations of Market-based Refinancing in the Case
of Mortgages with a Variable Interest Rate
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Comparison of Manipulation-proof Measures on
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Economic Growth?
Péter Mihályi

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Who Can Refinance? The Possibilities and Limitations of Market-based Refinancing in the Case of Mortgages with a Variable Interest Rate*

Bálint Dancsik – Nedim Márton El-Meouch

In our study we examine what portion of variable interest rate mortgages can be profitably and realistically refinanced on a market basis, in the light of remaining maturity, the current one-off costs of refinancing and the prevailing interest rate spread. To that end, relying on microdata we applied various methods (from using the simple banking sector average spread to applying a linear regression model) to estimate the interest rate spread at which debtors would be able to take out a new, variable-rate loan. If the estimated spread of the new loan is adequately low, refinancing may be a financially rewarding option for the debtor. According to our results, 22–31 per cent of the variable interest rate mortgage loans disbursed prior to 2015 could be refinanced in this way assuming conservative lending conditions. Although we focused on the refinancing of variable-rate loans with other variable-rate loans directly, our results also indicate that on a market basis, there may be limited room for refinancing variable-rate loans with fixed-rate loans and hence, for mitigating the interest rate risk of the household sector. In our opinion, by easing the obstacles to loan refinancing, the recommendation of the Magyar Nemzeti Bank on interest rate risk may considerably raise the share of debtors switching to fixed-rate loans.

Journal of Economic Literature (JEL) codes: D14, E43, G21, G41

Keywords: mortgage loan, variable interest rate, interest rate risk, loan refinancing

1. Introduction and motivation

The post-crisis history of the Hungarian financial system demonstrates that a rise in borrowers' debt service can stretch debtors' financial position and this can easily become a problem for the banking sector as well via the increase in credit risk. Although the conversion of FX-denominated retail mortgages to HUF in the

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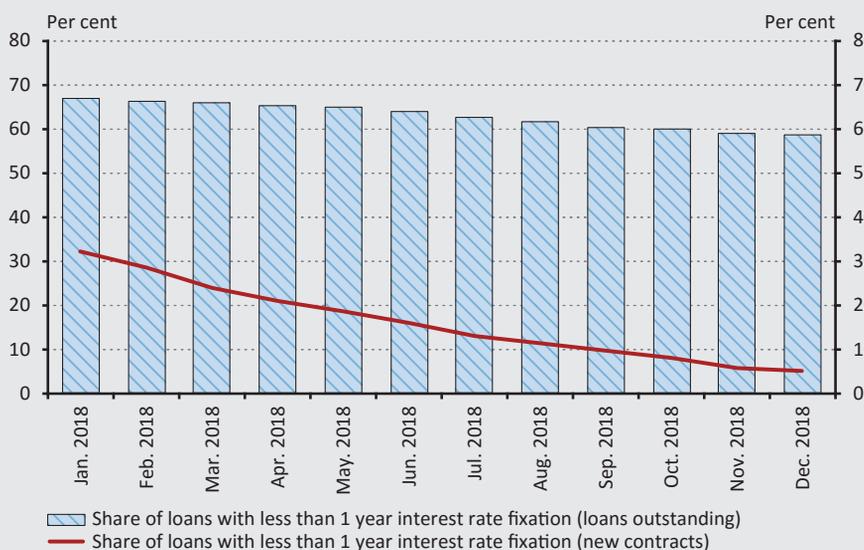
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first quarter of 2015 eliminated debtors' exchange rate risk, under the relevant legislation lending rates were tied to the 3-month interbank rate; consequently, instalments remained volatile in many cases.¹ Apart from FX loans converted to HUF, there are also other loans outstanding with variable interest rates: a significant portion of the housing loans disbursed in the first few years following the demise of foreign currency lending was extended with an interest rate fixation of less than 1 year up until 2018, after which the expansion of loans with an interest rate fixation of over 1 year became unquestionable.² Between 2010 and 2018, loans extended by credit institutions with an interest rate fixation of less than 1 year amounted to HUF 1,369 billion, and banks' on-balance sheet stock of loans converted to HUF

Figure 1
Share of fixed-rate mortgages in loans outstanding vs. in new contracts



Note: Shares are calculated on the basis of volume. In the case of new contracts, shares were calculated based on newly disbursed housing loans, while for loans outstanding it was based on all mortgage loans (housing loans and home equity loans together).

Source: MNB

¹ While in this way the Conversion Act exposed debtors to interest rate risk, had it provided otherwise – i.e. had it prescribed a fixed rate – the conversion would have caused a shock-like surge in banks' interest rate risk. The hedging requirement of this conversion would have induced a large-scale, simultaneous, same-direction demand in the interest rate derivative market, which would have also raised the price of interest rate swaps. The Act, however, enabled debtors to refinance their debt at reduced costs (even with fixed-rate loans), although only a marginal percentage of borrowers (around 1.5 per cent) took advantage of this opportunity.

² While the share of variable-rate loans in new contracts ranged between 40 and 45 per cent in the period of 2015–2017, this ratio shrank to 15 per cent in 2018 as a whole. By December 2018, 95 per cent of newly disbursed housing loans had an initial interest rate fixation of over 1 year. Contracts with an initial interest rate fixation of 1–5 years represented 26 per cent, while 57 per cent and 12 per cent of new housing loans were disbursed with an initial interest rate fixation of 5–10 years and over 10 years, respectively.

still exceeds HUF 1,200 billion. Therefore, although loans extended with an interest rate fixation of over 1 year now account for a considerable share of newly disbursed mortgages, with a stock of HUF 2,500 billion and a share of nearly 60 per cent, the outstanding portfolio is still dominated by variable-rate loans (*Figure 1*).

In the case of variable-interest loans indexed to the short-term reference interest rate, a rise in the interest rate environment will quickly increase the amount of the debt service as well. The percentage of this increase depends primarily on remaining maturity: the longer the remaining maturity, the larger the rise in the instalment in response to one unit of interest rate increase. An interest rate increase of 100 basis points raises instalments by around 3 per cent in the case of a loan with a remaining maturity of 5 years, whereas this increment reaches 5 per cent for a 10-year loan and almost 9 per cent for a loan with a remaining maturity of 20 years. The effect of an interest rate increase also depends on the current interest rate level (the lower the current interest rate, the larger the effect of a unit increase in the rate), but its impact is far less significant than that of the remaining maturity.³

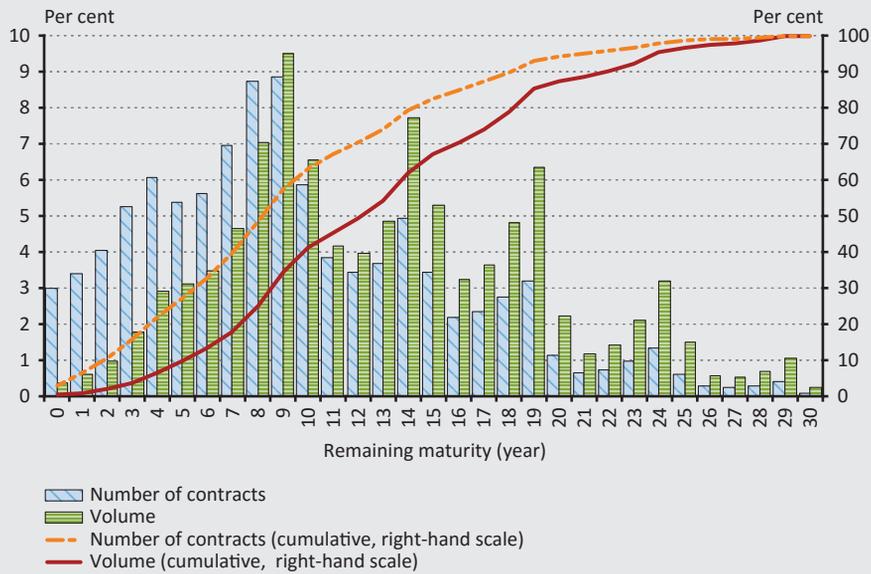
A considerable portion of the variable interest rate mortgage portfolio is still characterised by relatively long remaining maturities. More than half of the loans have a remaining maturity of over 10 years (*Figure 2*). Consequently, the normalisation of monetary policy – that is, departure from the near-zero interest environment – may raise the debt service of many households in the period ahead. This risk can be reduced significantly by the long-term fixation of interest rates, but this comes at a price: in the light of the normal yield curve, the current value of the long-term fixed interest rate is higher than the value of floating interest rates indexed to the reference rate, which are subject to short-term adjustments.⁴ The customer primarily pays for the hedging cost of banks' interest rate risk – in other words, the difference between the short-term interbank interest rate and the interest rate swap corresponding to the duration of the interest rate fixation and reflecting market expectations about rate changes – assuming that the spread applied by the bank does not differ significantly in the case of these two product types.⁵

³ Obviously, loans with an interest rate fixation for longer periods – but not for the entire term of the loan – also involve an interest rate risk, as the loan is repriced at the end of the interest period. With an interest rate hike like this the debtor may even face a potentially greater shock because, as opposed to floating-rate loans, the rate increase takes place in a concentrated, rather than a gradual, manner. Rate-sensitivity, however, is mitigated by the fact that, on the one hand, the transaction's remaining maturity can decrease significantly by the end of the interest period and, on the other hand, in the event of interest rate changes detrimental to the debtor, the customer is entitled to early prepayment free of charge.

⁴ Based on data for new contracts as at December 2018, weighted by contracted amount the Annual Percentage Rate of Charge (APRC) of housing loans with an interest rate fixation of less than 1 year was 3.33 per cent. The APRC was 4.49 per cent for loans with an interest rate fixation of 1–5 years, 5.22 per cent in the case of 5–10 year fixation and 5.66 per cent over 10 years.

⁵ Based on the data, however, banks set substantially different spreads for these two product types for a long time; in other words, the spreads on loans with an initial interest rate fixation of over 1 year were higher than justified (*Aczél et al. 2016; MNB 2017*). This discrepancy could be observed up until 2018, when the two spreads converged (*MNB 2018b*).

Figure 2
Distribution of variable interest rate mortgages by remaining maturity (2018 Q2)



Source: CCIS, MNB

As a method of averting interest rate risk, debtors can opt to refinance their variable-rate debt with fixed-rate loans. The focal question of our research is to determine the extent to which the share of fixed-rate loans in loans outstanding can be increased on a market basis through refinancing. Although the interest rate structure of new loans suggests that the portfolio is increasingly shifting to loans with a longer-term interest rate fixation virtually “by itself” in any event, in terms of proportions, this shift can only be a slow and gradual process due to the size of the portfolio. Under the current circumstances, the share of loans with interest rate fixation of over 1 year in the total portfolio edges upward by 0.5–1 percentage point on a monthly basis on average. This rate may accelerate if a larger volume of new (fixed-rate) loans was taken out for the purpose of the early repayment of previous (variable-rate) loans. Our study is motivated by the following question: *how much room is available for debtors to replace their variable-rate loans with fixed-rate loans on a market basis?*

Whether or not it is worth it for a debtor to refinance a variable-rate mortgage loan with a fixed-rate loan is an extremely complex question, which depends, first and foremost, on the following:

- (1) the size of the spread over the funding cost corresponding to the interest rate fixation in the case of the two products,
- (2) the one-off costs of the refinancing,
- (3) the debtor's risk sensitivity; i.e. the "utility" attributed by the debtor to constant instalments,
- (4) the debtor's interest rate expectations which may differ from the market expectations reflected in the price of interest rate swaps,
- (5) the debtor's financial awareness or lack thereof, which may deter the debtor from loan refinancing even if the debtor has the necessary financial means.

The data at our disposal do not allow us to address all of these aspects. Our study is focused primarily on the first and second aspects, and attempts to assess loan refinancing options from a pricing point of view. Our specific research question is the following: how many variable-rate mortgage contracts could be replaced *by another variable-rate mortgage contract* in such a way that the gain stemming from the lower interest rate spread offsets the one-off costs of the refinancing during the remaining maturity? Although we rely on the database of variable-rate loans for our estimation with *spreads* being the main focus of the estimate, the ratio thus received may also serve as an indication of the *breadth available for refinancing debts with fixed-rate loans on a market basis*. Of course, by extending our results we implicitly assume that (1) the debtor's interest rate expectations are identical with market expectations; in other words, (2) the debtor is willing to pay the difference in funding costs, and (3) the bank is willing to disburse variable-rate and fixed-rate refinancing loans at the same spread.

Our paper is structured as follows: Section 2 provides a brief overview of the main findings of the relevant literature. In Section 3, we discuss in detail the way in which the profitability of loan refinancing can be determined; in Section 4 we describe the data and methodology used, while the results of our estimates are presented in Section 5. Finally, Section 6 provides a summary of our conclusions.

2. Findings of the relevant literature

The literature on this topic raises a number of questions. Some of these focus on the decision-making situation of households, while the rest explore the macroeconomic consequences of the interest rate risk and the interest type. From the perspective of households, the present value of refinancing is determined by four factors (Follain – Tzang 1988): (1) the one-off costs of refinancing, i.e. the early repayment fee of the old loan and the administrative costs of the new loan, (2) the duration for which the debtor wishes to hold his mortgage loan (for practical purposes, the remaining maturity), (3) the difference between the interest rates of the old and the new loan, and (4) the tax implications of the early repayment fee and the interest payments.⁶ In making their decision, households need to weigh two questions: firstly, whether the present value of the gain to be achieved by refinancing is positive (i.e. whether the lower cash flows of the refinancing loan will compensate for the costs of refinancing) and secondly, whether, at the given moment, this present value is at its maximum, or they are better off waiting somewhat longer before they refinance (Agarwal et al. 2016). The latter aspect is important because even if the present value of the refinancing is positive, by opting for refinancing the borrower loses the option of refinancing at a more optimal rate after waiting longer. Several studies pointed out that borrowers do not make rational decisions in refinancing situations and are prone to making both potential mistakes: on the one hand, they may miss refinancing opportunities even though they could gain from the transaction (Bajo – Barbi 2018); on the other hand, they often choose to refinance at a sub-optimal time (Chang – Yavas 2009; Agarwal et al. 2016).⁷

It is important to stress that the earlier literature typically attempts to gauge the optimal time at which it is worthwhile to refinance a *fixed-rate* loan with another *fixed-rate loan*. This question raises far fewer problems than trying to determine the optimal time for refinancing a variable-rate transaction with a fixed-rate transaction, as the borrower's risk sensitivity plays a prominent role in the latter case, but this is a hard-to-observe variable. In the case of new loans, households' choice between variable and fixed rates typically reveals the bounded rationality of the participants. The literature found that households do not act prudently when assessing risks, and their decisions are far more likely to be determined by the prevailing interest

⁶ In some countries, interest payments and the early repayment fee can be deducted from the taxes paid by the debtor, which may influence the decision-making situation. In Hungary, however, interest payment has no such tax implications.

⁷ Numerous studies have been published on the calculation of the optimal refinancing rate; however, they have less relevance for our research question which is more of an economic policy nature. For a comprehensive overview of the theoretical models, see the studies by Agarwal et al. (2013) and Agarwal et al. (2016).

rate differential between the two product types⁸ (Kojien *et al.* 2009; Ehrmann – Ziegelmeier 2014; Badarinza *et al.* 2018; Basten *et al.* 2018), rather than by the size of the cash flows expected throughout the loan term. However, as mentioned in the introduction, we refrain from addressing these questions in this specific estimate.

The issue of interest type is all the more relevant as the interest type typical of mortgage loans has a significant impact on the balance sheet of the banking sector. For instance, euro area banks operating in countries with predominantly fixed-rate mortgages banks typically undertake higher interest risks; i.e. they do not fully hedge their interest rate risk exposures (ECB 2018; Hoffmann *et al.* 2018). Therefore, although households are protected from the effects of interest rate hikes in these countries, for banks, an interest rate increase entails a decline in the profits generated by mortgage loans. Albertazzi *et al.* (2018) also highlight the importance of the level of development of the capital market: the share of fixed-rate loans is typically higher in countries with a more advanced institutional structure for long-term, fixed-rate borrowing. Basten *et al.* (2018), in turn, found that banks' pre-existing interest rate risk exposure also strongly influences the lending rates of fixed and variable-rate loans: when banks see their target level of interest rate risk reached or exceeded, they try to steer their customers to product types that allow the banks to reduce their risks, either by adjusting their lending rates or offering shorter (or longer) fixation periods than those preferred by the customer.

The interest rate structure of loans also affects the functioning of monetary policy transmission (Calza *et al.* 2013). In countries characterised by a higher share of variable rates, monetary policy exerts a stronger influence on real economic developments. Ippolito *et al.* (2018) confirm this by demonstrating, through outstanding corporate loans, that owing to the floating rates, monetary policy-induced changes affect firms' investment decisions and liquidity faster. The study refers to this phenomenon as the floating rate channel.

3. Estimating the gain achievable by refinancing

In this study, our goal is to select loans from outstanding variable-rate mortgages where refinancing could be a financially rewarding and realistic option. In constructing our model for refinancing, we examined the refinancing of loans with another, variable-rate mortgage in the light of the data available. In our analysis, we weighed and compared against each other two main criteria:

⁸ This trend may also reflect the fact that – for the lack of certainty regarding future information – upon the calculation of the annual percentage rate of charge (APRC) it is assumed in the case of variable-rate products that the initial borrowing rate remains unchanged throughout the whole lifespan of the loan, which is almost certain to underestimate the actual costs when the yield curve is normal (Berlinger 2017).

- firstly, the debtor bears *one-off costs*, which are charged in relation to the new borrowing and to the early repayment of the old loan,
- secondly, the future expected *cash flows* of the new loan *are different* from the expected cash flows of the old loan. The difference between the present value of the two cash flows shows the debtor’s gain (or potential loss) stemming from refinancing.

The above can be summed up as follows:

$$PV = -C_{refinancing} + \sum_{t=1}^n \frac{(C_{t,old} - C_{t,new})}{(1-r_t)^t} \quad (1)$$

where PV is the present value of refinancing, $C_{refinancing}$ is the initial costs, $C_{t,old}$ and $C_{t,new}$ are the cash flows stemming from the old and the new loan at date t , respectively, r_t is the discount rate prevailing in period t (which equals the product of forward yields between period 1 and t), and n denotes the number of the remaining periods.

If the gain stemming from the difference between the cash flows (instalments) exceeds the one-off costs of refinancing, the present value of the transaction will be positive.

The positive difference can be primarily explained by the spread decline achievable during the term of the loan by way of the refinancing loan. If the refinancing loan has a lower spread, the longer the remaining maturity of the loan, the greater the gain thus received. In the case of loans with short remaining maturities, the gain realised by the customer from the difference in debt services is insufficient to “cover” the one-off costs. Therefore, remaining maturity and the gains from refinancing are positively correlated.

Obviously, the gain achievable depends on the one-off costs of refinancing. If the refinancing process is free of charge,⁹ even the smallest spread decline will make the refinancing profitable; by contrast, high one-off costs would require a greater spread decline for the transaction to be profitable. In other words, the level of one-off costs and the potential gain are negatively correlated.

⁹ Of course, owing to the non-negligible administrative requirements of refinancing (according to *MNB 2018a* the time requirement of refinancing is around 30–40 days), non-monetary “costs” are incurred even in this case, but these are disregarded in our analysis.

Some of the one-off costs (early repayment fee, disbursement charge, notary fee) depend on the amount of the early repayment/new borrowing, while another part (land registry fee, lien registration) is independent of it (*Table 1*). Due to the nominally fixed costs, in the case of larger contracted amounts even a smaller spread decrease compensates for one-off costs. Accordingly, the amount of the outstanding debt and the gain from refinancing are also positively correlated.

Table 1
Cost types incurred in 2019 in Hungary for refinancing

Description of cost	Cost amount	Bank discount is typical
Submission of sales contract to the land registry	HUF 11,100	No
Valuation of property	HUF 30,000	Yes
Issuance of notarial deed	~HUF 50,000–150,000	Yes
Lien registration	HUF 17,100	No
Disbursement	1 per cent of the disbursed amount	Yes
Early repayment/Prepayment	1 per cent of the early repayment amount	No
Total costs (for a loan of HUF 10 million)	HUF 393,000	–

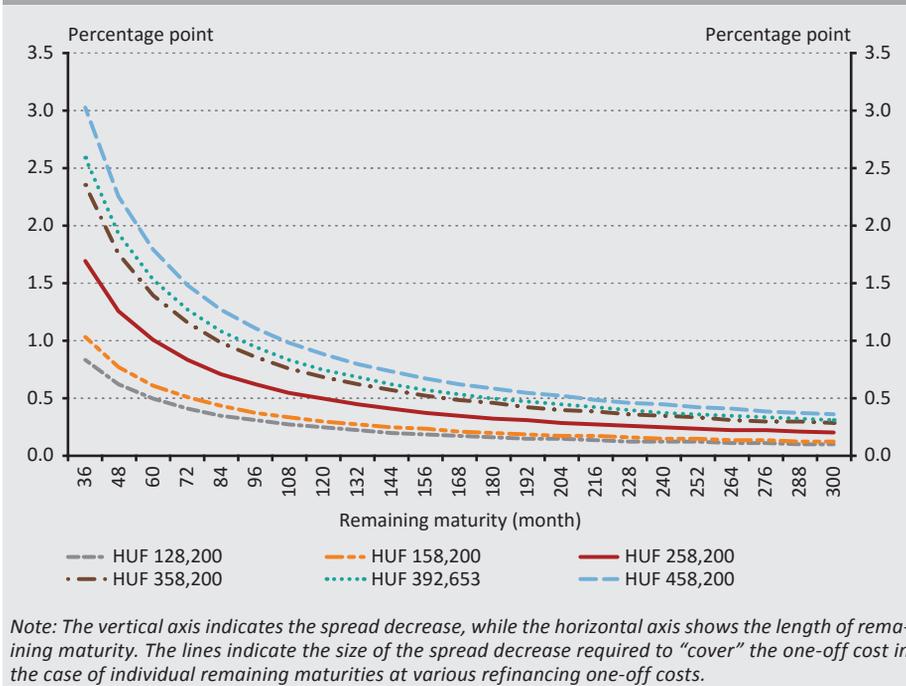
Note: For the issuance of the notarial deed we used individual, contract-level notary fees, but we did not detail them in the table due to the complexity of the calculation method (staggered fee charged as a function of the basic amount and the contracted amount, lump sum cost). For the purposes of the calculations we applied notary fees planned to be effective from 1 July 2019 (after the repeated prolongation of the fee changes).

Source: MNB

In order to illustrate the correlations described above, we constructed a number of indifference curves (*Figure 3*). The indifference curves show by how much should the spread decrease *at the minimum* to make refinancing at various refinancing costs and under stipulated credit terms (HUF 10 million outstanding principal amount, 2.8 per cent spread) worthwhile for borrowers in the case of loans with given maturities. Therefore, the points displayed on the indifference curve by and large meet the following condition:

$$C_{\text{refinancing}} = \sum_{t=1}^n \frac{(C_{t,\text{old}} - C_{t,\text{new}})}{(1 - r_t)^t} \quad (2)$$

Figure 3
Indifferent spread decrease in the case of refinancing a HUF 10 million loan with a spread of 2.8 per cent as a function of remaining maturity at various one-off costs



Calculating the present value or “gain” described above would be far more difficult if we were to assess the refinancing of variable-rate loans with fixed-rate loans. While in the case of a variable rate–variable rate or fixed-rate–fixed-rate refinancing transaction a change in the interest rate exerts a similar impact on the cash flows of the old and the new loan and thus the difference remains approximately constant, in comparing variable and fixed-rate loans we must reckon with the possibility of unexpected interest rate shocks and the level of the debtor’s risk aversion or risk appetite, i.e. the extent to which the debtor wishes to avoid the effects of unexpected interest rate shocks.¹⁰

Since we have no information on debtors’ risk appetite, we did not analyse this issue directly. For the purposes of our estimate, we essentially examined *whether the borrower of a variable-rate loan could refinance his loan with another variable-*

¹⁰ For instance, in the case of mortgage loans disbursed prior to 2018, the spread of loans with an interest rate fixation of over 1 year over the IRS was far higher than the spread of floating-rate loans over the short-term interbank interest rate. This suggests that Hungarian households were willing to pay a premium in exchange for the constancy of the instalments, which may also reflect the negative experiences gained in relation to foreign currency borrowing (Dancsik 2017).

rate loan in a financially rewarding way.¹¹ However, in our opinion (and also in consideration of the implicit assumptions emphasised in the introductory section), the results of our estimates can be also interpreted extensively: if, based on our estimate, the borrower can take out such a variable-rate loan, then he can also have access to a fixed-rate loan with a similar spread and accordingly, he can potentially reduce his interest rate risk by way of refinancing. This extension assumes a neutral risk appetite on average, which means that, in exchange for hedging their interest rate risk, borrowers are only willing to pay the market price of the hedging (i.e. the difference between IRS and BUBOR, the Budapest Interbank Offered Rate). *With this, if the customers are risk averse we underestimate, and if they are risk-takers we overestimate the effective refinancing possibilities.* Although the previous high spread of fixed-rate loans indicates that customers are willing to pay a premium for safety (i.e. they are risk averse), Hungarian financial culture is also prone to overrate immediate advantages. The latter inclination suggests that borrowers choose the product that comes with a currently lower instalment amount, which may be indicative of a – not necessarily conscious – risk-taking attitude. It is therefore difficult, overall, to determine the direction of the bias arising from the extension of our estimate due to the assumption of risk neutrality.

In view of the above, our estimation strategy is the following:

1. We calculate the current spreads of the variable-rate loans disbursed between 2004 and 2014.¹² In order to do so, we needed to estimate the handling charges applied by banks in the case of loans disbursed in the period 2004–2009;¹³
2. On a sample of the variable-rate loans disbursed between 2015 and 2018 we estimate the spread that is currently typical for loans with various features. As part of this step, we estimate the partial effect exerted on the spread by the factors shaping the spread of recently disbursed loans;

¹¹ The previous, excessively high spread set for loans with an interest rate fixation of over a year over the funding cost is another reason why we should not include these loans in the estimate. Indeed, if these loans were included in our sample, in our estimate the size of the refinancing spreads would be overestimated compared with the actual situation.

¹² We did not estimate spreads for variable-rate mortgage loans disbursed after 2015 as we assumed that the actual spread captures reality better than any value that we could have estimated regarding the specific contract.

¹³ Although we have contract-level data available pertaining to the current interest rates, contracts for the loans converted to forint were concluded on the basis of a previous version of the Act on Consumer Credit that is no longer effective; therefore, costs over and above the interest rate also constitute a part of the debt service. The most important of these are handling charges – a non-negligible item in the practice of most banks. In the first step of the estimate, we adjusted the interest rates for the handling charges, for which we took into account the service charges specified in the List of Conditions of the ten largest banks for the no longer disbursed, FX- (and HUF-) denominated mortgage loans. Inevitably, our estimate reflects some bias due to the fact that the actual handling charges may differ for each contract type even within the same bank (e.g. normal or preferential handling charges or loans without handling charges). Moreover, we also assume that, despite the handling charge categories specified in the List of Conditions, banks may have deviated from those values at the transaction level, which gives rise to further bias in our estimate.

3. Based on certain features of the loans disbursed between 2004 and 2014 and using the coefficients/spreads estimated as described above, we estimate the spread at which these loans could be refinanced today;
4. We examine whether the difference between the current spread and the estimated spread of the refinancing loan would be sufficient to compensate for the borrower's one-off refinancing costs during the remaining maturity of the transaction;
5. Finally, we also examine potential grounds for exclusion (previous non-performance, high age, high loan-to-value ratio, low income) which may prevent the refinancing transaction.

It is also important to stress that our calculations show only and exclusively the number of contracts *worth* refinancing from a financial perspective on a market basis under the prevailing regulations. This is far from stating that the borrowers concerned (1) are even aware of this option, and (2) are willing to take advantage of it. As we mentioned in the introduction, after the conversion of foreign currency loans to forint, borrowers were given an option to refinance their loans fully exempted from paying the early repayment fee, but the value of refinancing contracts only amounted to HUF 45 billion at the end of 2015, which accounts for a negligible 1.5 per cent of the potential stock.¹⁴ Thus our estimates by no means reflect our expectations about future refinancing volumes; they much rather point out that – given that a considerable portion of the variable-rate loans have short remaining maturities, low principal amounts and/or low spreads – we cannot expect debtors to switch their contracts to fixed-rate contracts without any external incentive for a significant part of the portfolio.

4. Data and methodology

For the purposes of this study, we relied on databases that contain *contract level* data on the household loan contracts carried on the balance sheets of credit institutions. We had access to 2018 Q2 data recorded in the Central Credit Information System (CCIS), to which we linked *anonymised* credit risk data from the MNB's data supply coded L11 (payment-to-income ratio, loan-to-value ratio) and data from the personal income tax returns provided by the National Tax and Customs Administration.

Before the analysis, we excluded outliers and presumably inaccurate values from our database to prevent significant bias to our estimates. For the exclusion of outliers from the database, we used the 1st and 99th percentile as a benchmark in the case of most variables. As a result of these exclusions and due to the data

¹⁴ *Bajo – Barbi (2018)* described a similar phenomenon in Italy: although the one-off costs associated with refinancing were practically cancelled in full in 2007, the share of borrowers taking recourse to refinancing was only 13 per cent 8.5 years after the modification.

that were unavailable from the start, our analysis – which did not include income and co-debtor statuses – covered 361,252 mortgage loan contracts, while our methodologies that also processed the former data categories were developed on the basis of 288,893 observations.¹⁵ In all cases, we projected our final results to the total dataset and accordingly, the results show the refinancability ratio and other distributions relative to a total of 379,852 contracts for variable-rate mortgages disbursed in the period 2004–2014.¹⁶

We estimated the spread of the refinancing loans on the sample of variable-rate mortgage loans disbursed between 2015 Q1 and 2018 Q2, which was constructed on the basis of 77,713 contracts in the case of the smallest banking sector sample. In *Table 2* and *Table 3*, the descriptive statistics of the variables used are broken down by date of disbursement: on the one hand, for the loans disbursed in the period 2004–2014 – which comprised the dataset analysed – and, on the other hand, for the loans disbursed between January 2015 and July 2018, which played a role in the determination of the refinancing interest rate spread. In the former case, the variable values as at end-June 2018, while in the latter case the values prevailing at the contract date bore relevance.

Table 2
Descriptive statistics of the variables pertaining to the variable-rate mortgage loan contracts disbursed in 2004–2014

Variable	Number	Mean	Median	Standard deviation	Minimum	Maximum
Spread*	364,949	4.56	4.36	1.74	0.07	15
Indifference spread differential	358,748	4.75	1.47	10.02	0.20	59.25
Outstanding principal amount	379,852	4,534,396	3,142,305	4,860,102	1	99,300,000
Remaining maturity	377,095	9.46	8.85	5.62	0.003	31.60
Income by co-debtor	302,749	3,211,436	2,594,197	2,320,615	166,256	25,000,000
Co-debtor	329,557	0.48	0	0.50	0	1
Age**	329,557	46.05	45	8.46	12	89
Contract type***	381,130	0.48	0	0.50	0	1

*Adjusted for service charges in the case of contracts concluded in the period 2004–2009.

**Where the transaction involved co-debtors, we used the average age of the debtor and the co-debtors for our calculations.

***For the purposes of contract type, 0 means housing loan and 1 means home equity loan contracts.

¹⁵ In the case of contracts concluded in 2004–2009, the number of contracts included in the analysis was reduced further by the fact that we adjusted the spreads for service charges for the ten largest banks only.

¹⁶ All this entailed 237,819 and 187,167 observations, respectively, in the individual analyses of loans converted to forint; in their case the total dataset under review comprised 250,525 observations, and we scaled our results and distributions to this statistical population.

Table 3

Descriptive statistics of the variables pertaining to the variable-rate mortgage loan contracts disbursed between January 2015 and June 2018

Variable	Number	Mean	Median	Standard deviation	Minimum	Maximum
Spread	88,959	3.38	2.91	1.32	0.08	15
Contracted amount	87,751	7,925,319	6,500,000	5,544,318	150,043	30,000,000
Original maturity	89,251	15.85	15.05	6.59	1.02	31.00
Income by co-debtor	79,602	3,984,491	3,124,783	2,956,716	200,105	25,000,000
Co-debtor	83,939	0.53	1	0.50	0	1
Age*	83,939	39.60	39	8.89	16	83
Contract type**	89,510	0.20	0	0.40	0	1

*Average age is used in the case of co-debtors.

**For the purposes of contract type, 0 means housing loan and 1 means home equity loan contracts.

In summary, our estimates were intended to determine – based on the main correlations presented above – whether individual debtors would be able to take out a refinancing loan that would result in a spread decrease sufficient to compensate the debtor for the one-off costs during the remaining term of the loan. We needed the following for the estimate:

- currently charged spread (i.e. the difference between the cost of credit and the 3-month BUBOR),
- spread attainable with a new loan,
- outstanding principal amount,
- length of the remaining maturity,
- refinancing costs.

The biggest problem arising during the estimate is our inability to directly observe the interest rates at which debtors with pre-existing loans would receive a new loan *at present*. Since without the spread of the refinancing loan it is impossible to determine the spread decrease that could be achieved by the debtors by refinancing, we applied various statistical methods to estimate refinancing spreads for all contracts. That notwithstanding, the information available in the databases at our disposal was still far more limited than what is used by banks in making pricing decisions; consequently, our estimate is surrounded by significant uncertainty.

We applied four different approaches to mitigate the uncertainties surrounding the estimate. On the one hand, this is justified by robustness reasons; on the other hand, we sought to compare the results of the individual estimates that

complemented one another and had their own advantages and disadvantages. In the estimates, we essentially handled the housing loan and home equity loan portfolios separately. Progressing from the simple to the complex, in the four estimates we approximated the spread of the refinancing loans with the methods described below.

4.1. Banking sector average spread method

In the simplest approach, we assigned the average spread of variable-rate mortgage loans disbursed between January 2015 and August 2018 by loan category to all variable-rate mortgage contracts (separately for housing loan and home equity loan products) disbursed between 2004 and 2014, and we took this as the refinancing spread. For the sake of simplicity, in this estimate we assumed that at present, all borrowers with pre-existing mortgage loans could take out a new loan at the typical average spread of the recent period (3 percentage points for housing loans and around 4.4 percentage points for home equity loans).

4.2. Spread-based distribution method

Separately for housing loans and home equity loans, we calculated the distribution of variable-rate loans disbursed between January 2015 and June 2018 by spread, broken down by percentiles. We assigned the spreads thus received to the percentiles¹⁷ corresponding to the spreads of the variable-rate mortgage contracts in each purpose category, separately for the loans disbursed in the period 2004–2009 and then for those disbursed in 2010–2014, and took this as the refinancing spread. Thus, for the purposes of this estimate we assumed that the borrower would reside at a similar point of the distribution in the case of newly disbursed loans as in the spread-based distribution of previously disbursed loans; in other words, the borrower's relative risk position did not change in the past years.

4.3. Median spread method

In this approach, based on the banks' List of Conditions we assumed that the interest rate/spread is determined primarily by the borrower's income¹⁸ and the principal amount. Accordingly, within these two dimensions we set up categories for both loan types and examined the median spread of the mortgage loans disbursed between January 2015 and June 2018 as a cross-section of these categories (*Table 4* and *Table 5*). We generated such median values both at the level of the banking sector and at individual bank level.

¹⁷ In the case of loans disbursed between 2004 and 2009 the percentiles are based on spreads adjusted for service charges.

¹⁸ The database provided information only on income subject to personal income tax (declared income) and as such, our income data do not contain the value of social transfers and pensions, and we have no information on potential undeclared incomes.

Table 4
Median spreads of variable-rate housing loans disbursed between January 2015 and June 2018 according to income and contracted amount

		Annual income				
		600,000 – 2,400,000	2,400,000 – 4,800,000	4,800,000 – 7,200,000	7,200,000 – 9,600,000	9,600,000 –
Contracted amount	0 – 500,000	4.13	4.13	4.13	4.13	4.13
	500,000 – 2,000,000	3.90	3.61	3.48	3.18	3.09
	2,000,000 – 4,000,000	3.09	3.06	2.91	2.91	2.91
	4,000,000 – 6,000,000	2.91	2.91	2.91	2.90	2.65
	6,000,000 – 8,000,000	2.91	2.91	2.91	2.71	2.57
	8,000,000 – 10,000,000	2.91	2.91	2.90	2.65	2.50
	10,000,000 –	2.91	2.91	2.66	2.57	2.41

Table 5
Median spreads of variable-rate home equity loans disbursed between January 2015 and June 2018 according to income and contracted amount

		Annual income				
		600,000 – 2,400,000	2,400,000 – 4,800,000	4,800,000 – 7,200,000	7,200,000 – 9,600,000	9 600,000 –
Contracted amount	0 – 500,000	5.18	5.18	5.18	5.18	5.18
	500,000 – 2,000,000	5.86	5.39	4.78	4.83	4.26
	2,000,000 – 4,000,000	5.62	5.16	4.76	4.40	4.26
	4,000,000 – 6,000,000	5.31	4.79	4.54	4.34	3.98
	6,000,000 – 8,000,000	4.79	4.72	4.41	4.01	3.87
	8,000,000 – 10,000,000	4.64	4.39	4.18	3.85	3.66
	10,000,000 –	4.26	4.10	3.95	3.74	3.58

Based on the categories set up according to the outstanding principal amount and the debtor's income, we were able to assign "refinancing spreads" to the old loans as well. We assigned a total of three spreads to each contract:

- 1) for each contract, the median spread achievable at the debtor's own bank,
- 2) the median spread achievable at the debtor's bank or in the banking sector as a whole, whichever is lower,
- 3) the median spread applied by the bank that offers the most favourable spread.

With this distinction, we were trying to factor in the often *ad hoc* nature of loan refinancing: in the first version, the customer takes into account the offer of his own bank only, in the second version he also considers the offer of "a few other banks" – which we approximated by means of the banking sector average – and finally, in the third version the borrower makes the banks compete in earnest and picks the best spread offered. Our base result is the refinancing ratio which takes the more favourable of two estimates: the own bank and total banking sector spread estimates (Method 2); accordingly, this result is displayed in the summary tables of the results of our estimates (*Table 8 and Table 9*), while the results of the two remaining estimates are shown separately in *Table 10*.

4.4. Linear regression method

We applied the fourth method to estimate banks' pricing function by means of linear regression. For the purposes of the estimate, we relied on the sample of variable-rate mortgages disbursed between January 2015 and June 2018. Our target variable was the spread over the 3-month BUBOR, while we took into account, as explanatory variables, the log of the contracted amount and the square thereof, the maturity and the square thereof, the log of the average income of debtors and co-debtors, the average age of debtors and co-debtors and the square thereof; moreover, we used binary variables to control for the existence of co-debtors and the contract type. We checked the multicollinearity between the variables with variance inflating factor and did not find it excessive.

We conducted the estimates at the level of the banking sector and at individual bank level by running OLS regressions. We estimated the banking sector model both by controlling for disbursing banks with binary variables and without these control variables.¹⁹ As a result, we estimated a total of 12 models.

¹⁹ In the case of regressions run for each individual bank we essentially allow the partial effect exerted on the spread by specific contractual features to differ across banks, while in the case of the banking sector model estimated with bank fixed effects that is not possible. In the latter model, individual bank features are expressed by bank dummies, but the partial effect of the other variables is uniform for all institutions.

The estimated coefficients of the models of the total banking sector are shown in *Table 6*.²⁰ The direction of the coefficients estimated by the model is consistent with the intuition and with the model results estimated by previous studies (*Aczél et al. 2016; Mérő and Vágó 2018*). The explanatory power of the models amounts to 44 per cent in the case of the banking sector estimate (based on R^2 statistics), and ranges between 8 per cent and 72 per cent in the case of individual bank estimates. At this point, once again we need to draw attention to the uncertainties stemming from the estimate (especially regarding the bank-level models), which can be primarily attributed to the limited scope of the data available. That notwithstanding, for the purposes of our research question we consider the explanatory power of the models sufficient overall, especially in light of the fact that our estimation results are deemed relevant only at the portfolio level.

Table 6
Output tables of the linear regressions estimated on the banking sector sample

Variables	(1) Target variable: Spread over BUBOR	(2) Target variable: Spread over BUBOR
Ln(Contracted amount)	-1.966***	-2.264***
Ln(Contracted amount) ²	0.0508***	0.0633***
Maturity	-0.00657*	0.0117***
Maturity ²	0.000499***	-0.000196**
Ln(Income/number of co-debtors)	-0.301***	-0.264***
Co-debtor	-0.134***	-0.134***
Age	-0.0300***	-0.0159***
Age ²	0.000365***	0.000209***
Home equity loan	1.506***	1.451***
Bank dummy	No	Yes
Constant	26.48***	26.47***
Number of observations	77,713	77,713
R ²	0.336	0.441

*Note: Banks' indicator variables are only included in equation (2); their estimated coefficients are not displayed in our result table for data protection reasons. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$*

Having estimated the models, using the estimated coefficients and the information available on previously disbursed variable-rate loans, we predicted “refinancing loan” spreads for the contracts of the old portfolio. Using the results of the various estimation methods, in this case as well, we were able to supply, for each borrower,

²⁰ For data protection reasons, our result table does not include the output tables of individual bank-level regressions.

his own bank's "offer", the banking sector's "average offer" and the best bank's "offer". For the purposes of the linear regressions as well, the assumption we considered the most realistic was where the borrower considers his own bank's offer and the banking sector's "average offer", and chooses the one offering the more favourable spread for refinancing his loan. Accordingly, the summary result table shows the results calculated with the spreads of the total banking sector regression equation thus received.

The advantages and disadvantages of the individual methods are presented in *Table 7*.

Table 7				
Advantages and disadvantages of the methods applied to estimate the spread of the refinancing loan				
	Banking sector average spread method	Spread distribution method	Median spread (based on loan amount and income)	Spread estimated by linear regression
ADVANTAGE	a reliable way to double-check the rest of the estimates	easy to interpret, intuitive	captures the two most important determinants; less influenced by outliers	the most complex and comprehensive; incorporates into the spread as much relevant information as possible
DISADVANTAGE	overly simplified	deems previous and current spread distributions identical, disregards important features	disregards other determinants	its point estimate is surrounded by a high degree of uncertainty; influenced by outliers

We compared the "refinancing" spreads estimated in accordance with the above methods with the actual spread (adjusted for service charges) of the contract and examined whether the difference between the two exceeds the level of the indifference spread decrease associated with the given contract. If yes, we concluded that refinancing the loan is financially worthwhile for the debtor, and if not, then on the contrary, the debt is not worth refinancing.

5. Estimation results

Based on our results, it may be possible to refinance around 38–47 per cent of the total portfolio of mortgage loans disbursed prior to 2015 (HUF 651–803 billion) in a financially rewarding manner. Based on the number of contracts, this accounts for 20–29 per cent of the contracts (*Table 8*).²¹ Examining only the loans converted

²¹ The stock-based refinancing ratio exceeds the contract-based ratio in the case of all of our results. This is because in the case of longer-term loans – where refinancing may be, *ceteris paribus*, a more rewarding option – the outstanding debt is typically also higher.

to forint, around 40–48 per cent of the portfolio (HUF 499–603 billion) may be refinanced with financial gain, which covers 20–29 per cent of these contracts (Table 9).

Besides financial considerations, however, it is questionable whether any bank would be even willing to extend a loan to the debtor. Obstacles include the debtor's advanced age, insufficient income, the transaction's excessively high current loan-to-value ratio or the debtor's prior delinquency. Filtering the population by these criteria²² revealed that refinancing could be a realistic option for 22–31 per cent of the variable-rate mortgage loan portfolio disbursed prior to 2015 (accounting for 13–21 per cent of the contracts), while in the case of loans converted to forint the corresponding value is 20–28 per cent (12–19 per cent of the contracts).

The scope of loans that could be effectively refinanced on a market basis may be even more limited in view of the significant share of home equity loans in the total variable-rate mortgage loan portfolio (in particular, in the total portfolio of loans converted to forint). Since the number of home equity loans extended at present is insignificant, we have very limited information on the interest rates at which these loans would be disbursed. Consequently, our estimates pertaining to the refinancing spreads of loans extended in this category are surrounded by greater uncertainty. For all practical purposes, in our estimate we already distinguished between these two product markets, but it is still important to examine the stock of loans that may be refinanced effectively from the aspect of loan type. If we used the extreme assumption that, for lack of market supply, home equity loans cannot be refinanced at all, we would find that, according to our estimate, refinancing could be a viable option for 16–22 per cent of the variable-rate mortgage loan portfolio disbursed prior to 2015 (12–15 per cent of the contracts) and for 14–20 per cent of the loan portfolio converted to forint (9–13 per cent of the contracts). However, we deem this assumption overly excessive; consequently, we consider the ratio of 22–31 per cent (including home equity loans) to be our base result.

²² We applied the following filter criteria: age above 60 years, current loan-to-value ratio above 100 per cent, annual income below HUF 1.5 million, previous delinquency.

Table 8
Refinancing options of variable-rate mortgage loans disbursed prior to 2015

	Using the banking sector average spread method	Using the spread distribution method	Using the median spread method (based on loan amount and income)	Spread estimated by linear regression	All estimates considered
Variable-rate forint loans disbursed prior to 2015	1,722	1,722	1,722	1,722	1,722
	Number of contracts	379,852	379,852	379,852	379,852
Loans outstanding that can be refinanced financially	682 (40%)	651 (38%)	803 (47%)	752 (44%)	651-803 (38-47%)
	Number of contracts	100,215 (26%)	74,649 (20%)	109,813 (29%)	74,649-109,813 (20-29%)
Loans that cannot be refinanced based on other criteria	288 (17%)	268 (16%)	276 (16%)	251 (15%)	251-288 (15-17%)
	Number of contracts	33,153 (9%)	24,968 (7%)	29,026 (8%)	24,968-33,153 (7-9%)
Total refinancable loan portfolio	394 (23%)	383 (22%)	527 (31%)	501 (29%)	383-527 (22-31%)
	Number of contracts	67,062 (18%)	49,681 (13%)	80,787 (21%)	49,681-80,787 (13-21%)
of which: housing loan	276 (16%)	354 (21%)	380 (22%)	364 (21%)	276-380 (16-22%)
	Number of contracts	43,903 (12%)	45,589 (12%)	56,869 (15%)	43,903-56,869 (12-15%)
of which: home equity loan	118 (7%)	29 (2%)	147 (9%)	137 (8%)	29-147 (2-9%)
	Number of contracts	23,159 (6%)	4,092 (1%)	23,918 (6%)	4,092-23,918 (1-6%)

Note: other criteria that can prevent refinancing included previous delinquency, age above 60 years, current loan-to-value ratio above 100 per cent, annual income below HUF 1.5 million. We displayed the results of Method 2 both for the median spread estimate and for the linear regression (based on the total banking sector model in the case of the regression), which calculates with either the offer by the debtor's own bank or the average banking sector offer, whichever spread is more favourable. In all cases, percentages indicate the ratio to total contracts.

Table 9 Refinancing options of variable-rate mortgage loans converted to forint						
	Using the banking sector average spread method	Using the spread distribution method	Using the median spread method (based on loan amount and income)	Spread estimated by linear regression	All estimates considered	
Variable-rate forint loans outstanding converted to forint	1,251	1,251	1,251	1,251	1,251	
	HUF billions					
	Number of contracts	250,525	250,525	250,525	250,525	
Loans outstanding that can be refinanced financially	505 (40%)	499 (40%)	603 (48%)	563 (45%)	499–603 (40–48%)	
	HUF billions					
	Number of contracts	65,023 (26%)	51,279 (20%)	72,731 (29%)	51,279–72,731 (20–29%)	
Loans that cannot be refinanced based on other criteria	253 (20%)	242 (19%)	248 (20%)	225 (18%)	225–253 (18–20%)	
	HUF billions					
	Number of contracts	27,260 (11%)	21,494 (9%)	24,589 (10%)	21,494–27,260 (9–11%)	
Total refinaceable loan portfolio	252 (20%)	257 (21%)	355 (28%)	338 (27%)	252–355 (20–28%)	
	HUF billions					
	Number of contracts	37,764 (15%)	29,785 (12%)	48,142 (19%)	29,785–48,142 (12–19%)	
of which: housing loan	173 (14%)	246 (20%)	249 (20%)	240 (19%)	173–249 (14–20%)	
	HUF billions					
	Number of contracts	23,060 (9%)	28,704 (11%)	31,960 (13%)	23,060–31,960 (9–13%)	
of which: home equity loan	80 (6%)	11 (1%)	106 (8%)	98 (8%)	11–106 (1–8%)	
	HUF billions					
	Number of contracts	14,703 (6%)	1,081 (0,5%)	16,182 (6%)	1,081–16,182 (0,5–6%)	

Note: other criteria that can prevent refinancing included previous delinquency, age above 60 years, current loan-to-value ratio above 100 per cent, annual income below HUF 1.5 million. We displayed the results of Method 2 both for the median spread estimate and for the linear regression (based on the total banking sector model in the case of the regression), which calculates with either the offer by the debtor's own bank or the average banking sector offer, whichever spread is more favourable. In all cases, percentages indicate the ratio to total contracts.

In addition to our benchmark results, in the analyses in which we estimated the spread based on the median spread and by linear regression, we considered it important to examine the change in the portfolio of refinanceable loans (with the constraints already considered) generated by the spread that was constructed based on the offer of the debtor's own bank, the average banking sector offer and that of the bank with the best offer. The results of these hypothetical models pertaining to variable-rate forint loans disbursed prior to 2015 are shown in *Table 10*. In the case of methods where we assumed that the debtor refinances his loan at his own bank, the results received were similar to those yielded by the methods that also take into account the average banking sector spread and take the best spread of the two. 24–31 per cent (HUF 407–527 billion) of the variable-rate loan portfolio disbursed prior to 2015 was found to be refinanceable, accounting for 17–21 per cent of the contracts. The corresponding ratio for loans converted to HUF is 21–28 per cent (HUF 263–355 billion) at the stock level, representing 14–19 per cent of the loans converted to HUF at the contract level.

If we assume that all debtors refinance their loans at the bank offering the best spread, the refinancing ratio significantly exceeds the corresponding values received in the other models. Based on the results of these methods, 38–43 per cent (HUF 656–746 billion) of the pre-2015 portfolio can be refinanced at the stock level, while this ratio ranges between 27 and 32 per cent according to the number of contracts. Similarly, we received higher refinancing ratios in the case of loans converted to HUF: representing 25–30 per cent of the contracts, 35–40 per cent (HUF 442–503 billion) of the loan portfolio is worth refinancing (and can be refinanced). This result demonstrates that enhancing consumer awareness may offer significant value added in boosting bank competition and at the same time, in reducing households' interest rate risks.

Table 10

Results of the estimation methods of the spread estimated by the median spread method and by linear regression pertaining to refinancing among variable-rate forint loans disbursed prior to 2015

		Refinanceable loan portfolio (HUF billions)		
		Method 1: Own bank offer	Method 2: Own bank or average banking sector offer, whichever better	Method 3: Best bank offer
Under the median spread method (based on loan amount and income)		407 (24%)	527 (31%)	746 (43%)
Spread estimated by linear regression	Total banking sector regression	445 (26%)	501 (29%)	656 (38%)
	Individual bank-level regressions	435 (25%)	–	672 (39%)
All estimation methods considered		407–445 (24–26%)	501–527 (29–31%)	656–746 (38–43%)

6. Conclusion

In this study, we attempted to estimate what percentage of the variable-rate mortgage loan portfolio could be refinanced on a market basis based on purely financial criteria. Our motivation was provided by the fact that the portfolio of variable-rate mortgage loans is still substantial and that – through the sharp increase in instalments – an extreme interest rate shock would significantly stretch the financial position of many vulnerable households. As *MNB (2019)* pointed out, many households are not familiar with the concept and basic terms of variable interest rates, which foreshadows that a considerable number of debtors may be unprepared in the event of a potential interest rate increase.

Our estimates were intended to quantify the spread at which borrowers with pre-existing variable-rate mortgage loans would be capable of refinancing their loan with a new variable-rate mortgage loan, and to examine whether the difference between the spreads would be sufficient to cover the costs of the refinancing. According to our results, this ratio is relatively low, accounting for 22–31 per cent of the portfolio, with the high level of refinancing costs contributing significantly to this. If we accept the hypothesis that debtors are willing to pay the funding cost increment arising from the interest rate fixation in exchange for the reduced volatility of the instalment amounts, then the estimated ratio may also be indicative of the room available for refinancing with fixed-rate loans on a market basis.

The results presented in the previous section reveal that, *in view of the costs of refinancing and the features of the outstanding portfolio, it cannot be expected in the case of a considerable part of the portfolio that the interest rate type will switch to interest rate fixation of over 1 year on a market basis, without external incentives, through consumers' financially aware refinancing decisions.* In this regard, it poses a problem that, owing to their potentially low financial awareness and imperfect information, debtors may not necessarily take advantage of the option of refinancing even if they could do so with clear financial gains.

To facilitate a shift toward fixed-rate loans, a regulatory measure has been taken by the Magyar Nemzeti Bank. Under the recommendation issued by the MNB in April 2019, banks are expected to contact vulnerable debtors – i.e. those holding variable-rate mortgage loans with a remaining maturity of over 10 years – in a targeted way and to offer them a switch to fixed interest rates. Based on the recommendation, banks may only charge the costs directly arising from the contract modification to the debtors and may not offer a higher spread to the customer than the current spread specified in the contract.

In our opinion, the MNB's recommendation tackles several problems that currently pose a potential obstacle to refinancing. Firstly, according to the recommendation

banks contact vulnerable customers (those with long remaining maturity) in a targeted manner and inform them of the phenomenon of interest rate risk. Simultaneously, they offer a fixed-rate refinancing option – or more precisely, a contract modification – to the customers, thereby enhancing their financial awareness in a targeted way. Secondly, by way of the contract modification numerous costs associated with refinancing can be avoided, which significantly improves the chances of the switchover to fixed rates. Thirdly, according to the recommendation, the best practice on banks' part is to offer a spread to customers that is at most identical with the previous spread, and to charge to consumers only the funding cost increment of the reference interest rate corresponding to the duration of the interest rate fixation after the contract modification. This opens up the opportunity for interest rate fixation also for those debtors who would otherwise have access to loans only with higher spreads than previously. Fourthly, the contract modification also enables those debtors to switch to interest rate fixation who would be otherwise unable to take out a new loan due to their age, income or loan-to-value ratio.

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Comparison of Manipulation-proof Measures on Hungarian Data*

Dávid Andor Rácz

The further development of performance measures has managed to remedy some of the problems with earlier solutions, but with regard to the measures used most widely today, the issue of performance manipulation still needs to be tackled. This article presents the manipulation-proof performance measure (MPPM) developed by Ingersoll et al. (2007), which addresses this problem in a general sense. The MPPM used by Brown et al. (2010) is also detailed, along with the doubt ratio they developed, which can be used as a manipulation-detecting measure assessing implied risk aversion. With the calculations included here, this paper is one of the first to compare the MPPM and doubt ratio values calculated with the methods of the two groups of authors, seeking to explain the differences by using data from Hungarian absolute return funds as a sample. The results allow the author to be the first to propose the use of the more accurate MPPM formula of Ingersoll et al. (2007) both for performance measurement and calculation of the doubt ratio.

Journal of Economic Literature (JEL) codes: G11, G23

Keywords: portfolio selection, investment decisions, investment funds, performance assessment

1. Introduction

Although traditional performance measures have eliminated the faults of earlier solutions in the course of their development, potential manipulation is still an issue in connection with the measures widely cited in the literature and currently used by the market. One possible solution to this problem is to use manipulation-proof performance measures (hereinafter: MPPM), based on the utility theory well known in microeconomics. Due to their structure, these measures are especially suited for assessing actively managed funds, since their value can only be increased if

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the fund manager has actual information or skills. By contrast, it is impossible to enhance a fund's score just by knowing the measure used by the market or the performance assessor for performance measurement. This special feature sets apart manipulation-proof performance measures from traditional indicators, which can be manipulated without extra knowledge or information, simply by knowing the indicator.

The article presents the requirements that manipulation-proof measures need to meet and how *Ingersoll et al. (2007)* produced a possible solution to the problem and describes the measure defined by Ingersoll et al. (hereinafter: Ingersoll measure). The study also touches on the approach used by *Brown et al. (2010)* (hereinafter: Brown approach), which is a linear approximation of the Ingersoll formula. The Brown approach allows the measure to be better structured with excess return and excess standard deviation, and therefore it can also be used to assess implied risk aversion. The new indicator derived in this manner is referred to as the *doubt ratio*, which can indicate the presence of return smoothing or performance manipulation in the case of extreme values. As *Brown et al. (2010)* offered several ways to calculate the doubt ratio, including calculation of the MPPM with various risk aversion factors, not only the Ingersoll and Brown MPPM values were calculated here, but also the doubt ratios based on them.

The article looks at *issues previously not discussed*: What is the relationship between the results of the Ingersoll and the Brown MPPM and the doubt ratio (implied risk aversion)? What could explain any differences detected? Taking into account the results and the practical calculation requirements of the two different methods, which method should be used for calculating the MPPM and the doubt ratio? Using data from Hungarian absolute return investment funds as a sample, our own calculations are used to show that the results of the Ingersoll and the Brown MPPM and doubt ratio almost completely overlap; however, the difference between them and the corresponding reasons are also indicated.

The study is structured as follows: *Section 2* describes the characteristics of manipulation-proof performance measures, providing Ingersoll's solution. *Section 3* then outlines the identification of manipulated performance, the Brown approach and the doubt ratio defined by them. After that, *Section 4* compares the Ingersoll and Brown MPPM values and doubt ratios using data from Hungarian absolute return investment funds, and determines which method should be used in which situation, based on the results and the complexity of the calculations in practice. The paper ends with a brief summary and the conclusions.

2. Manipulation-proof performance measures

Based on the literature, the assessment of actively managed portfolios can be approached from several aspects: *Amihud et al. (2015)* analyse the effect of the pricing of illiquidity, *Gemmill et al. (2006)* assess investment funds taking into account loss aversion. When examining fair risk allocation, *Csóka and Pintér (2016)* acknowledge and *Balog et al. (2017)* clarify that there is no risk allocation method that is always applicable, stable and motivating at the same time. *Zawadowski (2017)* presents a disappointing correlation in investment fund managers' focus on commission, because according to his results, the fund managers who demand a higher commission cannot generate more excess return than that in exchange: on the contrary, 1 percentage point higher fees are coupled with over 1 percentage point lower performance on average (Jensen's alpha) compared to the benchmark rate. There is ample literature on measuring the returns and risks of investment funds as well as identifying the factors that influence fund performance.¹

Traditional performance measures have eliminated the faults of earlier solutions during the course of their development. The Sharpe ratio (*Sharpe 1966*) only explains whether an investment fund provides adequate excess return for one unit of excess risk taken, but it does not show the relationship between the benchmark and the investment fund's performance, in other words it does not break down investment fund performance into the performance arising from the change in the market/benchmark and the performance arising from the individual decisions of the investment fund manager. Therefore, it cannot be used to determine how exactly the fund manager was able to underperform or outperform the benchmark.

On the other hand, Jensen's alpha (*Jensen 1969*) clearly demonstrates superior and inferior performance compared to the benchmark index, and its calculation is also fairly simple. The problem with it, however, is that it only shows the return achieved by the fund manager relative to the benchmark, but not the additional risk taken. The extent to which the portfolio created by the fund manager through overweighting is riskier than the benchmark cannot be ascertained.

The information ratio (*Treynor and Black 1973*) combines the two approaches, as it shows the excess return achieved by the fund manager for one unit of risk actively taken (Jensen's alpha divided by its standard deviation). The information ratio is basically a modified Sharpe ratio: instead of the risk-free rate, the excess return relative to the benchmark is compared to the additional risk taken relative to the benchmark index.

¹ *Blake et al. (1993); Elton et al. (1996a); Carhart (1997); Bóta and Ormos (2016); Erdős and Ormos (2009); Bóta (2014)*

However, when assessing absolute return investment funds, the lack of an appropriate benchmark index is a huge problem, as these investment funds do not track clearly and properly defined indices. Instead, they aim to achieve positive returns in all market conditions, coupled with low volatility. The literature offers several approaches to manage this problem. These seek to introduce performance measures that are independent from benchmarks and able to appropriately assess the risk-return combinations even if the return distribution of the investment fund is abnormal. *One possible solution* is to use factors representing investment styles to *calculate a modified information ratio* (Pojarliev and Levich 2013). However, using the necessary factors is quite difficult in the case of these investment funds. Another issue is manipulation.² *The other possible solution* for the problem related to the assessment of absolute return investment funds is *to use manipulation-proof performance measures*.

This article does *not* use the term “manipulation-proof” in the sense of non-manipulability from the Gibbard–Satterthwaite theorem well known in microeconomics.³ Here, the focus is not on how vulnerable a social choice function is to manipulation. Instead, *what is attempted here is to prevent fund managers from boosting their own performance-based remuneration and bonuses simply by being familiar with the performance measure which is used to assess them*. Fund managers who have no material extra knowledge or information to base their investment decisions on, but are aware of the weaknesses of the measure used for assessing them should not be able to make decisions that do not in fact increase the utility of the investors holding the investment fund but still raise the value of the assessment measure. The goal is to use an assessment system that rewards only those investment decisions that truly enhance the utility of investors, those that can only be made by fund managers who have more information or better skills than the market, and use these to effectively and profitably deviate from the market benchmark portfolio’s composition.

It has already been demonstrated that there are trading and reporting techniques that boost the value of traditional performance measures without actually increasing the investors’ utility on the risk-return spectrum. These methods can be best illustrated in the case of the Sharpe ratio, because it has a relatively simple structure: it compares the excess return over the risk-free rate to the standard deviation of the portfolio. One possible manipulation is so-called return smoothing, when fund managers report their losses stretched out and averaged out for a longer period, for example by subjectively stating assets that are illiquid, rarely priced and difficult to assess (Abdulali 2006). The reported average excess return does not change, but the detected standard deviation declines, and therefore ultimately

² Abdulali (2006); Bollen and Pool (2009); Ingersoll et al. (2007); Qian and Yu (2015)

³ See, for example, Mas-Colell et al. (1995) Chapter 23

the risk-adjusted performance appears to improve. There is also so-called dynamic manipulation when, for example, after a lucky gain at the beginning of the period under review the fund manager protects the profits by resorting to risk-free investments for the remaining period, making the risk-adjusted performance high, since its standard deviation will be close to zero. However, this choice is still suboptimal, and it does not provide the greatest utility to investors, because the fund manager should probably hold some risky assets in the remaining period, too. *Ingersoll et al. (2007)* present other investment strategies using options as well, which result in unreasonably high Sharpe ratio values. For example, the fund manager sells an OTM option with 1-month maturity at the beginning of the period, and the money from that as well as the already existing funds are invested in risk-free assets. If the option expires worthless (the probability of this is strictly positive), the fund manager achieves positive returns with zero standard deviation and thus an infinite Sharpe ratio. Due to the positive probability, the expected value of this strategy also generates an infinite Sharpe ratio.

Nevertheless, it was also shown that there may exist properly constructed performance measures that are able to eliminate the above-mentioned problems based on a utility approach. The results of manipulation-proof performance measures cannot be improved by smoothing in the reports, in other words returns reported averaged out, leaving the average return unchanged. Moreover, the value of manipulation-proof performance measures can only be increased by deviating from the market benchmark portfolio by overweighting certain investment elements. These investment decisions are based on fund managers' extra information compared to the market or their ability to create genuine value added, thanks to their timing and selection skills. Another advantage is that these measures' assumptions do not include the normal distribution of returns, and therefore their results are less distorted in the case of a skewed or fat-tailed distribution of returns, in contrast to traditional performance measures that typically assume normal distribution and thus are more sensitive to the distortions caused by the abnormal distributions seen in real life.

Manipulation-proof performance measures are characterised by the following conditions:

- 1) They should generate a single valued score for ranking.
- 2) The score should not depend upon the portfolio's monetary value, only the return percentage.
- 3) Uninformed investors should not achieve a higher estimated score by deviating from the benchmark, however, informed investors should be able to do so by taking advantage of arbitrage opportunities.

4) The measures should be consistent with standard financial market equilibrium conditions.

If any of these conditions is not met, there is at least one way for active portfolio managers to enhance or manipulate their score by using strategies that result in seemingly better risk-return distributions but in reality achieve the higher score without genuine performance and without increasing the utility of investors.

The first condition excludes the measures that only make an incomplete ranking as well as the useless ones that, for example, merely list the returns. The second condition simply states that returns in themselves are sufficient statistics, while monetary gains and losses are not. For instance, the absolute net asset value of the fund cannot be relevant in ranking. Just because one fund has more assets than the other, the former does not necessarily perform better. The third and fourth conditions express that uninformed investors cannot profit by deviating from the benchmark, for example by trying to change the investment fund's score on the observable data, whereas the exploitation of arbitrage opportunities should be reflected in the score. The measure should not be enhanced without value or information added by, for example, using simple return smoothing, the manipulated reporting of averaged returns or completely shifting to risk-free investments after a lucky streak to reduce volatility. At the same time, the measure should detect the investment decisions that genuinely increase utility, and consequently assign higher and higher scores to these results. The authors show that these conditions are fulfilled if the measure is:

- increasing for the returns (monotonic),
- concave,
- time-separable,
- shaped as a power function.

The first condition ensures that the measure acknowledges arbitrage opportunities. The second prevents the achievement of higher scores merely by increasing leverage or adding unpriced risk. In other words, not only the returns but also the risks taken matter. The third condition prevents dynamic or temporal manipulation. The fourth ensures consistency with the financial market equilibrium theory, and the different returns should be taken from different times to replace returns from different outcomes.

The Ingersoll measure, which meets these conditions, is the following (1):

$$\hat{\Theta} = \frac{1}{(1-\rho)\Delta t} \ln \left(\frac{1}{T} \sum_{t=1}^T \left[\frac{1+r_t}{1+r_{ft}} \right]^{1-\rho} \right). \quad (1)$$

where $\hat{\Theta}$ estimates the risk-adjusted return premium of the investment fund. For a given $\hat{\Theta}$, the portfolio's score is the same as the annualised return of a continuously compounded risk-free asset, which is higher than the risk-free rate by the value of $\hat{\Theta}$. r_t is the return of the fund, r_{ft} is the risk-free rate and ρ is the relative risk aversion ratio. If $\rho = 1$, then measure (1) is not interpretable. If $\rho > 1$, then measure (1) usually takes a positive value, since the ratio of $1 + r_t$ and $1 + r_{ft}$ is generally greater than 1, and $1 - \rho$ is negative in the denominator of the first fraction and the exponent, therefore the logarithm is also negative, while the product is positive. And if $\rho < 1$, measure (1) is still expected to take a positive value by the former logic, but in this case $1 - \rho$ has a positive value in both places, and the logarithm is also positive, just like the product.

The MPPM can also be identified with the benchmark index. For the uninformed investors, the benchmark should be a desirable, ideal investment target with a high score. If the lognormal return of the benchmark is $1 + r_b$, then the parameter ρ is the following:

$$\frac{\ln[E(1+r_b)] - \ln(1+r_f)}{\text{Var}[\ln(1+r_b)]}.$$

ρ usually has a value between 0.2 and 10, according to empirical evidence from the literature. *Arrow (1971)* argues that it is around 1, the results of *Szpiro and Outreville (1988)* show that it is between 1 and 5, and the average ratio is 2.89. *Layard et al. (2008)* also observed values of roughly 1. It is approximately 2 according to the studies by *Friend and Blume (1975)* and *Kydland and Prescott (1982)*. *Gandelman and Hernandez-Murillo (2015)* claim that it varies across countries, with a typical value of 1, and even the values of outlier countries are within the 0–3 range.

Both the Ingersoll and the Brown measure used risk aversion factors between 2 and 4. *Ingersoll et al. (2007)* justified this by stating that even though according to empirical data it would be theoretically possible to make the calculations with a broader range, the relative risk aversion factor of between 2 and 4 corresponds to portfolios whose leverage is between 1.75 and 0.75. And this range covers most funds to be ranked. The selected Hungarian investment funds exhibit similar values based on the portfolio reports: out of 32 funds 23, or 72 per cent of the funds under review, belong to this range. *Brown et al. (2010)* decided to use risk aversion factors

between 2 and 4 to facilitate comparability to the results by *Ingersoll et al. (2007)*. To ensure comparability here as well, risk aversion factors between 2 and 4 are used in the calculations below.

3. Detecting manipulated performance and defining the doubt ratio

According to the Brown formula, the linear approximation of MPPM (1) is:

$$\hat{\Theta}(p) = \frac{1}{\Delta t} \left\{ \bar{x} + \frac{1-\rho}{2} (s_x^*)^2 \right\}, \quad (2)$$

where \bar{x} is the average of the excess return and $(s_x^*)^2 = s_x^2(T-1)/T$ is the variance of the excess return calculated from the sample.

This MPPM version allowed the simple statement of the so-called doubt ratio (DR), which deduces the development of implied risk aversion from the measure values calculated from various risk aversion ratios.

$$DR = \frac{\hat{\Theta}(2)}{\hat{\Theta}(2) - \hat{\Theta}(3)} + 2 \approx \frac{2\bar{x}}{(s_x^*)^2} + 1 \quad (3)$$

An extremely high doubt ratio suggests extreme risk aversion, which is a potential sign of performance manipulation. *Brown et al. (2010)* found 34 hedge funds with doubt ratios of over 150 at a 5 per cent significance level, representing 2 per cent of the total sample under review. 80 per cent of these 34 funds were flagged as suspicious by five alternative statistical approaches with respect to return manipulation, so the analysis performed with the doubt ratio is consistent with the other statistical methods indicating manipulation, and an extremely high doubt ratio is a good indicator of potential performance manipulation or return smoothing (see *Table 1*).

Style	Not detected			Detected			Total
	< 1%	< 5%	%	< 1%	< 5%	%	
Convertible arbitrage	0	0	0.0%	0	0	0.0%	38
Emerging markets	1	1	1.0%	2	2	2.0%	98
Equity market neutral	0	0	0.0%	3	3	4.6%	65
Event-driven	0	2	1.5%	2	5	3.7%	135
Fixed-income arbitrage	1	1	1.8%	0	2	3.6%	55
Fund of funds	0	0	0.0%	9	11	2.1%	531
Global macro	0	0	0.0%	0	0	0.0%	53
Long/short equity hedge	1	1	0.2%	0	1	0.2%	489
Managed futures	0	0	0.0%	0	0	0.0%	125
Multi-strategy	1	2	1.7%	1	3	2.5%	121
Total	4	7	0.4%	17	27	1.6%	1710

Note: Based on Brown et al. (2010:58)

4. Calculating MPPM and the doubt ratio on return data of Hungarian absolute return investment funds

The MPPM and doubt ratio values calculated with the two different methods are compared here using data on absolute return funds traded in Hungary and denominated in HUF. 32 investment funds listed in *Table 2* were picked for the analysis that are in the category of absolute return investment funds, denominated in HUF, public, open-end, and whose return data for the analysis period between 28 April 2010 and 27 April 2017 were available on the website of the Association of Hungarian Investment Fund and Asset Management Companies (BAMOSZ) at the time when the data were downloaded, comprising a total of 56,832 daily returns. When choosing the analysis period, it was crucial that the sample cover a period without structural breaks and contain funds traded continuously until the date of download to ensure consistent comparisons. Since the analysis seeks to compare the Ingersoll and the Brown approach and not to measure the overall market performance in the segment of absolute return investment funds, any potential survivorship bias (the bias or overestimation of measured performance arising from the fact that only those funds are examined that operated from the beginning to the end of the period under review, so the results are not adjusted downwards by the poor performance of the funds that ceased operating in the meantime, *Elton et al. 1996b*) probably has a negligible effect on the comparison of the two methods on the sample.

Table 2**The selected absolute return funds**

No.	Name of fund	ISIN code of fund
1	Aberdeen Diversified Growth Fund of Funds Class "B"	HU0000704549
2	Aberdeen Diversified Growth Fund of Funds Class "I"	HU0000704556
3	Aegon Alfa Absolute Return Investment Fund	HU0000703970
4	AEGON MoneyMaxx Expressz	HU0000703145
5	Aegon ÓzonMaxx Total Return Investment Fund	HU0000705157
6	AEGON Smart Money Investment Fund of Funds	HU0000708169
7	Budapest Control Total Return Derivatives Fund	HU0000702741
8	Citadella Derivative Investment Fund	HU0000707948
9	Concorde Columbus Global Value Derivative Investment Fund	HU0000705702
10	Concorde PB2 Fund of Funds	HU0000704705
11	Concorde Rubicon Derivative Investment Fund	HU0000707252
12	Concorde VM Absolute Derivative Investment Fund	HU0000703749
13	Erste DPM Open-ended Alternative Fund of Funds	HU0000705314
14	Erste Multistrategy Absolute Return Fund of Funds	HU0000705322
15	Generali IPO Absolute Return Fund	HU0000706791
16	Generali Spirit Absolute Derivative Fund	HU0000706833
17	Generali Titanium Total Return Fund	HU0000706817
18	OTP Absolute Return Open-ended Derivative Fund	HU0000704457
19	OTP EMDA Derivative Fund	HU0000706361
20	OTP G10 Euro Derivative Fund	HU0000706221
21	OTP Supra Derivative Investment Fund	HU0000706379
22	OTP New Europe Open-ended Securities Fund	HU0000705827
23	Platina Alfa Derivative Investment Fund	HU0000704648
24	Platina Beta Derivative Investment Fund	HU0000704655
25	Platina Delta Derivative Investment Fund	HU0000704671
26	Platina Gamma Derivative Investment Fund	HU0000704663
27	Platina Pi Derivative Investment Fund	HU0000704689
28	Raiffeisen Hozam Premium Derivative Fund	HU0000703699
29	Raiffeisen Index Premium Derivative Fund	HU0000703707
30	Raiffeisen Private Pannonia Fund of Funds	HU0000705231
31	Sovereign PB Derivatives Fund	HU0000707732
32	Takarek Total Return Investment Fund	HU0000707997

Note: On 11 September 2017 Concorde Asset Management was renamed to HOLD Asset Management.

4.1. Treatment of the risk-free rate

The risk-free rate used was the 12-month benchmark rate of the Government Debt Management Agency, because the return on these short-term government securities is risk-free and it also accurately reflects the major changes of the risk-free rate in the period under review. The MPPM was calculated taking into account the monthly changes in the 12-month benchmark rate. To calculate the daily continuously compounded risk-free rate for the given period, one has to take the value of the relevant monthly risk-free rate and transform with the logarithmic function the nominal annual return shown in the Government Debt Management Agency's database with effective return calculation, then prorate it from the annualised return to daily return, for 250 trading days, using the following formula:

$$r_{ft(\text{continuous})} = \frac{\ln\left(\frac{100+R_{ft}}{100}\right)}{250}. \quad (4)$$

4.2. Treatment of the fund returns

The daily log returns can be determined by downloading the daily unit price data from the BAMOSZ website and using the following formula:

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right). \quad (5)$$

4.3. Determining MPPM values with the Ingersoll formula

The Ingersoll MPPM values need to be determined for $\rho = 2$, $\rho = 3$ and $\rho = 4$. In all three cases, first the return premium from the given period over the risk-free rate should be raised to the power of $1 - \rho$ to adjust the return ratio by the risk:

$$\text{Risk adjusted return premium} = \left(\frac{1+r_t}{1+r_{ft}}\right)^{1-\rho}, \quad (6)$$

then the log of the average risk-adjusted return premium calculated for the whole period is divided by $1 - \rho$:

$$\frac{1}{(1-\rho)} \ln\left(\frac{1}{T} \sum_{t=1}^T \text{Risk adjusted return premium}_t\right). \quad (7)$$

Finally, the value of $\hat{\Theta}$ calculated for the daily returns is annualised by multiplying it for 250 trading days.

$$\hat{\Theta}_{\text{Ingersoll}} = \frac{1}{\Delta t} \hat{\Theta}_{\text{daily}}. \quad (8)$$

$\hat{\Theta}$ estimates the risk-adjusted return premium of the investment fund. In other words, a given $\hat{\Theta}$ is the portfolio's score that equals the continuously compounded and annualised return of a risk-free asset, exceeding the risk-free rate by $\hat{\Theta}$.

4.4. Determining MPPM values with the Brown formula

In the Brown approach, the MPPM can be stated as the difference between the average excess return and the variance of the excess return calculated from the sample, where the coefficient of the variance is $(1 - \rho)/2$.

Thus, to calculate the Brown MPPM, one first needs to calculate the average excess return by taking the log of the ratio of the daily return of the investment fund and the risk-free rate for each day:

$$\text{Return premium} = \ln\left(\frac{1+r_t}{1+r_{ft}}\right), \quad (9)$$

then their average is calculated for the whole period:

$$\bar{x} = \frac{1}{T} \sum_{t=1}^T \text{Return premium}_t. \quad (10)$$

In the Brown approach, the other building block is the calculation of the variance of the excess return calculated from the sample.

Finally, the difference between the two values is calculated for the three ρ 's (2, 3 and 4), where the coefficient of variation is $(1 - \rho)/2$. The daily $\hat{\Theta}$ value derived in this manner is prorated for annualised return by multiplying it by 250 trading days.

$$\hat{\Theta}_{\text{Brown}} = \frac{1}{\Delta t} \hat{\Theta}_{\text{daily}} \quad (11)$$

4.5. Comparison of the Ingersoll and Brown MPPM values and rankings

This is one of the first studies to compare the MPPM values calculated with the Ingersoll and the Brown formula. Very similar results were derived for the MPPM with respect to both the value of the measure and the ranking (*Table 3*, where, for example, "MPPM(3)" in the Ingersoll section means the MPPM value calculated with the Ingersoll formula and a risk aversion factor of 3, while "MPPM(3) rank" means the ranking of the fund calculated with the same formula). In quantifiable terms, this means that correlation is 1 for the MPPM values with a risk aversion

factor of 2, and around 0.9999 even with a parameter of 3 or 4. And the rank correlation takes a value of 1 even with a risk aversion factor of 2 or 4, exhibiting full consistency, while it is 0.9996 with a factor of 3, exhibiting almost full consistency, which means that out of the 32 funds under review, 30 received the same ranking calculated with the two approaches, and only two funds switch ranks. Out of the 96 cases of the MPPM ranking of the 32 funds calculated with 3 different risk aversion factors, there were only 2 differences: therefore, consistency is 97.92 per cent for the two methods.

The percentage differences of the MPPM values derived from the two calculation methods are usually below 1 per cent (See *Table 3* under “Ingersoll-Brown $\Delta\%$ ”). In the case of the OTP EMDA fund, there is a difference of 79.9 per cent with a risk aversion of 4, which is the greatest percentage difference, but this does not alter the ranking. This is partly because the MPPM values are very close to 0 (Ingersoll MPPM -0.0003 , Brown MPPM -0.0005), thus the relatively small change in absolute value (the value of $+0.0002$ seen in the “Ingersoll-Brown Δ ” section of *Table 3* under MPPM(4)) means a large percentage change between the two calculation methods. On the other hand, compared to the relatively small change in absolute value, the MPPM value of the next-ranked investment fund is sufficiently far away.

When changing from the Ingersoll to the Brown formula and using a risk aversion factor of 3, the OTP Supra fund sticks out and switches places with the Concorde Columbus fund. While the Concorde Columbus values calculated with the two methods are identical to six decimal places for all risk aversion factors, in the case of the OTP Supra, the MPPM value increases by 2.66 per cent with a risk aversion factor of 3 when the Brown approach is used, which is the second greatest difference in absolute terms (0.0013). The change in the OTP Supra fund’s MPPM that also influences ranking is attributable to the fact that while this fund generates the second largest returns, and the standard deviation of its returns is the fourth greatest, based on the results, the Brown linear approximation of the MPPM penalises risk less than the Ingersoll approach. The switched ranking of the two funds is also due to the fact that with a risk aversion factor of 3 there is a relatively large difference between the two approaches in absolute terms, and compared to that the difference between the MPPM values of the two funds is relatively small.

Table 3				
Comparison of the Ingersoll and Brown MPPM values and rankings				
	Concorde Columbus	Sovereign PB Derivatives	OTP EMDA	OTP Supra
Ingersoll				
MPPM(2)	0.0500	-0.0523	0.0435	0.0612
MPPM(3)	0.0486	-0.0544	0.0216	0.0475
MPPM(4)	0.0472	-0.0566	-0.0003	0.0330
MPPM(2) rank	6	32	8	2
MPPM(3) rank	5	31	10	6
MPPM(4) rank	5	31	16	7
Brown				
MPPM(2)	0.0500	-0.0523	0.0435	0.0615
MPPM(3)	0.0486	-0.0542	0.0215	0.0488
MPPM(4)	0.0472	-0.0561	-0.0005	0.0361
MPPM(2) rank	6	32	8	2
MPPM(3) rank	6	31	10	5
MPPM(4) rank	5	31	16	7
Ingersoll-Brown Δ				
MPPM(2)	8.10673E-07	-5.02266E-05	3.8088E-05	-0.000291847
MPPM(3)	1.65408E-06	-0.0002099	0.000122	-0.001266
MPPM(4)	2.51586E-06	-0.0004900	0.000243	-0.003065
MPPM(2) rank	0	0	0	0
MPPM(3) rank	-1	0	0	1
MPPM(4) rank	0	0	0	0
Ingersoll-Brown $\Delta\%$				
MPPM(2)	0.0016	0.0960	0.0875	-0.4768
MPPM(3)	0.0034	0.3860	0.5642	-2.6627
MPPM(4)	0.0053	0.8663	-79.92	-9.2836

Note: In the table, yellow denotes the cases where the rankings were switched when calculated with the Ingersoll and the Brown approach, while orange denotes the cases where the MPPM values differed substantially between the two methods (either in absolute value or relatively).

4.6. Comparison of the doubt ratio values calculated from the Ingersoll and the Brown MPPM and the Brown approximation

Until now, the doubt ratio has never been calculated in practice with the Ingersoll and the Brown formula to compare the results. The doubt ratio can be determined based on *Brown et al. (2010)* (3) by comparing the MPPM values calculated with

different risk aversion ratios and estimating the value of the implied risk aversion ratio. Based on the Ingersoll MPPM⁴ values, the formula is as follows:

$$DR = \frac{\hat{\Theta}_{Ingersoll}(2)}{\hat{\Theta}_{Ingersoll}(2) - \hat{\Theta}_{Ingersoll}(3)} + 2 \quad (12)$$

Based on the Brown MPPM⁵ values, the formula is modified as follows:

$$DR = \frac{\hat{\Theta}_{Brown}(2)}{\hat{\Theta}_{Brown}(2) - \hat{\Theta}_{Brown}(3)} + 2 \quad (13)$$

According to the Brown approximation, the doubt ratio can also be calculated as the ratio of the average excess return and the variance of the excess return calculated from the sample:

$$DR \approx \frac{2\bar{x}}{(s_x^*)^2} + 1 \quad (14)$$

The doubt ratio value is practically almost identical when calculated using the formula based on the Brown MPPM or the Brown approximation (to 13 decimal places); thus, the calculated ranking is also identical, and rank correlation and correlation take a value of 1, exhibiting full consistency. When calculating from the Ingersoll or the Brown MPPM (or using the Brown approximation), very similar results are obtained: the correlation and the rank correlation are 0.999. The doubt ratio ranking is identical with all three calculation methods in 29 cases out of the 32 investment funds under review, representing 90.6 per cent of the funds.

Only two funds exhibited major differences in the doubt ratio values calculated with the Ingersoll and the Brown MPPM (and the Brown approximation) (*Table 4* “DR(Ingersoll)-DR(Brown) Δ” and “DR(Ingersoll)-DR(Brown approximation) Δ”): OTP Supra and Sovereign PB Derivatives. The different values cause a change in ranking in only the latter case (*Table 4* „DR(Ingersoll)-DR(Brown) rankingΔ”). The 5.65 per cent change in the case of the OTP Supra fund is relatively small in absolute terms, and the subsequent doubt ratio value is sufficiently far away. However, the Sovereign PB Derivatives Fund is ranked two places lower in the Brown ranking than in the Ingersoll ranking, whereas the Raiffeisen Hozamprémium és Raiffeisen Indexprémium values that precede it are hardly modified, and there was no change in their relative ranking either. The change in ranking is ultimately caused by the major drop in value (−8.97 per cent) in the Sovereign PB Derivatives Fund, and the fact that the subsequent funds’ doubt ratio values are close enough to

⁴ See formula (1).

⁵ See formula (2).

enable a change in rankings. This fund exhibited the third largest MPPM change in absolute value and the fourth largest percentage change with a risk aversion factor of 3 when calculated with the Brown approach compared to the Ingersoll version (0.386 per cent), and the results show that the MPPM difference was magnified when transferred to the doubt ratio values (8.97 per cent).

4.7. Comparison of the Ingersoll and the Brown method based on practical applicability and the complexity of their implementation, proposal for the preferred method

The calculations showed the applicability and the difficulty of implementation as well as practical aspects of the differences between the methods in the case of 32 Hungarian absolute return investment funds.

With respect to MPPM calculation, there is no major difference between the two approaches as regards difficulty or the necessary calculation steps. While the Ingersoll formula takes the average of the *risk-adjusted return premia* in the period, and then adjusts it with a logarithm and the risk aversion factor, the Brown approach calculates using the simple difference of the average *excess returns* in the period and the variance, where the risk aversion factor is included as the coefficient of variation. So the Brown approach uses an additional step when calculating the variance of excess returns, and this facilitates the better understanding of the logic behind the MPPM structure by quantifying risk. Since the Brown MPPM is a linear approximation of the more accurate Ingersoll MPPM, and according to the calculations there are differences between the two methods that influence ranking, the Ingersoll approach should be used to calculate MPPM. The calculation of the Brown MPPM or the steps necessary for that are recommended if the analysis also seeks to find out the average and standard deviation of excess return to ensure the better understanding of the correlations.

The calculation of the doubt ratio includes the same steps using both the Ingersoll and the Brown MPPM values (or the Brown approach to the doubt ratio); therefore, they require exactly the same effort. Taking into account the observed inaccuracy of the Brown MPPM formula arising from the linear approach, the doubt ratio can be more accurately calculated from the Ingersoll MPPM, and therefore the use of the latter is recommended.

Table 4
Comparison of doubt ratio values calculated from the Ingersoll and the Brown MPPM values and using the Brown approach

	Concorde Columbus	Sovereign PB Derivatives	OTP EMDA	OTP Supra	Raiffeisen Hozam Premium	Raiffeisen Index Premium
DR(Ingersoll)	37.694	-23.299	3.984	6.473	-23.673	-24.617
DR(Brown)	37.672	-25.390		6.839	-23.674	-24.625
DR(Brown approximation)	37.672	-25.390	3.975	6.839	-23.674	-24.625
DR(Ingersoll)-DR(Brown) Δ	0.0220	2.0907	0.0093	-0.3657	0.0010	0.0079
DR(Ingersoll)-DR(Brown approximation) Δ	0.0220	2.0907	0.0093	-0.3657	0.0010	0.0079
DR(Brown)-DR(Brown approximation) Δ	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DR(Ingersoll)-DR(Brown) Δ%	0.0585	-8.9734	0.2329	-5.6487	-0.0042	-0.0320
DR(Ingersoll)-DR(Brown approximation) Δ%	0.0585	-8.9734	0.2329	-5.6487	-0.0042	-0.0320
DR(Brown)-DR(Brown approximation) Δ%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DR(Ingersoll) ranking	8	30	16	14	31	32
DR(Brown) ranking	8	32	16	14	30	31
DR(Brown approximation) ranking	8	32	16	14	30	31
DR(Ingersoll)-DR(Brown) ranking	0	-2	0	0	1	1
DR(Ingersoll)-DR(Brown approx.) ranking	0	-2	0	0	1	1
DR(Brown)-DR(Brown approx.) ranking	0	0	0	0	0	0

Note: In the table, yellow denotes the cases where a shift of one position was observed using the Ingersoll and the Brown approach, while red denotes those where a shift of two positions occurred. Orange denotes the major differences in the doubt ratio values between the two methods (either in absolute value or relatively), while green denotes almost complete consistency (or full consistency in the case of the ranking).

5. Summary, conclusions

The development of performance measures has managed to remedy the problems of earlier solutions, but in the case of the measures popular in the literature and used most widely today, the issue of performance manipulation still needs to be tackled. This article outlined the Ingersoll manipulation-proof performance measure, which solves this general problem when assessing investment funds and hedge funds. The Brown MPPM version was also described, which is the linear approximation of the Ingersoll measure. Furthermore, the doubt ratio developed by *Brown et al. (2010)* was presented, which can be used as a *manipulation-detecting measure* because it measures implied risk aversion. By using data from Hungarian absolute return funds for our own calculations, it was shown how the change in MPPM and implied risk aversion can be calculated in practice using the measures of the two groups of authors.

This was among the first comparisons of the MPPMs calculated with the two different methods, and the first in the case of the doubt ratio. It was shown that the results of the Ingersoll and the Brown MPPM and doubt ratio almost completely overlap, and the reasons behind the small number of differences observed were examined.

In the case of the MPPM, the ranking is the same with both methods for all 32 funds, using a risk aversion factor of 2 or 4. Only the risk aversion factor of 3 produced differences, and even then 30 out of the 32 funds under review received the same ranking, with only two switching places when calculated with the different approaches. This is partly because with a risk aversion factor of 3, the difference between the MPPM values of the two funds is relatively small, whichever method is used. On the other hand, one of the two funds concerned has the second largest returns and the fourth largest standard deviation of returns, while the other has average values in terms of both, and the results attest that the Brown linear approximation of the MPPM penalises risk less than the Ingersoll approach.

When calculating the doubt ratio from the Ingersoll and the Brown MPPM (and using the Brown approximation), very similar results are derived, the correlation and the rank correlation are 0.999. The ranking is identical with all three calculation methods in 29 cases out of the 32 investment funds under review, representing 90.6 per cent of the funds. The difference is attributable to the fact that a huge drop in value is observed in the case of one fund between the Ingersoll and the Brown approach, and the subsequent funds' doubt ratio values are also relatively close, while their values are not significantly modified, and they retain their relative ranking. This fund exhibited the third largest MPPM change in absolute value and the fourth largest percentage change with a risk aversion factor of 3 when calculated with the Brown approach compared to the Ingersoll version (−0.386 per cent), and

the results show that the MPPM difference was magnified when transferred to the doubt ratio values (8.97 per cent).

The results of the calculation led to the following conclusions:

1. The Brown linear approximation of the MPPM *penalises risk less* than the Ingersoll approach.
2. *The larger changes in the MPPM values* observed between the Ingersoll and the Brown approach *are usually magnified* when transferred to the doubt ratio calculated from them.
3. *A change in ranking* between the two methods is seen for both the MPPM and the doubt ratio *if the observed change is large enough and the values of the funds ranked near the fund concerned are close enough to its values*, so that this change in value affects ranking.
4. Since there is no significant difference between the Ingersoll and the Brown MPPM calculation as regards difficulty or the number of steps required, and since the Brown approach, the inaccuracy of which sometimes alters the ranking, is merely a linear approximation of the Ingersoll MPPM, *the MPPM calculation is recommended to be performed using the more accurate Ingersoll approach. However, the Brown method may be useful for analysis purposes when calculating the average and standard deviation of excess return.*
5. *This first comparison showed that the doubt ratio can be more accurately calculated from the Ingersoll MPPM*, therefore the use of this approach is recommended.

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Performance Measurement of Active Investment Strategies Using Pure Factor Portfolios*

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The article uses pure factor portfolios formed by multivariate cross-sectional regressions to examine whether these active investment strategies could achieve excess return relative to passive strategies. The hypothesis can also be construed as a test of market efficiency. The study includes ten style factors. Our empirical study shows that a consensus buy strategy of the pure value factor yielded significant positive excess returns in the past almost 20 years. Size and momentum factors characterised in the literature by positive excess return are not significant in our study. Excess return of the factors capturing riskiness (earnings variability, volatility, leverage) is significant and negative, which corroborates with our expectations, rendering a consensus sell investment strategy successful, based on these factors. The profitability, growth and trading activity factors produced results contrary to our expectations; therefore, excess return could have been achieved via a contrarian selling strategy. Our research results are consistent with the weak form of market efficiency analyses.

Journal of Economic Literature (JEL) codes: G11, G12, G14, G15.

Keywords: equity markets, asset pricing, return, pure factor portfolio, multivariate regression, performance measurement, market efficiency

1. Introduction

The active professionals engaged with financial investments and scientific researchers have always been intrigued by the question how to forecast and interpret the fair expected return of securities reflecting risk¹ and ultimately equity prices.² The various capital market theories and applications devised in past decades

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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¹ There is a major difference between expected return and the required rate of return, which should be borne in mind. See, for example, *Fernandez (2015) and Fernandez – Acín (2015)*.

² More precisely, investors are interested in total return, comprising the sum of dividend yield and price changes. In this study, return always means total return.

focused on identifying the various factors influencing returns and on establishing a significant link between expected return and risk.

How has financial and investment thinking changed over the last roughly 50 years? The analytical framework of stocks' intrinsic value emerged in the 1930s. The major methodological tomes are attributable to Williams³ and Graham – Dodd⁴ (*Malkiel 2001*). Modern finance was born and consolidated in the 1950s and 1960s. This period was characterised by economists and their theories such as the modern portfolio theory of *Markowitz (1952)* or the capital asset pricing model (CAPM) of *Sharpe (1964)*, *Lintner (1965)* and *Mossin (1966)*. Contemporary thinking featured rational investors, efficient markets from an information perspective (see *Fama 1970*) and approaches that interpreted the development of returns as random walk.

Around the 1970s, the belief that markets are probably not “that” efficient as previously supposed, and that investors do not always behave rationally slowly became accepted in financial thinking.⁵ The assumptions and conclusions of the CAPM were increasingly questioned; in response, multifactor models started to dominate (see the Arbitrage Pricing Theory by *Ross 1976*). The literature usually attributes the spread and popularisation of the multifactor models to Fama – French. By now, researchers in the field have identified roughly one hundred factors that could explain returns. In any case, it is not easy to decide which of these can be deemed significant in this universe of factors, both statistically and from the perspective of practical interpretability. *Cochrane (2011)* aptly referred to this multitude as a factor zoo.

Our study uses pure factor portfolios formed by multivariate cross-sectional regressions to examine whether these active investment strategies could achieve excess return relative to passive strategies. The hypothesis of the paper can also be regarded as a test of market efficiency. The universe of the analysis comprises the equity market of the United States between 2000 and 2018, while the benchmark is the Russell 3000 Index. The indicators used for assessing the performance of the factors are Jensen's alpha and the Sharpe ratio.

The sections below first describe the major studies criticising the capital asset pricing model and the efficient market theory and also present the market pricing anomalies (*Section 2*). After the anomalies, the focus shifts to various multifactor models explaining returns, mainly the works of Fama and French (*Section 3*). After reviewing the literature, studies are presented that used pure factor portfolios to

³ The Theory of Investment Value

⁴ Security Analysis

⁵ This is the period of the emergence of behavioural finance, the foundations of which were laid down by Kahneman and Tversky with their seminal work published in 1979 (Prospect Theory).

analyse various returns (*Sections 4 and 5*). Before turning towards the empirical part of the paper (*Section 7*) the database used is described in detail (*Section 6*). *Section 8* summarises the main messages of the paper.

2. Market anomalies

Before starting with the detailed discussion of market anomalies, it must be underlined that testing market efficiency and quantifying the risk-adjusted abnormal rate of return of equity investments is basically identical to testing the widely-used pricing models (mostly the CAPM). According to *Chien-Ting (1999)*, the anomalies related to CAPM as a benchmark may have three main reasons: 1) measurement errors, 2) unrealistic assumptions of the model, and 3) model specification errors.

The methodological and measurement errors include inaccurate measurement of the model variables, such as risk-free return, the beta and the market risk premium, since the theoretical CAPM does not provide practical guidance for their calculation.⁶ The most often cited flawed assumptions include the efficient market hypothesis (EMH). Model specification errors are grounded in statistics. They include, for example, the omitted variables bias. The presence of these errors does not (necessarily) mean that markets are not efficient, “merely” that not all the explanatory factors have been taken into account.

According to the classification by Chien-Ting, the use of pure factor portfolios is intended to address model specification errors in the first place and measurement errors in the second place. Nonetheless, the modelling takes into account the claim by *Damodaran (2012)* that if the outcome of an analysis explaining returns is not sensitive to various model specifications, it is much more likely that it is due to the lack of market efficiency rather than a model specification error.

It follows from the above that one of the key conditions of the CAPM is the existence of perfect (competitive) markets (see *Lintner 1965:22*). However, perfect markets assume market efficiency. At the same time, efficient markets do not necessarily have to be perfect (*Kasper 1997*). In practical terms, this means that if the conditions of efficient market theory are violated, the presumptions of the CAPM regarding perfect markets do not hold. In recent decades, several studies have been conducted on market anomalies that seem at first glance to violate the assumptions on market efficiency. Some of these market anomalies are highlighted below (without attempting to be exhaustive). The next subsection presents multifactor models that use some of these factors to explain returns. Everyday trading and portfolio optimisation (searching for alpha) based on the anomalies described here can be regarded as different styles of investment.

⁶ The assumption that the beta and the market risk premium are constant over time is also untenable.

The *momentum* effect can be briefly summarised as follows: the current good performance will be followed by good performance, while the current poor performance will be followed by poor performance. Statistically speaking, a positive autocorrelation can be observed between subsequent returns. The real question in connection with the anomaly is time: how long does the momentum last? *Fama and Blume (1966)* examined the presence of positive autocorrelation on daily returns, integrating the filter technique from Alexander's 1964 work. *Lo and MacKinlay (1988)* and *Conrad and Kaul (1988)* analysed weekly returns. The essence of their conclusion is that although there is some positive autocorrelation, it is not sufficient to generate significant profit. The paper by *Jegadeesh and Titman (1993)* used a longer period. The authors found the momentum factor to be significant over a time horizon of 3–12 months. The 2001 article by the same authors confirms their observations from 1993.

One phenomenon closely linked to momentum is the *reversal (adjustment) effect*. This assumes negative autocorrelation, meaning that markets tend to penalise former "winner" stocks and reward "loser" stocks after some time: in other words, markets have a tendency to overreact. Among others, *De Bondt and Thaler (1985 and 1987)*, *Howe (1986)* and *Brown and Harlow (1988)* examined market overreaction and concluded that reversal can be seen in the long run, over years. According to the findings of *De Bondt and Thaler*, the originally "loser" portfolio outperformed the earlier "winner" 36 months later, by approximately 25 per cent. *Howe* found that stocks that achieved large gains performed below the market by 30 per cent one year after the good news. Overall, the momentum factor seems to be relevant in the short run, and the reversal effect seems to exist in the long run.⁷

The *size effect*, which is also referred to as small-firm effect, was originally described by *Banz (1981)*. The essence of this anomaly is that the return that can be achieved by small firms is significantly higher than the risk-adjusted fair return. Banz performed the analysis on a large sample: the database contained the companies listed on the New York Stock Exchange for at least five years between 1926 and 1975. His research shows that the largest difference was seen in the case of the smallest firms (hence the name "small-firm effect"). Several papers have attempted to explain the reasons for excess returns. Some of these treat small enterprises as firms neglected by large portfolio managers ("neglected firm effect"), which allows them to achieve higher risk-adjusted returns (*Carvell – Strebel 1987; Arbel et al. 1983*). Yet a study from 1990 (*Beard – Sias 1997*) concluded that the neglected firm effect did not exist anymore. Other studies (see *Reinganum 1983, Ritter 1988*) emphasized tax considerations at the beginning and the end of the year, which led to the finding that the size effect exists "only" in January (January effect).

⁷ "Mean reversion" is a concept closely linked to momentum and the reversal effect. See *De Bondt– Thaler (1989)*.

The *value* factor helps to identify corporate fundamentals that can significantly determine value, thus making it possible to recognise undervalued and overvalued stocks. Widely-used value factors include the price/earnings ratio (P/E), its inverse, the earnings yield ratio (E/P), the price to book value ratio (P/BV) and dividend yield (DIV/P). The empirical findings of *Basu (1977, 1983)* confirmed the belief widely held among investors that securities with a low P/E ratio (or high E/P ratio) are undervalued and may generate excess returns. *Fama and French (1992)* showed that the firms listed on the NYSE, the AMEX and the NASDAQ with a high BV/P ratio between 1963 and 1990 generated substantial excess returns compared to the companies with a low BV/P ratio. *Rosenberg et al. (1985)*, *Chan et al. (1991)* and *Capaul et al. (1993)* have basically the same conclusions for different periods and markets.

Regarding value factors, the paper of *Robert Novy-Marx (2013)* should also be mentioned, who argues for the explanatory power of a somewhat different *profitability factor*. According to the author, the gross margin⁸ is an appropriate alternative to BV/P, as the criticism against the explanatory power of the book value-to-price ratio are not relevant here (see, for example, the critiques against *Fama and French 1992*). He justifies this by stating that profitable firms have lower operating leverage, and therefore positive corporate cash flows are more stable and sustainable on the long run.

Another interesting and relatively new topic is the *low volatility* or *low beta* anomaly. The essence of this anomaly is that companies with high volatility (beta) significantly underperform low-risk (beta) investments. *Baker et al. (2011)* underline that the results are not entirely new, but earlier authors have not emphasised the importance of this phenomenon enough. Others reach a similar conclusion, see, for example, *Frazzini – Pedersen (2014)*, *Ang et al. (2006, 2009)*, *Blitz and van Vliet (2007)*, *Bali et al. (2011)*.

3. Multifactor models

The multifactor models most often cited in the literature are associated with the works of *Fama and French (FF)*.⁹ Of course, there are other important studies in the literature not just those of FF. One should mention Barr Rosenberg, who was one of the first to focus on factor models, both on a theoretical and a practical implementation level. *Rosenberg (1974)* laid down the statistical foundations of

⁸ The difference between net sales and the cost of goods sold.

⁹ The methodological background to the early works by Fama and French is provided by *Fama – MacBeth (1973)*. The most important methodological messages of the paper should be briefly summarised, particularly because several subsequent analyses used this technique, including the study by *Chen et al. (1986:394)* presented below. First, the returns of the selected stocks have to be explained by the selected risk factors, which yields the beta parameter associated with the risk factors. Second, the returns have to be regressed again, but this time with the betas derived in the first step. The result of the second regression is the risk premium of the factors.

multifactor models. Later, together with his colleagues, he also performed empirical analyses, in which he dedicated great attention to industries and to the financial statements' data (see, for example, *Rosenberg – McKibben 1973*; *Rosenberg – Guy 1976*). Another often quoted work is *Carhart (1997)*, which expands the three-factor model by *Fama – French (1996)* with the momentum factor. From the Central and Eastern European region, one could mention *Zaremba – Konieczka (2017)*, *Berlinger – Walter (1999)* or *Naffa (2009)*.

Chen et al. (1986) identified several macroeconomic factors, such as industrial production, expected and unexpected inflation changes, unexpected changes in bond risk premia and term premia, which may influence expected return. Using the two-stage Fama – MacBeth regression technique presented above, they found that industrial production, unexpected inflation and the excess return on bonds have significant explanatory power.

Fama and French (1992) explained returns by making two statements, which caused huge turmoil among academics and practitioners. First, the authors found that the returns between 1963 and 1990 were considerably influenced by two variables: size and the BV/P ratio. According to the relationship between returns and explanatory variables, the investments with a high BV/P ratio and relatively small size performed better, yielding higher returns. The authors' second conclusion, which sparked greater turmoil, was that there was no relationship between systematic risk, or the beta, and returns (the beta was statistically insignificant). This was worrying news with respect to the applicability of the CAPM.

In an article published a few years later (1996), *Fama and French* introduced an asset pricing technique to the academic community that later became known as the three-factor model. The title of the paper (Multifactor Explanations of Asset Pricing Anomalies) is "talkative" in the sense that the authors were looking for explanations on the risk-adjusted excess returns that cannot be explained by the CAPM. They argued that besides the market portfolio, two further explanatory variables should be used to capture the observed anomalies: the difference between the return on a portfolio of small and large stocks (size factor, SMB) and the difference between the return on a portfolio with a high BV/P value and a low BV/P value (value factor, HML).

The authors have recently (*Fama – French 2015*) added two further factors to their earlier model, namely the profitability (citing *Novy-Marx 2013*) and the investment variables. The variables were defined in line with the approach used in the three-factor model. The profitability variable was represented by the difference between the returns on diversified portfolios of stocks with robust and weak profitability (RMW). The investment variable (CMA) expressed the difference between the returns on portfolios of the stocks of the companies with conservative and aggressive investment strategies.

4. Pure factor portfolios in the literature

Several recent studies (*Menchero 2010; Menchero – Lee 2015; Clarke et al. 2017; Menchero – Ji 2017*) have pointed out the statistical shortcomings of earlier models explaining returns. The articles cited draw attention to the significance of pure factor portfolios. Pure factors have the advantage that the effects of other factors do not influence them, so pure factors correlate best with the given factor but not with the others (thus multicollinearity is eliminated). From a mathematical perspective, pure factor portfolios are based on multivariate cross-sectional regression. According to *Clarke et al. (2017:27)*: “... pure factor portfolios are rebalanced [at regular intervals] to have exposures of exactly zero to all but the primary factor of interest. [...] The security weights of the pure portfolios are based on multivariate Fama and MacBeth (1973) regressions.”

The definition of pure factors is consistent with multifactor APT models and with the expectations of modelling. On the basis of the definition by *Bodie et al. (2011:331)*, a factor portfolio is:¹⁰ “... a well-diversified portfolio constructed to have a beta of 1 on one of the factors and a beta of 0 on any other factor. We can think of a factor portfolio as a tracking portfolio.”

Menchero – Lee (2015:71-72) classify factor portfolios into three main groups: (1) simple factor portfolios that can be captured methodologically through simple regression; (2) pure factor portfolios where the best approach is to use multivariate regressions; (3) minimum-volatility factor portfolios that are based on the optimisation of expected return and variance. In the following, the focus is on pure factor portfolios (2), but before that a brief summary is provided on the shortcomings of simple factor portfolios to demonstrate how pure factors achieve great enhancement.

The main drawback of simple factor portfolios is that they may accidentally reflect the effects of other factors, thus taking unnecessary risk into the portfolio, without improving expected performance. *Menchero – Lee (2015:73)* illustrate the distortion by the following examples: if stocks with a positive momentum also have a higher beta, the momentum factor has a positive exposure to the beta factor. In a similar fashion, if energy stocks have been performing well recently, the simple momentum factor assigns too much weight to the energy sector (relative to the benchmark). To put it simply, it does not show the real risk–return ratio.

The use of pure factors makes multicollinearity manageable, due to multivariate regression models. *Menchero – Ji (2017)* refer to the Bloomberg Global Equity

¹⁰ For more details on factor portfolios and their role in determining returns, see, for example, *Lovas (2017)*.

Model, where the pure factor returns are calculated from the regression of the return of a given equity on four core factors. These are as follows: market - (M), country - (c), industry (i) and investment style (s). The formula is the following:

$$r_n = r_M + \sum_c X_{nc} r_c + \sum_i X_{ni} r_i + \sum_s X_{ns} r_s + u_n \quad (1)$$

In the above equation, “ r_n ” is the expected return of the given stock n , “ r_M ” is the expected return of the market factor, “ X_{nc} ” is the exposure of the given n stock to the country factor c and “ r_c ” denotes the expected return of the given country factor c .¹¹ The other factors can be interpreted in a similar fashion: “ X_{ni} ” and “ r_i ” are the exposure to the industry i and the expected return, respectively, while “ X_{ns} ” and “ r_s ” is the exposure to the given style s and the expected return. “ u_n ” is the idiosyncratic return of the given stock n . The individual stock-specific returns are assumed not to correlate with each other or the individual factors.

Equation (1) shows that stocks have a unit exposure to the market factor. Exposure to the country and industry factors is measured with dummy variables, so the particular stock has a unit exposure to its own country and industry, but zero to any other country and industry. Exposure to style factors can be measured by the standardised values of the given factor (for example P/E). As a result of standardisation, if the stock’s exposure to the appropriate style factor is positive, the given stock has above-average value for the corresponding style.

Menchero and Ji (2017) present an example of the logic behind pure factors, using Bloomberg Global Equity Model data from 31 January 2016. *Table 1* contains the weighting scheme of various factor portfolios, with respect to different segments of the global equity markets.¹² In the second column, the table is supplemented with the weights of the (global) market portfolio.

¹¹ In factor modelling, the reference to “factors” can often be ambiguous. The difference between factor *exposure* and factor *return* should be emphasised. Factor *exposure* often covers obvious characteristics of individual stocks, such as a specific industry or country. By contrast, the factor *return* is the return that can be derived from the analysed factor exposure (using the appropriate mathematical apparatus).

¹² The table is just an extract, therefore it does not contain all the country, industry and investment style factors.

Market segment	Market portfolio	Market factor	US factor	Japan factor	Auto factor	Value factor
World (net)	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Long	100.00%	105.19%	61.25%	93.46%	108.69%	40.18%
Short	0.00%	-5.19%	-61.25%	-93.46%	-108.69%	-40.18%
US (net)	39.55%	39.55%	60.45%	-39.55%	0.00%	0.00%
Long	39.55%	39.65%	60.45%	0.07%	15.75%	9.52%
Short	0.00%	-0.09%	0.00%	-39.62%	-15.75%	-9.52%
Japan (net)	8.36%	8.36%	-8.36%	91.64%	0.00%	0.00%
Long	8.36%	9.32%	0.02%	91.64%	26.25%	4.42%
Short	0.00%	-0.97%	-8.38%	0.00%	-26.25%	-4.42%
Auto (net)	2.93%	2.93%	0.00%	0.00%	97.07%	0.00%
Long	2.93%	3.11%	0.98%	4.94%	97.07%	1.24%
Short	0.00%	-0.18%	-0.98%	-4.94%	0.00%	-1.24%
US Auto (net)	0.38%	0.43%	0.87%	-0.97%	11.98%	0.10%
Long	0.38%	0.43%	0.87%	0.00%	11.98%	0.18%
Short	0.00%	0.00%	0.00%	-0.97%	0.00%	-0.08%
Japan Auto (net)	0.99%	0.89%	-0.19%	4.94%	26.25%	0.09%
Long	0.99%	0.94%	0.01%	4.94%	26.25%	0.33%
Short	0.00%	-0.04%	-0.20%	0.00%	0.00%	-0.23%

Source: Menchero – Ji (2017:6)

The third column of the table shows that the market factor portfolio contains 100 per cent net long positions. The other factor portfolios are strictly dollar-neutral. The Japanese factor portfolio is 100 per cent long for the Japanese market, and 100 per cent short for the market portfolio. Nevertheless, in the market portfolio, the Japanese market has a net share of 8.36 per cent, therefore combining the values of the two positions, a net long weight of 91.46 per cent is derived for the Japanese market (and by analogy, all other markets have a net short weight of 91.46 per cent). The Japanese factor portfolio is industry-neutral, so a net weight of zero is shown for all industries (this table only presents the auto industry). Similarly, the Japanese factor is style-neutral (but the table does not contain this).

The industry pure factor portfolios can be interpreted in a similar fashion: they take a 100 per cent long position in the given industry (auto industry), and a 100 per cent short position in the market portfolio. Since in this case the auto industry has a share of 2.93 per cent in the market portfolio, the auto industry's overall net long

weight is 97.07 per cent (and similarly, all other industries have a net short weight of 97.07 per cent). The industry factor is country- and investment style-neutral.

As a practical example, let us assume a global portfolio investor (*Menchero – Ji 2017:7*) who would also like to invest in the Japanese market, generally expecting a bull market, but does not wish to commit to any investment style, industry or any other variable; the only thing that matters is the country factor. If the investor purchased the Japanese market portfolio, the share of the car industry within the portfolio would be 11.84 per cent,¹³ in contrast to 2.93 per cent in the global portfolio, so the auto industry would be overweighted. However, pure factor portfolios eliminate this shortcoming by appropriately separating the true sources of returns. In other words, by purchasing the global market portfolio and the pure Japanese country factor portfolio, the portfolio takes a 100 per cent long position in Japanese investments, zero net weight in other countries, and it is industry- and investment style-neutral.

In their paper, *Clarke et al. (2017)* analysed the monthly returns of 1,000 US stocks between 1967 and 2016 for six different factors: 1) value (E/P); 2) momentum; 3) size; 4) low volatility (low beta); 5) profitability; 6) bond beta. The latter is to take into account the effects of market interest rates on equity markets and the factors. The key message of the study is methodological in the sense that the authors point out the necessity of using pure factors. They argue that the Fama–MacBeth regression framework can function truly well if the explanatory factors are regularly adjusted to filter out secondary effects. They do not wish to identify new factors, but 50 years' worth of data offer some interesting results. For example, the excess return of the pure value factor over the market return has been diminishing in the past 15 years. Similar developments could be observed in the case of the momentum factor, after it became increasingly popular in the 1990s.

5. Methodological framework of factor portfolios¹⁴

Factor returns are usually quantified by cross-sectional regressions. The given factor is represented using a portfolio replicating it. Factor-replicating portfolios can be formed in two ways: 1) using simple factor portfolios through simple regressions, 2) using pure factor portfolios through multivariate regressions. The shortcomings of simple factor portfolios have already been mentioned, but they are an important starting point from a methodological perspective. First, the simple regression calculation methodology of factor returns associated with investment styles, and

¹³ Within the global portfolio, the Japanese car industry's market share is 0.99 per cent, whereas the entire Japanese market's share is 8.36 per cent. The ratio of the two is 11.84 per cent.

¹⁴ This methodological description is based on *Menchero (2010)*, *Mechero – Ji (2017)* and *Clarke et al. (2017)*.

country and industry factors¹⁵ is presented. After the univariate case, multivariate regressions are briefly described.

A simple regression is written for the return of the simple factors of *investment styles*:

$$r_n = r_W + X_{ns}r_s + u_n, \quad (2)$$

where “ r_n ” is the expected return of the given stock n , “ r_W ” is the intercept, “ X_{ns} ” is the exposure of the given stock n to the style s , “ r_s ” is the return of the given style factor s and “ u_n ” is the company-specific return. All stocks have a unit exposure to the intercept, which may be called the global factor.¹⁶ Factor returns (r_s) should be estimated on a sample of sufficient size.

In order to reduce the estimation errors of factor returns, the appropriate weighting should be used. One possible (but not the only) calculation method uses the square root of the capitalisation of stocks:

$$\sum_n v_n = 1, \quad (3)$$

where “ v_n ” is the square root of the capitalisation of the given stock n , in proportion to the root of the total capitalisation of the investment universe under review. The total of the ratios gives 1.

Since the exposures to the given investment style s are standardised, the expected value calculated with the regression weights is zero:

$$\sum_n v_n X_{ns} = 0. \quad (4)$$

Due to standardisation, the given factor has a unit standard deviation calculated with regression weights:

$$\sum_n v_n X_{ns}^2 = 1. \quad (5)$$

Using the equations seen above, the following equation can be written for the return of the style factor:

$$r_s = \sum_n (v_n X_{ns}) r_n, \quad (6)$$

where “ r_s ” is the return of the factor portfolio with a weight of “ $v_n X_{ns}$ ”. From a practical perspective, the simple style factor portfolio takes a long position for the stocks with a positive exposure, and a short position for the stocks with a negative exposure, taking a proportionately greater position in the stocks with

¹⁵ From a methodological perspective, factors measured on a continuous scale (that are typically standardised) are differentiated from those represented by dummy variables.

¹⁶ Assuming a global investor.

a larger regression weight. The portfolio is dollar-neutral, since the weights add up to 0. The style factor portfolio has a unit exposure to the given style (the sum of the products of the weights $v_n X_{ns}$ and the exposure X_{ns} is 1).

The regression equation of the *grouping factors measured with dummy variables* is as follows:

$$r_n = r_w + \sum_g X_{ng} r_g + u_n, \quad (7)$$

where “ X_{ng} ” measures the exposure of the given stock n to the grouping factor g (0,1) and “ r_g ” is the factor return for the given grouping factor g . The interpretation of the other variables is similar to formula (2).

Equation (7) contains clear multicollinearity (the sum of the industries equals the global portfolio), therefore the following constraint is introduced to ensure the applicability of the regression:

$$\sum_g W_g r_g = 0. \quad (8)$$

As the formula shows, the sum of the market value-weighted factor returns is 0 (“ W_g ” means the market weight of the given group). Using equation (8), the simple global factor return can be written as formula (9):

$$r_w = \sum_g W_g \sum_{n \in g} \left(\frac{v_n r_n}{V_g} \right), \quad (9)$$

where “ V_g ” is the regression weight of the given group g .

In the case of the factors measured with dummy variables, the global factor contains only long positions. All groups are weighted by market value, but within the particular groups, the individual stocks are weighted by the regression weights. The formula for the simple grouping factor returns is as follows:

$$r_g = \frac{1}{V_g} \sum_{n \in g} (v_n r_n) - r_w, \quad (10)$$

where “ r_w ” can be interpreted based on formula (9). Let us see an example for the content of formula (10): simple country factor portfolios take a long position in the country portfolio using regression weights and a short position in the global portfolio.

Pure factor portfolios require multivariate regression calculations. Here formula (1) can be repeated:

$$r_n = r_w + \sum_c X_{nc} r_c + \sum_i X_{ni} r_i + \sum_s X_{ns} r_s + u_n. \quad (11)$$

The model uses regression weights in proportion to the square root of the given stocks' market capitalisation. All stocks have unit exposure to the global portfolio as well as the corresponding country, industry and investment style portfolio (the exposure is zero in all other cases). The idiosyncratic returns are uncorrelated with each other and the factors. The model handles the problem of multicollinearity as described above. *Menchero (2010)*, citing *Ruud (2000)*, determines the factor returns using the weighted least squares (WLS) method as follows:

$$r_k = \sum_n \Omega_{nk} r_{n,t}, \quad (12)$$

where " Ω_{nk} " denotes the weight of the given stock n within the given pure factor portfolio k .

6. Methodology of the empirical analysis and the database used

The empirical section of the study compares the performance of the factors and the market portfolio, raising several important methodological questions: Which are the most widespread performance measures in the literature and in the investment industry? What statistical and mathematical tools and assumptions are required to appropriately calculate the performance measures? We attempt to answer these questions in the following.

There are many performance measures for assessing investments: *Eling and Schuhmacher (2007)*, and *Farinelli et al. (2008)* give an excellent summary of the topic. The present article does not intend to explore the whole universe of performance measures; nevertheless, two widely used indicators were selected, namely Jensen's alpha and the Sharpe ratio. The alpha is to find out whether the given factor outperformed the market portfolio or not. The Sharpe ratio also measures excess returns, but it takes into account total risk.

The alpha by *Michael C. Jensen (1968)* shows the excess return over the CAPM. The calculations are performed as follows:

$$Alfa_{it} = r_{it} - (r_{ft} + \beta_i \cdot (r_{Mt} - r_{ft})), \quad (13)$$

where " r_{it} " is the return of the given factor i , " r_{ft} " is the risk-free return, " β_i " is the market risk and " $r_{Mt} - r_{ft}$ " is the market risk premium for given time t . The beta is derived from the following equation:

$$\beta_i = \frac{Cov_{iM}}{Var_M}, \quad (14)$$

where " Cov_{iM} " is the covariance between the returns of the given factor i and the market portfolio (M) and " Var_M " is the variance of the return of the market portfolio.

The Sharpe ratio was described by *William F. Sharpe* in his 1966 article.¹⁷ When calculated, it shows how the excess return of the given portfolio over the risk-free rate relates to total risk:

$$\text{Sharpe}_{it} = \frac{r_{it} - r_{ft}}{\sigma_{it}}, \quad (15)$$

where “ $r_{it} - r_{ft}$ ” is the excess return of the given factor portfolio i over the risk-free investment at a given time t , and “ σ_{it} ” is the standard deviation of the risk premium of the given factor portfolio i at time t .

The excess return is tested using regression models. The idea is to first explain the performance of the pure factors (dependent variables) one by one by the performance of the market portfolio (explanatory variable). From the perspective of the analysis, the key is the constant parameter of the regression equations (β_0): if it significantly differs from zero, the given factor delivers excess returns. The regression equations logic is as follows: the explanatory variables are the log return and the Sharpe ratio of the market portfolio, while the dependent variables are the log return and Sharpe ratio of the given factor.

Before beginning the test of the performance metrics, the type of regressions has to be specified. This issue is fundamentally influenced by the behaviour of returns and the error terms characterising the Sharpe ratio time series: if the error terms are homoscedastic and are not autocorrelated, a simple OLS regression can be used.¹⁸ If these requirements are not met, the ARCH-GARCH regression models created for financial time series analysis are used. Autocorrelation is assessed using Engle’s so-called “ARCH effects” test, while the disturbing heteroscedasticity is checked using the Breusch–Pagan test.

It is important to note that the GARCH models are used even if the particular regression will be OLS-based in the end, since the volatility in the denominator of the Sharpe ratio or the beta parameter necessary for the calculation of Jensen’s alpha are not constant over time, and thus conditional variances and covariances are required. The usefulness of GARCH models is that they make volatility and covariance dynamic, which thus allow performance measures to be dynamic and our hypotheses to be adequately tested. The analysis uses simple GARCH and DCC GARCH models, the methodological background for which can be found in *Bollerslev (1986)* and *Engle (1982; 2002)*.

¹⁷ Sharpe originally called it the “reward-to-variability” ratio; it started to be referred to as the Sharpe ratio only later, in his honour.

¹⁸ There are further requirements of the OLS regression models, without which the least squares method cannot be BLUE (best linear unbiased estimator). For more details, see, for example, *Wooldridge (2013)*.

Testing the performance of factor returns requires reliable data. The factor portfolios and the returns of the market index are taken from the Bloomberg database. The downloaded time series cover roughly the past two decades, so they include the weekly log returns between 4 January 2000 and 10 December 2018 for the US equity markets. The weekly log returns include the market portfolio and ten pure factor portfolios. Using the Pure Factor Returns function of the Bloomberg Factors to Watch (FTW), the pure factor portfolios are rebalanced on a weekly basis. The ten pure factor portfolios are listed in *Table 2*.

Table 2			
Pure factor portfolios used in the empirical analysis			
Name	Acronym	Name	Acronym
Value	V	Volatility	Vol
Size	S	Dividend	D
Profitability	P	Growth	G
Trading activity	TA	Leverage	L
Earnings variability	EV	Momentum	Mom

The size factor in the table focuses on large enterprises. If the direction is reversed, the size factor represents the performance of small firms, so the signs regarding performance are also reversed. The empirical analysis takes into account this feature of the model. The factors were chosen because the relevant studies mostly focus on these investment styles, as already shown in the literature review.¹⁹

The market portfolio regarded as the benchmark during the analysis is the market value-weighted Russell 3000 Index, which covers the 3,000 US listed companies with the largest capitalisation. The enterprises in the Index cover roughly 98 per cent of the entire American equity market. *Figure 1* shows the Russell 3000 Index between 2000 and 2018.

¹⁹ The definitions of the pure factor portfolios used by Bloomberg and the corresponding calculation methods are described in the Annex.

Figure 1
The price of Russell 3000 Index between 2000 and 2018



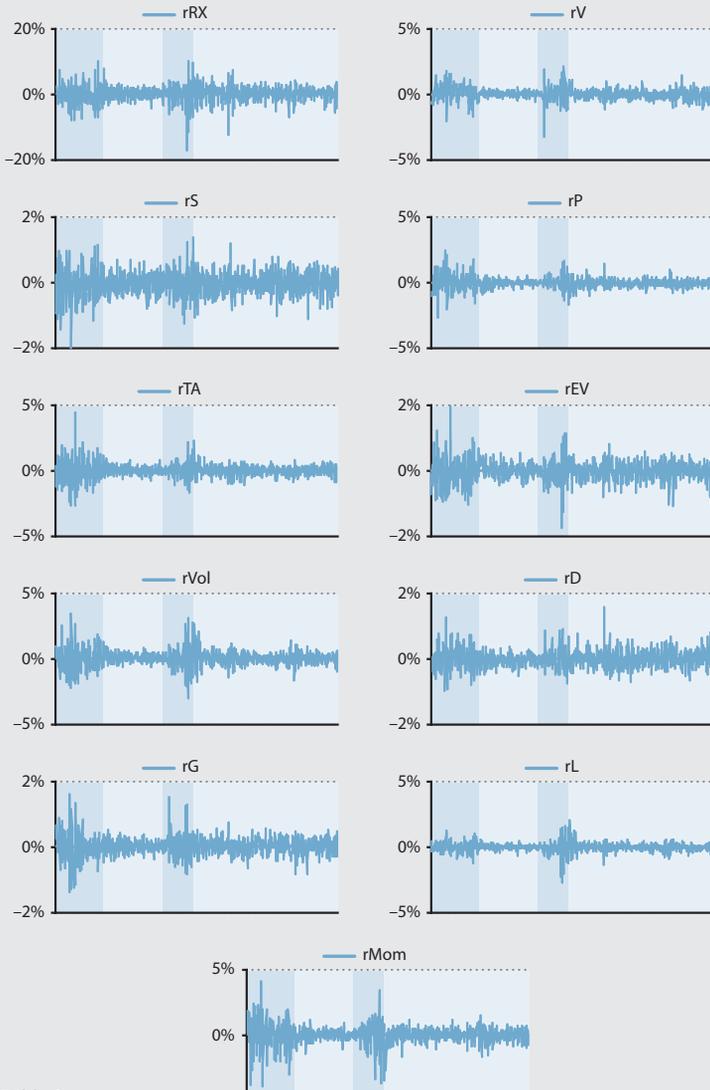
The figure distinguishes two periods. The first lasts from early 2000 until 2009 Q1, and it is referred to as the “*crisis period*”. The dot-com bubble burst at the beginning of the millennium, and then 2007 saw the subprime mortgage crisis in the United States, which quickly became a global economic crisis. By March 2009, the market hit rock bottom, which was followed by an approximately 10-year recovery, albeit with “minor” economic downturns. Therefore, the period after March 2009 is referred to as the years of “*recovery*”.

Of course, the time series could be broken down into shorter phases. In the period referred to here as the crisis, an adjustment was observed between 2002 and 2007. And the recovery between 2009 and 2018 was interrupted by the occurrence of the Greek debt crisis around 2010 and by the tumbling oil prices between 2014 and 2016, which precipitated the Russian financial crisis. However, in line with the analysis purposes of this paper and for reasons of brevity, it is sufficient to distinguish the aforementioned two larger periods, so that the performance of the factors can be analysed in the entire period and examined with various “price regimes”, to test whether there is a difference in factor performance in a “*crisis*” (between 2000 and early 2009) and the years of the “*recovery*”.

Before turning to the empirical findings, it is assessed whether the conditions of the applicability of the GARCH and DCC GARCH regression models are met. First, the log returns of pure factor portfolios and the market index are analysed, as these are the input for calculating Jensen’s alpha, and the GARCH model is also sought

to be used for calculating the volatility in the denominator of the Sharpe ratio.²⁰ After the log returns, the behaviour of the GARCH regressions is evaluated on the Sharpe ratios' time series.

Figure 2
Weekly log returns of the Russell 3000 Index and the pure factor portfolios, 2000–2018



Note: See Table 2.

²⁰ It has already been noted that when using the GARCH models, the aim is often not to draw traditional regression conclusions but to model conditional variance (volatility).

Figure 2 shows the weekly log returns of the Russell 3000 Index and the ten pure factor portfolios between 2000 and 2018. The log returns allow an intuitive examination of the clustering of volatility. Most factors clearly exhibit volatility clustering (the two major crises were indicated with darker shading). At the beginning of the period under review, between 2000 and 2002, returns typically fluctuated widely (dot-com bubble), which was followed by a lull, then 2008 and 2009 once again saw extraordinary volatility (global economic meltdown). The past roughly ten years were again calmer.

If the applicability of the GARCH models is sought to be examined in a more formalised framework, Engle’s Lagrange multiplier (LM) test should be performed (“ARCH effects” test). Table 3 summarises the test results.

Table 3											
Engle’s ARCH effect test for market portfolio’s and pure factor portfolios’ returns											
<i>with 3 weeks lag</i>											
<i>LM</i>	<i>RX</i>	<i>V</i>	<i>S</i>	<i>P</i>	<i>TA</i>	<i>EV</i>	<i>Vol</i>	<i>D</i>	<i>G</i>	<i>L</i>	<i>Mom</i>
H_0						No ARCH effect					
H_A						ARCH effect					
Log returns											
χ^2	57.94 ***	65.86 ***	22.55 ***	53.56 ***	109.09 ***	28.37 ***	127.45 ***	7.8 **	183.13 ***	242.75 ***	87.01 ***
<i>p-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000	0.000
Sharpe ratios											
χ^2	1.767	3.161	1.285	1.127	3.416	0.828	0.075	0.635	2.226	2.447	0.884
<i>p-value</i>	0.622	0.367	0.733	0.771	0.332	0.843	0.995	0.888	0.527	0.485	0.829
<i>Notes: See Table 2. *** Significant at 1 per cent, ** Significant at 5 per cent, * Significant at 10 per cent</i>											

When examining the log returns, the H_0 hypothesis can be rejected in the case of the Russell 3000 Index and most of the factors at rational significance levels, so the ARCH effect can be observed. The dividend factor is not significant at 1 per cent, but it is only just so at 5 per cent. The analysis of the Sharpe ratios shows that no ARCH effect can be observed for any factor, so the H_0 hypothesis cannot be rejected. If the Sharpe ratios were shown as in Figure 2, it would be clear that there is no substantial volatility clustering. Based on the results, the performance of the Sharpe ratios is tested with a simple OLS regression. Since no autocorrelation can be observed, the next task is to determine the heteroscedasticity of the error terms. The relevant Breusch–Pagan (BP) test can be found in Table 4.

Table 4										
Heteroscedasticity test of the factor portfolios' Sharpe ratios										
BP	V	S	P	TA	EV	Vol	D	G	L	Mom
H ₀ Constant variance										
H ₁ Heteroscedasticity										
χ^2	9.58 ***	0.43	0.09	12.67 ***	3.15 *	5.75 **	37.60 ***	12.32 ***	18.22 ***	2.36
p-value	0.002	0.512	0.766	0.000	0.076	0.017	0.000	0.000	0.000	0.125

Notes: See Table 2. *** Significant at 1 per cent, ** Significant at 5 per cent, * Significant at 10 per cent

At the usual significance level of 5 per cent, the H₀ hypothesis cannot be rejected in the case of the size, profitability, earnings variability and momentum factors, so the error terms of these factors are assumed to be homoscedastic. Based on the BP test, the residual variables of the other factors are heteroscedastic, and therefore the robust version of the OLS regression is used in their case.

7. Empirical findings

This section of the paper presents the empirical findings of the analysis. The hypotheses are as follows:

Hypothesis 1: The given pure factor portfolio produced excess returns over the passive strategy.

In formal terms:

$$H_0: RP(\text{factor}) = MRP, \text{ or } \beta_0 = 0^{21}$$

$$H_A: RP(\text{factor}) \neq MRP, \text{ or } \beta_0 \neq 0$$

Hypothesis 2: The given pure factor portfolio produced risk-adjusted excess return over the passive strategy.

In formal terms:

$$H_0: \text{Sharpe}(\text{factor}) = \text{Sharpe}(\text{passive strategy})$$

$$H_A: \text{Sharpe}(\text{factor}) \neq \text{Sharpe}(\text{passive strategy})$$

²¹ RP and MRP are short for the risk premium and market risk premium over the risk-free rate, respectively. The risk-free rate is the return on the 1-month US T-bill for the given period. In the regression methodology, Jensen's alpha equals the intercept, which is usually denoted as β_0 . In the literature on investments, alpha is actually a "special" β_0 .

The above hypotheses are actually the tests of the market anomalies presented in the section on literature review, but they can also be interpreted as the tests of efficient markets. The hypotheses are examined for the entire period under review (2000–2018), the crisis years (2000–2009) and the recovery period after the crisis (2009–2018). The division of the entire period into phases practically adds a subhypothesis to the main ones: Is it possible to achieve risk-adjusted excess return over the market with the factors in the crisis (recovery) years?

The first hypothesis assesses Jensen's alpha; it is tested using the DCC GARCH model, the regression model based on conditional variances and covariances. The second hypothesis tests the Sharpe ratio. To verify the Sharpe ratio hypotheses, the OLS regression model handling heteroscedasticity is used in the case of the factors where this is necessary (otherwise the calculations are based on the traditional OLS).

Before the detailed analysis of the results of the regression calculations, the performance of the factors and the market portfolio in the past 19 years should be evaluated. *Figure 3* shows the cumulative log returns of the Russell 3000 Index and the ten factor portfolios based on weekly data. The crisis and the recovery years are distinguished, and the total 19-year cumulative return series is also shown.

The examination of the entire period attests that the performance of the market index (RX) (black solid line) basically caught up with the value factor by the end of 2018 (V line). During the crisis, the value factor performed better than all the other strategies and the market as a whole. In this period, the cumulative return of the pure factors exceeded the return of the market portfolio several times. The last ten years heralded a change, and the market return was much higher than the factor returns.

Figure 3 may suggest that the factor portfolios are less volatile than the market portfolio. This is precisely because of the structure of pure factor portfolios: they control for the effects of other factors, making the actual return–standard deviation relationship easier to capture, and thus also reducing standard deviation (see *Menchero – Lee 2015:83* and *Clarke et al. 2017:27*). In connection with the relationship between total market risk and the volatility of the various factors, the paper by *Csóka et al. (2009)* should be mentioned. The authors acknowledge in their article that risk can always be allocated in a stable manner, so that no subset (coalition) of the subelements (factors) resists the given allocation.

Figure 3
Cumulative logreturns of Russell 3000 Index and pure factor portfolios between 2000 and 2018

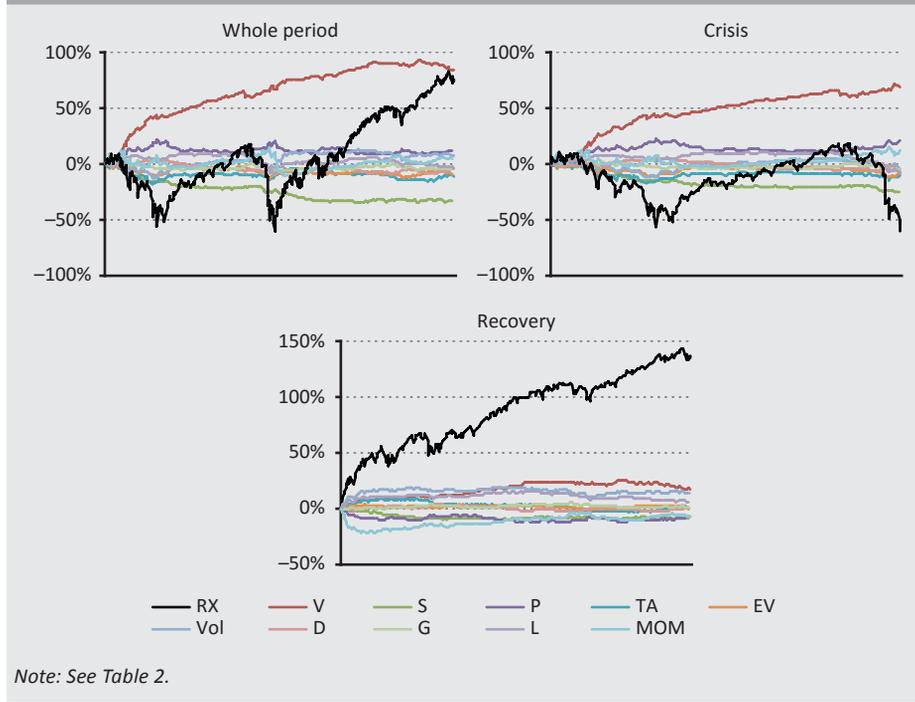


Table 5 contains the average return and standard deviation of the factors and the market in recent years as well as the performance measures. The average return and standard deviation figures are annual values calculated from weekly log returns.²²

²² The calculation methodology is as follows (for the more detailed relationships between the formulas, see *Medvegyev – Száz 2010:15–17*): the arithmetic average of the weekly log returns $-\ln(S_t/S_{t-1})$ gives the average weekly log return (r_h), and the standard deviation of the weekly log returns (σ_h) is also obtained. The annual average log return is calculated from the formula “ $r = r_h * 52$ ”, while the annual average standard deviation is derived from “ $\sigma = \sigma_h * \sqrt{52}$ ”. The average annual Sharpe ratio is derived by substituting the annualised returns and the annualised standard deviation into formula (15). The average annual Jensen’s alpha is the output of the GARCH regression (the regression calculates the average weekly alpha, which has to be multiplied by 52 to give the average annual alpha).

Table 5

Descriptive statistics of market and pure factor portfolios, mean Jensen's alpha and Sharpe-ratio

Statistics	RX	V	S	P	TA	EV	Vol	D	G	L	Mom
Whole period											
Mean return	3.91%	4.42%	1.73%	0.67%	-0.56%	-0.53%	0.36%	-0.24%	-0.21%	-0.19%	0.24%
Standard deviation	17.48%	3.28%	2.58%	3.09%	3.81%	2.30%	4.38%	1.93%	2.05%	2.56%	5.13%
Sharpe ratio	0.12%	0.78%	-0.05%	-0.38%	-0.63%	-1.03%	-0.34%	-1.08%	-1.00%	-0.80%	-0.31%
Jensen's alpha	0.00%	1.82%	-0.50%	-1.45%	-2.59%	-2.14%	-2.28%	-1.76%	-1.81%	-2.15%	-1.09%
Crisis											
Mean return	-6.64%	7.31%	2.65%	2.21%	-1.29%	-1.08%	-0.68%	-0.66%	-0.62%	-1.05%	1.20%
Standard deviation	19.71%	3.98%	2.83%	3.81%	4.87%	2.76%	5.36%	2.01%	2.57%	2.92%	6.59%
Sharpe ratio	-0.50%	1.04%	-0.18%	-0.25%	-0.92%	-1.54%	-0.72%	-1.91%	-1.48%	-1.45%	-0.30%
Jensen's alpha	0.00%	2.90%	-1.24%	-3.36%	-3.37%	-3.45%	-3.09%	-4.30%	-3.81%	-3.29%	-2.37%
Recovery											
Mean return	13.81%	1.70%	0.86%	-0.78%	0.12%	0.00%	1.34%	0.15%	0.18%	0.63%	-0.67%
Standard deviation	15.31%	2.50%	2.28%	2.27%	2.62%	1.84%	3.34%	1.86%	1.60%	2.22%	3.67%
Sharpe ratio	0.86%	0.44%	0.11%	-0.61%	-0.19%	-0.33%	0.22%	-0.25%	-0.26%	0.01%	-0.35%
Jensen's alpha	0.00%	0.99%	-0.06%	-0.29%	-1.70%	-1.48%	-1.72%	0.45%	-0.06%	-1.29%	0.11%

Note: See Table 2.

The examination of the entire period (2000–2018) shows that the value factor had the highest returns (4.42 per cent). Positive returns could also be achieved with the passive strategy (3.91 per cent), the small firm factor (1.73 per cent), the profit factor (0.67 per cent) as well as the volatility (0.36 per cent) and the momentum factor (0.24 per cent). When adjusting for risk (Sharpe ratio), the best performance is still linked to the value factor (0.78 per cent, compared to 0.12 per cent by the market), while the performance of the profitability, small firm, volatility and momentum factors is negative. The average annual return of the other factors was slightly negative.

In the “crisis” period (between 2000 and 2009), positive returns could be achieved with the value (7.31 per cent), the size (2.65 per cent), the profit (2.21 per cent) and the momentum factor (1.20 per cent). The passive strategy fared fairly poorly (–6.64 per cent). It can be seen that although the returns of the other factors were negative, the losses were always lower than in the case of the market factor. All in all, the crisis years saw higher volatility than the entire period under review, and therefore the Sharpe ratios are negative everywhere, except for the value factor.

In the “growth” years (between 2009 and 2018), returns were positive with decreasing volatility, except for the profit, momentum and earnings variability factor. Nonetheless, the positive returns were mostly close to zero. At this time, the market portfolio outperformed the factor portfolios by far, generating a return of 13.81 per cent, compared to the average annual performance of 0.35 per cent in the case of the factors.

Table 6 contains the outcome of hypothesis testing of excess return. We can say that the two types of performance measures basically lead to the same conclusions; therefore, only Jensen’s alpha is analysed below.

Table 6 Result of hypothesis tests: excess return of pure factor portfolios relative to market portfolio												
Statistics	V	S	P	TA	EV	Vol	D	G	L	Mom		
$H_0: \beta_0 = 0$												
$H_A: \beta_0 \neq 0$												
Jensen's alpha												
Whole period	1.82% ***	-0.50%	-1.45% ***	-2.59% ***	-2.14% ***	-2.28% ***	-1.76% ***	-1.81% ***	-2.15% ***	-1.09%		
p-value	0.000	0.364	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.126		
Crisis	2.90% ***	-1.24%	-3.36% ***	-3.37% ***	-3.45% ***	-3.09% ***	-4.30% ***	-3.81% ***	-3.29% ***	-2.37% **		
p-value	0.000	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022		
Recovery	0.99%	-0.06%	-0.29%	-1.70% **	-1.48% ***	-1.72% ***	0.45%	-0.06%	-1.29% **	0.11%		
p-value	0.185	0.931	0.599	0.014	0.002	0.003	0.368	0.910	0.014	0.905		
Sharpe ratio												
Whole period	0.11% ***	-0.02%	-0.08% ***	-0.12% ***	-0.18% ***	-0.10% ***	-0.16% ***	-0.15% ***	-0.16% ***	-0.01%		
p-value	0.001	0.543	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.739		
Crisis	0.18% ***	-0.04%	-0.17% ***	-0.14% ***	-0.25% ***	-0.09% ***	-0.34% ***	-0.27% ***	-0.24% ***	-0.04%		
p-value	0.000	0.339	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.347		
Recovery	0.04%	0.00%	-0.03%	-0.09% **	-0.11% ***	-0.10% ***	0.01%	-0.02%	-0.09% **	0.00%		
p-value	0.402	0.947	0.445	0.031	0.004	0.002	0.713	0.586	0.024	0.923		

Note: See Table 2. *** Significant at 1 per cent, ** Significant at 5 per cent, * Significant at 10 per cent

Interestingly, neither the size nor the momentum factors achieved significant excess returns, regardless of the period under review,²³ and thus the zero hypothesis on zero excess return cannot be rejected at the rational significance levels. This partly tallies with the conclusions of *Clarke et al. (2017)* and *Beard – Sias (1997)*, and it is probably attributable to the fact that in the 1990s, investors increasingly adopted these strategies.

When examining the crisis years and the recovery period separately, there is a major difference between the significance of the factors. In the crisis years, all of the factors, except for the size factor, generated significant excess returns (the p-values were practically zero). By contrast, in the recovery period most factors were unable to achieve significant excess returns, so the null hypothesis cannot be rejected. No excess return could be achieved with the value, size, profitability, dividend, growth and momentum factors, but the factors measuring riskiness (earnings variability, volatility, leverage) and the trading activity factor capturing the liquidity of assets were exceptions to this rule.

In the following, the direction of the excess return of the factors deemed significant is examined, to find out which investment strategy was beneficial in the past almost 20 years. The assessment is presented along two dimensions simultaneously: based on the buy or sell recommendation arising from the literature or the investment practice on the one hand, and the ex-post buy or sell strategies derived from the empirical findings on the other hand. The two dimensions can produce four outcomes:

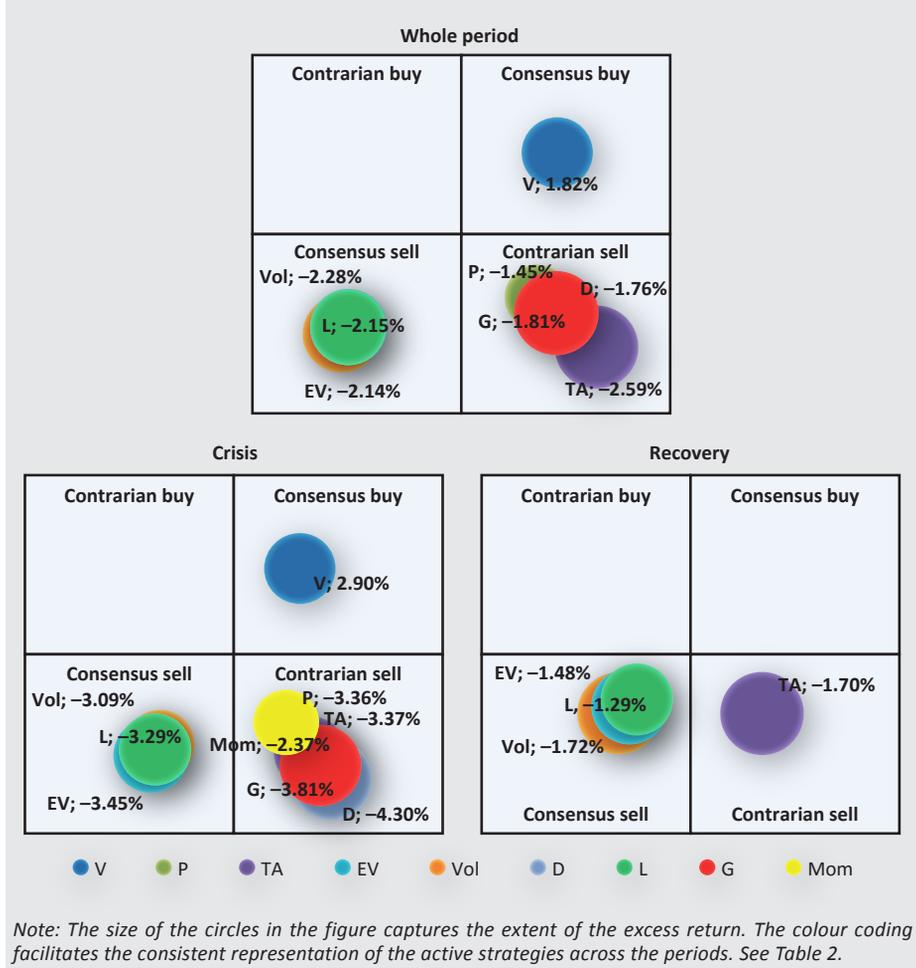
- 1) Consensus buy: the long position produced excess return according to both the assumption and the empirical findings.
- 2) Contrarian buy: the assumption forecasts selling, however, according to the empirical findings, the long position produced the excess return.
- 3) Consensus sell: the short position produced excess return according to both the assumption and the empirical findings.
- 4) Contrarian sell: the assumption forecasts buying, however, according to the empirical findings, the short position produced the excess return.

“Consensus” means that the recommendations in the literature and the empirical findings coincide, while “contrarian” denotes the empirical findings that run counter to the expectations in the literature. In the former case, the advisable trading

²³ The momentum factor is significant at 5 per cent in the crisis years (and not at 1 per cent) and has negative returns. Since the factor-extracting variable is the cumulative return of the previous year, this result conflicts with the findings of *Jegadeesh and Titman* from 1993 and 2001, and it was useful to pursue a contrarian strategy (see *Figure 4*).

strategy was to follow the recommendations in the literature, while in the latter case it seemed to be expedient to reject the strategies formulated based on earlier experiences (and use a so-called contrarian strategy).

Figure 4
Significant excess returns of factor portfolios



The first quadrant of *Figure 4* only contains the value factor in the consensus buy category, so according to the literature positive excess return was expected for this factor, which was ultimately confirmed by the findings. The alpha was 1.82 and 2.90 per cent for the entire period and the crisis years, respectively. In the recovery period, neither factor outperformed the passive strategy to a significant extent.

There was no significant recommendation for contrarian buy: in other words, no factor produced a positive alpha in the past 20 years, while the literature expected negative excess returns. This holds true for the crisis and the recovery years as well.

In the case of the factors measuring riskiness (earnings variability, volatility, leverage), the empirical analysis confirms the negative excess return expected based on the literature on market anomalies. The consensus short strategy dominated for all three factors for the entire period and also for the two subperiods. The excess return was -2.14 , -2.28 and -2.15 per cent for the entire period.

Surprising results were obtained for the trading activity, dividend, growth and profitability factors. The hypothesis foresaw positive excess returns, but significantly negative returns were observed. It was advisable to use a contrarian sell (short) strategy. Nevertheless, only the trading activity was significant in the recovery years. The excess return was -2.59 , -1.76 , -1.81 and -1.45 per cent for the entire period.

8. Conclusion

The article used pure factor portfolios formed by multivariate cross-sectional regressions to test the hypothesis that active investment strategies achieve excess return relative to passive strategies. The hypothesis can also be construed as a test of market efficiency. Factor performance was measured by Jensen's alpha and the Sharpe ratio.

The universe of the analysis comprised the equity market of the United States between 2000 and 2018, while the benchmark portfolio was the Russell 3000 Index. This period saw two major crises, so the time series was examined in two parts: the period between 2000 and 2009 was referred to as the "crisis" years, and the period after 2009 was called the "recovery" years. The factors under review were the following: value, size, profit, trading activity, earnings variability, volatility, dividend, growth, leverage and momentum.

The main findings of the empirical study are as follows. The excess return of the size and momentum factor often cited in the literature was not significant for the entire period or the recovery years. During the crisis years, the momentum factor was significant, but the size factor was not. Moreover, in the recovery period, most factors did not generate significant excess returns (except for the factors capturing riskiness and trading activity). The hypotheses on excess return could not be confirmed for these factors and periods.

Finally, the investment strategies of the factors generating significant excess returns during the period under review were presented. The investment strategy was framed by contrasting buy or sell recommendations suggested by the literature

or the professional investment convention with the ex-post findings. As expected, over the past roughly 20 years, significant excess returns (alpha of 1.82 per cent) could only be achieved with the pure value factor, hence the *consensus buy* strategy was profitable. This partial result of the study is in accord with the works of Fama and French. Excess returns of the riskiness proxy factors (earnings variability, volatility, and leverage) were significant and negative (−2.14, −2.28 and −2.15 per cent), which also coincide with the expectations formulated by the literature, therefore the *consensus sell* investment strategy was the successful one. Contrary to expectations, however, empirical results yielded negative returns for the profitability, growth, dividend and trading activity factors, and therefore investors could have realised excess returns via a *contrarian sell* strategy. Overall, the findings reinforce the weak form of market efficiency cited in the literature.

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Annex

Definitions of pure style factor portfolios

Factor	Calculation method
Momentum (M) : separates stocks that have outperformed over the past year and those that have underperformed.	Cumulative returns in the past year, skipping the most recent two weeks to mitigate the reversal effect.
Value (V) : composite metric that differentiates between “rich” and “cheap” stocks. Bloomberg combines fundamental multipliers with analyst consensus data.	<ul style="list-style-type: none"> • BV/P (14 per cent) • E/P (20 per cent) • CF/P (20 per cent) • S/EV (5 per cent) • EBITDA/EV (20 per cent) • Analyst forecast E/P (21 per cent)
Dividend yield (D) : this is also a value factor, but distinct enough to be a standalone indicator.	It is the ratio of the most recently announced annualised net dividend and the current market price.
Size (S) : a composite metric distinguishing between small and large enterprises.	<ul style="list-style-type: none"> • log(market capitalisation) (33 per cent) • log(net sales) (33 per cent) • log(total assets) (33 per cent)
Trading activity (TA) : a turnover-based measure	It normalises trading volume with the number of shares outstanding, and indirectly controls for the size effect.
Earnings variability (EV) : it gauges how consistent the cash flow, sales and earnings have been in the past 5 years.	<ul style="list-style-type: none"> • Earnings vola./Median of total assets (34 per cent) • Cash flow vola./Median of total assets (35 per cent) • Sales vola./Median of total assets (31 per cent)
Profit (profitability) (P) : it examines the profit margin.	<ul style="list-style-type: none"> • ROE (26 per cent) • ROA (28 per cent) • ROCE (28 per cent) • EBITDA rate (18 per cent)
Volatility (Vol) : it distinguishes between volatile and less volatile stocks by using various volatility measures.	<ul style="list-style-type: none"> • Rolling volatility: the volatility of the returns from the last 252 trading days (27 per cent) • Rolling CAPM beta (20 per cent) • Historical sigma (residual volatility) (27 per cent) • Cumulative range: ratio of the maximum and minimum price (26 per cent)

Factor	Calculation method
<p>Growth (G): it aims to capture the difference between companies exhibiting high and low growth. It uses both historical and analyst data.</p>	<ul style="list-style-type: none"> • 5-year average growth rate of assets/average total assets in the past five years (22 per cent) • 5-year average growth rate of sales/average total assets in the past five years (24 per cent) • 5-year average growth rate of earnings/average total assets in the past five years (19 per cent) • 2-year EPS forecast/1-year EPS forecast (15 per cent) • 2-year sales forecast/1-year sales forecast (21 per cent)
<p>Leverage (L): a composite indicator that expresses companies' indebtedness.</p>	<ul style="list-style-type: none"> • $[\text{long-term debt} + \text{max}(\text{short-term debt} - \text{cash}, 0)] / [\text{Equity BV} + \text{long-term debt} + \text{max}(\text{short-term debt} - \text{cash}, 0)]$ (33 per cent) • $[\text{long-term debt} + \text{max}(\text{short-term debt} - \text{cash}, 0)] / [\text{Market capitalisation} + \text{long-term debt} + \text{max}(\text{short-term debt} - \text{cash}, 0)]$ (33 per cent) • $[\text{long-term debt} + \text{max}(\text{short-term debt} - \text{cash}, 0)] / \text{total assets}$ (33 per cent)
<p><i>Note: The abbreviations used in the analysis are shown in brackets next to the factors' name (Column 1).</i> <i>Source: Cahlan – Ji (2016:28–31)</i></p>	

Issues and Types of Adverse Selection and Negative Selection*

László Csorba

In a relatively high number of cases, there are selection criteria in everyday life, the implementation of which clearly does not support the development of the economy, even in the short term. At the same time, the phenomenon of adverse selection raises its head relatively rarely in reality, since it is equally dependent on the preconditions of a high degree of hidden information and the complete good faith of the stakeholders. In comparison, negative selection is – by necessity – a more frequent case. In such cases, the relevant information is available to the parties. At the same time, the individual or group possessing the information consciously abuses their dominant position. Moreover, this specifically disadvantages those who currently best comply with the existing selection requirements, but in spite of this are vulnerable due to the lack of a proper negotiating position or interest-asserting capability. However, the dominant position or power possessed by the relevant party can also be used “according to its intended purpose”, which enables the implementation of positive selection that is very likely to promote development.

Journal of Economic Literature (JEL) codes: D81, D82, D92, E32, L15

Keywords: economic evolution, economic selection, adverse selection, negative selection, market structure, stakeholder theories

1. Introduction

In folktales, it is a common ending that good deeds are amply rewarded. The fact that this is not always so in everyday life seems natural, since even in a modern market economy not every effort is destined to succeed. It is more remarkable that in Eastern and Central Europe we usually do not feel that the message of the adage “It is the horse that pulls its weight that gets beaten” is no exaggeration. Mihály Vörösmarty wrote in his poem titled Appeal: “*And here in age-long struggles fell our best and noblest, dead.*” In fact, the way a particular community, organisation, group or company treats its best members tells a lot about it. A military leader or even a football coach worth his salt knows that the best persons should be

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protected, treated gently and supported, to enable them to serve the interests of their communities, and ultimately those of the leaders for as long and as best as possible. They know that if the existence of the best ones are put on the line or even lost, the survival of the community may become questionable. On the other hand, in everyday life it is common that the best employees, managers, the best customers, even high-performing companies or entire industries suffer disadvantages. Typically, economic operators suffer the disadvantages not directly in their person, legally or physically, but rather because the goods, services produced by them or the activity performed by them, generally, their implemented activities are underrated. This underrating may occur both inside and outside the organisation, and it is reflected back (*Schumpeter /1934/ 1980*) to every operator participating in creating the given value. Here is what István Széchenyi wrote about it: *“The Hungarian farmer cannot bring his fields to the highest level of flourishing. (...) It is because of limitations, especially the limitation of meat, that one of the cornerstones of our agriculture is paralysed, and therefore stands with one leg raised. The administered price of meat makes all proper fattening useless, and wherever fattening is useless, there one of the cornerstones of the economy is missing. Good meat is not more expensive than bad meat, so why would a farmer strive to produce better meat?”* (*Széchenyi /1830/ 1903: 58–59*). The majority of domestic economic operators do not seem to understand – and this is almost like a tradition – the seriousness of the requirement that the high quality they need – whatever the area where they want to utilise it – should be properly appreciated and rewarded, to enable the relevant efforts of the stakeholders to benefit in the longer term as well. This study is intended to provide assistance for the awareness necessary for this.

2. The foundational logic of economic evolution

Darwin’s theory of biological evolution had a strong impact on several disciplines, including economics. The idea that, by way of the filtering effect of evolution, a population capable of achieving a high level of harmony could be created from the constantly emerging variations, has stirred the fantasy of several economists. According to *Thorstein Veblen (1899: 125)*, who is considered one of the founders of evolutionary economics, *“The life of man in society, just like the life of other species, is a struggle for existence, and therefore it is a process of selective adaptation. The progress which has been and is being made in human institutions and in human character may be set down, broadly, to a natural selection of the fittest habits of thought and to a process of enforced adaptation of individuals to an environment which has progressively changed with the growth of the community and with the changing institutions under which men have lived.”*¹

¹ *Veblen (1972: 180)*

For a long time, the analogy between biological specimens and economic operators, the population and the national economy, industry and market seemed quite unambiguous. Especially in the special case when a high level of adaptability of economic operators and that of the population was identified with economic development. *Kotosz (2002)* also pointed out that in fact, there is no accurate, generally accepted definition for evolutionary economics, similarly to several branches of economics, especially to those that do not belong to the mainstream. In the opinion of *Beinhocker (2006)*, applying the terminology of game theory, economic evolution itself, its basic logic is a “child’s play”, in that there is and there can be no difference between the researchers and analysts exploring various fields of this subject. In fact, we have a given set, a population which – still or already – must have at least two members. Let us assume that there are minor or major differences among members of the population in terms of their capabilities or the activities they perform. Hence, let us assume that there are variants. Through selection, certain consequences are attached to the individual variants, depending on the extent of their adequacy in respect of the current selection requirements. It is possible that differences compared to one another – who is which variant – happen to be insignificant, but typically the variants may face different consequences. Consequences that are more favourable improve the chances of the given variant for survival or its survivor conditions, and consequences that are generally adverse do the opposite. According to *Beinhocker (2006)*, economic evolution is different from biological evolution in that the role of awareness is extremely high in both the creation of variants and in the field of selection requirements, and thus the biological characteristics of humans could be much less important. In fact, *Harford (2011)* highlights that in biological evolution there is and there can be no foresight or planning, only different levels of compliance with the trials. Only the current variants and the current selection requirements exist. At the same time, in economic evolution humans try – with varying degrees of success – to look forward, to plan and to gain advantages in selection, even at the expense of longer-term investments or sacrifices. The reason why evolutionary economics itself is still so diverse in the opinion of *Beinhocker (2006)* is that various concepts exist to explain the emergence of variants, selection requirements, the process of selection or the existence, expression and transfer of genes, as well as the spread of successful patterns and concerning the relationship between economic development and economic evolution.

Schumpeter, one of the major economists of the 20th century, also believed that the foundational evolutionary logics can be transferred into economics. As is pointed out by *Shionoya (2008)*, Schumpeter initially interpreted development and evolution as basically identical. *Hagemann (2008)* points out that the early, famous work of Schumpeter – *The Theory of Economic Development* – systematically used the term evolution instead of development in its earliest version. Even in its title. However,

according to *Shionoya (2008)*, Schumpeter later realised that although the role of knowledge and awareness in the process of economic evolution is very high, it is not at all obvious that those innovations – i.e. variants – that are successful in the short term will result in favourable quality transformations, i.e. the development of the economy in the longer term as well. In the opinion of *Nazaretyan (2003)*, it could also happen in the economy that short-term efficient adaptation to the current conditions destroys the foundations of longer-term survival. In other cases, drastic changes in the circumstances subsequently make the former highest level of compliance and adaptability a complete dead-end. This is what we call an evolutionary dead-end. An evolutionary dead-end is not very common even in biology, and in economic evolution it is even less frequent. According to *Deng (2003)*, there are several development alternatives even at this point, and the decision time horizon of the decision-makers is still very far from the beginning of the supposed endgame. Therefore, in these cases we can talk about developmental dead-ends at best. In their theory of the so-called learning society, *Stiglitz and Greenwald (2016)* keep away from the specific sub-areas of economic evolution, the debates going on about these, and only focus on the basic rationale of economic evolution, as outlined above. According to *Stiglitz and Greenwald (2016: 188–190)*, countries that are capable of alleviating the major problems of economic evolution by establishing and maintaining the creative and learning capabilities of society can be successful or relatively more successful in the future. In their opinion, the following factors counter the efficiency of economic evolution:

- when profit is applied as an exclusive criterion of selection, as the sole benchmark of adequacy;
- when the time horizon of the operators is short;
- when economic competition may be decided even in the short term;
- when those that issue negative externalities, i.e. the beneficiaries of irrational abundance, are able to secure a lasting evolutionary advantage.

3. The requirements of selection

In the opinion of *Nelson and Winter (1982)*, the selection criteria are the requirements that define the likelihood of survival by the measure of compliance with them, as well as the characteristics of the survival state, i.e. the conditions for survival. In respect of economic evolution, *Nelson (1995)* drew a distinction between biological selection criteria consisting of conditions created by the natural environment and “cultural” selection criteria created by humans. In economic selection, “fit” operators which maintain a higher level of harmony with the current selection criteria have better chances of becoming survivors in the given period

and in a favourable state, which will provide more significant and positive chances for them later on. Therefore, operators who enjoy an advantage in selection can “afford” more than those who are less in harmony with the selection criteria. The source of that could be knowledge, power, health, time, money or other resources. *Friedman (2007)* concludes that if a more successful survivor starts the next period with such additional reserves, this will provide to them relatively higher freedom of action, less vulnerability and more opportunities for influencing and making an impact. *Nelson and Winter (1982: 262–263)* defined four elements of the environment of selection:

- what are the expenditures required by the individual activities and what returns can be accomplished by them;
- the method by which the preferences and rules of the consumer or the regulatory agency affect efficiency;
- what relationship applies between efficiency on the one hand, the size of the operator and the level of market concentration on the other hand;
- in what way and to what extent one can learn from successful innovators, to what extent copying is facilitated or prevented.

Within the cultural, artificial selection environment, a market and a non-market selection environment has been distinguished. According to *Dosi and Nelson (1994)*, some actors – for example, legislators – specifically show a certain purposefulness and complexity, in order to shape the partial results of the selection, typically through the selection environment. At the same time, the economic thought of the early (1934) school also associated with the name of *Schumpeter (1980)*, namely that ultimately it is the consumers who determine the value of everything, became popular and remains so to this day. It is their decision that is reflected back all the way to the prices of raw materials or is expressed at the given point in the value chain in the amount of wages as well. Agreeing with that, *Sandlin and McLaren (2010)* emphasise that ultimately it is the consumer who helps reproduce capitalism on an ongoing basis. Naturally, it makes a difference how successful reproduction is, especially in the long term.

An actor that has a so-called dominant (market) position is capable of influencing the definition of the selection criteria of the actors affected by its activity, including customers, competitors or suppliers, in a direct and meaningful way, even in the short term, as well as the compliance of the stakeholders with these selection criteria (*Utton 2003*). Meanwhile, the relevant stakeholders are capable of exerting similar impacts on the party in a dominant position only in an indirect manner and in the longer term, by the so-called co-evolution. Power is not a market category. Power means formal or informal prerogatives in a hierarchical relationship, for the

person having the power to direct or substantially influence the activities of the obligor, in order to accomplish aims that are theoretically the aims of the group, also defined by the hierarchical relationship (*Kornai 1993*).

4. Group selection

By group we mean an interest community of individuals not isolated from one another, where cooperative interactions assuming reciprocity occur relatively regularly among the members and where the activities of the members have a meaningful impact on each other's goal attainment activity (*Bergh – Gowdy 2009*). Therefore, group members depend on one another and thus they are forced to display a certain degree of cooperation, adaptation and mutuality, especially because this dependence is not an occasional arrangement, but rather a permanent one, owing to the series of interactions. Following this logic, all organisations, including companies, can be considered a group. But the community of residents in a street, family or circle of friends can also be a group. There may be overlaps between groups, i.e. one person may be a member of multiple groups at the same time. Membership is not necessarily established by joining a group formally. Similarly to contracting, implied conduct may be very significant in this case as well. In other words, in the event of the realisation of a series of interactions with other members and compliance with the rest of the conditions for group membership, we can already talk about belonging to a group, without formal joining or admission having taken place. In the study, within groups we focus on companies. In accordance with the concept of the group as outlined above, according to *Van den Bergh and Stagl (2003)*, during group selection a member of a particular community participates in selection primarily and crucially not separated from others, not on their own, but rather as part of a large or small community as a unit of selection. In this way, it is not the particular individual characteristics, but rather the relevant group characteristics that need to apply with the selection requirements. A group may exist because the individual obtains or may obtain some kind of selection advantage from activities more or less coordinated with its peers and its "proximity" to them: its chances for survival increase and its survival conditions may improve. At the same time, the entirety of the group may also obtain a selection advantage through the relatively larger and more diverse population and through synergies. The decision situation often mentioned as an example "a smaller slice of a larger cake or a larger slice of a smaller cake" applies to the situation as well. The operation and survival of the group in the longer term is also manifested by the fact that series of interactions regularly occur among group members and with other groups over and over again, i.e. using the terminology of game theory, infinitely repeated games are realised.

During these repeated interactions or “games”, group members have a chance of getting to know one another better and they implement combinations of various alternative actions and “test” the strategies of themselves and those of others. Eventually, a higher level of trust and a sense of responsibility may develop among “veteran” members of groups that experience and survive longer periods, and furthermore, a shared value system and routines may be established, which can significantly facilitate the successful achievement of their aims. Not every group is destined to succeed. Establishment of groups and participation in them provides an opportunity for acquiring selective advantages. However, as with every opportunity, this also needs to be managed properly for the individual to retroactively consider its group membership for a particular period as a success. In economic group selection, it is also not ruled out that every group may strengthen its survival characteristics absolutely (*Polignac 1995*), even though substantial differences may persist, originate or increase compared to one another.

Nevertheless, the development of the size of the group or population is also a substantial criterion of acquiring an advantage in group selection (*Bergh – Gowdy 2009*). The size of the group is so much a benchmark of success that according to *Avilés (2002)*, it is a general feature among individuals that in the case of two alternative groups to choose from, they want to join the larger group. *Barry (1961)* pointed out that when the population of a particular city decreases below a certain level, it starts showing signs of collapse, since outward migration could become a self-propelling process. On the other hand, the attainment of a certain city size will generate a self-propelling process in the opposite direction. *Diamond (2009)* illustrated by several historical examples that a human community becomes vulnerable and its direct physical survival is endangered if – while meeting other conditions – the size of the group drops below the critical level and there is no way to substitute the lost members. Today, in a modern market economy, the physical existence of members of a particular group cannot be endangered, but at the same time, the decline and termination of the groups themselves – companies, organisations, populations, markets, industries, customer communities and others – is a very real danger. We know full well that this is an inevitable feature of the operation of the market economy. Still, when it is a group to which we are committed, we would like to act against the decline or termination. On the other hand, as we will see in the following part, it does make a difference whether a group is defeated in selection because considering the important, substantial aspects, it does not perform well enough compared to the rest of the groups, or because sand got into the cogwheels of the operating mechanism of selection.

5. Stakeholder base and free riders

The so-called stakeholder theory is primarily associated with the name of *Edward Freeman (1984)*, a representative of the theory of strategic management. It intends to demonstrate that a company is structured not only according to the shared will of the owners and the employees, but it is subject to the essential influence of other stakeholders as well. *Masahiko Aoki (1984)* uses the methodological toolset of game theory to present the basic relations determining corporate existence by presenting the company as a system distinct from its environment, through the emergence and changes of its internal institutions. *Clarkson (1995)* identifies primary and secondary stakeholders within the stakeholder group. Primary stakeholders include those without the support and cooperation of which, i.e. the realisation of interests necessary for that in the making of company decisions, it is not possible to ensure the existence or survival of the company at all. This category generally includes employees, management and owners, but apart from these, even an authority that issues an operating license may be a primary stakeholder, for the necessary time. Members of the secondary group are also important, but their support “only” increases the efficiency of the company, it has a favourable impact on the likely survival state conditions of the company. *Mitchell et al. (1997)* argue that three conditions must be met simultaneously for one to be a stakeholder. It should be affected by the operation of the company, this concern should be important for it from some aspect, and it should have some kind of power to affect the operation of the company. *Freeman and Liedtka (1997)* go as far as talking about stakeholder capitalism. In other words, the engine of existence and development as a capitalist company is a stakeholder base that is more extensive and stronger compared to other systems. Since each of the stakeholders is subject to some kind of impact by the given company, organisation or activity, therefore directly or indirectly, as initiators, suffering or receiving parties, each of us is a participant of the relevant interactions. That way – regardless of what other groups the members are also interested in – each of us paddles in the same boat in terms of selection and moreover as a group. Naturally, this is an advantage for those who are affected positively and a disadvantage for the negatively affected.

One of the most well-known analyses of the so-called free rider problem that loads the operation of communities can be associated with *Hardin (1968)* and deals with the tragedy of commons. Before that, *Olson (1965)* provided the general theoretical framework. It posits that an actual or potential group member may expropriate some of the common goods produced by a group, in such a manner that while doing so, it does not take its share or its fair share of the burdens of the common good that has become a private good in the meantime. The result of the free rider behaviour will be a decrease in group performance or group efficiency, or it relatively underperforms the level that would have become attainable but for the

free riders. The term “free rider” does not sound as bad as the level of the negative impact it could have on the given group in group selection. Recently, free riding has also been identified as a negative externality burdening the group, regardless of whether it is committed by an actual group member or only by a potential group member (*Milgrom 1987; Laffont – Tirole 1988; Rey – Salanié 1996*). Free rider group members are not real, only pseudo-members in the conceptual framework of group selection. While earlier free riding was almost considered as a natural feature of large groups, i.e. something that they have to tolerate, later approaches consider it much more as a negative externality that can and should be reduced.

6. Adverse selection and negative selection

It is important to clarify at the beginning of this chapter that this study is intended to provide a normative approach to selection requirements. It is not our aim to assess the “adequacy” of selection requirements, such as their compliance with the needs of sustainability. In the process of economic evolution, adverse selection and negative selection are phenomena that can occur regardless of the actual selection requirements that apply in terms of economic development. Subsequently many selection requirements are proven to have had an expressly adverse effect. At the same time, this failure arising from the trial and error method is an apparent feature of both biological and economic evolution.

The mere name of adverse selection means that here we are talking about such an unusual thing, a “selection anomaly” in which selection occurs specifically despite the selection requirements. Not because of human misconduct or ill-will, but because in respect of certain goods, situations and activities the knowledge of the involved actors is not sufficient to set up selection requirements that they are also capable of enforcing. As a result, economic operators which otherwise fulfil the relevant selection requirements relatively the best by the goods produced by them, by their services, activities or performance have to leave the group, for example, the industry, market, company or organisation. The reason of departure forced by economic necessity is that owing to the high level of compliance with the selection requirements, the goods, services, activities or performance considered of the highest quality and the economic operator which provides these do not receive the highest consideration in relative terms to which they are proportionately “entitled”. They will not and cannot receive it, because the other economic operator which determines and provides the consideration is not in a position where it could determine the level of compliance with the selection requirements with at least rough accuracy, owing to the information asymmetry it suffers. Therefore, the consideration is only defined as an estimate and apparently its basis can only be an expected quality value. In this manner, by necessity, the consideration available for the actors capable of providing the relatively highest level of quality substantially

underrates their efforts. This leads to them leaving the group to find another group where relevant efforts are rewarded in the appropriate manner and on the appropriate level. It is important to note that money or value expressed in monetary terms are not the only forms of consideration, it can also be, for example, moral appreciation. Since after some time it is noticed that providers of higher quality have left, more and more estimated considerations are defined for the remaining group members, each time on a lower level than before. Unless some kind of solution is provided for the problem of the evaluation of quality, according to *Akerlof (1970)*, the group will eventually fall apart.

In everyday life, processes are also labelled as adverse selection that are in reality forms of manifestation of negative selection, which is discussed later. In fact, in adverse selection the actor affected by the selection fulfils all the current selection requirements at relatively the highest level by the good, service or activity provided by it or by its performance, but it still cannot obtain the relatively proportionate consideration. The system is prevented from doing so by hidden information. On the contrary, in the case of negative selection discussed below, the undervalued actor cannot fulfil an important selection requirement properly, while it can fulfil all the others. This leads to a phenomenon with similar manifestations as the one we saw with adverse selection. Here, the problem of the undervalued actors is that they are not in an appropriately strong negotiating position. Not only are they not in a dominant position or in a position of authority in respect of the party that defines the consideration, their interest-enforcing ability is also expressly weak. Although this selection requirement is not one directly associated with the goods, services or activity provided by the actor, or with the performance provided by it, it still is a selection requirement.

Tirole (2016) concludes that all in all, selection can be negative or positive. If appropriate objectivity is ensured, it is actually possible to make a distinction between the two. The relevant community may develop through positive selection. For example, according to *Tirole* a case in point is when the market is expanding, something that is also manifest in such features as the improvement of the determining factors, which could make the relevant activities more efficient. In the case of a market, this means a lower price level projected on unchanged products, while the producer side is also capable of retaining its profitability in the long term. However, negative selection undermines and disrupts efficiency in some way, which will result in adverse consequences for the community sooner or later. I have summarised the comparison of adverse selection and negative selection in *Table 1*.

Table 1		
Comparison of adverse selection and negative selection		
Aspect	Adverse selection	Negative selection
Who will be in a selective disadvantage	Those who comply with all the selection criteria the best, by the goods produced by them, or by their activities or performance.	Those who comply with all the selection criteria – except one – the best, by the goods produced by them, or by their activities or performance.
What circles are adversely affected by selection directly	External and internal stakeholders	External and internal stakeholders
Deficiencies of disadvantaged parties	Cannot express their high quality outwards	Have no negotiating power, are in a subordinated position
Good faith of those who cause a disadvantage	They are in good faith	They abuse their rights, dominant position or power
The purpose of originators of disadvantage by causing a selective disadvantage	Causing a disadvantage is not intentional	A private interest against the internal stakeholders, a short-term group interest against the external stakeholders
Impact on the size of the group	Constant loss of members	At the beginning there is no loss of membership, but later on it becomes continuous
Final outcome of the process	Termination of the group	Termination of the group
Opportunities of removing, suppressing	Reducing the information asymmetry below the proper level	Imposing sanctions for abuse by the relevant selection criteria and/or by creating commitment of the abusers
Forms of manifestation of this phenomenon	Equal treatment regardless of quality, with hidden information	<ol style="list-style-type: none"> 1) Equal treatment regardless of quality, without hidden information; 2) Ad hoc and collective soft budget constraint; 3) Abuse with the dominant position of monopoly; 4) Corruption hidden activity; 5) Maintenance or change of status quo while suppressing higher quality

7. Fundamental types of adverse selection and negative selection in everyday life

As seen previously, in reality negative selection underlies most of the processes of apparent adverse selection and not actual adverse selection. As we will see in the summary chapter, in themselves dominant position or power are not adverse for the purposes of selection either, since they can be used in many ways. The problem of negative selection basically occurs when the abuse of dominant position or power is intentionally targeted against those who otherwise fulfil every selection

requirement at the highest level, with the exception of interest assertion. In the following part, we present a brief description of real adverse selection and those types of negative selection that are significant in respect of economic selection.

7.1. Equal treatment regardless of quality, with hidden information

In his famous study, *George Akerlof (1970)* presents how informational asymmetry in a market between the demand and the supply side can result in adverse selection, which may ultimately lead to the collapse of the market. This process can intensify owing to the high and increasing uncertainty, since there are no institutions operating in the market – as clear selection criteria – that could minimise this uncertainty. In Akerlof's model, buyers cannot assess the actual quality of the product, and therefore they have to underprice it systematically and increasingly. These activities also increasingly keep sellers which come up with better quality products that are of higher quality from this aspect away from the market. For lack of a better alternative, an average good considered to be of average quality could not be priced higher than the average price, which creates an adverse situation for sellers delivering higher quality and a favourable situation for those delivering lower quality.² Therefore, in this case the buyers are not in a position to assess quality of the goods because of the hidden information, and for lack of the institutionalisation of some kind of solution, this will result in a deterioration of the market. In this case, it is a consequence of the lack of knowledge of the actors on the buyer's side, and moreover in an unintended way. Buyers expressly want to recognise higher quality and are also willing to pay higher prices for it proportionately to that, but they are unable to do so.³

Arrow (1979) considered the uncertainty of the quality of goods to be purchased more significant than even the uncertainty of the prices. Price and non-price indications – such as those on quality – are equally significant in the decisions made by economic operators. If an insurance company is not capable of screening out the low-quality portion of possible customers, the phenomenon of adverse selection may become extensive, and increasingly those customers will take out insurance who will raise the highest compensation claims, at a high price, owing to the poor portfolio. As the customer portfolio is deteriorating and insurance premiums keep rising, more and more high quality customers will stay away from the insurance market. Therefore, the company needs to make efforts to be able to offer a proportionate insurance premium for everyone, distinguishing the high quality customers from the low-quality ones: screening theory (*Spence 1973; Stiglitz 1975*). By this, the expenditures on obtaining and enforcing non-price type indications and information may be recouped. However, as has been pointed out

² The research of *Major (2014)* on the system of relations of economic operators and their bilateral asymmetric informational positions has led to similar conclusions.

³ *Vincze (1991a, 1991b)* analysed this model of the emergence of adverse selection in great detail.

by *Bester (1985)*, it is important to fine-tune the severity of screening. Excessive severity could plunge the market into a decline – through the loss of some of the high quality customers – in the same way as the penetration of processes of adverse selection can. Unreasonably loose control could expose the operation of the company to excessive risks. Even high quality customers are interested in conveying genuine signals – signalling theory (*Spence 1973*) – to the effect that they can be considered high quality customers. In their compelling model simulating the behaviour of the insurance market, *Rothschild and Stiglitz (1976)* present, on the one hand, that higher quality customers express their lower risk characteristics by a higher level of risk sharing with the insurance company, i.e. the deductible. Naturally, the repeated application of screening on one side of the market could encourage the actors on the other side or in certain markets even force them to release signals about themselves that comply with the system of conditions of screening (*Riley 1989*).

7.2. Equal treatment regardless of quality, without hidden information

Of the types of negative selection, let us first review the case in which the actor makes no distinction on the *input side* between different qualities, in respect of either the supplier or the employees. In this case the actor has appropriate information concerning the inputs, and in respect of the inputs it is also important for it to obtain the highest possible quality. However, by abusing its dominant position it attempts to obtain higher quality at a price that is usually attached to lower quality. In other words, the pricing of the inputs is not quality-dependent. It is obvious that according to the basic logic of the market, in this case the actor could only obtain higher-quality inputs if the production of these involves lower expenditures by the actors affected there. But in a high number of cases this is not so. What else could still ensure that the actor can obtain higher-quality inputs, more beneficial for it, persistently at such lower prices that could only yield an adequate income for the input-side stakeholders at a lower level of quality? According to *Kegan and Lahey (2017)*, a large number of economic operators display substantial resistance to any kind of change. In our case, a change for the input-side stakeholders producing high quality would mean that they would have to accommodate to the production of lower quality inputs requiring lower expenditures. This is only possible for suppliers in the first place, since an employee is not able to invalidate their qualification, experiences or other required skills and competences. If an employee is not able to take a proper bargaining position, they have no other choice than accept the abuse of power to their disadvantage or join another group with better outlooks. This lock-in situation is extensively analysed by *Hirschman (1995)* in his work titled *Exit, Voice, and Loyalty*.

However, in the case of suppliers, “quality deteriorating” production methods must also be elaborated and learned and this too requires efforts. Helplessness could

stabilise production at an earlier level of quality, at a higher one in our example, (*Schumpeter 1980*). The measure of the producer's helplessness occurring as a result of technological change and manifest in the duration of staying away from change, is significantly shaped by the size, knowledge and income of the operator (*Dong – Saha 1998*), on the other hand, the cultural embeddedness of the owners formulating the production strategy, managers or employees, their system of norms do not enable the intentional reduction of quality even if it would increase the profitability and survival chances of the operator (*Solow 1979*). If the production of the high quality "best possible" good is based on deeply embedded norms, customs or possibly religion, then these could be maintained for as long as several decades or generations (*Williamson 2000*) even when consideration is not proportionate with quality. It happens often even without the institution of embeddedness of efforts at higher quality, that commitment is on a personal or group level. The operators perceive the disappearance of relatively higher quality as a crisis and they would like to terminate this crisis by the institutionalisation of higher quality on the one hand, on the other hand, by accepting and obtaining acceptance for a proportionate market price, if they had an appropriate bargaining position or interest asserting capability for that (*Sylvander et al. 2006:63*).

The second sub-type is the case of collective reward and penalty. Both of these concepts consist of two components. As was pointed out by *Avnar Greif (2006)*, in the case of collective punishment, each member of a particular community participates in punishing those who operated in violation of the rules, regardless of which member of the community was injured directly. Any member of the community who fails to participate personally in punishing the perpetrator will be punished themselves. At the same time, even if the perpetrator acted alone, not only one person will be punished, but the group that includes them as well. In the case of the medieval "merchants of the Maghreb" this meant that any member of the merchant community who acted in grave violation of the rules was no longer allowed to trade with anyone, he was placed under a certain kind of boycott. This could be easily extended to include several members of his narrower group or even to the entire group, regardless of the fact that the rest of the affected group members apparently did not commit any crime. Therefore, collective punishment was intended to take advantage of a stronger commitment to the narrower group, for the benefit of the larger group. This kind of punishment is a strong deterrent. The method of decimation, as applied in ancient Rome, is based on a similar fundamental rationale. The fundamental rationale of collective reward is similar. In other words, it is not that – theoretically – it would be impossible to clearly identify those members of the community who deserve a reward or that no differentiation would be possible among them, but rather that rewarding the entire group provides a better drive for increasing the cooperation of the members. According to *Narloch et al. (2012)*, the system of collective rewarding is workable if

the members of the group are appropriately homogeneous, in terms of both their individual characteristics and their interests. This system presumes appropriate group cohesion as well as cooperation within the group. However, where these attributes are missing, those members of the group which contribute to group efforts to a relatively higher extent, by higher expenditures or more significant sacrifices could more easily deplete their reserves, while their proportionate entitlement of the collective reward does not compensate them for all of this (Willer 2009). In a community that is not closely-knit or not homogeneous enough, collective punishment means a similarly substantial disadvantage for those who otherwise fulfilled the selection requirements relatively at the highest level, but there is no way to have their extra efforts returned and they have to suffer the same disadvantage as the others. It is these operators who are the first to see their operations and activities fail (Heckathorn 1993). It needs to be highlighted that it should also be interpreted as collective punishment if in reality there is no formal collective punishment, but there is no reward either. Therefore, where a community is not appropriately homogeneous, tightly-knit and cooperative to start with, and although there are no collective punishments, but there is no differentiated reward system either, there we will certainly face the consequences of negative selection.

7.3. Ad hoc and collective, soft budget constraint

When analysing the soft budget constraint, *János Kornai (1997)* points out that in the case of a hard budget constraint it is essential for the operators to attain an appropriate level of efficiency from their income, to be able to cover their expenditures. However, with a soft budget constraint the budget is no longer able to constitute a bottleneck for the operator. Those who should become victims of this selection requirement are also able to continue operating, since their actual or relative losses – relative to the more efficient ones that is – will be covered eventually. If they are saved by the state, then it will marshal the resources for this coverage of loss and income support by directly or indirectly taking away the profits of the successful operators. If the profitability of the company does not significantly affect the remuneration of the management, then there is no appropriate motivating force for the management to make substantial efforts in order to reduce costs and increase profitability (Kornai et al. 2004). The same applies to subordinates: successful innovation draws no or insignificant rewards from the centre, even at management level, which hardly affects those who actually did the job (Kornai 2010). The presence of soft budget constraint in a group does not necessarily mean that negative selection is also present. Kornai (2008) describes that the regular annual debt consolidation by the state in the case of domestic hospitals and “bailouts” results in a situation where the hospitals have clearly adapted to this feature of their financial environment. Those that attained a relatively greater harmony with the rest of the selection requirements – i.e. are among the best in terms of healing and prevention and generally in financial management – as

well as those that did not. In this way, hospitals that represent higher quality are not necessarily disadvantaged only because they show greater harmony with the selection requirements, i.e. there is no negative selection at present among hospitals in Hungary. Apparently, they operate and manage their finances with wide efficiency gaps according to several aspects, but those hospitals that represent higher quality do not have to suffer selective disadvantages. Having said that, it is true that the reason why hospitals need a bailout by the state at the end of each year, is that they are underfinanced by the state during the year, as a way of motivating them for cost efficiency. The debt consolidation of local governments implemented between 2011 and 2014 is a different situation. Similarly to hospitals, *Lentner (2014)* did not find negative selection for these either, but only because he did not meaningfully include in his analysis those local governments that had not accumulated debts earlier, and despite that, were capable of significant development. A budget constraint that is occasional and ad hoc in nature and is also soft occurs too infrequently to make the rescued parties view it as a selection requirement and adapt to its existence. Despite that, this phenomenon also clearly affects selection among local governments (*Vigneault 2005*) and this applies to countries other than Hungary as well. Local governments with balanced finances are put at a disadvantage by the occasional, but general debt consolidation plans that apply to everyone – a soft budget constraint – compared to those that became indebted generally through their own faults. By their balanced financial management they caused just as much “damage” to their own local government as the amount of the debt that they could have borrowed and then have consolidated by the state. Although in Hungary the central government took notice of this controversial situation and intended to provide compensation for local governments with balanced finances, only a token amount was provided as compensation. In the case of Hajdúszoboszló, it remained below 10 per cent, and the local governments had to submit grant applications even for that amount. At the same time, the awarded support was allowed to be spent only on projects that were substantially completed earlier in the areas of well-managed local governments.⁴ With this, the small town was put at a disadvantage of about HUF 3 billion compared to those cities that financed their similar tourism developments from loans.

7.4. Hidden corruption

According to the principle-agent theory, agents will basically follow their own interests that may conflict with the interests of the principal. Concerning the decision characteristics of agents, there is an informational asymmetry to the benefit of agents, and the higher risk appetite of agents compared to their principles partly derives from this (*Eisenhardt 1989*). To talk about corruption, *Graaf and Huberts*

⁴ Support for developments of municipalities pursuant to Article 10 of Annex 3 of Act C of 2014 on the central budget for Hungary for the year 2015.

(2008) add another condition to this, namely the condition that the agent needs to assert its own private interests, through the violation of the rules applying to its activity, at the expense of the interests of that group where it has obligations and responsibility as a member. The power that was abused by certain group members in this case is enabled by the informational asymmetry from which they benefit, and is created by their decision and action autonomy of a specific measure. In the United States of America mainly the abusive practices of the management of private companies are considered corruption (*Heidenheimer – Johnston 2011:28–29*), after all, it is not necessary to have state property or a public office for the interests of a community to be sacrificed illegally in the assertion of private interests. In the framework of the principal-agent theory, corruption related to the public sector can be interpreted similarly, with the difference that the politicians who oversee the offices are themselves the agents of the voters. Therefore, in this case we talk about agents of agents. As is presented by *Guriev (2004)*, because corruptible officials or managers demand a share of the implementation costs or revenues of projects, corruption systematically and continuously erodes the highest quality. This is because typically not the best ones will become the winners, since the best bidders would not have to apply corruption in order to win. Lower “quasi-quality” provides more available resources to be skimmed for those involved in corruption. But even if occasionally the highest quality was selected, economic motivation for further quality development would still be weakened. Thus, high quality goods are gradually disappearing from the market in any case, and the increasingly poor quality can cause increasingly worse damages to the community. Competition is distorted, and indirectly the entire society suffers welfare losses (*Hámori 2002*). According to certain experts – *Huntington (1968)* and *Leff (1964)* among others – corruption is not generally and clearly harmful concerning the development of the economy. In their opinion, several kinds of corruption increase efficiency, improve operability and provide lubricant for the machinery of the economy as an early stage of the institutionalisation of the new rules. Others – including (*Méon – Sekkat 2005*) – do not share this view. In their opinion, the assertion of private interests at the expense of group interests means a disadvantage relative to the affected groups in selection, even if otherwise those rules that are violated do not support the development of the group adequately. Only such illegal activities can actually be a “lubricant” for the machinery – while committing not corruption, but other acts of crime – that directly prioritise the perceived interests of the group. It is true that all this is done probably at the expense of other economic operators, while personal private interests may be satisfied indirectly. *Bardhan (1997)* pointed out that the fact that Eastern European countries were capable of accomplishing economic growth parallel with increasing corruption after the political changes, but this does not mean that corruption did not set back the development and growth of these countries. We will never know what would have been the growth rates of these countries with substantially less corruption. However, it is certain that economic operators who were unable to

fulfil only one single selection requirement at a high level were pushed back and put at a disadvantage by necessity, i.e. they did not have the proper bargaining position and they lacked adequate interest-asserting capability. Therefore, negative selection created and could create chances for those operators by corruption who had an excellent bargaining position and interest-asserting capability, even though they were less capable of meeting other selection requirements. In accordance with that, the calculated estimates of *Mo (2001)* show that 1-per cent increase in the level of corruption reduces economic growth by 0.72 per cent, in other words, one unit of increase of the corruption index reduces economic growth by 0.545 percentage points.

7.5. Discriminatory action of a monopoly at the expense of the best customers

According to *Lambsdorff (2002)*, in the vast majority of cases, monopolies are fundamentally created by the intervention of the state into the economy. Either the state wants to realise rent through them or it wants to provide these to another economic operator. According to Lambsdorff, there is an obvious connection between rent-seeking and corruption. But rent can be obtained not only illegally, not only by corruption. A monopoly is capable of providing rent to its owners in a legal way as well (*Hillman – Katz 1984*). Typically, monopolies undoubtedly have a dominant position, but this derives not only from their market share, but also from demand features, for example, from its different elasticity, (*Pindyck 1985*). Economics has been interested in monopolies for a long time. The social deadweight loss caused by monopolies is an essential parts of textbooks on microeconomics, as is the discussion of applied price discrimination. According to these, it seemed necessary that monopolies should be considered one of the basic types of market failures (*Stiglitz 1986*). At the same time, *Vickers (2005)* notes that the abuse of dominant position by a monopoly may not be manifest in relatively higher prices, but in the tools by which it attempts to maintain its monopolistic power. Such areas of maintaining the dominant position as a restriction of competition or unfair competition may lead to inequitable, unfair competition, or perhaps to the total lack thereof, and indirectly may not serve development either. However, the way actual and possible competitors are treated cannot result in negative selection. As pointed out by *Baumol (1982)*, even a monopoly with the most powerful dominant position, i.e. the one that abuses it the most, only becomes unchallengeable if currently and in the predictable future it can present the best possible proposal to its customers, in terms of both price and quality. If this is not so, then potential entrants pose a real threat to it even if very serious barriers to entry exist. Therefore, the only way for a monopoly to maintain its monopolistic power is to ensure that it is the one that meets the existing selection requirements the most, however inequitable these might be. As long as only such challengers, such actual or potential competitors are defeated by it who comply with the selection requirements to a lesser extent,

selection remains positive (*Schumpeter 1942*). Therefore a monopoly cannot cause negative selection in respect of its competitors. However, the situation is different concerning its suppliers, employees or customers.

In the earlier sections, the negative selection of the input side – regardless of the existence of a monopoly – has been discussed. Let us now continue with the buyer side. *Mussa and Rosen (1978)* demonstrated that the price discrimination and quality policy applied by the monopoly in respect of the individual buyer segments result in peculiar cases by creating several kinds of combinations. Indeed, when price discrimination is coupled with quality provided on a standard level, an excessively large difference may emerge in the price-to-value ratios of a good sold to the individual segments. Buyers who receive access at the lowest price receive relatively high quality in exchange for their money, while those who pay the highest price receive relatively low quality as consideration. Therefore, what is too high for the latter is not the price, but rather the consideration manifested in quality by the monopoly. If the buyer's segment that pays the highest price is composed of those buyers who comply the best with the selection requirements imposed by the monopoly, then in this case the monopoly may be losing its best customers. When a monopoly abuses its dominant position in respect of its best paying customer community, then there is a high probability of the emergence of negative selection. The only way to stop negative selection is price capping by statute or an increase in quality standards (*Besanko et al. 1987*). According to *Forgács (2013)*, the contribution revenues for domestic health insurance stem from one third of the population, while essentially the entire population is entitled to healthcare services. As he pointed out *"for those who pay the contribution, sometimes a very high amount, it is difficult to tolerate that they receive the same treatment as their fellow countrymen who never pay any contribution. This anomaly is compensated by the German social security system in such a manner that persons belonging to the upper income decile are not even allowed to use the services of solidarity-based insurance"* (*Forgács 2013:8*). In addition, those who pay the highest contribution are in the best health on average, and therefore they should use services rarely, but then in high quality. However, the domestic healthcare system does not intend to forego the resources provided by these persons, since in that case even the general quality minimums could not be maintained any longer. In turn, this results in constant negative selection, even formally the best customers continue paying social security contribution. The healthcare sector is constantly losing these persons as customers: they use private healthcare services, and now it is not uncommon that they buy these services in a foreign country. Therefore, hardly any supplementary income flows any longer to healthcare practitioners in the form of gratitude payments made by them.

7.6. Suppression of higher quality for the maintenance or change of the status quo

The status quo between the affected persons – whether they are entities or individuals – is of determining importance for every stakeholder, since this is what designates the boundaries of autonomy in activities, responsibilities, powers and decision-making. Changing the status quo, even though it can be more favourable for the given person or entity for the attainment of their aims, is always loaded with uncertainty. In respect of the existing status quo, the person or entity has certain, minor or major knowledge owing to past experiences and learning; by comparison, in respect of the assessment of future status quo they may have substantially less knowledge available. Until the new status quo is reached, several transaction and other costs are also incurred, the amount of which is not easy to forecast, nor is it easy to forecast the amount of supplementary yields. In addition to cost-benefit analysis, we should also anticipate the increase in risks, since the existing routines and skills are incomplete from the aspect of the different future, or at least they have not gone through the baptism of fire yet. In the model of planned behaviour, *Ajzen (1991)* presents the behaviour of the persons or entities as the combined effect of three factors: the norms applying to the planned behaviour or activity of the person or entity, their own relevant attitudes, and their perceptions concerning maintaining control over the future activity. It is these three factors from which such a critical level of motivating could develop that is already sufficient for the planned activity to start. At the same time, the persons or entities continue to afford special attention to the measure of keeping under control by the start of the activity, since the biggest danger for them could be the loss of control. The more relevant past experiences and similarities the person or entity has, the likelier that they will be able to keep the planned activity under control. In their theory applicable in every market, *Samuelson and Zeckhauser (1988)* point out that if in a decision situation choosing – i.e. maintaining – the existing status quo as an alternative is allowed by the community, organisational norms and the rules of the regulatory body, then it is the most likely choice to be made. And when it is not allowed, then the alternative that will be chosen is the one that will result in conditions that are the closest to the conditions provided by the existing status quo. Naturally, the extent may change, on the one hand because of taking into account uncertainty and risks as a rational actor, on the other hand, because of wrong perceptions of cognitive origin – decoding of information – and thirdly, owing to differences in psychological commitment. According to *Mokyr (2004)*, persons and groups interested in maintaining the current status quo traditionally attempt to block technological progress and other forms of development. They do so even though they could be clearly aware that those goods, services, processes and techniques and through these, indirectly those who produce them, comply better with the existing selection requirements than themselves. This is exactly why it is necessary to counter them, to put them at a disadvantage and to squeeze them out, because by their appearance, actions and

activities they made it clear that – using the terminology of *Baumol (1982)* – there is a good chance to challenge or change the current status quo. In the opinion of *Geletkanycz (1997)*, commitment to the current status quo has its roots in social norms and values, in a form that is almost genetically coded. However, it is not self-evident at all that the newly created higher quality or the operators that represent them should be put at such a disadvantage, by abusing a dominant position, that already corresponds to negative selection. The selection requirements should be especially stringent in respect of new things, but it is not desirable to create an insurmountable disadvantage for the possible tools and agents of development (*Geletkanycz 1997*).

According to *Olson (2008)*, compelling institutional changes must be applied to prepare the field for radical economic development or transformation. However, for this the community of operators interested in the maintenance of the status quo, possessing strong bargaining power and interest-asserting capability, should be significantly weakened. For this to happen, they should be put at a significant disadvantage in selection, in the short term already. As a result of the institutional and political changes, those operators who otherwise comply with the existing selection requirements to the highest degree may lose their strong bargaining positions and interest-asserting capabilities in respect of the governing power. If the selection requirements in the economy have not changed, then the market mechanisms – including the use and abuse of dominant position – are not really suitable for weakening those operators who comply best with the requirements through negative selection. However, the government is capable of launching the process of negative selection more efficiently, by abusing its power. The reason why governments abuse their power is that although formally the relevant actions may seem legitimate, they are obviously in conflict with the economic and other interests of the governed group. This is what happened in Hungary as well after the Second World War, where the prosperous peasants (kulaks) were interned to promote the political changes of the time, and extensive nationalisation took place (*Glatz 1997*). In the beginning the most successful, biggest rural farmers and companies were targeted, and later on, of those who remained, the relatively most successful, largest ones. This resulted in a permanent disadvantage in the development of Hungary's domestic economy.

8. Conclusions

In a relatively large number of cases, there are selection criteria in everyday life, the implementation of which clearly does not support the development of the economy, even in the short term. At the same time, the phenomenon of adverse selection raises its head relatively rarely in reality, since it is equally dependent on the preconditions of a high volume of hidden information and the complete

good faith of the stakeholders. In comparison, negative selection is – by necessity – a more frequent case. In this case, the relevant information is available to the parties. At the same time, the individual or group possessing the information consciously abuses their dominant position. Moreover, this puts at a disadvantage exactly those who currently best comply with the existing selection requirements, but despite that, they are vulnerable because of the lack of a proper negotiating position or asserting capability. However, the dominant position or power in the possession of the relevant party can also be used “according to its intended purpose”, which enables the implementation of positive selection, very likely to promote development (see *Table 2* for a summary of that).

Table 2		
Taking advantage of dominant position or power – as opposed to abuse		
Description	Abuse with dominant position	Example for abuse of dominant power
Equal treatment regardless of quality	Bleeding out the best operators on the input side, collective punishment, collective reward	Definition of consideration differentiated according to quality, forcing or motivating operators representing lower quality for development
Ad hoc and collective, soft budget constraint	Putting the best performers at a disadvantage, retroactively raising their alternative costs drastically	While bailing out weaker performers, provision of a proportionate premium that significantly exceeds even the full compensation of those that do not require assistance
Hidden corruption	Squeezing out the best stakeholders that do not perform hidden activities	Establishment of an organisation that ensures the coordination of individual and group interests and a high level of individual interests
Discriminatory action of a monopoly	Discrimination at the expense of the best customers	Innovations for goods that the buyers find more attractive or for cost reduction; Increasing the knowledge of the customers
Suppression of higher quality for the maintenance or change of the status quo	Pushing the best quality stakeholders to the background	Constant planning, encouragement of constant learning and adaptation, enforcement

According to *Akerlof and Klenow (2009:323)*, the perception of corruption is – similarly to other negative selection – an indication that from the aspect of the development of the group, “bad guys” managed to infiltrate the system. In fact, these “bad guys” are considered a body alien to the interests: they are pseudo-members of the group who serve interests not compatible with the interests of the group. Although they seem to be group members, in reality it is just the other way

around, and therefore their presence, their free riding cause negative externalities to certain stakeholder groups, and thereby manifests every reason that results in a selection problem designated by *Stiglitz and Greenwald (2016:188–190)* and already referred to in *Chapter 2*:

- For these individuals which abuse their dominant position, power or profit is the only success criterion;
- As free riders, they have a short-term planning horizon;
- As a result of their activity, those which best comply with the selection requirements are pushed to the background and expelled from the system within the shortest time;
- Their irrational abundance acquired through their operation regularly resulting in negative externalities provides a selection advantage for them, even in the long term.

Considering developed market economies, the leaders are not distinguished from the rest of the countries by the lack of a wild presence of dominant positions in the markets, or a lower level of concentration of power. The substantial difference lies in the fact that in the leading countries in most cases dominant position and power are used, but not abused.

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Is Learning a Wonder Weapon of Endogenous Economic Growth?*

Péter Mihályi

This essay attempts to refute the practicality of the main policy propositions of the book by Joseph Stiglitz and Bruce Greenwald (S&G) entitled Creating a Learning Society. More specifically, it looks at the 700-page scholarly work from the perspective of countries struggling to catch up with the advanced Western countries. In the opinion of the author, S&G use the term “learning” in such a broad sense that it becomes almost meaningless as an explanatory factor and/or an objectively verifiable indicator. Equally important, by using such a value-loaded, entirely positive term like “learning”, S&G create a misleading feeling in the readers: catching-up is easy (win-win). As history has shown, it is not easy. In the paper, the model of a lesser known Hungarian economist, Ferenc Jánossy (1914–1997), is presented as a more convincing explanation of endogenous economic growth.

Journal of Economic Literature (JEL) codes: E61, E71, F12, I26, I28

Keywords: Infant industry, learning-by-doing, labour productivity, endogenous growth, Washington consensus

1. Introduction

Personally, it makes me contented to see that thick theoretical books are now coming into fashion in economics once again. In the recent past, the first in the sequence was *Daron Acemoglu and James A. Robinson’s (2012) monograph – Why Nations Fail: The Origins of Power, Prosperity, and Poverty* – with 529 pages. Two years later came the 703-page blockbuster work of *Piketty (2014)* and the joint work of Joseph E. Stiglitz and Bruce C. Greenwald (henceforth: S&G) at 660 pages. One can, of course, make cynical estimates about the percentage of buyers of these books who really read them from cover-to-cover, but the sheer size of these works opens the possibility of a broad, deep discussion among those specialists who have

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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read the aforementioned books thoroughly. Social and economic issues are always multi-faceted. There is no such thing as a single-factor explanation. When complex and controversial issues, such as inequality in the case of Piketty or learning as *the* main driver of development in the case of S&G are analysed at this length, it opens up the possibility for specialists to verify or refute the authors' assertions from many angles (e.g. methodology, geographical validity, data reliability). Such a broad evaluation of new propositions is simply not feasible in the case of a journal article or conference paper, where only one assertion or hypothesis is made ("One idea, one paper") and there is simply no place to discuss the earlier, rival theories except of those published in the same or similar journals in the previous 3–4 years.

S&G certainly meet the requirements of a prudently written monograph. Nearly all the 17 substantive chapters are enriched with appendices, in which they spell out the simply formulated, take-home message of the given chapter using a formal model. What is even more valuable (and rare), in the last part of the book (Chapters 18–22 and the Afterword) the giants of the economics profession, such as Philippe Aghion, Robert Solow and Kenneth J. Arrow express their opinion on the main tenets of the book itself, as they were formulated in the first, 2008 draft of the manuscript.

There is no doubt that S&G set an extraordinarily ambitious task for themselves. In our reading, their aim was to come out with a landmark book and a persuading, unique policy doctrine on a par with the *Communist Manifesto* (1848) of the young Marx and Engels and *The Stages of Economic Growth: A Non-communist Manifesto* of W.W. Rostow (1960), an economic history account of the modern world economy. As the full title of S&G's book indicates, the authors try to build a new conceptual model of growth, development and social progress.

Authoring a thick book like this comes with a trade-off. It takes a lot of time to read it. As S&G explain, the book's main idea was born at a 2008 conference celebrating the work of K. J. Arrow in general and his "learning-by-doing" growth theory in particular. Those were very different times from the present ones, when trade wars are already being fought between the world's super powers. If the S&G book had been drafted today, it would have been a very different book in many ways.

The rest of the paper is structured as follows. *Section 2* summarises the main take-home policy recommendations of the S&G book, and then *Section 3* attempts to show the flaws in these ideas. *Section 4* introduces an alternative model of knowledge dissemination based on the book of an internationally lesser known Hungarian economist, Ferenc Jánosy (1914–1997). The advantage of his model is that he interpreted learning as a *qualitative* change, as opposed to the "knowledge gap" approach used by S&G which underscores the *quantitative* nature of the

changes. *Section 5* presents short summary and a prompt reaction to the 2018 Nobel prize awarded to Paul Romer for his endogenous growth model.

2. Starting point of the S&G hypothesis and its construction

The concept of a “learning society” has been used in the scholarly literature for almost 50 years.¹ Among international organisations, it was first embraced by the *OECD (2000)* as a key to a nation’s economic development. The idea was subsequently taken further by the UNESCO, stating that education should extend beyond formal learning (in schools, universities, etc.) and continue until the end of life (“lifelong learning”).

But this is not the point where S&G start the presentation of their hypothesis. They start with the rejection of the mainstream, neoclassical growth model, the Cobb-Douglas production function, the famous $Y=A(K^\alpha L^{1-\alpha})$ equation, the Solow model and the Golden Rule of Edmund Phelps, because this family of models assumes that technological change is an *exogenous* factor in the model. This criticism, as S&G readily acknowledge many times in the book, is not original. It is derived from *Arrow (1962)*, where the concept of learning by doing, as the *endogenous* driver of labour productivity growth was first introduced.² Let us recall that the idea of endogenous growth itself can be traced back to the so-called Verdoorn law (after the Dutch economist P. J. Verdoorn) and through him back to Adam Smith. As is well known, it was the great Scottish philosopher who first realised that the unstoppable rise of labour productivity is primarily the consequence of the division of labour which in turn leads to “the increase of dexterity in every particular workman” as a by-product of the rising volume of production. When a cobbler makes a boot or the hairdresser cuts a client’s hair in practicing his profession, he himself becomes better and more productive all the time. This is all true, even if the cobbler or the hairdresser does not invent anything new, but simply applies and practices the know-how invented and introduced by others. Thus, rising productivity is achieved through practice, self-perfection and minor innovations, without adding workers or investing significant amounts of capital. This line of thinking was taken further by *Verdoorn (1949)*, who found statistical evidence that in the long run *macroeconomic* productivity grows proportionally to the square root of output.

According to S&G, the secret of technical progress is not innovation, but the dissemination of innovation embodied in the learning-by-doing process (p. 490).

¹ See e.g. *Hutchins (1970)*, *Schön (1973)*, *Husén (1986)* and *Hughes – Tight (1995)* among the English language works published before the millennium.

² Arrow’s specific *microeconomic* example to justify the concept of learning-by-doing was borrowed from a 1936 paper published in an aeronautical journal, according to which the labour hours required to build airplane frames declined in reverse proportion to the third root of the number of frames built. As the cited author – *Wright (1936)* – explained in the paper, his cost estimates were based on his own personal work experience in the 1920s.

And indeed, if we take a look at the countries in the world, it is not difficult to observe that productivity differences within one country and/or within a single industry of the same country are quite considerable. *Lewis's (2004)* empirical study, based on the collective effort of the research staff of McKinsey Global Institute, is full of such examples. At the end of the 1990s, labour productivity in the Japanese retail trade sector was not higher than one half of the comparable US figure, while the successful Japanese car manufacturing firms – such as Toyota – surpassed in labour productivity their US competitors by a margin of 30 per cent. Labour productivity in housing construction varied even more.³

As a generalisation of the learning-by-doing theory, the S&G hypothesis is built on four new propositions:

- (i) Growth is based on innovation, which in turn is based on learning. Both concepts are more important than allocative efficiency.
- (ii) The presumption that all firms are efficient is false; the majority of firms always operate below the efficiency frontiers, whether in the United States or elsewhere.
- (iii) Knowledge is quantifiable. The “knowledge gap” between the potential maximum and the actual average within a country or within a given industry is in itself a source of rent.
- (iv) If the knowledge gap is persistent, countries can be trapped in a low-level equilibrium (low rate of productivity growth) even over the medium or long term.⁴

From here, the thinking of S&G makes a turn that takes them beyond *Myrdal (1957)* and *Kaldor (1966)*, who in the 1960s were already inclined to support state intervention as a part of macroeconomic demand management in the allocation of resources.⁵ But why should the state control the knowledge dissemination process from the supply side (as opposed to the Keynesian demand-side explanation)? According to S&G, globalisation and within this the growing *gap between social and individual returns* is the most important impediment to worldwide, lasting and equitable growth. Knowledge is a public good and in the absence of government

³ The book drew on extensive microeconomic studies of 13 countries over 12 years conducted by the Institute staff and invited world-class university professors, such as Robert Solow himself. See also fn. 9.

⁴ For the first authentic formulation of these hypotheses, see *Greenwald – Stiglitz (2006)*.

⁵ On Kaldor's views in this regard, see *Mihályi (2017)* and *Thirlwall (2017)*.

intervention it is undersupplied by utility maximising firms and/or individuals.⁶ Unlimited free trade, the cross-border flow of capital and labour, the mechanism of freely floating exchange rates, the liberalisation of financial markets⁷ and the harsh protection of intellectual property rights (essentially the entire list of the Washington consensus, Williamson, 1990, 2008) are *all* problematic, because in the less developed economies – i.e. practically in all countries, except the US – the overwhelming American productivity superiority prevents the local engineers, workers and business managers from learning and innovating. Under such a regime, conducting research is bound to fail businesswise. But without continuous learning and innovation, there is no opportunity to grow and develop. From the point of view of the developing countries – or using S&G's terms: *infant industries* and *infant economies* – it is more promising to restrict competition and protect the entire home economy rather than entering into open competition with the more advanced economies.

According to Stiglitz and Greenwald, infant economies have two good reasons to protect their internal markets and support the national companies' learning and research possibilities: (i) the countries and the domestic firms learn directly from the production process as the learning-by-doing theory suggests; and (ii) the newly acquired knowledge always has significant, dynamic spill-over effects (or positive externalities). S&G mention several examples, such as technological innovations in the manufacturing sector where a good idea of one firm can be applied later by other firms of another industry, or organisational innovations, such as the "just-in-time" inventory management technique which can be applied across industries, once the necessary organisational skills and disciplines are learned by a relatively large pool of managers (p. 65).

If we return to the previously mentioned example of the cobbler, the problem is that once it was found out how to produce good quality, inexpensive boots in the US, firms in other countries will *never* be able to compete with the industry-leader US cobbler. According to the S&G hypothesis, this is a major problem not because all other countries will find it more economical to import boots from the US, but because the infant economies will *never* learn how to make boots. Furthermore, once a boot factory in a developing country starts its operation despite the poor chances of success, there is a high likelihood that it will lose out in free competition and go bankrupt. Then the already acquired "new knowledge" will be wasted (p.

⁶ Although S&G fail to mention, there is nothing new in this proposition either. Enhancing the Marshallian concept of externalities, Marshall's favourite disciple, *Arthur Pigou (1920)* stated exactly the same: "self-interest will not (...) tend to make the national dividend a maximum" (Part II, Chapter IX). In the original Arrow paper, the same proposition is made as well. The competitive solution is different from the societal optimum solution, because "learning means that an act of investment benefits future investors, but this benefit is not paid for by the market" (*op. cit.* p. 168).

⁷ Exposing their criticism over this issue, S&G go quite far in the direction of populism, when they refer to "speculative businesses" and conclude that "in certain cases it is more efficient, if the state implements the allocation of capital investment itself" (*op. cit.* pp. 410–411).

491) and the spill-over effects will cease driving the other segments of the economy forward. According to S&G, their theory is valid historically as well. “[T]he fact that some countries and firms have “learned how to learn” helps explain why the last two centuries have seen such remarkable increases in standards of living, in comparison to the millennia that preceded them, which were marked by stagnation” (p. 373). In short: the secret of development is learning and *learning to learn*.⁸

3. Challenging the S&G theory

The S&G hypothesis is not convincing at all and the solicited commentators on the original 2008 draft (Aghion, Solow and Arrow himself) did not hide very much their own reservations either. In our opinion, Stiglitz and Greenwald pretended as if they did not know...

1. ... that the essence of the capitalist system is the rivalry. There are always winners and losers in a competitive environment (*Lavoie 1985*). Only in the world of Utopia can one think of countries enjoying the same level of economic development and the closure of the knowledge gap.
2. ... that market competition is the strongest driver of innovation, even if there are well-known situations when limited competition actually hampers innovation (e.g. the rise of monopolies).
3. ... the variation of productivity among firms operating on the same market is not caused by a failure in learning. It is the result of better management,⁹ the power of increasing return to scale and the natural monopoly situations arising from it. In other cases, better performance and higher productivity are simply a matter of luck. It doesn't make much sense to say that Facebook is successful because its managers “learned how to learn”, while Compaq, the once renowned computer manufacturer disappeared from the world markets because its business leaders were bad “pupils”.¹⁰
4. ... that if a Chinese product outcompetes an American or a European producer, the reason is not that the Chinese workers are cleverer or have learned more. It is usually because Chinese wages are still so much lower.¹¹

⁸ The expression of “learning to learn” was originally developed in *Stiglitz (1987)*.

⁹ This point was actually raised in the contribution of Robert Solow in Chapter 21. He directly referred to the empirical findings of *Lewis (2004)*, in which he was one of the main research contributors. The key finding of the research was that the lower quality of management did not have much to do with learning, knowledge or competence. The cross-country comparisons showed that it was caused “by the weakness of competitive pressure, and the most important obstacle to competitive pressure was formal or informal protection. Firms and industries exposed to competition from best practice were driven toward best practice” (*op. cit.* pp 501–502).

¹⁰ In fact, the company disappeared after it signed a merger agreement with Hewlett-Packard in 2002.

¹¹ I am grateful to Michael Joffe for this crucially important completion of my argumentation.

5. ... the 75,000 employees who lose their jobs on every working day in the American economy are not bad “learners” either. They get fired because the structure of the economy is constantly changing. Certain industries created new jobs for decades (e.g. retail trade, publishing, etc.), but after some fundamental shifts in technology, the very same industries started to shed labour.¹²
6. ... that rent-seeking and corruption are more important snags in the developing countries than in the advanced ones. Therefore, centrally determined industrial policies carry with them an intrinsic risk. If governments assume the power to select the winners, the industries and firms that “merit” protection, the risk of state capturing might arise, and in this way industrial policies become the hotbed of corruption.¹³

Several contradictions arise from the fact that the two authors of the *Learning Society* are Americans and that therefore the book was chiefly addressed to the American readership. They tried to phrase their ideas in a way that is understandable and attractive for Americans. For example, it is a widely held opinion that the American educational system is disgracefully feeble and, therefore, emphasising the importance of learning is a popular proposition for every segment of American society. The upper middle class and the middle class are happy to read about this because these elites are convinced that they merited their relatively high social positions through successful education (Reeves 2017). The lower level classes also like to be open to the importance of education, because they expect the government to spend more on the education of their children.

Who is losing in free trade? At this point, some readers of the present paper might start to protest and raise two objections. First, it has been argued for more than 200 years by scholars of the economics profession that free trade is not desirable for developing countries and new (“infant”) industries. The most important example was the case of the United States of America. Alexander Hamilton, one of the founding fathers, who served his newly born country as Secretary of the Treasury between 1789 and 1795, became renowned as an opponent of free trade and as a supporter of protectionism. It is also common knowledge that Hamilton’s views influenced the German Friedrich List (1841), who became the main proponent of economic protectionism on the European continent two generations later. Second, speaking for protectionism and against free trade means something very different today, when the United States – as the most developed Western country – complains about the consequences of free trade on its labour markets, than it did before the trade war started between China and the United States.

¹² Krugman (2016)

¹³ This argument, which is probably trivial for readers in the post-communist countries, was mentioned in the contribution of Philippe Aghion (p. 496). Together with Iván Széleányi, the present author came to similar conclusions in *Mihályi – Széleányi (2017)*.

Piketty's voluminous book, already mentioned above, was a totally unexpected and unparalleled commercial success. In two years more than 2.1 million copies were sold in French, English, German, Chinese and Spanish. For many reasons, S&G is unlikely to come close to this achievement. Among the reasons, I presume, the protectionist trade rhetoric of the current US administration is by far the most important. Any idea that so closely resembles the official US government position is bound to be rejected by the academic circles in the United States and the prestigious European university departments as well. It is widely known that there was a historical precedent, when protectionist legislation was enacted by the US Congress and signed into law by a president, but the consensus view today is that the so-called Smoot-Hawley Tariff Act of 1930 was – also according to Arrow – “a very destructive policy” (p. 508).¹⁴

Against the backdrop of such history and the noisy trade protectionism of many Republican-leaning congressmen and congresswomen, everything that was proposed by Stiglitz and Greenwald in 2014 sounds totally different today. While the book's main idea, that learning can be a wonder weapon in the hands of enlightened, good-willing policy-makers, will continue to attract many supporters, the present academic environment will remain unsupportive of the policy proposals emanating from S&G's interpretation of the “learning by doing” metaphor. As long as the ongoing trade negotiations are not completed, S&G's suggestions pointing in the same direction will be hardly heard.

It is inconceivable that the two authors did not take into consideration that the asymmetric limitation of free trade and/or administrative manipulation of exchange rates are not real options for infant economies. They don't have enough power. It is very difficult to speak openly like this: “We would like to export freely, but we restrict imports. We will keep the value of our currency low, but our trade partners should allow their currency to fluctuate freely.” Using double standards can be one element in the toolbox of a powerful country. As recent examples show, the US was able to put pressure on other countries to open their market to US goods, while the

¹⁴ The full, official title of the Act was already expressive: “*An Act to provide revenue, to regulate commerce with foreign countries, to encourage the industries of the United States, to protect American labor, and for other purposes.*” When it was still under debate in Congress, a petition was signed by 1,028 economists in the US asking President Hoover to veto the legislation. The legendary automobile executive Henry Ford spent an evening at the White House trying to convince Hoover to veto the bill, calling it “an economic stupidity.” J. P. Morgan's chief executive Thomas W. Lamont said he “almost went down on [his] knees to beg Herbert Hoover to veto the asinine Hawley-Smoot tariff.” Initially, Hoover himself opposed the bill and called it “vicious, extortionate, and obnoxious”, but eventually he yielded to influence from his own party and signed the bill. The new tariff imposed an effective tax rate of 60 per cent on more than 3,200 products and materials imported into the United States, quadrupling previous tariff rates on individual items, and thus raised the average tariff rate to 19.2 per cent. As was feared, Canada and other countries raised their own tariffs in retaliation after the bill had become law. Unemployment was at 8 per cent in 1930 when the Smoot–Hawley tariff was passed, but the new law failed to lower it. The rate jumped to 16 per cent in 1931, and 25 per cent in 1932–33.

US markets remained closed for the partner country. But this is not a viable strategy for converging countries, except for the very large ones such as China or India.¹⁵

To whom is the book's message addressed? To whom do the authors direct their policy recommendations? To the poorest countries of Africa, the 10 new Member States of the European Union, to Russia or China, or to Greece or Italy, as the laggard countries in the EU? In the book, there is no answer to this critically important question. What is even more troublesome, the authors close their book by saying that industrial policies and government interventions in trade are desirable and may even be a permanent part of economic policy in the most advanced countries and not just in the early part of the convergence period of an ambitious infant economy (p. 474).

Learning has several meanings in the book. As we noted already, much of what S&G call learning is partly or entirely something else. There are at least five different meanings of “learning” in the book.

1. Often the term's true meaning in the given context is *adjustment* (p. 375). Firms always try to adjust to the changing market conditions, sometimes successfully, other times unsuccessfully. Behind the failures the retrospective analysis usually identifies managerial mistakes, bad judgment or slow reaction.
2. Industrialisation in lagging, catching-up countries is always based on *emulation*. In these economies, improved competitiveness at the level of firms means the adoption of existing technologies, and usually not the latest ones. If this is followed by innovation, this innovation is incremental and of small significance. This was the “secret” of the successful industrialisation of Japan, the Soviet Union, and South Korea. Other authors rightly use the term *catching-up growth* to characterise the nature of this type of development. By contrast, *cutting-edge growth* is observable only in the most advanced countries.¹⁶ Confounding the two types of progression and the two types of learning processes behind them is utterly misleading.
3. Few growth specialists or economic historians would question the importance of acquiring *basic cognitive skills*, like reading, writing, arithmetic, etc. There is a huge literature asserting that economic development is correlated with formal education (schooling), especially with the advancement of primary education.

¹⁵ Robert Solow pointed out this contradiction, and – in an extremely polite way – made a devastating counter-argument. It is true that for an infant economy it is of vital importance to direct its products toward export markets in order to exploit the advantages arising from scale economies. Exporting is also very important to maintain and improve the quality of its products and services under the pressure of the high requirements of the foreign buyers. At the same time, however, it follows from the S&G hypothesis that the infant country should protect its own domestic markets from foreign competitors. One can imagine tolerance for the protection of an infant industry here and another there, but an overarching protection for an *entire* infant economy would be a harder sell (*op. cit.* p.501).

¹⁶ See Joffe (2017). With the same meaning as cutting-edge growth, Jones (2015) introduced the term frontier-growth.

4. Since Max Weber's hypothesis on the contribution of the Protestant values to growth, there has been a broad agreement that *non-cognitive* (cultural or soft) *skills* are also indispensable for growth. Sometimes these skills are part and parcel of the local, traditional culture (e.g. Protestant ethic, Confucianism); in other cases, these skills need to be "imported" and disseminated by the educational system, religious organisations, the media, etc. The dissemination of English as a foreign language and Anglo-Saxon cultural values is a good recent example in Eastern Europe. The modernisation of Russia under Peter the Great (1696–1725) and Japan during the Meiji period (1868–1912) worked with similar policy tools. Such implantations are almost impossible to carry out effectively without some kind of government commitment, although today much of it happens through the unstoppable use of the internet and mobile phone applications, even if the incumbent governments don't like it or try to stop it. A recent bad example in this regard is the decision of the Iranian leadership to ban the teaching of English in all primary schools.¹⁷
5. Admittedly, the US has been the most advanced and most productive economy for about a century, and its advantage has only increased vis-à-vis Western Europe since the onset of the international financial crisis of 2008. But how can the US economy be so effective in spite of the allegedly poor quality of its educational system? In our opinion, the answer is simple. The tens of millions working in the trade and service sector don't need to learn how to do business in school. They bring this knowledge from home. Americans have been good entrepreneurs since the foundation of the Republic, and there is a constant supply of potential entrepreneurs through *immigration*.

The importance of resistance to learning. The authors correctly point out more than one time in the book that certain conservative societies are purposely built on the strategy of no-change (p. 96). But they fail to draw the conclusion from this, namely that in such cases what is missing is not "learning" or "the capacity to learn", but those specific values that are required to catch up with the more advanced countries. In more difficult cases, the majority of people in such conservative countries are honestly and deeply convinced that it is in their country's interest to defend the "old" values.

Finally, an author from a post-socialist economy can only regret that S&G do not even mention the bitter experiences of the large and small former socialist countries, such as the Soviet Union or Hungary, and the military dictatorships in Latin America that in many ways were similar to the planned economies. Dozens of such countries pursued protectionist policies for decades in the 20th century. But

¹⁷ *The Guardian*, 7 January, 2018.

their overall growth performance was dismal. These countries failed to catch up with their international competitors as long as they pursued such policies.

In a certain sense, this is understandable. Professor Stiglitz and Greenwald do not have personal experience with such regimes and, therefore, do not have a gut feel for how centralised, autocratic regimes function. But they should know from the literature that there are few good examples proving that state-initiated trade restrictions, investment policies, and industrial research – which are all important parts of the “learning society” model – lead to the hoped-for results, to a sustainable increase in competitiveness and catching-up in productivity levels. Only the case of Japan (between 1945 and 1990), South Korea (1978–2010) and Taiwan (1960–1990) can be cited as convincing examples. If in the case of China, state-supported industrial research brings significant and sustainable returns to the country in the future (which is far from certain), this is probably due to the gigantic size of its economy.¹⁸

4. A better theory of “learning by doing”

Learning is a qualitative change. Even among Hungarian economists of the young generation, only a few read and remember the works of Ferenc Jánosy (1914–1997), a Hungarian economist of great originality.¹⁹ This is a pity because much of S&G sounds very similar to Jánosy’s thoughts developed during the 1960s. In our opinion, Jánosy put forward a more convincing endogenous growth theory than the S&G concept.

The central assumption of this theory is that over the *long run* the productive potential of an economy is determined by the size and qualification structure of the labour force only. Technically speaking, the slope of the long-run potential growth path is determined by the rate of accumulation in labour qualifications and is thus unaffected by the investment rate. In the *short run*, however, actual output is limited by the workplace structure of the economy, i.e. the capital stock and its technological composition. In crisis-free economic development, the complementary factors of production tend to accumulate in harmony, so that the employment structure of the economy reflects the qualification structure of the labour force. However, in the immediate aftermath of a war or a major depression, a large gap between actual and potential output can open up due to a severe distortion in factor proportions. This phenomenon is termed “structural incongruence” and is

¹⁸ According to the latest available data, China’s total R&D in 2013 was equal to the money the United States spent in 2005 (Veuglers 2017).

¹⁹ Ferenc Jánosy grew up in Germany and worked and studied engineering in the Soviet Union between 1933–1946 before returning to his native Hungary. German was his first language; therefore everything he wrote in German was subsequently translated into Hungarian. His most important book, *The End of the Economic Miracle. Appearance and Reality in Economic Development* was simultaneously published in German and Hungarian in 1966. The English translation, used in the present paper, appeared in 1971.

assumed to result from the depletion of physical capital, especially machinery, as a consequence of wartime destruction and/or depressed investment activity. This structural incongruence constitutes an extraordinary growth potential. Initially, due to the low capital-labour ratio, returns on capital are very high, inducing exceptional rates of investment and, consequently, accelerated capital accumulation. In other words, during the reconstruction period, there are no labour-supply constraints on capital formation. Once the economy returns to its long-run potential growth path, the miracle ends. Further expansion must rely exclusively on improvement of the qualification structure of labour, since the complementary workplace structure of the economy can no longer develop faster.²⁰

In this complex model, Jánosy interpreted learning – i.e. the improvement of the qualification structure of the labour force – as a qualitative change rather than a quantitative process: “man’s individual knowledge today is not necessarily greater than yesterday’s, but mainly of a different kind” (Jánosy 1971: p. 205). This is very much different from Arrow’s starting point (“knowledge is *growing* in time”²¹) which has been taken over uncritically by S&G. If, however, learning means a qualitative change, there is no such thing as a “knowledge gap” that separates infant economies from the more developed countries (as S&G claim on p. 481). Every child who grew up on the enchanting Indian stories of James F. Cooper or Karl May knows that the life of Native Americans required all sorts of knowledge (horse-riding, hunting, making fire, shooting arrows, etc.) which were necessary to survive in that environment. Their knowledge, of course, was immeasurably different from the knowledge of modern American farmers growing wheat in the state of Iowa, or a banker working on Wall Street today. But horse-riding is not a must anymore.

The concept of “learning by doing” was identified by Jánosy independently from Arrow, and his metaphor (learning *from* the machine) was more illuminating than that of Arrow. As Jánosy wrote “cutting can only be learned at a lathe, crushing at a milling machine, and driving at the wheel of the car. (...) This transfer of knowledge through the means of production is of particular interest (...) because this is precisely what causes the misleading impression that perfection of machinery is the primary factor of economic development” (*op. cit.* p. 209). Due to this important link, there is no real substitution between capital (C) and labour (L). Both of them are needed – simultaneously at a given point of historical time and in more or less fixed proportions.²²

²⁰ For a detailed, English language summary of Jánosy’s model and fresh research in the spirit of Jánosy, see *Tarján (2002)* and *Vonyó (2008)*.

²¹ See Arrow’s clear statement in the first paragraph of his 1962 paper (*op. cit.* p. 155). Author’s emphasis (P.M.).

²² This is very different from Arrow’s original approach, where the cumulative production of capital goods is used as a proxy for workers’ experience – i.e. for learning.

Forced industrialisation is risky. In several of his writings, Jánosy discussed the ways and means how these fixed proportions were often purposely distorted by government policies. One important example is when state-controlled, forced industrialisation leads to loss-making investments and then the government has no choice other than to impose limits on other market participants to protect the newly created factories. This may make sense, concludes Jánosy similarly to S&G, if and when the loss-making investment significantly helps the formation of the working force in the enterprise concerned. The example of the Soviet industrialisation drive in the 1930s proves that such policies are sustainable for quite some time. But there are two uncomfortable by-products of policies based on the presumption that allocative efficiency doesn't count. Firstly, to maintain such a system, the state needs a large and brutal state apparatus, because these loss-making investments are financed to the detriment of consumers. With the benefit of hindsight, it is very likely that the development of Russia would have been faster and much less murderous than it was, if the market system had been maintained all along the 70 years of socialist planning. Second, the forced investment drive – at least in the Soviet or the Chinese cases – led to slow growth in consumption, which in turn slowed the “learning” of the labour force. Widespread knowledge of driving supposes private ownership of passenger cars, clean working hands require the availability of bathrooms at home, the knowledge of foreign languages requires mass tourism, etc.

Jánosy, who spent many years in the Hungarian Planning Office, warned his contemporary socialist planners not to try to accelerate economic growth through radically increased *research and development expenditures* (R&D) either. Although it is not easy to comprehend on first hearing, innovation, as the output of research, does not generate welfare directly. Innovation is merely a “recipe” that shows how the structure of production needs to be modified in order to increase the productivity of labour (*op. cit.* p. 117). Whether the conditions of implementing the necessary restructuring of production are present or not in a given country and a given industry, depends on the quality of the labour force at large, and not on the quality of the researchers. It doesn't help if the R&D activity runs much ahead of the quality of the labour force. If this happens, it leads only to massive societal waste.

As shown above, the broader meaning of learning in the S&G concept included emulation, the copying of technologies of the more advanced countries. There is nothing wrong with this. Although in theory, the possibility of a revolutionary innovation being born in an infant economy cannot be excluded, the experience of the past two centuries has showed that *all* pioneering innovations came from the most advanced countries such as Britain, Germany, and the US. *János Kornai (2014)* compiled a list of 111 innovations of great significance and proved that indeed only the most advanced countries were capable of converting inventions to innovation

and organising the large-scale manufacturing of the new product in a commercially viable way (*op. cit.* pp. 5–18). There are few exceptions to this rule. The inventor of the ballpoint pen lived in Argentina, Nescafe is a Swiss product, and the software behind Skype was developed in Estonia, but none of these innovations had a major macroeconomic impact on the countries where these exceptional technological attainments were achieved.

Before anybody falls in love with the “Learning Society” hypothesis, it is worth recalling the warning of *Jánosy (1969)* who introduced the concept of “*quasi-development*”. This is directly linked to emulation or copying. As he argued 50 years ago, when a country tries to accelerate economic growth in general and the development of manufacturing industry with protectionist trade policies and artificial manipulation of the exchange rate, etc., there is a danger that the emulation will be successful only in a statistical sense. The volume of production will increase, but the quality of goods coming off the conveyor belts of the newly created factories will be hopelessly inferior to the products of the advanced market economies. Many socialist countries went through this bitter experience. Perhaps the most telling illustration is the fate of the Soviet Lada passenger cars produced during the 1970s and 1980s, originally copied from a 1966 model of the Italian car manufacturer Fiat. Millions of such cars were manufactured, but they were outmoded from Day One onwards, and the factory made financial losses on the Western exports of these cars.

Aggressive spending on schooling does not guarantee success either. It follows from *Jánosy’s* endogenous growth concept that growth also cannot be accelerated by the forced expansion of schooling.

- Let us illustrate this point first with present-day pair-wise comparisons. Take Poland and Germany. According to standardised OECD data, the share of persons in the labour force with a *tertiary education* degree is the same in both countries (28 per cent), while productivity²³ is more than 2.1 times as high in Germany. We can take another, even more shocking, example. In the 25–64 age group, 54 per cent of the Russian workers had some tertiary education, which is much higher than the corresponding American, Japanese or Israeli figures (all between 45–50 per cent), let alone the comparable Danish figure (37 per cent). Regarding productivity, however, the American level is 2.5 times as high as in Russia.
- Similar differences can be identified when the least educated population is compared (*primary education*). The share of Hungarians in the labour force with no more than 8 years spent in school is just 1 per cent, while in Portugal this

²³ Measured as output per hour worked in international US dollars (converted to 2016 price level with updated 2011 PPPs).

indicator stands at 32 per cent. From this strikingly large difference, one would assume that the Hungarian economy must display higher productivity levels. However, the contrary is the case: output per hour worked is 10 per cent higher in Portugal than in Hungary.²⁴ It is worthwhile to cite old cross-country comparisons as well. In 1910, the percentage of illiterates in Hungary amounted to 15 per cent and the country's GDP was estimated by Maddison at 2,000 \$/head.²⁵ By contrast, in Italy and Belgium, where the illiteracy rates were 38 and 25 per cent, respectively, the GDP/head figures were 2,332 and 4,064 dollars – i.e. significantly higher than in Hungary.

- Cross-country studies equipped with rigorous econometric tools also lead to similar conclusions. In Pritchett (2006), the lack of econometric evidence for the quantitative “knowledge gap” is explained by the fact that over the last 50 years schooling at all levels (from primary to tertiary) has expanded massively on all continents, while there has been a historical and continued divergence in output per capita. Hence, the cross-national dispersion of schooling per worker and the dispersion of output per head have moved sharply in opposite directions.

Thus, the implication that the level and growth of aggregate schooling per worker will do, at best, a modest amount to explain the growth of output per worker only confirms Jánosy's assertion born in the 1960s.

As another Hungarian economist – *Polónyi (2010)* – already noted, this “over-education” is not a unique Hungarian phenomenon. It holds for all the post-socialist countries that the population's *formal* educational level is higher than in market economy countries with similar levels of economic development. Quite clearly, this over-education drive was – to a very great extent – driven by the absence of tuition fees during the decades of socialism. As *Jánosy (1969)* and *Holló (1974)* who worked together showed, the extensive growth strategy in general and in the educational sector, in particular, led to quasi-development and over-education, or waste – if we allow ourselves to use such a harsh term. Later research upheld this speculative finding. Covering more than 60 countries with comparable PISA-test results, a study by the consulting company, *McKinsey (2010:14–15)* found that in low- and middle-income countries “systems with similar education spending have widely varying levels of performance – until the USD 6,000 spend per student (PPP) mark is reached – system performance spans the full spectrum of poor, fair, good, and great”. Better schools do not necessarily lead to more growth (*Hanushek – Woessmann 2012*).

²⁴ The source of education and productivity data are https://stats.oecd.org/Index.aspx?DataSetCode=EAG_NEAC (downloaded on 30 August 2017) and The Conference Board (2017), respectively. All data refer to 2015.

²⁵ GDP/head data in constant 1990 USD.

Resistance to change/learning. At this point, it is worthwhile to return to one of the shortcomings of the S&G hypothesis which was mentioned above: namely, that it does not pay sufficient attention to the natural inertia of societies and the conscious resistance to change. By using such a value-loaded, entirely positive term like “learning”, Stiglitz and Greenwald create a misleading feeling in their readers: catching up is easy. In reality, the transition has always been difficult from low to middle or from middle to upper-income and very few countries have succeeded in it.²⁶ In the last 20 years, South Korea was the only large country in the world that managed to pass the second hurdle.

Jánosy showed with a simple argument that rapid economic progress is not easy at all, because people, for good reasons from their perspective, resist. “For if no great resistance would stand in the way of diffusion of new achievements and of greater labour productivity, there would be no people left who carry drinking water home in earthen vessels on their heads from the well, no nomad tents, and even no steam locomotives, the last specimens of which would already stand in museums next to waterwheels and handlooms” (*op. cit.* p.135). Often religious norms are the main obstacle, such as the strict interpretation of Islamic sharia law in some countries according to which girls should not be allowed to go to school.²⁷ The traditional forms of Hinduism have a similar negative impact on women’s education and employment. In other cases, as the authors of the third thick book, Acemoglu and Robinson, convincingly demonstrated, the resistance comes from a small group of people or a minority group within the country controlling all political institutions and excluding others from decision-making, ownership rights, fair competition, etc. This, in turn, may lead to counter-resistance, strikes, uprisings and civil wars, which then throw countries back in development by decades. A few hundred years ago, the resistance to change and to new narratives was difficult in Europe too. Scholars at the turn of the 15th and 16th century often risked their own lives when they criticised the canonised truths of Greek and Latin authors, dead already for many hundreds of years.

Convergence is difficult, because the pioneers learn too. With the introduction of the “knowledge gap” concept, the S&G hypothesis creates a deceitful image about the future chances of infant economies to catch up with the most advanced

²⁶ Using the World Bank’s categorisation – low-, middle and upper-income countries – and more recent data for a large number of countries Cox (2017) paper is a convincing illustration of this statement.

²⁷ A 2017 Pew Research Center survey in 39 countries asked Muslims whether they want sharia law, a legal code based on the Quran and other Islamic scripture, to be the official law of the land in their country. Responses to this question varied widely. Nearly all Muslims in Afghanistan (99 per cent) and most in Iraq (91 per cent) and Pakistan (84 per cent) support sharia law as official law. But in other countries, especially in Eastern Europe and Central Asia – including Turkey (12 per cent), Kazakhstan (10 per cent) and Azerbaijan (8 per cent) – relatively few favour the implementation of sharia law. The variation in Africa is also considerable: 86 per cent in Niger, but only 37 per cent in Tanzania. <http://www.pewresearch.org/fact-tank/2017/08/09/muslims-and-islam-key-findings-in-the-u-s-and-around-the-world/>, downloaded on 1 September 2017.

countries. It is enough that well-meaning policy-makers support learning and the spread of innovation in all possible ways. By contrast, Jánosy presented a very simple illustration that shows that – beyond the problem of resistance, analysed already above – the horrendous difficulty in catching up with the most advanced countries lies in the fact that the most productive economies are usually capable of improving their performance all the time, and there is no intrinsic impediment blocking them from innovating further.

In the Anglo-Saxon world, this phenomenon is known as the Red Queen Hypothesis, which is an often used metaphor in everyday life, in economics, in the theory of arms race, in evolutionary biology, etc. The Red Queen is a fictional character in *Lewis Carroll's* (1865) fantasy novella, *Through the Looking-Glass*. Talking to the real-world hero of the book, Alice, the Red Queen described her empire as a system, in which “It takes all the running you can do, to keep in the same place.” In narrow, economic terms, this is the description of competition: if your competitors are moving ahead, you have to move as fast, not to lose ground. In broader evolutionary terms (*Valen 1973*), the message is: “For an evolutionary system, continuing development is needed just in order to maintain its fitness relative to the systems it is co-evolving with.”

The following model directly taken over from Jánosy's book (*op. cit.* pp. 128–131) illustrates the connection between the diffusion of innovations and the rise of productivity in time and space. Let us assume that six shipwrecked sailors – *A, B, C, D, E* and *F* – go ashore on a Monday and start to catch turtles as the only source of food on an uninhabited island. After one day of hard work, each of them returns with 10 turtles. Then sailor *A* racks his brain overnight and comes up with a trick, a kind of a turtle trap, with which he succeeds in doubling his catch on Tuesday. He catches 20 turtles instead of 10, while the other five sailors achieve only the yield of the previous day. After that, the innovation begins to spread. On Wednesday the trap is already used by sailor *B*, and on Thursday by sailors *A, B* and *C* as well. On Friday, *A* succeeds in perfecting his method further, and thus catches 30 turtles, while *B, C* and *D* – still using Tuesday's innovation – continue to get 20 each, while *E* and *F*, still using their hands only – catch 10 each. The improved method finds acceptance too and is adopted by *B* on Saturday, while all the others remain content with Tuesday's innovation, except for the most backward among them, *F*, who still hunts turtles without any tool. *Table 1* below shows the “catch” for each sailor and each day.

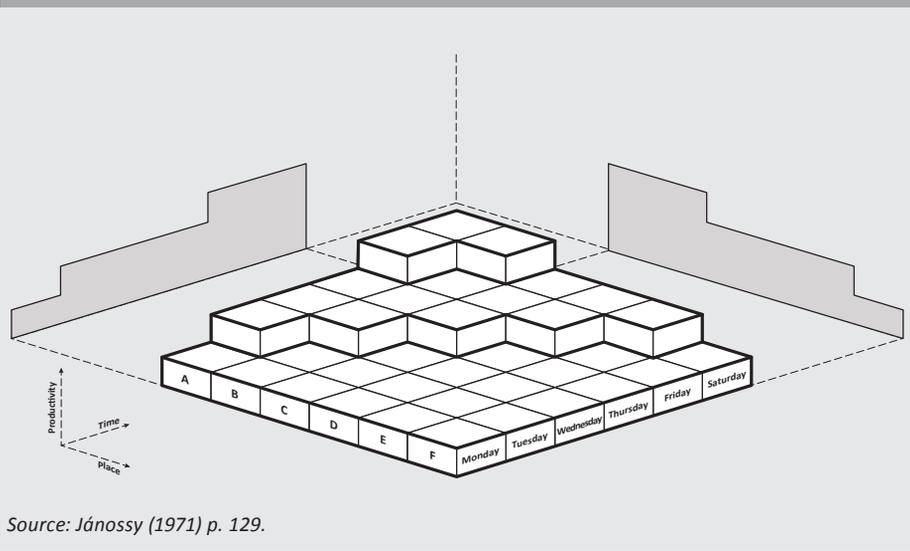
Table 1
The spread of innovation in catching turtle in the Jánosy model

Sailor	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
A	10	20	20	20	30	30
B	10	10	20	20	20	30
C	10	10	10	20	20	20
D	10	10	10	10	20	20
E	10	10	10	10	10	20
F	10	10	10	10	10	10

Source: Jánosy (1971) p. 129.

In order to show the course of the first and the second innovation – increasing the daily catch from 10 to 20 and then from 20 to 30 – the data in the table are presented in graphic form (Figure 1) too. The figure is a representation, in a general sense, of productivity as a function of time and place.

Figure 1
Transmission of the best practice, as an illustration of the diffusion process in general



Source: Jánosy (1971) p. 129.

The three-dimensional figure has the advantage of showing both the increase of productivity in the course of time and the growing variation of productivity for each day of the week (non-existent on Monday, quite significant on Saturday). These two cross sections of time and sailors are shown as projected silhouettes. The third projection, an aerial view shows the diffusion process itself – i.e. how fast the steps of productivity created by the inventions of sailor A were diffused. The measure of diffusion at a given time is the number of sailors who have already adopted the

innovation. In this example, the speed of diffusion is one worker per day. Let us now leap from the six sailors to the entire population of the globe, and from the “developments” of one week to developments of several centuries, while we stay in the one-product (turtles-only) world.

Let each sailor correspond to a country, his labour productivity to the average productivity in that country, and the week on the uninhabited island to world economic history over the past 200 years. The increase in productivity of one country forms a cross-section through time – this is the per capita growth of national income (or GDP). On the left-hand side of *Figure 2*, the projected silhouette corresponds to the GDP growth of country *A*, while on the right-hand side we see (without projection) that in country *F* there was no GDP growth at all over the past 200 years. The other projected silhouette shows the productivity of the six sailors on Saturday, or (in the generalised model) all countries of the world in order of their stage of development after the transmission of the innovations. Country *A* is the most developed and country *F* is the least advanced one. If we extend our time horizon, we can easily get the same result: *only country A innovates* – the one which was the most advanced already at the beginning – *and the rest grow as fast as they can emulate the leading edge technology*.

While we stay within Jánosy’s endogenous model, we are moving closer to reality if we say that – beyond the qualification of the labour force – economic development in peace times is strongly influenced by three static endowment factors and three countervailing dynamic forces. The static (hardly changeable or improvable) factors are *geography*, *ecology*, and *geopolitics*. The physical distance from the centres of economic growth, access to the high seas, weather conditions, the availability of exploitable natural resources (e.g. hydrocarbons), and navigable rivers all matter (*Diamond 1997; Sachs 2003; Sachs 2012*). Seashores and mountains and archaeological treasures inherited from the past are all valuable for the development of tourism – a high value-added industry in general. The dynamic factors are

- the *inertia* that slows down the market-driven changes in the quality of the labour force,
- the *ambition to emulate* the more advanced countries which works in the opposite direction, and
- *immigration*, if it helps to increase healthy rivalry in the recipient country.

I do not want to pretend that the identification of these six factors is a particularly original idea. S&G are undoubtedly fully aware of them. However, they are all intrinsically more controversial than *learning*, and thus challenging to publicise in broader social circles.

5. Conclusion and the further direction of research

This essay on *Creating a Learning Society* by Joseph Stiglitz and Bruce Greenwald shows that the term “learning” is used in the book in such a broad sense that it becomes almost meaningless as the alleged main driver of economic convergence. Another major shortcoming of S&G is that they leave obscure to whom their policy advice is addressed: to the very poor, infant economies, the unsuccessful countries, or to every country that aspires to catch up with the world’s leading economy, the United States. By using such a value-loaded, entirely positive term such as “learning”, Stiglitz and Greenwald create a misleading feeling in their readers: catching up is easy. The present paper, relying on the endogenous growth theory of a lesser known late Hungarian economist, Ferenc Jánosy showed that it is not because people, for good reasons from their own perspective, resist change. Furthermore, catching up is difficult, because if your competitors are moving ahead, you have to move just as fast, just not to lose ground.

This essay was already accepted for publication when the news came that Paul Romer was awarded the 2018 Nobel Memorial Prize for laying down the foundation of the endogenous growth theory in 1990. A comparison of Romer’s model with that of Jánosy should be the subject of a next study.

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World Order Transformation – Is the Future in Eurasia’s Hands?*

Alexandra Zoltai

Bruno Maçães:

The Dawn of Eurasia – On the Trail of the New World Order

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In his book, Portuguese politician and political scientist Bruno Maçães expresses his view that the coming decade will not be ruled by a specific continent, but will instead see the advent of Eurasia. He draws attention to the fact that Eurasia is in itself a complex world where very different political regimes coexist. He argues that this super-continent may play the role of a balancing power in the near future. After the Second World War, European countries had to face the fact that they had lost their leading role in the world and the United States rose to become the major power. In his view, a similar transfer of power is in progress today, resulting in the rise of China. A possible consequence of this shift is that Eurasia’s role will increase since China sees the envisaged global order in the Eurasian concept. An important evidence of this idea is the Belt and Road Initiative (BRI). This emerging “Chinese” worldview proves that China (and according to the author, also Russia) already live in the Eurasian era. And so the book points out that it would make sense to consider Europe and Asia as one continent and think from now on in terms of a uniform Eurasia.

In the first part of his book, Maçães examines the roots of separation between Europe and Asia. He also explores the possibilities that could end this fragmentation and expresses his view about the possible role of the new super-continent which is being built on the ruins of the past world order. The border between Europe and Asia was always uncertain and illusory. The author makes use of Voltaire’s ideas to point out that it is difficult to tell where Europe ends and Asia begins when arriving at the Sea of Azov. Continuing this line of thought, the author argues that the separation between the two regions is not so much spatial but rather temporal owing to the fact that Europe had quite a head start during the era of

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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the Industrial Revolution in terms of modernisation and development. But today it seems that it is not impossible to make up for this disadvantage. What is even more interesting is that these developing societies seem to be choosing their own way of modernisation. The real difference between Europe and Asia is that Europe followed the road of modernisation while Asia kept itself to the traditional ways. Nowadays, however, these differences seem to be fading away thanks to the rapid spreading of modernisation outside of Europe. In agreement with Francis Fukuyama, the author points out that nowadays countries around the world are following different paths towards the development of modern society and even their vision about such a modern society is quite different.

The author argues that when Russia and China developed their joint megaproject – the One Belt One Road initiative – one of their main intentions was to prove to the European Union that the European integration ambition is not sufficient. Namely, while Europe follows an exercise of power based on the ecclesial model, Russia and China more or less believe in universality. The Eurasian supercontinent jointly envisaged by Russia and China would have three determining players: one in the West, one in the East and one in the centre. But the three central players cannot be construed without one another and their position relative to one another is also continuously changing. In the current case, for example, Moscow is politically closer to Beijing than to Berlin. These developments clearly benefit China as China may gain access to Russian raw materials and is able to represent a greater political power in Central Asia and even in Russia. According to the author the turning point for China to become a leading power is the ultimate resolution of the Russian issue. But he argues that the Eurasian integration means something different for China, Russia and the European Union. From the perspective of the European Union, the author considers the Eurasian concept as a possible solution because small European states which are currently unable to cooperate will have an incentive to reinforce their integration as they acknowledge that they will not be able to compete with countries such as China or India on their own.

In the second part of the book, the author paints a geopolitical picture of Eurasia through his own overland journey. During his trip he visited several less known countries and cities and talked to locals. With the help of this accumulated knowledge, through the eyes of the locals the author attempts to present the given regions and underpin the view that in the future the emergence of the Eurasian supercontinent may override the current positions of power. The author devoted separate chapters to China and Russia, which according to Maçães may provide the political and economic foundation of the supercontinent.

The first stop of the author was Azerbaijan where, according to the insight of a local architect, Baku is the only true Eurasian city on the world map, not only geopolitically but also in terms of architecture. European and Asian architectural

styles are mixed which influenced and still influences the city's culture and social life. In his view Europe and Asia represent a real paradox: two separate worlds on one joint continent. But East and West have to meet somewhere; the only question is where to find this connection point. The next stop was a Western province of China, the autonomous region of Xinjiang inhabited by the Uighur people. Despite all of its internal political problems, this province plays a huge role in the implementation of the One Belt One Road project. The next chapter takes us to China where we can read about the realisation of the Chinese dream. The author sees the key to Chinese success mainly in that the country has already reached such a developed level of Internet usage where the digital and the physical worlds are almost completely connected. This, however, also raises the question whether China will be able to catch up with the Western world and if the answer is yes, whether it will stop there when it reaches the Western level, or whether it will surpass it through new developments and exert strong influence on the Chinese society, on China's politics and practically even on all of humanity.

Maçães then guides us to the Big Ussuri Island presenting the island's current situation and then takes us to Russia where he discusses the issue of Russian identity. After visiting various parts and cities of the country, he reaches the conclusion in the light of historical and cultural differences that Russia cannot be considered as a European country. He argues that because Russia was always positioned between Europe and Asia, it is no wonder that it is so interested in the Eurasian concept. Next, he presents the "Eurasian tunnel", that is, Turkey. First, he describes some historical aspects and then covers the country's current situation. The foreign policy of Turkish president Recep Tayyip Erdogan is covered extensively as well as Turkey's relationship with NATO and Russia. He closes this chapter with the description of the Syrian and Afghan situation.

He then takes us to Europe. The author considers Europe's prospects within the Eurasian concept as critical. In his view, Europe still considers itself as one of the most developed continents of modern times. But when comparing it with the rest of the world (mainly with Asia) all he sees is underdevelopment. Maçães believes that we are witnessing great transformation in today's Europe which he mainly attributes to external changes. In his opinion, EU countries must certainly also be aware of these changes. Over the past decades, the European Union did not really care about the underdeveloped world outside of Europe. But today the winds of change come as a huge shock for Europe and for the time being the current European system is unable to give an appropriate response to these recent developments. This system – that has worked automatically and smoothly so far – has been suddenly overturned and Europe is desperately trying to find a solution. Not so much a political one, but rather one of an "engineering" aspect to make it functional once again. But the question is will this be the appropriate solution in the long run?

In the opinion of the author, the solution lies in that Europe should also bear in mind the Eurasian concept. His first argument is the two superpowers, Russia and China. Maçães lists some foreign policy facts as an additional argument, such as the issues surrounding Ukraine, energy and trade and the refugee crisis. In his view, the refugee crisis cannot be handled successfully without the coordinated efforts of Europe and Asia. His third argument consists of the significant security threats that should be construed and managed within a Eurasian context. The author believes that Europe, as one of the Eurasian powers, should put its complex of superiority aside and learn how to pursue its interests towards the East. He argues that to be Eurasian as a European means that when choosing the common European strategy and direction, not only Europe but eastern regions should also be considered. His last compelling argument as to why Europe would be better off with a Eurasian union is that this would enable Europe to overcome the centrifugal forces currently observable within Europe and to preserve European unity.

The author starts the epilogue with the election of Donald Trump as president of the United States and the impact thereof on international relations. He then analyses the current situation of the Muslim world and China and the difficulties they may face in the future. According to the author, these difficulties mainly reside in that these societies chose a new direction of civilisation on the road leading to modernisation. He finally analyses some future challenges facing America and Europe deriving firstly from their democratic systems. In his view, changes within the international balance of power have a much faster and deeper spill-over effect into these countries. The author identifies the second main challenge to be the emerging new global order. In his view there will be no specific centres in the new global order, instead the balance will be created among the poles. Brexit is yet another proof in the eyes of the author that our current global order is going through momentous shifts. Maçães concludes that a new superpower is emerging and the global power is unstoppably shifting towards Asia. The question is how Europe reacts to these developments.

Pillars and Prognoses – An Ethical Approach to Economics*

Katalin Tihanyi

György Kocsiszky (editor):
Etikus közgazdaságtan (Ethical Economics)
Budapest: Magyar Nemzeti Bank, 2019, p. 370.
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The latest volume of the Magyar Nemzeti Bank (MNB) book series deals with a core paradox in global financial context. Entitled *Ethical Economics* (2019), the work explores whether a normative, value-based order governed by community rules can be legitimised through institutional practices and what motivates the renewed demand for such in economic theories. The twelve authors take different perspectives in tracing ethical principles in economic practices. There is, however, one thing, that they definitely have in common: in weighing the recent effects of financial and capital market imbalances (by means of social sciences), they all urge a paradigm shift in mainstream thinking. The twelve assiduously prepared, yet comprehensible essays do not simply address the community of professionals: they are of interest to a much broader audience, even as additional reading material in academic courses.

Not all that seems ethical is in fact ethical. On the other hand, a hidden ethical dimension might be capable of restructuring the processes of economics. No member of society is unaffected by *ethos* and *oikos*, as the economy is a sub-system of society (that operates inseparably from our basic human relations, cultural code systems, material, technological and environmental conditions). The overt or covert ethical implications behind economic decisions/business activities can lead to grave financial outcomes, just as the lack of institutional norms and ethics can generate negative consequences. The authors use a variety of examples to illustrate the stabilising or destructive effects exerted by underlying value system(s) on economies. In his study, *Géza Sebestyén* assigns qualitative indicators to distinctive religious preferences (using databases of about 20 countries), analysing their impact on GDP and displaying how denominational commitment demonstrably contributes to the maintenance of macro-level stability.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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Gábor Gyura points to marginal “security gains” deriving from fair banking practices and to the additional business benefits generated by ethical capital. He thus justifies the way financial regulatory authorities tend to move from sanction policies towards positive incentives. The study by *Judit Hidasi* points out how cultural behaviour and value preferences (such as employees’ “organisational loyalty” or “culturally coded” commitment to quality standards) can enhance the economic position of a country or a particular business, but in the same way can also be restrictive in certain production contexts (e.g. when budgetary rationality is superseded by corporate or national reputational pressures or is subordinated to the network of personal relations).

One of the most impressive things about the book is that it examines the concept and manifestations of ethics from a wide range of perspectives. The conceptual definitions, the normative principles laid down by different schools of economic philosophy, the explanations offered by competing economic theories and the maxims derived from the considerations of current economic policies are issues which would all deserve examination in their own right. The essays published in the first part of the book (Chapters 1–6) discuss the expectations of ethical operations regarding individuals, regions, states and the supranational level, the benefits thereof and the associated long-term and short-term costs, with varying levels of detail and from the perspective of a variety of disciplines.

The collection of theoretical and historical analyses begins with a comprehensive, introductory study by *György Kocziszky*. The essay addresses the essential questions of economics and draws the reader’s attention to their constant social embeddedness. According to Kocziszky, economic thinking is deeply dependent on the context and values involved and is therefore subject to spatial and temporal changes. After considering the parameters of space and time, the author discusses the imperfections characterising the currently prevailing, mainstream trends and the distortions created by such in the real economy (deregulation of the financial market, unfair interest rate policies, corruption and bank failures, the globalisation of economic bubbles, the pressure of monopolistic concentration). Finally, he offers a suggestion for a normative, ethical approach to be (re)integrated into economic thinking. In his interpretation “ethical economic thinking... does not look for the maximum profit, but rather for a righteous, fair and sustainable version thereof [...], its central element being a type of community behaviour that involves responsibility for others, but which – on the other hand – does not exclude the concepts of profitability, efficiency and competition” (p. 46). Kocziszky defines the objectives of an economic and social system operating according to such principles (an ethical way of distribution and redistribution, an ethical market and state), and identifies the tools required (e.g. dual price and interest rate ceilings, ethical taxation and state aid policy, fair coordination and competition rules, a fair financial institutional

system). He concludes that a value system favouring public good (the well-being of a given society) is a resource, which is capable of maintaining competitiveness in the long run and contributes to the country's economic performance, while the lack of such a system will bring about destabilisation and damage to the budget and moral values even in the medium term.

The tradition of the biblical value system on which Western culture is essentially built, the paradigm of business ethics derived from this and the changes therein are analysed in an ambitious study by *Norbert Varga*. The essay, which also includes some lessons to be learnt from social theory, studies the transaction patterns of almost two decades in the context of a changing geopolitical order. The conclusion he arrives at is similar to the one outlined above: according to him, societies rooted in Christianity – such as the economic and political elite of the United States which represents a strongly Neo-Protestant context for interpretation or the practices aimed at the implementation of a type of governance based on Christian values – “should include their guidelines concerning business ethics in their monetary and fiscal decision-making mechanisms as well” (p. 96).

There are two other theoretical essays in the volume discussing the issues of justice, public good and ethical responsibility which define social and economic orders in the framework of the modern rule of law. *József Benedek* relies on the social theory defined by John Rawls and based on that he extends the concept of justice as fairness to the spatial dimension as well. His main points include: what is the degree of spatial disparities that can be still tolerated and/or maintained, and at what point exactly does the social fairness of disparities cease to exist? Although he does not offer a direct answer to these questions, he suggests a variety of approaches and provides a number of methodological instructions, which is a good example of how the articulation of a problem in itself can help us to arrive at a solution.

In his essay on the responsible involvement of the state, *Kolos Kardkovács* places the central focus on the institutional-normative aspect of social justice. Following a brief look at the history of theories, he elaborates on the characteristics, criteria and positive results of the ethical rule of law. He lists a number of arguments to support a value-based approach committed to the idea of public good, which manifests itself in the daily practices of the rule of law. He offers the Scandinavian model to be followed *mutatis mutandis*: according to him, the secret of this model can be found in “a work-based economy in favour of the acquisition of knowledge capital, the great capacity and ability for innovation, the stable and scale-efficient institutional system, the higher incomes enabled by high productivity (added value), the entrepreneurial spirit, the financial awareness, the strong and large middle class, the less work, more private life ratio, the health awareness and the protestant values and ethics” which characterise this system (p. 133). He highlights the role of the “public servants characterised by work ethic awareness” and that of an

institutional network of high integrity in the representation of the public good and the effective promotion thereof.

Géza Sebestény uses statistical methods to illustrate the statements set out above, namely, how commitment to a set of values can enhance welfare (and well-being). He carries out a regression analysis using the data of 58 countries over a decade to point out the non-linear relationship between economic prosperity and stability, and the intensity of a religious culture. As he puts it in his primary conclusion, “according to the regressions applied for economic stability, an increase both concerning the share of people who claim to belong to a certain denomination and the number of religious groups in the country will have a positive effect on the country’s economic stability.” Based on his insights “it seems that the stabilising effect of the religious culture in a certain country primarily manifests itself at the times of severe crises.” Relying on the results, the author even ventures to propose a new hypothesis, namely, that “there is a positive link between the strength of a religious culture and the sustainability of economic growth” (pp. 160–161).

With due regard to the fact that the regulated system for the distribution and redistribution of goods is one of the most fundamental principles of financial stability and the stability of the rule of law, the book devotes a whole chapter to the principle of equitable and ethical taxation. The study by *György Kocziszký* and *Kolos Kardkovács*, rich in data and illustrated with several diagrams, identifies and elaborates on 10 criteria to be fulfilled by systems of equitable taxation. These criteria include: the principle of legality, the principle of honest taxpayers and fair taxes, the principle of trust, the principle of return and solvency, balance between the taxation of salaries and income from capital, the principles of efficiency, simplicity/clarity and predictability/certainty, and the principle of horizontal sameness and vertical diversity. The descriptions associated with the given principles do not argue for specific tax policy measures, but they do emphasise the requirement of proportionality, the rights and obligations related to equitable taxation (both concerning legislators and taxpayers) and define the basic norms of public trust necessary for the maintenance of a functioning state (pp. 163–202).

The studies approaching the concept of “appropriateness” from the perspective of consumer protection, financial market supervision and bank regulation analyse the issue by applying another type of “microfiltration,” that of specific practices. As a result, the patterns of behaviour typical of the branch of investments and portfolio sales (e.g. the question of whether or not it is ethical for a seller to present a business promising a very high yield but coming from a “doubtful background” as an attractive investment), corporate remuneration policies (is it ethical to place managers under profit pressure and to provide them with incentives to generate short-term profits), the credit risk rating of the loan products offered by banks (is it ethical to cover up the associated risks; to create a competitive market environment

which favours a gambling institutional behaviour) and the presentation of correct/incorrect information to the public or to consumers (whether it is ethical to shift all the responsibilities within a situation of informational asymmetry) are all on the agenda.

Gábor Gyura refers to practices and activities which do not actually breach legal rules literally, nevertheless, their application results in social and/or financial damage, as “grey zone activities”. According to Gyura, innovative products newly introduced on the market and their unorthodox marketing techniques (“mis-selling”) can be considered as examples. When referring to the idea of misconduct as an example of abuse he concludes that: “The issues of business are ultimately ethical issues,” because due to the “blind spots” in regulation, fair conduct is often subject to the internal control introduced by business actors (pp. 204–207). This aspect makes it clear that modern control practices are no longer based exclusively on deterrent restrictions or sanctions, but strongly emphasise the importance of education, the formulation of and adherence to internal codes of conduct and the incentives for a well-developed organisational culture.

The study by *Vilmos Freisleben* examines the investment sector and addresses similar critical questions regarding seller behaviour: “can it be considered ethical to offer leveraged investments to novice or common investors” or to present an investment vehicle “in a too favourable light” (in the hopes of receiving a commission)? “Will the investor understand the degree of risk he will have to face due to the leverage?” (p. 231). Freisleben also introduces the reader to the “principles for responsible and ethical investment” (UNPRI) laid down by the United Nations and the concept of “impact investing”, drawing attention to the fact, that apart from financial return, positive social/environmental effects are also worth considering when investing.

Bálint Dancsik and *Gergely Fábrián* investigate compliance with normative principles on a systematic level, analysing the fiscal imbalances arising parallel to each other during the recession of 2008 (the credit market crisis in the USA and foreign currency household loans in Hungary). According to their conclusions, “market mechanisms can only achieve a result that is also desirable on a systemic level, if (a) economic actors (mainly on the side of supply of the financial system) possess the skills required to be able to completely realise the consequences of their decisions, and if (2) their decisions represent a less individualistic approach and are not only concerned with short-term gain.” The authors provide many examples to underline the difference between the criteria adopted by consequence ethics and the considerations of alternative ethics (e.g. deontological ethics, behavioural finance) when it comes to evaluating whether a specific monetary/financial market decision or activity is “good” or not. What are the things worth bearing in mind when we are trying to minimise transaction costs, are faced with the dilemma of

whether to launch securitised or risky loan products, or are applying performance incentives dependent on share prices and based on volume? Based on the decision-making model, they convincingly argue that long-term structural effects should also be taken into account, and that the “soft instruments” aimed at influencing the behaviour of financial actors (e.g. education, the transfer of best practices, the implementation of behavioural standards, consumer awareness-raising) may be just as necessary as the possible application of restrictive, preventive or bridging state measures (e.g. the rules established by the CRD IV/CRR, the rules concerning debt brakes, the law on fair banking, the National Asset Management Agency) in order to eliminate wrong decision-making mechanisms.

The third part of the book abandons the Euro-Atlantic context and goes on to offer micro-perspectives from the field of Oriental theoretical tradition. This opening is also justified by the fact that international actors are continuously interacting with each other in the connected global economic space, but their cultural contexts of interpretation are entirely different. The studies, written by professionals in Oriental research, all support the settlement of this issue, when offering an explanation for the geo-political and geo-economic differences partly by means of case studies, and partly by the exploration of the customs and mentality behind social behavioural patterns.

In her study on Japanese business ethics, *Judit Hidasi* claims that the successful economic performance of East-Asian countries is associated with the values of Confucianism. She thinks that the so-called “Japanese economic miracle” is the result of the fact, that “out of the teachings of Confucian ethics, the principle concerning the acknowledgement of the existing hierarchy and that of moral obligations (beholdenness) in particular have provided a solid basis for the establishment of Japanese business and economic organisational structure in a country shifting towards capitalism” (p. 178). Nevertheless, this Weberian logic is less applicable to the social and moral shortfall which could be seen during the period of recession following the 1990s. Following the theory of Fukuyama, the author refers to the prolonged crisis, which – as the result of a series of corruption scandals accompanying social recession – (also) led to the weakening of the social identity based on a collective sense of values as the “shrinkage of social capital”. Her case studies provide insight into Japanese business mentality, but at the same time, she refrains from offering a comprehensive solution to the issues mentioned.

The two studies published by *Balázs Sárvári* and *Viktor Eszterhai* fill a gap in the field of studies by exploring the background of the values of Chinese economic policy. Their research demonstrates convincingly that just as much as it is absolutely necessary for the interpretation of the geo-political relations prevailing these days to become familiar with the way of thinking presented by Chinese power, none of the European nations can disregard the knowledge of the opportunities,

limitations and domains of inter-cultural interactions, in order to be able to develop an adequate position within the network of economic and financial relationships. Following the path of the dominant theoretical traditions of the Eastern Empire, the study on China by *Balázs Sárvári* presents three different state governance models and describes the possible future scenarios of the new world order of the 21st century on the basis of these. He elaborates on the modern Chinese theories of globalisation, also including extremist viewpoints and a set of views offered by pragmatic thinkers (Tingyang Zhao, Yan Xuetong, Pan Wei), using Confucian, Taoist and Legalist theoretical systems as a starting point. Relying on the realist school of international relations, the author himself tends to take a moderate approach: he offers Kissinger's concept of co-evolution as a solution. According to this theory, the parallel operation of the powers of the East and the West "may be considered as the global expansion of the harmony characterising Chinese high culture (...), in which the specific regions, sectors and social groups, although presenting disharmony in themselves, manage to form a stable whole together. Harmony in this sense does not refer to the lack of conflicts (...), but it is rather to be interpreted as an organisational level, on which differences do not pose a systemic threat" (pp. 313–314). Sárvári sees co-evolution as a cooperative form of competition, which "can be a result of either the Western or the Chinese set of values, and fits into the technological and global economic relations prevailing in the 21st century. It is a kind of a power structure, in which China – on the highest level of security policy [...] – opts for the stability of the world order and a cooperative participation in the reallocation of the mandates entitling global intervention" (pp. 319–320).

Viktor Eszterhai's study on *guanxi* (Chinese 关系 means relation) supports the idea that a predefined set of values lies behind decision-making mechanisms. The author introduces a unique perspective, applying the *guanxi* model to the operation of China's entire economic and social structure, including institutionalised forms of behaviour. According to Eszterhai, "the importance of *guanxi* lies in the fact, that, as a primary form of social relations, it pervades the operating principles of Chinese society and controls the everyday lives of its members (e.g. the allocation of resources, economic operations, information flows, decision-making mechanisms, cultural roles, social status and the tasks of individuals)" (p. 324). Eszterhai gives a fine description of the intricate structure of Chinese society: besides drawing a map of relationship networks, he also elaborates on their distinctive nature. Compared to Western transactional schemes, the *guanxi*-driven exchange of goods and values is not merely instrumental, but associated with specific emotional motifs, normative aspects, gestures and inherent values. The defined order thereof designates the place of the individual in this formal and informal system of relationships. We might draw a parallel between his conclusions and the insights of "network theory", hence Eszterhai's observations can be considered complementary

to the European concepts of “social capital” and “relationship capital,” with due highlights on semantic differences.

The final study of the volume discusses trading and banking strategies from the perspective of Muslim communities, while also providing information on the cultural history of Islam. It serves as a contrastive tool to the Judeo-Christian paradigm of business ethics, the former’s encounter with the highly developed mathematical and financial culture of the Arab world in the early Middle Ages. The latter already involved the concept of monetisation, anticipated marginal utility calculations (based on the role of money as a medium of exchange) and managed to maintain a stable banking system. Today, one main contradiction of Islamic economic theory may be that the doctrines concerning appropriate behaviour associated with community beliefs – that reveal themselves in monetary transactions as well – preserve an archaic social structure unable to successfully adapt to changed circumstances. At least, that is claimed by *Judit Balázs* and *József Varga’s* study (relying on empirical evidence).

As illustrated by the variety of topics outlined above, this collection discusses possible conditions of (more) ethical economics and opens up a broad scope of analysis, both historically and in disciplinary terms. The representative hardback volume published by MNB does not aim – nor even attempt – to cover all of the relevant issues. Yet, by opening up new directions of thinking, the authors attempt to reformulate the so-far unanswered question of the 21st century: what is the way to a globally sustainable economic paradigm?

Collective Amnesia – Crises and Memories Thereof*

Gábor Tamás

György Kövér:

A növekedés terhe. Krízisek – Csődök – Ciklusok (The Burden of Growth. Crises – Bankruptcies – Cycles)

Osiris Publishing Company, Budapest, 2018, p. 311

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In the ten years since 2008, interest in the subject of crisis has increased worldwide, both among economists and historians. Economic theories were not able to forecast the most recent the global economic crisis, and the packages of measures based on economic science did not produce the expected results in many cases. Critics started to question the predictive power of theories and the applicability of theories to reality. However, it has become an increasingly widespread notion that the historical analysis of market structures, concepts and human behaviour patterns may add something to the explanatory power and practical applicability of theories. This is precisely the goal that György Kövér set for himself in his recently released work. Many have outlined that the history of crises is a history of amnesia and misunderstandings, and a historian can best help to improve the understanding of current developments by discussing the process of forgetting and the memories of crises. It is not the duty of a historian to offer new recipes for recovery, but it is to rethink the old ones drawing on the experience of current crises.

This is not the first time the author has dealt with this issue. In 1986, he published a monograph on the crisis of 1873, and later, in the context of the history of the Hungarian government debt in the age of the dual monarchy, he wrote about periodically returning financial crises. Between 2012 and 2017, he researched the economic, social and mentality history of the 19-20th century crises, in the MTA-ELTE Crisis History Research Group as its leader. The book is the author's own selection of studies, including previously published studies and studies written for this occasion, and pays tribute to this joint research encompassing a broad spectrum of crises from famine, floods and epidemics to agricultural, industrial, financial and commercial crises.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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The idea behind this selection, as the cohesive force of the book, is primarily the examination of Hungary's 19th and 20th century crises from macro- and microeconomic perspectives. The first two introductory studies set the theoretical framework and are followed by seven papers described by the author as crisis stories with multiple scales of observation. The book ends with another two studies presenting perceptions and memories of crises.

The first part includes two essays which were published 30 years apart. The more recent study from 2015 entitled *Crisis history as a discipline* presents, in particular, the spread of the concept of crisis and crisis phenomena borrowed from medical terminology, and the approach of international (Max Wirth, Clément Juglar, Joseph Schumpeter) and Hungarian (Jakab Pólya, Tivadar Surányi-Unger) classical representatives of crisis history and crisis theory. The older work deals with the *history of the Kondratiev cycle*. The key conclusion of the study is that although long-term economic cycles have been construed and defined in many different ways throughout time, and a number of explanations, mainly monocausal explanations have been and are still being provided, their existence seems justified at least since the 18th century. Even though – in contrast to shorter commercial cycles – people cannot directly perceive them, they leave indelible memories which come to life over and over again.

The crisis stories are introduced by a macro-level analysis (“*Nothing but crises*”) presenting the existential and financial crises of the 19th century and their fluctuations: short-term financial and commercial cycles (Juglar), long-term economic cycles (Kondratiev), and century-long trends (Braudel's secular trend-cycles). Standing at their intersection, the crisis of 1873 was exceptionally severe because it was interconnected with crises of various types (famine, cholera, financial-commercial, budgetary). However, the reason why it became known as the “Great Crash” by future generations is primarily the fact that it was followed by price drops for two decades in the descending phase of a long economic cycle. The study titled “*From famine to stock market crash*” also focuses on interconnected crises, highlighting the second half of the 1840s and the first half of the 1870s. The author illustrates the combined effect of cholera, famine and financial crisis using an extremely broad range of sources. The historian's narrative is supported by demographic data, price trends, industrial production indexes in addition to bankruptcy statistics and contemporaneous commemorations. In respect of the famine of 1863, in an essay titled “*Poverty around the corner*” the author leads the reader from the perspective of global climate events through measures at different levels of Hungarian authorities into the personal fate of the local population of Tiszaeszlár. From the remaining data collection of national, county and local authorities, we gain an understanding not only of the crisis management process, but also the specific circumstances and intentions which led to the creation of historic sources.

The Small Crisis ((1869) in the Shadow of the Great Crash (1873) points out that the historical judgement of the crisis of 1869 was dominated by the crisis four years later: most authors regarded the crisis of 1869 as a prelude and highlighted that actors did not learn from the mistakes. This is the image of the crisis in historical memory despite the fact that it showed completely different characteristics than the crisis of 1873: it was not international, and only hit the Austro-Hungarian Monarchy, more specifically, Vienna and Budapest. It had no particular impact on the real economy in Hungary, and rural areas were hardly touched upon. The crisis was definitely due to foundation fever in the preceding years and excessive stock market speculation. Additionally, through a macro analysis and contemporary perceptions of the crisis, we can understand the financial crisis at micro level through the failure of private banker I. I. Kohner. The study *“From fiscal crisis to gold annuity bond.”* provides an insight into the secrets of the fiscal consolidation after the Great Crash. Kálmán Széll, as the speaker of the National Assembly’s financial committee and later as the secretary of the committee aiming at restoring the balance of budget and finally as Minister of Finance between 1875 and 1878, played a significant role in the preparation of state budgets before, during and after the crisis. From the sources related to his activity, we get to know the financial government’s objectives and their limited room for manoeuvre, while, in respect of debt consolidation, we learn that – independently from the constitutional system of the empire – financial markets assessed the two states as a whole.

In a study co-written with Károly Halmos (*“Bankruptcy cases in Pest”*), the author draws the attention to the importance of bankruptcy statistics as sources for economic history, and he emphasises that data can equally reflect changes in economic activity, statutory regulation and culture. For the 1850s, Austrian bankruptcy statistics are only available. For the 1860s and 1870s, the statistics of the municipal court of Pest called Pesti Városi Törvényszék (individual entrepreneurs and companies with industrial licenses) and the commercial court of Budapest called Budapesti Kereskedelmi és Váltótörvényszék (companies under commercial law), while from the 1880s, official statistics on companies deleted from the company registry provide sources for research. When assessing sources, it should be considered that the number of liquidations significantly surpassed the number of bankruptcies. Data show financial cycles with a certain time lag, however they reveal that individual and commercial companies were more strongly hit by the crisis than others, and in the second half of the 19th century, some 40 per cent of the companies were terminated within 30 years. The subject and title of the paper closing the work on crisis events is *“The bankruptcy of a Lutheran wholesale trader in Pest”*. Although Frigyes Frölich applied for bankruptcy protection in 1865, finally he reached a settlement with his creditors. Contemporary Menyhért Lónyay and a 20th-century historian, Vera Bácskai arrived at two different assessments of Frölich’s carrier and failure. According to the former, on the one hand, a Jew is only

able to survive among merchants in Pest, on the other hand, Frölich should have stuck to what he was professional in. According to the latter, the second generation of merchant families in Pest was characterised by a stronger entrepreneurial mindset and greater flexibility as against that of their fathers. Following a detailed presentation of the history of the family and their business, the author draws the conclusion based on an analysis of the bankruptcy proceeding and lists of assets and liabilities identified in the proceeding that Frölich's failure was explicitly interconfessional: all major confessions were represented by the victims, and the "excessive expansion" into the field of railway construction cannot definitely be regarded either as the reason for bankruptcy. Maybe Frölich was just in the wrong place at the wrong time.

The first study of the chapter presenting the perceptions of crisis is titled *Growth and decline in the historical memory of the Austro-Hungarian Monarchy*. It demonstrates the memories of the economic fluctuations of the dualistic system, first through the eyes of contemporary actors, and then through the lens of economists and statisticians involved in researching history, and finally through historians' constructions of the past. The author concludes that the reflections of contemporary scientists are not free from the impacts of personal experience and contemporary discourses, and historians' retrospective constructions also have their own cycles. Their models reflect the prevailing approaches and concepts of their era. Contemporaries do not even perceive longer-term phenomena, and their perceptions relate to events of that time. Such contemporary perceptions are presented in the volume's final study entitled *Agony or resurrection?* It analyses the failure of Simon Krausz, "Napoleon of the Pest stock exchange" in the 20th century, in 1929 – even before the outbreak of the Great Crisis – as well as the diary notes written by the failed Krausz between 1931 and 1934. From this essay, we get to know the resentful worldview of Krausz who was considered to be a financial genius by many, but a swindler and gambler by others. In this worldview, the black and white figures of the classes of people seen by Krausz in a positive or negative way are completely separated in just the same way his contemporaries saw him in black and white terms.

In his book, György Kövér wanted to analyse crises from economic, social and mentality history aspects, and the study volume perfectly achieves this aim. Both the structure of the volume and the various studies reflect this approach. The macro analysis of the economic history, the local impacts and the individual perceptions of the crises complement each other well in most studies, making the historian's reasoning not only more easy-to-understand, but also more fascinating for the reader. The author's methodological versatility, the use of extremely diverse and different sources make the book a highly multifaceted and readable publication in which meteorological, demographic and economic statistics data series, presented

in an understandable way, coexist comfortably, often within one study, with biographic, historic and mentality history parts. The title *The burden of growth* probably refers to the view that crises are always caused by preceding upturns during which not only do the bubbles – fittingly illustrated on the cover designed by Nóra Sós – blow up, but we tend to forget about the lessons learned from previous crises.

Report on the Budapest Renminbi Initiative 2019 Conference*

Tünde Mészáros

On 29 March 2019, the Magyar Nemzeti Bank (Central Bank of Hungary, MNB) hosted its annual conference in the framework of the Budapest Renminbi Initiative for the fifth time.

In his opening speech, *Márton Nagy*, Deputy Governor of the Magyar Nemzeti Bank, noted that the MNB supports the internationalisation of renminbi and reports on the relevant results annually at the conference held in the framework of the Budapest Renminbi Initiative. The MNB takes a wide, open approach to the economic and financing opportunities offered by the Chinese economy, also taking into consideration the global changes. In addition to having taken the first steps for the establishment of a regulatory environment supportive of FinTech companies, the MNB supports the ambitions of Hungarian financial professionals aiming to become leaders in the field of financial innovation.

In his speech, *Levente Magyar*, Deputy Minister at the Ministry of Foreign Affairs and Trade, highlighted that economic ties between Hungary and China have been developing dynamically, and consequently Hungary can report a number of new success stories. In addition to the results of the government and the central bank so far, the various connections between the two countries offer further opportunities for cooperation. The Deputy Minister emphasised the geopolitical importance of the influx of Chinese capital into Europe, pointing out the fact that the number of Chinese investments has also increased markedly over the last 10 years in Hungary.

Qui Yonghao, Vice President of Fudan University, congratulated Hungary for having made the Alipay, the Chinese mobile payment service available in Hungary, as a result of another successful initiative. He appreciated the importance of financial cooperation between the two countries and the “opening to the East” strategy of Hungary, highlighting the Bank of China Hungarian Branch as the first Chinese bank in the Central-Eastern European region, the currency swap agreement, the bond issuance on the Chinese market, as well as the accomplishments in the field of economy, finance, culture and education, including the double degree MBA

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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course, launched in Corvinus University of Budapest with Fudan University as the co-organiser, which was implemented with the professional support of the MNB.

Mihály Patai, Chairman of the Hungarian Banking Association¹, highlighted that the banking sector had to learn several important lessons in recent years. The corporate sector had difficulties in accessing credit, but the Funding for Growth Scheme of the MNB supported it in emerging from this adverse situation. The high proportion of retail foreign currency loans carried significant risks, but their conversion into forint contributed to stabilising the Hungarian economy. The ownership structure of the banking sector had also changed, which led to a domestic share of 50 per cent by now. The vast majority of members of the domestic banking system were already profitable in 2018, with favourable liquidity positions and stable capital positions.

Marco Iannaccone, Deputy Chief Executive Officer of UniCredit Bank Hungary Ltd., mentioned that the bank is the first one to make the most common Chinese mobile payment solution available in Hungary. One of the focuses of their strategy is to provide innovative methods to their customers. The service through which Chinese tourists are able to pay to Hungarian merchants using their usual mobile telephone application fits this concept, and this innovative payment solution also provides several benefits to Hungarian retailers.

After that, the Alipay terminal located in the bookstore of Pallas Athéné Publishing House (PABOOKS) was delivered and tested by a purchase.

The professional programme continued with the lecture of *Richard Werner*, Professor of Fudan University, who analysed, among others, why only a few East Asian countries, namely Japan, South Korea, Singapore and China were able to make the transition from “developing country” status to “developed” economies. The spectacular economic development of China could show a good example to the entire world for what is possible if the right policies are adopted. The “Belt and Road Initiative” is a cooperation scheme through which China shares its successful development strategy with the cooperating states, whose economy will likely to benefit far more directly from this than under previous international development opportunities. The internationalisation of the renminbi creates enormous opportunities not only for China, but also for other countries.

Petra Ponevács-Pana, Deputy State Secretary at the Ministry of Foreign Affairs and Trade, appreciated the benefits of the diverse, strong and efficient cooperation between China and Hungary, highlighting, among others, the “16+1” summit and the Economic, Commercial and Financial Forum both held in Budapest, the first Chinese International Import Expo, to which the Prime Minister of Hungary was

¹ Dr Mihály Patai served as Chairman of the Hungarian Banking Association from 15 April 2011 until 21 April 2019.

also invited, along with the dynamic development of the trade relations between the two countries and the export of high quality Hungarian agricultural products. In the field of investments, the Hungarian government aims to establish a research, development and innovation hub (R&D&I hub). The fastest developing segment is that of cooperation in monetary policy, which is perfectly exemplified by the accomplishments of the MNB so far.

Rob Loewy gave a presentation on behalf of the Bank of China London Branch on the development of the Chinese financial markets. As a result of the gradual opening-up of China's financial market the domestic financial assets held by overseas entities increased over fourfold in the bond market and threefold in the equity market between 2013 and 2018. The renminbi is an icon of an even more significant China, which is why the reforms must continue, in the FX market, among others. The China Interbank Bond Market has now become the third-largest OTC fixed income market in the world, with more than 1,200 overseas investors entering this market by the end of 2018, and the tendency of growth is also expected to continue in the future.

Dániel Palotai, Executive Director and Chief Economist of the MNB, talked about the global role of China in the new economic world order. He emphasised that the financial and economic ties of Hungary with China are developing at a fast pace and that the volume of commercial relations had significantly increased in recent years, while the growing number of Chinese citizens settling in or visiting Hungary and the significant deepening of the connectedness of tertiary education provide further significant growth potential. In addition to supporting the internationalisation of Chinese currency, the Renminbi Programme of the MNB and the Budapest Renminbi Initiative have accomplished significant results since 2015 in the Hungarian context as well, which is exemplified by the current presentation of the Alipay terminal.

The series of professional lectures was continued by *Gergely Gabler*, Director of the MNB, who presented Hungarian innovations and FinTech-related topics from a regulatory point of view. From the aspect of the central bank the aim is to develop a framework, which will adequately support the spread of innovations, while minimising risks. The MNB has implemented two solutions to resolve the supervisory dilemma, i.e. the choice between applying excessive restrictions or taking the approach of non-intervention. Through the launch and operation of the "innovation hub" and the "regulatory sandbox", the central bank provides a regulatory support platform and regulatory test environment for participating FinTech companies. The next step in the innovative solutions of the MNB is the launch of the instant payment system.

Representing UniCredit Bank, *Bence Marosi* talked about the global cooperation between the Bank and Alipay, which made available from that date forward the Chinese mobile payment service for Chinese customers in Hungary as well. The

appearance of Alipay terminals in Hungary is beneficial for both the merchants and the users of the service. The number of tourists arriving from Asia and mainly from China in European countries has been increasing dynamically, and experiences show that the visitors coming here are quite willing to use their usual mobile payment solutions in foreign countries as well, therefore this service is expected to ramp up quickly in Hungary too.

Trinh Anh Tuan, Head of Corvinus FinTech Center, presented Chinese, Swiss and American FinTech solutions among the current developments and highlighted that Hungary also supports innovative start-up enterprises through more and more forums (for example, by the establishment of dedicated labs). Corvinus FinTech Center intends to coordinate and develop university education, research, the community of stakeholders and innovation in the field of financial technology and digital transformation. It focuses, among other things, on the application of artificial intelligence in finance, the digital wallet and blockchain.

Speaking about the Chinese shadow banking system, *Qian Jun*, Dean of Fudan University, presented what caused the fast penetration of one of the most important factors of the sector – the wealth management products offered by banks – and what the risks of these phenomena are, including rollover risks. He also highlighted the major differences between the relevant products of the four large banks and those of smaller institutions. The expansion of the shadow banking system not only intensified competition in the field of deposits, but also among institutions, while also having an effect on monetary policy decisions.

The conference was closed by the lecture of *Xiaoqiong Hu*, the representative of Alipay. She explained that the globalisation-related aims of Alibaba Group focus on (i) buying, in order to boost imports, (ii) selling, in order to scale out exports, (iii) the global digital financial platform, (iv) the establishment of a global logistic network and spreading the solutions worldwide, furthermore, (v) leisure, primarily travelling. The community of over 870 million users are able to use the payment and transfer service at anytime, anywhere, online and off-line. In China, the rate of mobile payment penetration has been increasing dynamically, not only in cities, but also in rural areas. The credit service provided by the company is also gradually expanding: the number of customers and repeated usage rate keeps increasing, as does the amount of the average monthly spending.

To close the conference, Dániel Palotai expressed appreciation for the speakers, the lectures that were provided and also for the Alipay terminal delivered as part of the conference, as the latest milestone in Hungarian–Chinese cooperation. He also expressed his hope that in the event to be held next year new accomplishments will be reported.

Report on the 9th Annual Financial Market Liquidity Conference*

Endre Morvay – Zsolt Lakatos – Zoltán Pollák – Csaba Kádár

One of Hungary's key international conferences on finance, which has also featured prominent speakers from abroad, was held for the ninth time at the Corvinus University of Budapest. Similarly to previous years, the Annual Financial Market Liquidity Conference was organised by the Department of Finance at the Corvinus Business School, and the Game Theory Research Group of the Centre for Economic and Regional Studies of the Hungarian Academy of Sciences. The conference, which took place on 15–16 November 2018, was financed by the Foundation of the Department of Finance, and key supporters of the event included KELER CCP, OTP Bank, the Institute for Training and Consulting in Banking, the CFA Society Hungary, the Department of Finance at the Faculty of Economic and Social Sciences of the Budapest University of Technology and Economics as well as international companies and associations, such as Morgan Stanley, MSCI and the European Federation of Financial Analysts Societies (EFFAS). The programme of the two-day event included lectures by nine renowned foreign experts and one domestic invited expert, and the agenda was completed by a series of papers and posters submitted to the conference. The increasing prestige of the conference is reflected in the fact that the programme has been enlarged from year to year: at the 2019 event, participants could listen to a total of 47 lectures, and during the breaks they could see the results of another 20 research studies in poster form. The international character of the conference is best highlighted by the fact that its participants represented every continent: 170 university teachers, researchers, PhD students and analysts from 25 countries registered for the event. The speakers came from 21 countries representing 28 foreign and 6 domestic universities or research institutes.

The conference was opened by *Mrs Zita Zoltay-Paprika*, Dean of the Corvinus Business School. After greeting the speakers and attendants, she highlighted that the conference was becoming more and more successful, and reflecting the improvement in the standards and international reputation of the conference, even more journals than last year (including *Studies in Economics and Finance*, *Finance*

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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Research Letters, Journal of Corporate Finance, Emerging Markets Review, Journal of International Financial Markets, Institutions & Money, Journal of Multinational Financial Management, Risk Management) had notified their wish to receive the papers of the participants on that occasion as well.

The keynote speaker of the opening plenary section was *Edward I. Altman*, the Max L. Heine Professor of Finance, Emeritus at New York University's Stern School of Business and Associate Editor of financial journals including the Journal of Credit Risk and the International Journal of Banking, Accounting & Finance. He gave his lecture 50 years after he first published his multivariable method for evaluating the financial status of US manufacturing companies. In view of the experience gained, the speaker placed the Z-score method developed by him in the wider context of developments in scoring systems. According to the literature, owing to its simplicity, repeatability and reliability, the Z-score method is still an essential and very widely used model for predicting bankruptcy, and the most frequently applied model for comparing results. In the basic 1968 model, calculating the Z-score clearly identified the thresholds for determining if a company was financially healthy or was at risk of default. These thresholds have been widely applied, but are no longer relevant, as bond markets have undergone a significant change, with leveraged loans receiving a boost and indebted companies taking out further loans, with competition increasingly globalised and with the changing distribution of credit ratings. Therefore, an enhanced version of the Z-score model taking account of changed circumstances is to be applied. At the end of his lecture, Altman mentioned where the world stands today in the credit cycle. He is of the opinion that we are now in a benign credit cycle characterised by an increase in credit portfolios and liquidity, low interest rates, a low likelihood of bankruptcy, and high recovery rates. However, he advised that the Z-score results for 2017, the excessive and global indebtedness of several sectors, certain international processes such as the slowdown in economic growth in China, the high likelihood of a recession in major economies and last but not least the general increase in interest rates should be read as cautionary signs.

Following this, lectures in parallel sections were held. The main topics were market microstructure, derivatives, macroeconomics, risk management and quality of life, asset pricing and investments. Theoretical and empirical examinations of market liquidity were also discussed. On the first day, four invited researchers gave lectures in parallel sections.

In the section concerned with the theoretical aspects of liquidity, *Alexander Szimayer*, Professor at the University of Hamburg, presented the effects of a firm's rating in a game theoretical model with asymmetric information. In his model, the informed player, i.e. the manager-owner of a firm decides whether to stay solvent by injecting new equity in low cash-flow states. Rating agencies as outsiders

learn the firm's quality (rating) and creditworthiness in presence of a measurement error regarding the firm's cash flow. All of this feeds back into the firm's strategic choice of staying solvent or defaulting on its debt. The main conclusion of the model is that the decisions of the two players – the rating agency and the firm – have a mutual influence on each other: rating affects the cost of finance, the firm makes its decision accordingly, which again affects rating. The rating agency rules out more and more reactions of the firm during this interaction, however, at a certain point, the actual option is over the estimation of the rating agency, and thus the rating agency overestimates the measurement error. Under consideration of these measurement errors, the firm delays its default decision, and consequently increases the value of own funds to the expenses of debtors (lenders).

In the section discussing the empirical issues of liquidity, the first speaker, *Niklas Wagner*, Professor at the University of Passau, presented a regression model to explain the extra yield on US stocks, using several liquidity¹ and risk² indicators. The speaker's key question was whether regression models based on these indicators allow better forecasting of extra yields on US stocks than the historical average model. The results show that in the period preceding the 2008 global financial crisis, models based on macroeconomic indicators and the TED spread performed better than historical averages. Besides the two indicators, during the financial crisis it was also possible to perform the forecast with the ARMA model, a method for time series analysis, while after the crisis all models based on the indicators performed better.

In the same section, *Igor Loncarski*, Associate Professor of Finance at the University of Ljubljana, examined in his lecture the features of insider trading in the foreign exchange market. An excellent illustration was the case of an inside trader prosecuted in Australia and an employee of the Australian Bureau of Statistics. In his presentation, he aimed at answering the question of how inside traders try to hide their insider information while reducing their losses from accidental market movements. In his study, he used spot currency pairs. He applied the CUSUM test (cumulative sum control chart) for identifying abnormal – insider – trading activities. In the period under review, the test monitors the instable movement of yields by tracking the cumulative sums of the error terms. He outlined that during the execution of their transactions, inside traders presumably try to select the trading dates – directly prior to the announcement of the insider information in question – when the direction of movements in the market is highly forecastable, and the risk of sudden exchange rate movements is low. The presented results confirmed the fact that regulatory authorities and actors interested in the surveillance of the

¹ Stock market liquidity: Amihud indicator, Roll-spread, funding liquidity: TED-spread – the difference between the 3-month LIBOR and the yield on the 3-month US Treasury Bill.

² VIX index, and macroeconomic and economy policy uncertainty

market must pay close attention to trading periods around announcement dates in order to be able to detect insider trading.

In the section focusing on the issue of risk management and quality of life, *Md Hamid Uddin*, Associate Professor at Taylor's University, Malaysia, gave a lecture on cybersecurity risks in the banking sector, which may bring a fundamental change in the general perception of bank stability directly linked to global financial markets. The speaker examined the relation between cyber risks and risks related to the performance and operation of the institution. He also pointed out the impact of cybersecurity disclosures on the governance of banks. Risks related to cybersecurity can be seen as a systematic risk – the focal point was on banks that connect the corporations of several sectors through their operations. Banks have to continuously improve their IT systems and therefore have to cope with increasing operating costs. Vulnerable IT systems increase the vulnerability of banks as well as their operational risks, eventually leading to decreased profitability. In the course of improving their IT systems, banks are also exposed to the risk that their IT security systems, due to external contractors mainly involved in development, will remain in the hands of an external party that may have access to confidential data including critical resources. Overall, it can be stated that the top management of banks play an important role in reducing cybersecurity risks.

The first day was closed by a plenary section. In the first lecture, *Seema Narayan*, Associate Professor at the Royal Melbourne Institute of Technology, discussed the indebtedness of US companies, drawing attention to the impacts of changes in the macroeconomic environment. The companies examined were S&P 500 non-financial companies. The speaker's model analysed the period between 2000 and 2018. The macroeconomic indicators included GDP growth and industrial production, the inflation rate, the nominal interest rate, and other financial factors consistent with the optimisation of the financing structures of the companies. The key conclusion of the analysis distinguishing between corporations with strong and with weak balance sheet positions is that the financial crisis had a much stronger impact on highly indebted companies than on those that are less indebted. In addition, further interesting conclusions can be drawn from the results: 1) when making short-term debt decisions, companies ignore the level of economic activity, 2) during recessions, inflation does not play a role in short-term debt decisions, 3) during recessions, smaller-sized, less indebted companies ignore the effects of tax savings stemming from the level of interest rates and lending.

The last speaker of the day was *Douglas Cumming*, DeSantis Distinguished Professor at the College of Business, Florida Atlantic University, and Editor-in-Chief of the *Journal of Corporate Finance*. He has published over 150 articles in leading refereed academic journals in finance, management and economics. In his lecture, Cumming talked about the relation between stock price manipulation and corporate finance

businesses such as fusions and acquisitions as well as innovation. In the literature, this topic is exclusively discussed in terms of market microstructure. The findings of his research highlight that manipulation is harmful and it affects not only market microstructure, but also management decisions. In the case of corporate fusions, he found that in addition to decreasing the purchase premium, price manipulations significantly increase the probability of withdrawing the tender offer. In his opinion, this negative effect could be reduced by regulating trading in the greatest detail. In respect of innovation, robust empirical results indicate that enhanced liquidity encourages innovation, but this positive effect may be undermined by manipulation.

The second day of the conference opened with a plenary section with two lectures delivered by renowned foreign invited experts. *Thomas Walker*, Professor of Finance at Concordia University, Montreal, examined in his lecture the role of social innovation, and in particular the financing of social issues. In his introduction, he presented an initiative in Canada implemented with the aim of providing locally grown fresh vegetables at available prices, on a sustainable basis and with a lower environmental impact by facilitating the development of local communities in areas which are difficult to reach. As a possible technological solution he mentioned aquaponic food production in which aquaculture and media-based crop production is accomplished in a symbiotic ecosystem. One of the most important questions is certainly how we can finance these social initiatives. The second part of the lecture presented a range of innovative financing solutions, including community, green or social impact bonds, long-term “patient” capital, solidarity guarantee as well social funds and solidarity-based FinTech solutions. These models lend targeted support to socially useful initiatives by keeping short-term or even long-term yield expectations at moderate levels and by linking financial return to social impact.

The second lecture of the plenary section was given by *Jonathan A. Batten*, Professor of Finance at University Utara Malaysia and Managing Editor of journals *Emerging Markets Review* and *Journal of International Financial Markets Institutions and Money*, and Co-editor of *Finance Research Letters*. He focused on the time-varying, dynamic co-movements among crude oil and major commodities, and their role in hedging market price risks. The speaker examined the relationship between West Texas Intermediate (WTI) crude oil and five agricultural commodities (corn, wheat, rice, sugar and cotton) and three metals (gold, aluminium and copper) in the period between January 1990 and June 2017. Using the results of the correlation analyses of yields, first he pointed out that primarily aluminium and copper had a positive correlation with oil prices. Then he presented the results of examining the hedging error of a portfolio of two elements comprising oil and a commodity. Analysing the time-varying hedge ratio requires the estimation of conditional variances and covariances in a modelling environment taking into account the volatility of the time series of the two elements as well as the delayed effects and cross effects. The

analysis pointed to the fact that the global financial crisis had a significant impact on hedge ratios which tended to increase primarily for copper and corn. Testing the efficiency of hedging, it was concluded that aluminium and copper provided the highest – but very time-varying – hedging effectiveness, and it significantly increased in the case of corn during the global crisis. Thus, Batten's key conclusion was that the time-varying co-movement among crude oil and major commodities allows for risk diversification by way of a portfolio that combines a long position in an asset with a short oil position. However, it requires continuous monitoring and rebalancing of the hedged position. The method can also be applied for reducing the exposure to the risk associated with a portfolio of non-sustainable energy assets.

On the second day, parallel sections were held where experts discussed subjects such as banking, social innovation, liquidity and high frequency trading, and topics related to corporate finance and liquidity, at both the theoretical and the empirical levels.

In the theoretical section, *Andras Bohak*, Head of Risk Management and Liquidity Core Research at MSCI, presented a lecture. He discussed the liquidity management of investment funds and its impact on investors. This subject is very topical given that both the rules of the Securities and Exchange Commission of the United States of America (SEC) and the guidelines of the International Organization of Securities Commissions (IOSCO) on liquidity risk management are encouraging US funds to manage liquidity risks more efficiently. The speaker defined the two major risks associated with the liquidity management of funds: dilution risk and the probability of a future liquidity crisis. He also presented the tools suitable for managing these risks. He explained that dilution occurs when due to the imbalance of the buy and sell side, the fund's assets are traded in the given asset market, and transaction costs are spread across the investors of the fund. Consequently, short-term investors in the fund, often traders, have a cost advantage over long-term investors.

At the end of the conference, in the name the organising committee, Barbara Dömötör expressed her hope that the 2018 conference had contributed to further increasing the professional reputation of the event. She thanked the speakers for their work, and the attendees for their participation. She also announced that the jubilee 10th Annual Financial Market Liquidity Conference to be held on 14–15 November 2019 was open for application (<http://afml.uni-corvinus.hu>).

INSTRUCTION FOR AUTHORS

Manuscripts should be submitted in accordance with the following rules.

- The length of the manuscripts should be limited to 40,000 characters (including spaces) but a ± 50 per cent deviation is accepted. Manuscripts should be written in Hungarian and/or English.
- Papers always begin with an abstract which should not exceed 800–1,000 characters. In the abstract a brief summary is to be given in which the main hypotheses and points are highlighted.
- At the bottom of the title page a footnote is to be given. The footnote contains every necessary information related to the paper (acknowledgement, relevant information etc.). This is followed by the name of the institution and position the author works at, e-mail address in Hungarian and English.
- Journal of Economic Literature (JEL) classification numbers should be given (three at least).
- Manuscripts should be written in clear, concise and grammatically correct Hungarian and/or English. Chapters and subchapters should be bold.
- Manuscripts should contain the list of references with the first and surname of the authors (in case of non-Hungarians the initials of the first name are required), the year of publication, the exact title of the book, the publisher, the place of publication. In case of papers, the exact title of the journal, the year, the volume, and the pages should be indicated. References in the text should contain the surname and the year separated by comma. When citing, the exact page be indicated.
- Tables and figures are to be numbered continuously (chapters and subchapters should not contain restarted numbering). Every table and figure should have a title and the units of quantitative values are to be indicated. Tables and figures are to be made by MS Word and Excel in Hungarian and English. Notes and sources are to be put directly at the bottom of the tables, figures.
- Equations should be aligned to the right and should be numbered continuously in parenthesis. (Chapters and subchapters should not contain restarted numbering.)
- Manuscripts are to be sent to the Editorial Office of the FER only. Papers are peer-reviewed by two independent and anonymous reviewers.
- Manuscripts should be sent as attachment by e-mail in MS Word file. Figures and tables should be sent in MS Excel file both in Hungarian and English.
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Thank you!

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