

Resolving Conflicts in Measuring Banking System Competitiveness – MNB Banking System Competitiveness Index*

Péter Asztalos – Gábor Horváth – Štefan Krakovský – Tamás Tóth

The competitiveness of a national economy structurally depends on the efficiency and quality of financial intermediation, which is in a close relationship with the competitiveness of the banking system. In our opinion, banking system competitiveness can best be captured through the sustained supportive role of the banking system in economic growth, which in practice is implemented through the efficient allocation of financial resources. In the course of our research we developed an index designed to measure the competitiveness of European banking systems which, in our understanding, is the first of its kind. It models competitiveness from two different or even conflicting perspectives – from the consumer and from the investor side alike – and synthesizes the results received. Our analysis points out that the Hungarian banking system lags significantly behind its peers with respect to the price-setting of loans to households, digitalisation and operational efficiency, and presents the sources of competitive advantage in national economies with a competitive banking system in place.

Journal of Economic Literature (JEL) codes: E51, O40, E44

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1. Introduction

Our analysis is intended to provide a systematic comparison between the banking systems of European countries from the perspective of competitiveness. The competitiveness of a national economy hinges on a multitude of institutional, geographical, material and human factors, of which the financial intermediary system in general and financial intermediaries in particular play a pivotal role. The link between the financial system and economic development is a central topic in the influential book by *Gerschenkron (1962)*, in which the author discusses the

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models applied in different eras for the financing of industrialisation and hence, economic convergence. Financial mediation is commonly interpreted as the collection and efficient allocation of financial resources and the drawbacks arising from the imperfections of the process were pointed out early on by *Hicks (1935)*. The adequate operation of the process benefits all stakeholders: savings increase, investment thrives and the banking system itself achieves the profitability required for performing its activity over the long run. Thus, the financial intermediary system greatly contributes to sustainable and dynamic economic growth¹ and hence, competitiveness. For a detailed analysis of this considerably simplified thought process, we need to examine two questions:

- a) How can we characterise and measure the competitiveness of a country's banking system in and of itself?
- b) What are the channels through which the banking system contributes to the competitiveness of the national economy as a whole?

Our analysis is focused on the first question. We hope that the proper interpretation of banking system competitiveness and an in-depth analysis of the structural features of a given banking system facilitates a better understanding not only of financial systems but of whole economies. In addition, a transparent international comparison may assist in identifying the development opportunities available to the Hungarian banking system, which endeavour is consistent with the statutory mandates of the Magyar Nemzeti Bank (MNB).

The first dilemma we faced during our investigation is the interpretation and measurability of banking system competitiveness. Banking system competitiveness is not a clearly defined or self-evident term. Our analyses started out with the premise that the goal of financial intermediation – and hence, the criterion of a well-functioning banking system – is the efficient allocation of financial resources that supports growth in a sustainable manner over the long term. The indicators used for measuring competitiveness were derived from this interpretation. This is consistent with the MNB's previously published study on the 10 measures of a well-functioning Hungarian banking system (*MNB 2014*), which identifies healthy lending, the importance of the self-financing of the banking system, supporting growth, and the potential behind efficiency improvement and innovation among the key factors at play. These dimensions need to be quantified and aggregated for the comparison of banking system competitiveness over time and across countries.

With respect to measurability – accepting the above-mentioned concept of banking system competitiveness – the selection of indicators and their optimal values

¹ The issue is discussed in detail in Chapter 4 of *Competitiveness and Growth: The role of financial intermediation in growth (Banai et al. 2016)*.

pose a challenge. The criteria system required for efficient financial allocation can be examined from the perspective of numerous participants. The features of financial intermediation can be inspected from the side of the state, the regulatory body, consumers and banks alike and even conflicting aspects can be considered. Looking at the financial system under market conditions, we found that it was through the analysis of the consumer side (households and corporations) and the infrastructure provider side that we could most easily interpret and measure efficient and sustainable resource allocation – as the definition of banking system competitiveness. This approach permitted us to also take into account such environmental and demand factors that play a decisive role not only in the structural features of a national economy but also in the competitiveness of its banking system. Banks are less capable of influencing developments in these factors over the medium term than the state and regulatory authorities are.

Bearing in mind the conflicting aspects of the consumer and of the structural side of financial intermediation, in our study we approach banking system competitiveness separately from these two angles:

- *Financing corporations and households:* From the perspective of households and corporations, the key question is whether the banking system fulfils its financial intermediation role properly and supports the financial involvement of customers. In our view, therefore, demand side competitiveness can best be captured in the accessibility, quality and price setting dimensions; in other words, when financial products become broadly available in high quality and at an affordable price. Accordingly, an analysis of the consumer side can shed light on which countries rational customers would prefer in case of a hypothetical choice between banking systems.
- *Capital attractiveness:* As regards bank owners and investors, we selected five determinants that may play a leading role when these actors decide on continuing or enlarging their activity. These are: stability, profitability, operating and tax environment, prospects of financial deepening, technology and efficiency.

In constructing the corporate and finance indices, we also included a number of indicators that are not solely determined by the demand side but their value emerges from an equilibrium state between demand and supply. For example, pricing indicators reflect consumers' demand side perception on the one hand but on the other hand, they also indicate the diversification of the financial system and the intensity of the competition.

The fact that the key stakeholders – especially consumers and owners of the banking system – are driven by different, sometimes conflicting motives regarding competitiveness complicates the task even further. One of the most obvious

example is the conflict of interest in pricing: while borrowers seek loans with the lowest possible margin and interest rate, the banking system and its owners strive to achieve the highest possible margins and hence, to maximise their profitability and capital accumulation capacity. Similarly, consumers demand easy access to services but an excessively large branch network may deteriorate the banking system's efficiency through high maintenance costs. It should also be considered that investors may often prefer higher returns to optimal allocation. Finally, while consumers benefit from a more mature, deeper and more competitive banking market, it may be less attractive to investors in view of the limited growth potential it offers.

The static contradiction between consumer side and investor side competitiveness, however, shifts over time and in the long run the factors above may mutually reinforce each other. If a given country's ability to attract capital is limited and thus it cannot develop an adequate banking infrastructure, willingness to participate in the financial system will be scant and the efficiency of financial intermediation, in turn, will be lower. More expensive and lower quality service and diminishing access deteriorate the efficiency of operations, which in turn reduces the return on equity and undermines the ability to attract capital even further. Breaking out of this vicious circle is only possible through somewhat higher prices until the cost of capital associated with the developing infrastructure is recovered. In the long run, however, both perspectives (consumer and investor) must be satisfied in order to ensure that the banking system functions sustainably and supports growth in an efficient manner. With that in mind, the results of the two indices should also be considered in conjunction with one another in order to identify the countries that were most successful in reconciling these two, often conflicting perspectives in the operation of the banking system.

While competitiveness is essentially based on structural factors and is interpreted over the long term (*Porter 1998*), cyclical indicators may also have high information content (*Nafzinger 2006*). The pro-cyclicality observed in the operation of the banking system is reflected in the lending activity and in risk-based competition and may contribute significantly to the fluctuations of economic growth (*Claessens 2009*). This may damage the economy by accelerating the booming of bubbles before crises; thereby, deepening and even protracting the subsequent recession. More severe crises and protracted recovery can also affect the long-term average of economic growth; therefore, it also affects competitiveness in its sense as a long-term potential for development (*Hatzichronoglou 1996*). Since banking system competitiveness means, according to our definition, efficient financial allocation, it cannot characterise a pro-cyclical banking system – an evaluation across financial cycles would pinpoint the growth sacrifices associated with the subdued risk appetite stemming from overheated lending and ballooning risk costs.

Consequently, if a banking system proves to be competitive with respect to the two aspects mentioned above, this would also imply a reduced probability of pro-cyclical operation; in other words, the banking system would carry out the allocation of resources in a stable and prudent manner – i.e. efficiently in a broad sense – even in the long run.

In the following section we discuss the methodological issues that arose as we were constructing the indicator system for the measuring of banking system competitiveness. Next we present the indicators used for surveying the two different sides, explain the reasons for their selection and present the results received. Section five describes the combined result of the two approaches and finally, we summarise the results and identify a number of potential directions for further research.

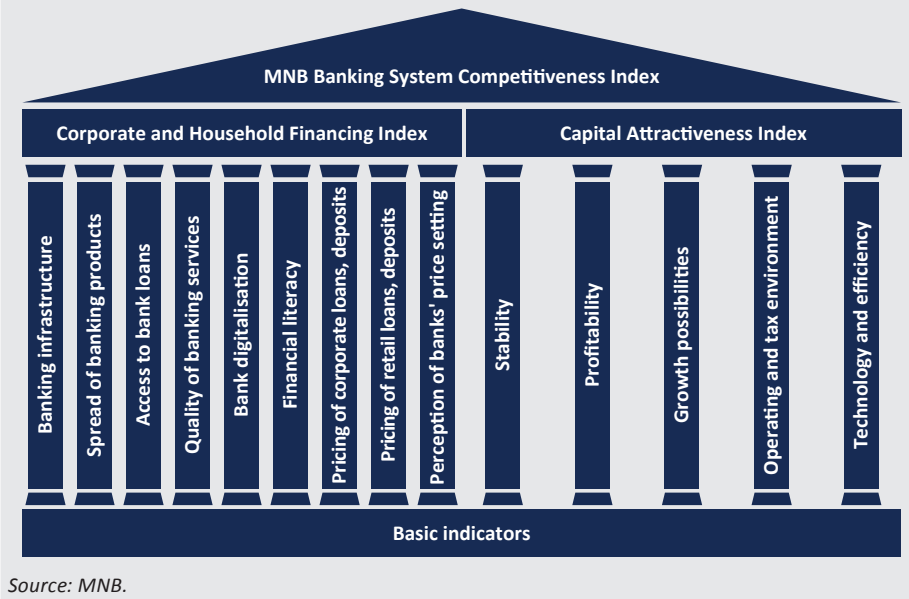
2. Methodology

Geographically, the subject matter – setting up a banking system competitiveness ranking – covers the Member States of the European Union as the consistency and comparability of the data available are limited to EU Member States. We strived to ensure that the comparison of the areas to be covered was based on, as far as possible, objective data. Most indicators of our data sources derive from the World Bank's Global Findex Database and from the European Central Bank's Survey on the Access to Finance of Enterprises (SAFE). In addition, our sources include OECD, Eurostat, Standard & Poor's and all major general competitiveness rankings (World Economic Forum Global Competitiveness Report, World Competitiveness Yearbook, Doing Business).

For the aggregation of the data measuring banking system competitiveness and for the construction of the indicators we defined, in line with the international practice, a multi-level hierarchy:

- I. Basic indicator: a quantitative value describing a specific feature of the banking operation or environment, which in and of itself can consider multiple factors (e.g. I.A.1. Bank branches per 100 thousand adults).
- II. Sub-pillar: a group of basic indicators clustered around the same theme, covering a well-defined area of the banking operation or environment (e.g. I.A. Banking infrastructure).
- III. Main pillar: a group of sub-pillars clustered around the same theme, covering a comprehensive area of banking operation. It is used only in the area of household and corporate finance (e.g. I. Access).
- IV. Index: an indicator that condenses into a single value the level of banking system competitiveness from a given aspect (e.g. Corporate and Household Finance Index).

Figure 1
Structure of the MNB Banking System Competitiveness Index



Before constructing the indices capturing the competitiveness of the banking system, three key questions need to be clarified:

- 1) What are the optimal values of the basic indicators?
- 2) How are the scores calculated for the basic indicators?
- 3) What weighting is used to construct an index from the basic indicators?

For building the indices we need to define which part of the scale should be considered optimal (maximum, minimum or average value) in the case of each basic indicator. Although in most cases the optimal value is obvious, other times the answer is less straightforward, either because it cannot be decided whether the higher or the lower level is the more favourable, or a value other than the two extreme values appears to be more optimal (non-linear scale). The former dilemma may arise in relation to price setting and infrastructure. However, we resolved these problems by examining two separate indices from the consumer side and from the investor side of the banking system and we could clearly determine which value was more favourable from the two different perspectives. The second dilemma involved certain indicators calculated by us where the linear nature of the scale was questionable. Since due to the lack of a target value it was not objectively feasible to define optimal ranges, in such cases we used the sample mean to define the optimum and the countries were scored based on their deviation from the mean.

To ensure the transparency of the evaluation, our goal was to score the results on a scale of 0–100 for each basic indicator, factoring in – besides the relative values – the deviation of the sample as well. For standardising the rough values of the basic indicators and for performing the subsequent scoring, we reviewed the methodologies used by the most major international competitiveness indices:

- a) World Bank (WB) – Doing Business (DB): this ranking applies the distance to frontier methodology, where 0 represents the worst performer and 100 the best performer, while countries in between are ranked by using the following formula (*World Bank 2017*):

$$([worst\ score] - [country\ score]) / ([worst\ score] - [best\ score]) * 100$$

- b) World Economic Forum (WEF) – Global Competitiveness Report (GCR): similar to the Doing Business ranking, its methodology is based on the distance to frontier principle, but the score is indicated on a scale from 1 to 7 (*Schwab 2017*):

$$6 * (([country\ score] - [sample\ minimum]) / ([sample\ maximum] - [sample\ minimum])) + 1$$

- c) IMD – World Competitiveness Yearbook (WCY): its main focus is on the ranking and although it standardises basic indicators, it does not generate scores from them (*IMD 2017*).

Neither of the formulas shown above could fully meet our prior expectations, primarily because, in our opinion, they failed to adequately reflect the dispersion of data. The methodology based on the distance to frontier principle (WB, WEF) exaggerates the differences in rough data by projecting the results onto the full scale (0–100) in all cases irrespective of the dispersion of the given sample. The methodology applied by the IMD, in turn, is primarily suitable for ranking without relying on comparable scores such as those we envisaged.

In order to factor in the deviation of data, we introduced the following formula for converting the basic indicators into scores:

$$MAX(0; 100 - \{([best\ score] - [country\ score]) / [deviation]\} * [P]),$$

where the value of the [P] parameter indicates the weight of “punishment” for the deviation from the best score.

Accordingly, our methodology factors in the deviation of the given sample in such a way that it deducts points in proportion to the distance from the highest score. Scores are indicated on a scale from 0 to 100, where the country with the best performance always receives the maximum 100 points; however, 0 does not emerge in the case of all indicators, a 0 score is given only when the distance from the

best score amounts to more than one standard deviations. Another advantage of this methodology is the fact that, in function of the deviation, the value of the “penalty” can be parameterised. In our calculations, we counted with a value of $[P] = 25$, which means that the results lying at 4 (or more) standard deviations from the best value will receive a score of 0. As mentioned before, in the case of some indicators it was not possible to define a linear scale. In such cases, distance from the mean (as optimum) equalled 1 standard deviation, with $[P] = 12.5$. With this approach we successfully normalised most countries evenly on a scale of 0–100.

With respect to the weighting of the basic indicators and the pillars, the international methodologies are consistent and acceptable to us (*World Bank 2017; Schwab 2017; IMD 2017*). Each ranking under review generates its final index with the application of the arithmetic mean, for the purposes of which basic indicators and pillars are assigned the same weight. The advantage of this methodology is that it is transparent and reproducible and that it adequately addresses the problems arising from potential data shortages. The final weighting of the index can be performed with various methods depending on what is considered to be the basis of the calculation (basic indicators, sub-pillars or main pillars). In our calculations, we assigned the same weights to sub-pillars, because they consist of thematically arranged basic indicators, address the problems arising from data shortages and at the same time, they are more numerous than main pillars, the analysis of which is hindered by the broadness of the areas covered by them. We also tested for robustness weighting methodologies that are based on the basic indicators and the main pillars; however, the results thus received did not differ significantly from those yielded by our selected methodology.

3. Corporate and Household Financing Index (CHFI)

We started out from the fact that, from the perspective of consumers, a banking system can be considered competitive if it offers high quality, broadly available services at an adequate and manageable price to retail and corporate customers alike; in other words, the cost of finances does not render investment projects impossible. Accordingly, in measuring the consumer side we identified three different dimensions (access, quality, pricing) with each dimension forming a main pillar. Each main pillar was broken down further to three sub-pillars, also taking into account corporate and retail oriented indicators (*Table 1*). The pricing sub-pillar includes numerous indicators whose value is not solely determined by demand side factors, but emerges from an equilibrium state between demand and supply. Notwithstanding the foregoing, the demand side receives priority in the corporate and household finance index and accordingly, in analysing the pricing of banking products the focus is on consumers’ perception.

Table 1
Structure of the MNB Corporate and Household Financing Index

Main pillars						
	I.	Access	II.	Quality	III.	Pricing
Sub-pillars	I.A	Banking infrastructure	II.A	Quality of banking services	III.A	Pricing of corporate loans and deposits
	I.B	Prevalence of banking products	II.B	Bank digitalisation	III.B	Pricing of retail loans and deposits
	I.C	Access to bank loans	II.C	Financial literacy	III.C	Perception of banks' price setting

The *access* main pillar is intended to represent access to banking services and it also involves infrastructure, the prevalence of banking products and lending activity. *Banking infrastructure* characterises the physical and digital availability and coverage of the financial system and it is measured by the branch and ATM coverage and by the scope of the credit information system. The latter provides valuable assistance to banks in that it largely determines the actual access to finance on the customer side. While these items increase banks' costs significantly, they remain principal factors in consumers' recourse to banking services. That notwithstanding, as the significance of the physical infrastructure decreases in line with the gaining ground of digitalisation, its prevalence may not be a truly reliable measure of competitiveness. Identifying the optimal level of the branch network is beyond the scope of our analysis; therefore, for the sake of simplicity we assumed that a larger branch network tends to be an advantage on the consumer side. In selecting our basic indicators, we discarded the number of commercial banks because we were unable to determine clearly the optimal number of banks.

The *prevalence of banking products* obviously plays a role in the competitiveness of the banking system as it shows what portion of potential consumers has become customers; i.e. it is a yardstick for measuring the success of financial inclusion. While the demand factor is particularly dominant in this pillar, availability also has a relevance. We quantified this based on the prevalence of bank accounts and debit cards and the features of their use (frequency of card payments, income transferred to bank account), strictly in relation to the retail segment. The number of these indicators can be increased; however, we found that the inclusion of more variables is redundant as they show a significantly positive covariance. We also considered to include the number of deposit accounts and the proportion of indebted household indicators but in their case, we did not have data available for a sufficient number of countries.

Access to bank loans, in essence, is also a measure of the prevalence of banking services, but due to its significance we included it in a separate sub-pillar that encompassed both the corporate and the retail sectors. In addition to the pricing

of loans, this sub-pillar also measures the percentage of companies who took out a new or renewed an old bank loan, the ease of access to loans and the proportion of completely approved applications. The percentage of companies who took out a new or renewed an old bank loan simply indicates financial depth and it is well complemented by the rest of the indicators which, to a certain degree, points to a harmony between banks and the private sector. A greater percentage of completely approved loan applications suggests, on the one hand, the applicants' increased financial awareness and on the other hand, the cyclical harmony between demand and supply. The ease of access to loans is a subjective indicator, but we found it appropriate regardless, as in this case it is the customer's individual perception that matters, which may vary across countries and in function of financial literacy. Moreover, the proportion of companies feels that the availability of bank loans improved. Due to inadequate geographical coverage, upon selecting the basic indicators we discarded the ECB's indicator that shows the proportion of indebted households.

The main pillar of *quality* sums up the service quality of the banking system, the degree of banking digitalisation and the financial literacy of households and market participants. Owing to the topics covered, this area is more difficult to quantify. The *quality of banking services* sub-pillar is the most difficult to measure objectively; with 3 indicators, it is designed to measure the corporate sector's satisfaction with banking services and the legal options of consumer protection. Adopted from the WEF database, the financial services meeting business needs indicator captures company managers' general perception about the extent to which financial services meet individual business needs and as such, it points to an equilibrium between demand and supply. The source of the percentage of companies who feel confident talking about financing with banks indicator is the ECB's corporate survey and it captures company managers' general confidence level towards the financial sector. Both indicators measure consumer satisfaction in all EU Member States based on customers' subjective assessment of the quality of banking services. This is complemented by the same sub-pillar's strength of legal rights index indicator (adopted from the World Bank's Doing Business Survey), which is an objective basic indicator that, based on 12 yes/no questions, factually describes the tools of available legal protection in the countries under review. Legal protection, in this case, largely signifies companies' protection against the financial sector (e.g. the existence of a financial legal framework or the enforceability of contracts at legal forums). In simplified terms, it measures companies' exposure to banks. In theory, a systematic, standardised international comparison of the quality of banking services would be conceivable; however, despite its subjective nature, the survey was deemed to fit the purpose. Although differences across the countries with respect to their expectations of the banking system may distort the international comparison, the fact that consumers were polled directly in this regard is completely consistent with our position.

In examining *bank digitalisation*, we wished to identify the percentage of individuals using the internet for internet banking, the percentage of age 15+ made or received digital payments, made payment using mobile phone and made payment using the internet. The topic of digitalisation was included in the main pillar of quality for two reasons: firstly, since we believe that digital products are largely available in the European Union, the number of actual consumers reflects rather the quality of the services rendered and banks' openness than the option of accessing such services. Secondly, although we interpreted banking digitalisation as a supplement to physical infrastructure at this time, the former may increasingly replace the latter in future in line with the growing demand. If it indeed replaces the traditional banking infrastructure in the future, its reclassification into the "access" pillar will be justified.

The *financial literacy* part is intended to gauge consumers' financial knowledge because, in our opinion, customers' level of understanding regarding their finances has an impact on banking system competitiveness. However, the two other indicators of the sub-pillar, measures the quality of higher education in economics, as it is intended to cover the skills of not only customers, but also the banking sector's human resources. Financial literacy – a sub-pillar that is linked to all factors under review – was classified into the main pillar of quality because in our opinion, this factor of the external environment plays an important role in the way in which the demand side reacts to the innovations reflected in financial products. In addition, banks – as the financial institutions nurturing the closest contact with households – have a vested interest in expanding customers' financial awareness, as indeed, they can sell more complex and potentially more profitable products to customers who are financially literate and more confident in their own financial skills. Banks' failure to contribute to improving their customers' financial awareness – mainly through the transparency of the products offered and through their staff's easy-to-understand but considerable expertise – may reduce the disbursement of high-return financial assets on the one hand and undermine market competition in the sector on the other hand. Banks' prudent and customer-friendly behaviour plays a critical role in any country where the financial literacy level is low, along with the regulations prescribing and the consumer protection measures enforcing such conduct. For this reason, the examination and continuous monitoring of this area is one of the MNB's key priorities. The quality of economics training in individual countries was captured by the quality of management schools and by the percentage of students enrolled in the field of business and administration in tertiary education. The latter is a basic indicator that also shows the extent to which economics is deemed to be an attractive field by the youth of the given country in general. In measuring the quality of the financial educational system, we contemplated the use of the number of institutions listed in institutional rankings (such as the Financial Times European Business School Ranking, *Financial Times 2017*) but eventually we dismissed it because we believe that a highly prestigious

institution itself may not necessarily capture the quality of the entire higher education sector adequately. In our comparison, it is perhaps the human side of the banking sector that received a smaller weight than it should have; its measurement therefore leaves ample room for improvement.

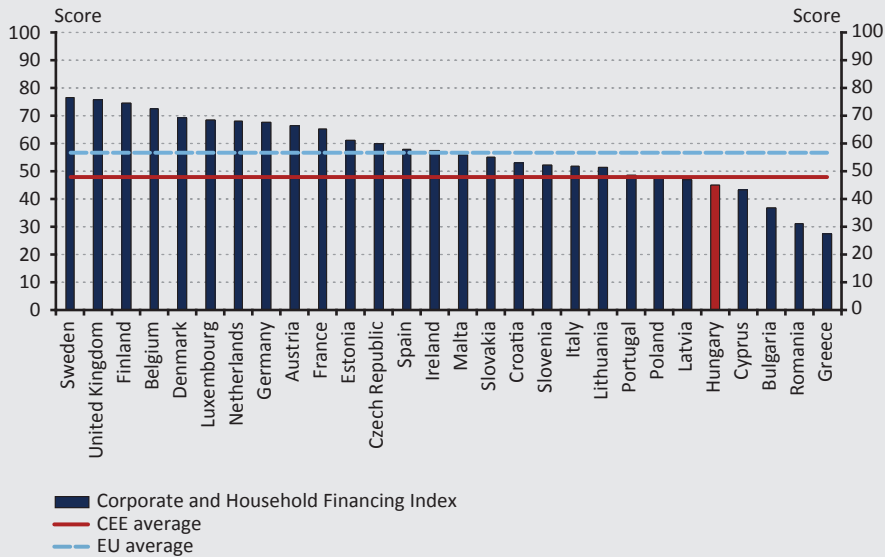
Price setting seemingly encompasses easy-to-quantify indicators; however, in practice it causes difficulties that, for the sake of international comparability, we need to eliminate the differences between the risk spreads of individual countries (which are independent of the banking system) and the different monetary policy features, which may both pass through to interest rates. In order to resolve this dilemma, instead of level-based indicators, we compared the countries' credit spreads and lending and deposit margins. Instead of the absolute level of interest rates, in our analysis we applied the 3-month average of the interest rate spreads both for the retail and corporate segments and as a result, the general risk of lending (including the sovereign CDS spreads of the individual national economies) were also reflected in the model. In addition, the *pricing of corporate loans and deposits* covers the difference between the spreads on SME's and large enterprises as we deemed lending to the SME sector – a token of inclusive and sustainable growth – equally important as lending to the large enterprise segment. The difference in price setting within the two sectors is displayed in the “interest rate spreads on loans to SMEs and to large enterprises” indicator, which reflects the different risk assessment of the two segments from the creditors' aspect. Although the interest expected of SMEs – as justified by the higher risk – should be somewhat higher, an excessive difference crowds out SMEs from the credit market, undermining their growth. There are few projects where excessively high cost of capital yields a positive net present value. If an SME still decides to go ahead, its ability to make payments will be questionable. Accordingly, lending above a certain interest rate threshold is counterproductive both in terms of banks' risk costs and for the national economy as a whole.

We measured the *pricing of retail loans and deposits* based on our own calculations and on the ECB's database. As a basic indicator, we incorporated the retail lending and deposit margin into the sub-pillar, and also examined the interest rate spread on the loans, as well as the difference between the APRC and the lending rate. Similar to the corporate margin indicator, the former's content is twofold: the interest rate spread shows the difference between the reference rate and the lending rate, whereas the difference between the APRC and the lending rate arises from a number of ad hoc cost factors. Households' debt service is proportionate to loan pricing. When this pricing is excessive, debt service will be stretched out at the outset, potentially giving rise to severe social damages and a confidence crisis in case of a stress induced by an exogenous shock. In the long run, institutional confidence can only be achieved amid the moderate prices imposed by market competition.

The *perception of banks' price setting* was included in a sub-pillar separate from the pricing of loans and deposits, because the former pillar is based on hard-to-measure and less comparable indicators, whereas the latter characterises exact interest rate and cost levels. Modelling the perception of the corporate sector, the perception of banks' price setting indicator measures the price level of service fees among the consumers. In setting up the structure of the sub-pillar, our goal was to map the relationship between the corporate sector and the banking system, which in this case indicates corporations' attitudes to banking services. The applied survey-based indicators reflect the opinion of company managers. Two of the three basic indicators applied are based on subjective and one on objective assessment. In the subjective dimension we attempt to gauge the affordability of financial services and the manageability of interest rates. Adopted from the WEF Survey, the affordability of financial services indicator shows company managers' subjective assessment of the pricing of banking services. In the indicator showing the percentage of companies for whom bank loans are not relevant because interest rates or prices are too high, company managers compare the costs of finance to their own rates of return; thereby, providing an opinion on the manageability of lending rates. The percentage of companies who feel that the cost of financing other than interest rates increased indicator, in turn, tries to be a more impartial measure of whether company managers perceive changes in price levels in the market of banking products compared to the previous year. However, this question causes a certain degree of bias as respondents can only offer an opinion on the banks and on the products with which they are connected; therefore, a general change in the price level could only be measured through proper aggregation. It is unfortunate that the data used in this sub-pillar are based, without exception, on surveys. This might be because measuring the costs – which are not standardised and are even concealed in many cases – is extremely difficult.

On the whole, the *Corporate and Household Financing Index* – which calibrates banking system competitiveness from the demand side – displays intuitive results that correlate positively with the level of development. The best performing countries in our ranking were Sweden, the United Kingdom and Finland, while Bulgaria, Romania and Greece had the least competitive banking systems from the perspective of consumers (*Figure 2*). The first half of the list was composed of Western-European and Scandinavian banking systems; their competitive advantage lay primarily in the development of the banking infrastructure and in the high degree of digitalisation. The competitive disadvantage of the banking systems bringing up the rear was apparent in all three topics; namely, lower quality services provided with limited access were combined, in their case, with a relatively high cost level. The banking systems of the stragglers typically demonstrated a low level of digitalisation; the scope of their services was less known and less utilised by their customers and their lending rates – partly because of the countries' higher sovereign risk premiums – were relatively high. The median of CCE countries surpassed the EU median in the case of two sub-pillars (banking infrastructure and service quality).

Figure 2
Results of the Corporate and Household Financing Index



Note: CEE means the average of Bulgaria, the Czech Republic, Croatia, Poland, Romania, Slovakia and Slovenia.

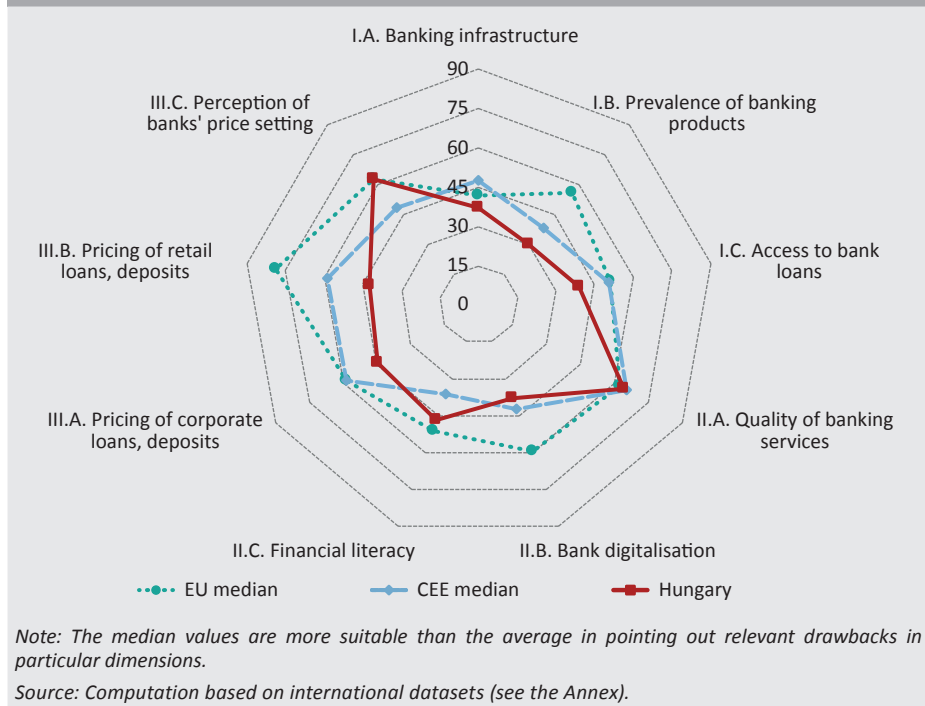
Source: Computation based on international datasets (see the Annex).

With a score of 45.0, Hungary finished 24th among the European Union Member States. Hungary's result fell behind that of the EU Member States (56.7) and CEE countries² (47.9) by 11.7 and 2.9 points, respectively. The primary source of Hungary's competitive disadvantage can be best identified in the high pricing of household loans, the lag in digitalisation and the low prevalence of banking products, while in terms of the quality of banking services, the perception of banks' price setting and financial literacy, the competitive position of Hungary can be considered adequate (Figure 3). The lag in digitalisation can be attributed to reasons associated with demand and supply alike; indeed, online banking has not gained ground in Hungary so far (even though the possibility is ensured), although the required IT developments may have been delayed by banks' significant losses during the crisis. The inadequate prevalence of banking products may be explained by the precarious balance between demand and supply and by the high demand for cash (despite the gaining ground of card payments), which could be offset by enhancing the infrastructure and by improving financial literacy.

² CEE region means the average of Bulgaria, the Czech Republic, Croatia, Poland, Romania, Slovakia and Slovenia.

For a variety of reasons, certain sub-pillars of the financing index Hungary performed extremely well and the results received can be considered consistent overall. In the banking services sub-pillar the Hungarian result, the CEE median and the EU median are located extremely close to one another, which can be attributed to the low deviation of the applied indicators. Apart from a few outliers, the deviation of the national economies under review was relatively low in the calculation of the sub-pillar, and the Hungarian value was around the medians shown. In practice, this means that the quality of banking services in the area of the EU represents a relatively consistent (medium high) level; the difference in competitiveness can be mainly captured in the quantity (e.g. pricing) dimension. As regards the sub-pillar of banks' price setting, exceeding the CEE median, Hungary's value is close to the EU median. This relatively good result reflects the fact that company managers have experienced a positive trend in banks' price setting behaviour in recent years; consequently, Hungary achieved an impressive ranking in the indicator that captures dynamics. With respect to the perception of pricing, we may conclude, overall, that the Hungarian company managers responding to the survey perceive a decline in the interest rates – owing to the growth stimulating central bank policy since 2013, Hungary's continuously improving risk perception and the favourable external market environment –, but even this level is deemed to be high and hardly manageable relative to the company's profits.

Figure 3
Hungarian results of the Corporate and Household Financing Index by sub-pillars



4. Capital Attractiveness Index (CAI)

Another important aspect of banking system competitiveness is the perception of the sector on the investor side, which we attempted to measure by way of the Capital Attractiveness Index. Whatever the sector, a potential project will not be implemented unless it offers the expected rate of return to investors. Based on this logic, the banking sector can only develop and contribute meaningfully to economic growth if it is an attractive investment for its owners over the long term. The banking system's stability and sustainable risk assumption is a relevant issue for investors even beyond compliance with macroprudential requirements, as a low capital adequacy level and a substantial non-performing portfolio jeopardises long-term profitable operation. In a conducive and stable environment, we deem profitability to be the main driver of capital attraction. We attempted to assess this factor by weighting together various scaled indicators.

Achieving the expected return on capital may be influenced by numerous other factors; thus, the prevailing structure and the operating and tax environment are fundamental upon expansion or entry into a new market. In addition to easily comparable indicators (e.g. corporate income tax rate), we captured these differences by the (mainly discrete or binary) quantification and summation of several qualitative factors. Since growth prospects define a banking system's expansion potential, they carry important information about the sustainability of the observed income which, to a large degree, is supported by cost-efficient operations. Therefore, we also examined the technological advancement of the services and the efficiency of banks and their employees.

Similar to the composite index of finances, based on their information content, we integrated the indicators involved in capital attractiveness into sub-pillars (which are not necessarily independent of each other, but exhibit low correlation) (Table 2). The study of Čihák *et al.* (2012) was a large-scale attempt to assess and compare the quality of banking systems and capital markets through the introduction of a new database. The authors defined four main, distinct aspects: size (depth) of the financial system; access to financial services; the efficiency of the financial system and its stability. We were also inspired by their approach in many regards; their classification provided a basis for our own. Since access to financing is adequately covered by the Corporate and Household Financing Index, retaining the depth, efficiency and stability aspects and adding profitability and selected aspects of the operating environment; thus, allowed us to capture the ability to attract capital via mutually independent dimensions. As opposed to Čihák *et al.*, our approach clearly separates the competitiveness lags associated with the demand side from problems arising on the supply side, as the banking system – including the regulator – has various options to modify the latter.

Table 2	
Structure of the Capital Attractiveness Index	
	Main indicators
1) Stability	Texas-ratio (ratio of net non-performing loans to regulatory capital)
2) Profitability	Return on equity, cost-to-income ratio, fee and interest income per total assets adjusted for impairment
3) Operating and tax environment	Concentration, environment indicator (strength of legal rights, adoption of bank levy and duty), corporate income tax
4) Growth possibilities	Long-term trend of private loans as a percentage of GDP, domestic credit to private sector to GDP, households' indebtedness, ratio of bank loans in corporate finances
5) Technology and efficiency	Online banking, ratio of fee and interest income to the number of employees, operating expenses per total assets

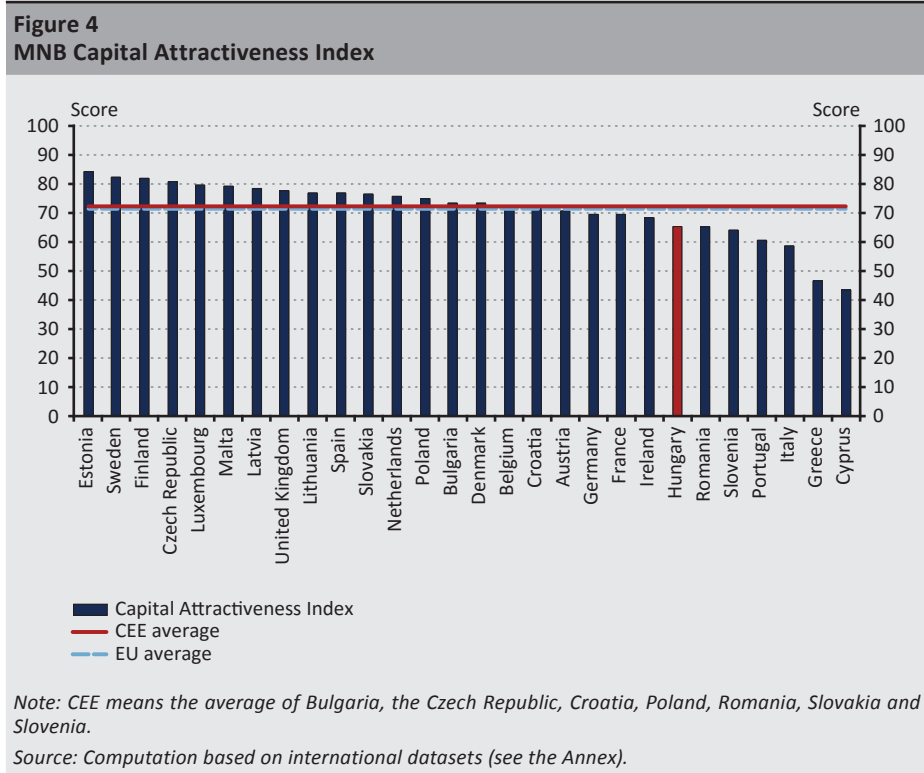
Our analysis of capital attraction ability was driven by theoretical and practical principles alike. With regard to stability, we selected a dense indicator that condenses solvency and country-specific efficient resource allocation decisions; that is, access to funding is truly limited to customers that are able and willing to repay their debt and if not, the banking system allocates prudent reserves to cover the losses. The Texas ratio serves this purpose. Similarly, we strived to provide a broad interpretation of profitability: we considered not only the existence of profitability, but also its cost implications both on the operating side and on the risk side. As regards the operating environment, our index is open to additional indicators both in relation to the independence and efficiency of the supervisory authority and to the simplicity of data supplies and regulatory compliance – EU countries exhibit a significant cross-country variability in this respect. A partial solution is provided, for example, by the corporate income tax rate, which not only reduces banks' profitability directly but, due to easy comparability, it also captures the diversity in the degree of government redistribution. We also tried to capture the concentration of market power in the operating environment; however, the direction of the effect, in the case of this indicator, is far from being straightforward. Greater concentration can be linked to an oligopolistic market (SCP paradigm and the "quiet life" hypothesis, see *Hicks 1935*), which may put participants with a smaller market share at a disadvantage, while lower concentration may ease market entry as the acquisition of smaller institutions requires less capital. The integration of numerous smaller participants into a larger institution may also require substantial expenditures. If the market is controlled by a number of large institutions, relatively less capital will suffice for the entry without the need for further integration. At the same time, the seemingly clear negative correlation between concentration and the intensity of competition is not necessarily inevitable even according to the literature, see, for example, the results of *Berger (1995)*, *Claessens – Laeven (2004)* and *van Leuvensteijn et al. (2013)*. As determining optimal concentration on this

basis is not necessarily possible, we defined the average concentration observed in the banking systems as the ideal level, and the scores of individual countries were calculated based on their distance from the average. We selected the Herfindahl–Hirschman Index (HHI) from the indicators applied in the literature, because, unlike the CR3 and CR5 indicators (market share of the largest banks), it carries information about smaller participants as well. We deemed it more important to capture growth prospects than financial depth, because the latter, in our view, is even more driven by demand. Besides overheated, investors may also be easily deterred by the lack of activity, especially when the subdued demand for credit sets back lending and undermines the profitable operation of the institution. In defining the optimal value of each indicator (minimum or average), we strived to ensure that both effects take hold sufficiently. Although demand is an influential factor in technology as well, in this case the banking system has more room for orientation. Since we identified this facet of competitiveness with the capital attraction ability of already existing banks, efficiency was clearly interpreted as a positive factor; indeed, the acquisition of inefficient institutions – notwithstanding the benefits gained from cost rationalisation – necessitates further investment and organisational realignment.

After carefully deliberating the potential aspects and indicators (see in more detail in *Annex 2*), with the application of 14 basic indicators we defined the five sub-pillars included in the table, which we evaluated on a scale of 0–100. As discussed in the methodology section, the sub-pillars are included with equal weight in the composite index that represents the ability to attract capital. For the sake of comparability, the indicators comprising the sub-pillars were also defined by using a uniform scale. In order to avoid multicollinearity, we applied correlation analysis to dismiss the indicators that carried no additional information, which allowed us to rule out any (even moderate) correlation between the sub-pillars; consequently, they can be considered independent. It should be noted that our analysis does not distinguish between domestic and foreign owned banks in the countries under review, and in this context, we relied on consolidated data throughout the analysis.

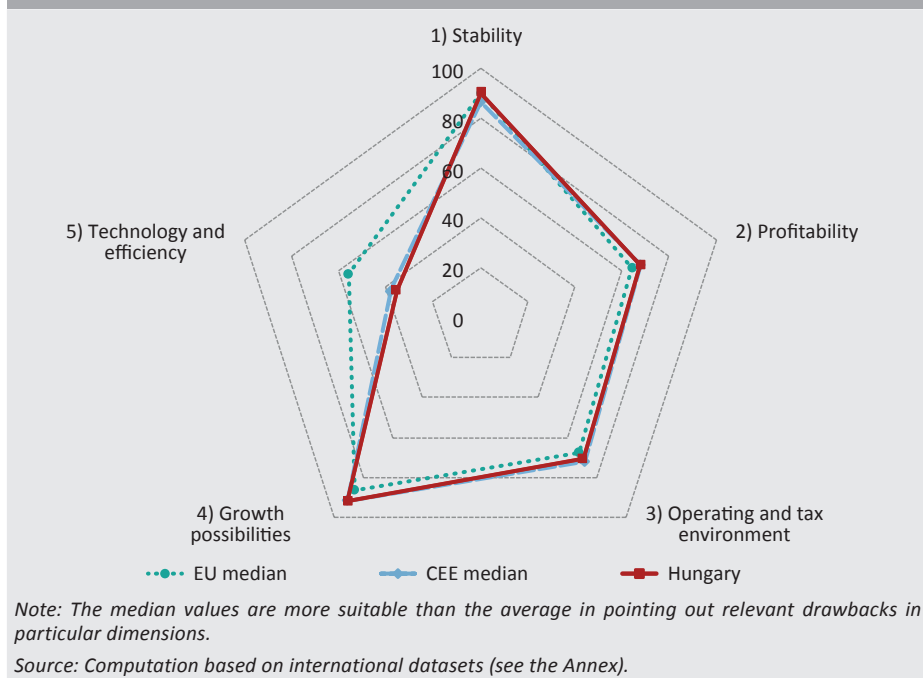
Based on the Capital Attractiveness Index (*Figure 4*), we found that the stragglers are made up of countries where stability considerations represent the biggest bottleneck: Greece, Cyprus, Italy and Portugal. The leaders are Baltic and Scandinavian banking systems (all Baltic states were included in the first ten), which can be attributed to their well-balanced, prudent, cost-efficient and sufficiently digitalised operation. These national economies were far less involved in overheated, predatory lending before the crisis; therefore the growth sacrifice they faced during the period of crisis management was less severe. Spain and the United Kingdom were also ranked among the first ten countries with regard to capital attraction ability. Their privileged position can be partly attributed to the prominent, central role they played in the banking of Latin America and Europe (cross-border financing) before the crisis. All of these countries had taken considerable efforts to

rejuvenate their less efficiently working banks through digital innovation and the positive effects of this changeover have become tangible by now.



Similar to the Corporate and Household Financing Index, in the ranking of the Capital Attractiveness Index Hungary can be found in the last third of the sample and scored below the CEE average, preceding only Romania and Slovenia. An analysis of the five sub-pillars of capital attractiveness (*Figure 5*) reveals that Hungary actually exceeds the CEE average in respect of stability. This can be mainly attributed to post-crisis parent bank capital injections, recent central bank stabilisation measures and the profitable operation of a few larger participants. As regards the profitability pillar, Hungary brings up the rear: while it ranked first in net fee and interest income per total assets, its final score was strongly deteriorated by its high risk cost and cost-to-income ratio. Looking at the operating and tax environment, Hungary is in the first half thanks to its corporate income tax rate and market concentration, but the environment index pushes the score of the Hungarian banking system towards the middle of the ranking. Owing to the subdued trend in lending and the opportunities presented in household lending, the growth dimension shows a positive potential for Hungary. Finally, only Romania and Bulgaria scored worse than Hungary in technology and efficiency, with the negative contribution of all indicators considered. This is the area where Hungary exhibited the most pronounced lag.

Figure 5
Hungarian results of MNB Capital Attractiveness Index by sub-pillars



5. MNB Banking System Competitiveness Index (BSCI)

The static contradiction between the consumer and the investor side competitiveness shifts over time, and in the long run they may become mutually reinforcing factors. In our opinion, a competitive banking system provides broadly available, high quality services at prices that adapt to investors' return expectations while also being affordable for the consumer side. By contrast, if a given country's ability to attract capital is limited and thus it cannot develop an adequate banking infrastructure, financial deepening will falter and in the absence of economies of scale, the efficiency of financial intermediation will decline. More expensive and lower quality service and diminishing access deteriorate the efficiency of operations, which in turn reduces the return on equity and undermines the ability to attract capital even further. Therefore, in the long run bank supply should adapt to the aspects of demand not only in view of the lessons of the past but also recognising the accelerating technological changes of the future, which will slowly reach the financial intermediary system as well.

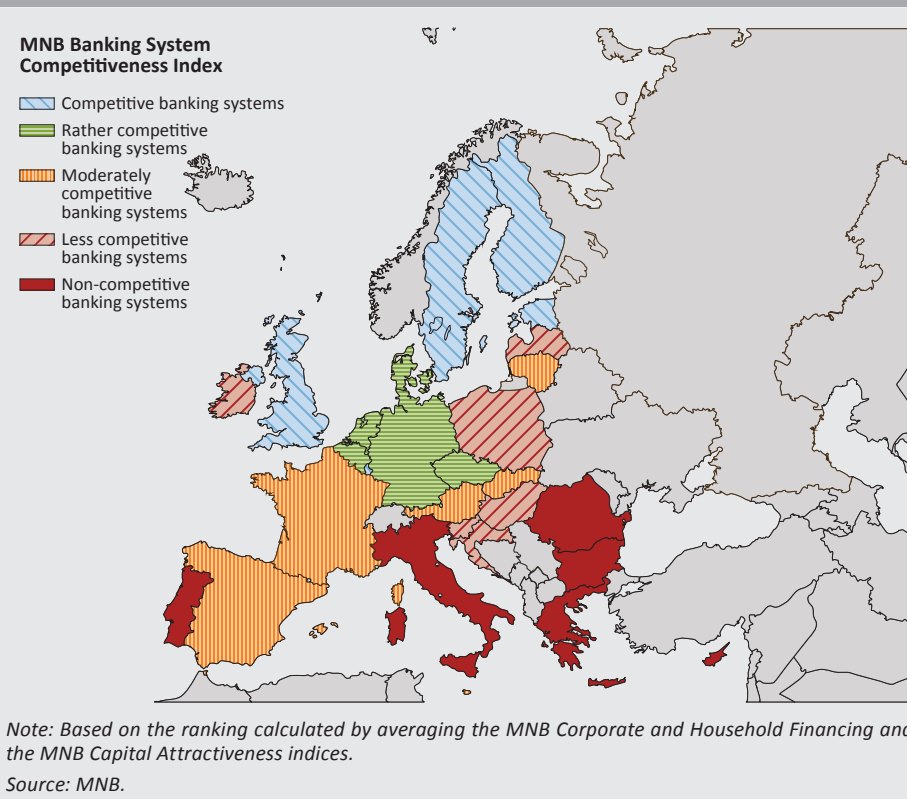
In the previous sections we attempted to assess the competitiveness of the banking system from the perspective of clients on one side and bank capital on the other. However, each approach is insufficient and lopsided in and of itself: a truly competitive banking system satisfies both, resolving the contradictions between the two sides as much as possible. In the MNB's final Banking System Competitiveness Index both sub-indices were considered in order to measure which countries are most successful in reconciling consumer and investor interests in the operation of the banking system.³

According to our survey and in consideration of both sides under review, Northern countries and some of the core EU Member States exhibited the strongest banking system competitiveness. Despite the struggling big banks of Germany's Deutsche Bank and Commerzbank, Germany's banking system is rather competitive, probably due to the less procyclical Savings Banks. The score of most Central and Eastern European Member States – including Hungary – was below average overall. The banking systems of South-East European and Mediterranean countries – Portugal, Italy and Greece – proved to be the weakest in terms of competitiveness.

Hungary is in the league of Latvia, Ireland and Poland as well as two North-Western Balkan states (Slovenia and Croatia). Hungary has room for improvement both on the demand and the supply side, but the two aspects coincide especially in the need for improvement in digitalisation and operational efficiency. Moreover, an opportunity to progress presents itself in the efficiency improvements that can be achieved by a more competitive banking system through the reduction of credit spreads and lending costs, which may ensure the Hungarian banking system's contribution to economic growth and its socially accepted role in the allocation of resources over the long run.

³ The two sub-indices were weighted together in various ways, but the results proved to be robust. Below we present the result received from the arithmetic mean.

Figure 6
The 28 countries of the EU based on the MNB Banking System Competitiveness Index



It is worth cross-checking our results against those found by other international surveys available in this subject. As we indicated in the introduction, such a comprehensive comparison is not available in the area of the banking system, but the competitiveness rankings partially include an analysis of some aspects of financial intermediation. For the purposes of the comparison, we relied on the “Doing Business” (World Bank 2017), “Global Competitiveness Report” (Schwab 2017) and the “World Competitiveness Yearbook” (IMD 2017) surveys, with each survey containing 4–9 indicators of the banking system. Correlations between the average scores and rankings received with regard to the questions dedicated to financial intermediation exhibited a fairly similar pattern in the surveys (Table 3). The results of the WEF and IMD rankings strongly correlated with ours ($r > 0.79$ in each case), while the correlation with the rankings of the Doing Business survey was weaker ($r = 0.48$ for the scores and $r = 0.51$ for the rankings). However, it is important to note that the Doing Business survey does not correlate more positively with the other two competitiveness rankings either, because it explicitly focuses on the business environment of SMEs, while the other rankings examine

the operation and profitability of the banking system based on a somewhat broader criteria system.

Table 3			
Cross-checking of the MNB's Banking System Competitiveness Index			
Correlation coefficients	World Bank – Doing Business	World Economic Forum – Global Competitiveness Report	IMD – World Competitiveness Yearbook
MNB BSCI	0.47	0.89	0.86
MNB CHFI	0.47	0.79	0.87
MNB CAI	0.30	0.70	0.48

Source: MNB.

6. Summary

The goal of our analysis was to propose an interpretation of banking system competitiveness and more importantly, to provide a quantifiable international comparison across European Union Member States. Since we were unable to locate any other international survey commensurate with the depth and comprehensiveness of our study, we faced new dilemmas both during the selection and the classification of our indicators. In order to resolve the fundamental conflicts, in our survey we examined the subject from two different perspectives (consumer and investor). Based on this, we constructed a financing index and a capital attractiveness index before combining the two indices into a single composite competitiveness index. Since the most favourable solution in the long run is to satisfy the two systems of preferences simultaneously, the MNB's Banking System Competitiveness Index reflects a combination of these two indices. In order to prevent the comparison from reflecting the cyclical position of the economy, we focused primarily on structural indicators; therefore, the analysis should be updated at two-year intervals.

We hope that our findings can be used for purposes other than ranking, perhaps providing a basis for the identification of neuralgic points and areas for future improvement. Our research may be carried forward in two dimensions: firstly, by enhancing the index and by expanding – and regularly updating – the indicator system. In this context, in the dimensions of the sub-pillars presented in our study a broad-based and consolidated data collection system and the introduction of comprehensive international polls may prove to be useful. Secondly, the link between the banking system and the competitiveness of the national economy merits a more thorough analysis; in particular, the channels through which the banking system may contribute to the competitiveness of a given country. The latter research, we hope, may draw from the initial results presented in this study.

References

- Banai, Á. – Horváth, G. – Vonnák, B. (2016): *The role of financial intermediation in growth*. In: Competitiveness and Growth. Magyar Nemzeti Bank, 2016: 186–211.
- Berger, A. N. (1995): *The Profit-Structure Relationship in Banking: Tests of Market-Power and Efficient-Structure Hypotheses*. Journal of Money, Credit and Banking, 27(2), May: 404–431. <https://doi.org/10.2307/2077876>.
- Claessens, S. (2009): *Competition in the Financial Sector: Overview of Competition Policies*. World Bank Research Observer, 24(1): 83–118. <https://doi.org/10.1093/wbro/lkp004>.
- Claessens, S. – Laeven, L. (2004): *What Drives Bank Competition? Some International Evidence*. Journal of Money, Credit and Banking, 36(3), June: 563–583. <https://doi.org/10.1353/mcb.2004.0044>.
- Čihák, M. – Demirgüç-Kunt, A. – Feyen, E. – Levine, R. (2012): *Benchmarking Financial Systems around the World*. World Bank, Policy Research Working Paper 6175, August.
- Financial Times (2017): *European Business School Rankings 2016*. <http://rankings.ft.com/businessschoolrankings/european-business-school-rankings-2016>. Downloaded: 1 August 2017.
- Gerschenkron, A. (1962): *Economic Backwardness in Historical Perspective. A Book of Essays*. Cambridge, Massachusetts: Belknap Press of Harvard University Press.
- Hatzichronoglou, T. (1996): *Globalisation and Competitiveness: Relevant indicators*. OECD STI Working Papers 1996/5, Paris.
- Hicks, J. (1935): *Annual Survey of Economic Theory: The Theory of Monopoly*. Econometrica, 3(1), January: 1–20. <https://doi.org/10.2307/1907343>.
- IMD (2017): *World Competitiveness Yearbook 2017*. <https://worldcompetitiveness.imd.org/>. Downloaded: 1 August 2017.
- Klaus Schwab, World Economic Forum (2017): *The Global Competitiveness Report 2016–2017*. Online: <https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1>. Downloaded: 1 August 2017.
- MNB (2014): *Átalakulóban a magyar bankrendszer: Vitaindító a magyar bankrendszerre vonatkozó konszenzusos jövőkép kialakításához (Hungarian banking system in transition. A keynote paper for developing a consensus-based vision for the Hungarian banking system.)* MNB-tanulmányok különkiadás (MNB Occasional Papers, Special Issue)
- Nafziger, E. W. (2006): *Economic development*. Cambridge University Press, New York.

Porter, M. E. (1998): *The Competitive Advantage of Nations*. The Free Press, New York.
<https://doi.org/10.1007/978-1-349-14865-3>.

van Leuvensteijn, M. – Sorensen, C. K. – Bikker, J. A. – Van Rixtel, A. A. (2013): *Impact of bank competition on the interest rate pass-through in the euro area*. European Central Bank, Working Paper Series, March, No. 885. <https://doi.org/10.1080/00036846.2011.617697>.

World Bank (2017): *Doing Business – 2017*. <http://www.doingbusiness.org/>. Downloaded: 1 August 2017.

Annex

Annex 1: Basic indicators of the Corporate and Household Finances Index

Main pillar	Sub-pillar	ID	Description of basic indicator	Source	Type	Year	Coverage	Optimum	
I. Access	A. Banking infrastructure	I.A.1	Branches per 100 thousand adults	IMF – Financial Access Survey	objective	2014	mixed	max	
		I.A.2	ATMs per 100 thousand adults	IMF – Financial Access Survey	objective	2014	mixed	max	
		I.A.3	Credit bureau coverage	WB – Doing Business	objective	2015	mixed	max	
	B. Prevalence of banking products	I.B.1	Financial cards in circulation (Number of cards per capita)	IMD – WCR	objective	2015	retail	max	
		I.B.2	Financial card transactions in proportion to consumption per capita	IMD – WCR + Eurostat	objective	2015	retail	max	
		I.B.3	Percentage of age 15+ made payment using a debit card	WB – Global FinIndex Database	objective	2014	retail	max	
	C. Access to bank loans	I.B.4	Percentage of age 15+ have account	WB – Global FinIndex Database	objective	2014	retail	max	
		I.B.5	Percentage of age 15+ received wages or government transfers into an account	WB – Global FinIndex Database	objective	2014	retail	max	
		I.C.1	Percentage of age 15+ borrowed from a financial institution in the past year	WB – Global FinIndex Database	objective	2014	retail	max	
	II. Quality	A. Quality of banking services	I.C.2	Ease of access to loans	WEF – GCI	subjective	2016	corporate	max
			I.C.3	Percentage of companies who took out a new or renewed an old bank loan	ECB – SAFE	objective	2016	corporate	max
			I.C.4	Percentage of companies who applied for bank loan and received everything	ECB – SAFE	objective	2016	corporate	max
			I.C.5	Percentage of companies who say that the availability of bank loans improved	ECB – SAFE	subjective	2016	corporate	min
			II.A.1	Financial services meeting business needs	WEF – GCI	subjective	2016	corporate	max
		B. Banking digitalisation	II.A.2	Strength of legal rights index	WB – Doing Business	objective	2016	corporate	max
II.A.3			Percentage of companies who feel confident talking about financing with banks	ECB – SAFE	subjective	2016	corporate	max	
II.B.1			Individuals using the internet for internet banking	Eurostat	objective	2016	retail	max	
II.B.2			Percentage of age 15+ made or received digital payments	WB – Global FinIndex Database	objective	2014	retail	max	
II.B.3			Percentage of age 15+ made payment using a mobile phone	WB – Global FinIndex Database	objective	2014	retail	max	
C. Financial literacy		II.B.4	Percentage of age 15+ made payment using the internet	WB – Global FinIndex Database	objective	2014	retail	max	
		II.C.1	Percentage of adults who are financially competent	S&P Global Financial Literacy Survey	objective	2014	mixed	max	
		II.C.2	Adult Financial Literacy	OECD – Adult Financial Literacy	subjective	2016	mixed	max	
		II.C.3	Quality of management schools	WEF – GCI	subjective	2016	mixed	max	
		II.C.4	Percentage of students enrolled in the field of business and administration in tertiary education	Eurostat	objective	2015	mixed	max	
III. Pricing	A. Pricing of corporate loans and deposits	III.A.1	Average interest rate spread on loans to enterprises	MNB	objective	2016	corporate	min	
		III.A.2	Interest rate spreads between loans to SMEs and to large enterprises	OECD	objective	2014	corporate	min	
		III.A.3	Bank lending and deposit margin – Enterprise	ECB – SDW	objective	2016	corporate	min	
	B. Pricing of retail loans and deposits	III.B.1	Average interest rate spread on retail loans	ECB – SDW	objective	2016	retail	min	
		III.B.2	Difference between the APRC and the lending rate – Retail	ECB – SDW	objective	2016	retail	min	
		III.B.3	Bank lending and deposit margin – Retail	ECB – SDW	objective	2016	retail	min	
	C. Perception of banks' price setting	III.C.1	Affordability of financial services	WEF – GCI	subjective	2016	corporate	max	
		III.C.2	Percentage of companies for whom bank loans are not relevant because interest rates or price too high	ECB – SAFE	subjective	2016	corporate	min	
		III.C.3	Percentage of companies who feel that the cost of financing other than interest rates increased	ECB – SAFE	subjective	2016	corporate	min	

Annex 2: Basic indicators of capital attractiveness

Sub-pillar	ID	Description of basic indicator	Source	Type	Year	Optimum
1) Stability	1.1	Adjusted Texas ratio	-	objective	-	min
	1.1.a	Equity	ECB – Macroprudential database	objective	2015	-
	1.1.b	Gross non-performing loans and advances [per gross total loans and advances]	ECB – Macroprudential database	objective	2015	-
	1.1.c	Accumulated impairment [per total gross non-performing portfolio]	ECB – Macroprudential database	objective	2015	-
2) Profitability	1.1.d	Total loans outstanding [% of total assets]	ECB – Consolidated Banking Data	objective	2015	-
	1.1.e	Total bank assets	ECB – Macroprudential database	objective	2015	-
	1.1.f	Texas ratio	MNB calculation based on ECB data, and IMF FSI	objective	2015	-
	2.1	Return on equity [%]	ECB – Consolidated Banking Data	objective	2010–2015	max
	2.2	Cost-to-income ratio [%]	ECB – Consolidated Banking Data	objective	2010–2015	min
	2.3	Net fee and commission income [% of total assets]	-	objective	-	max
	2.3.a	Net interest income	ECB – Macroprudential database	objective	2010–2015	-
	2.3.b	Net fee and commission income	ECB – Macroprudential database	objective	2010–2015	-
3) Operating and tax environment	2.3.c	Total bank assets	ECB – Macroprudential database	objective	2010–2015	-
	3.1	Environment index	-	mixed	-	max
	3.1.a	Bank levy (yes/no)	Authors' collection based on literature	objective	2015	0
4) Growth prospect	3.1.b	Strength of legal rights index (0=weak to 12=strong)	WB – World Development Indicators	subjective	2015	12
	3.1.c	Supporter of EU Financial Transaction Tax dummy	Based on the European Commission's proposal	objective	2014	0
	3.2	Herfindahl–Hirschmann Index	ECB – Macroprudential database	objective	2015	avg
	3.3	Corporate tax rate	KPMG	objective	2016	min
	4.1	Credit to private sector as a percentage of GDP, long-term trend	BIS	objective	2016	min
5) Technology and efficiency	4.2	Domestic credit to private sector by banks (% of GDP)	WB – World Development Indicators	objective	2015	avg
	4.3	Ratio of bank loans in corporate finances	Eurostat – Financial balance sheets	objective	-	avg
	4.4	Households' debt-to-gross disposable income ratio	ECB – Macroprudential database	objective	2015	min
	5.1	Prevalence of online banking	Based on authors' collection	objective	2016	max
	5.2	Number of bank employees in proportion to income	WB – Global Findex Database	objective	-	min
	5.2.a	Number of bank employees	ECB – Banking Structural Financial Indicators	objective	2015	-
	5.2.b	Net interest income	ECB – Macroprudential database	objective	2015	-
	5.2.c	Net fee and commission income	ECB – Macroprudential database	objective	2015	-
	5.3	Operating expenses per total assets	ECB – Macroprudential database	objective	2015	min