Methodology underlying the determination of the benchmark countercyclical capital buffer rate and supplementary indicators signalling the build-up of cyclical systemic financial risk

The application of the countercyclical capital buffer (CCB) is mandatory for all Member States of the European Union, thus also for Hungary, from 1 January 2016. Pursuant to Section 33 of Act CXXXIX of 2013 on Magyar Nemzeti Bank, the Magyar Nemzeti Bank, the public authority designated to determine the Hungarian countercyclical capital buffer rate, establishes the benchmark countercyclical capital buffer rate underlying the calculation of the countercyclical capital buffer rate applicable to the Hungarian exposures quarterly, and publishes the methodology underlying the definition of the benchmark capital buffer rate in a notice.

In the European Union, the definition of the countercyclical capital buffer follows the principle of guided discretion along common standards. Article 135 of CRD IV[1] authorises the European Systemic Risk Board (ESRB) to issue guidance to designated national authorities with regard to the calculation of the benchmark countercyclical capital buffer rate prescribed in Article 136 (2). Article 135 of CRD IV also authorises the ESRB to provide guidance on the selection of variables that indicate the build-up of systemic risks associated with periods of excessive credit growth in the financial system.

The ESRB recommendation[2] on the guidance related to the calculation of the countercyclical capital buffer rates recommends the following basic methodology. First, it makes a proposal for the calculation of the standardised credit-to-GDP gap, which is the deviation of the stock of credits to gross domestic product GDP, expressed as a percentage value, from its long-term trend. Second, it contains the rule applicable to the calculation of the capital buffer rate depending on the standardised credit-to-GDP gap (hereinafter: standardised capital buffer rate). Third, the proposed basic methodology recommends that upon making the decision on the capital buffer rate, the national authority should also consider a variety of supplementary indicators signalling the build-up of cyclical systemic financial risks. The recommendation specifies the following groups of these indicators: potential overvaluation of property prices, credit developments, external imbalance, strength of bank balance sheets, private sector debt burden, and potential mispricing of risks. In addition, it also recommends taking into consideration indicators derived from models that combine the credit-to-GDP gap and a selection of the indicators belonging to the previous six categories.

On the other hand, the ESRB recommendation permits the national macroprudential authorities to depart from this basic methodology to account for special features of the individual countries' financial intermediation system. The national authorities may calculate self-calibrated capital buffer benchmark rates that depend on the so-called additional credit-to-GDP gap, instead of the standardised credit-to-GDP gap. In addition, the recommendation also provides significant room to manoeuvre in terms of the type of indicators used by the designated national authorities, and the form they take these indicators into consideration when formulating their decision on the capital buffer rate.

According to the above, the capital buffer benchmark rate is an important, but not exclusive element of the definition of the capital buffer rate to be applied. Both the legislative framework and the ESRB recommendation permit policy-makers to consider any other factors, deemed important by them, related to the stability of the financial intermediary system, when pondering on the decision about the rate to be applied.

Standardised credit-to-GDP gap and standardised capital buffer rate recommended by ESRB

According to the ESRB recommendation, the definition of outstanding loans used for the standardised credit-to-GDP gap under the basic methodology includes all loans granted by resident and non-resident entities drawn down by

[1] DIRECTIVE 2013/36/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

[2] RECOMMENDATION OF THE EUROPEAN SYSTEMIC RISK BOARD of 18 June 2014 on guidance for setting countercyclical buffer rates (ESRB/2014/1) (2014/C 293/01).

domestic households and non-financial corporations, as well as the loans extended by domestic financial institutions to non-resident households and non-financial corporations. The recommended GDP value is the sum of the last four quarters' nominal GDP at current price.

The ESRB recommendation proposes to produce the standardised credit-to-GDP gap from the credit-to-GDP time series using the Hodrick-Prescott Filter (HP Filter), specifically a one sided, univariate HP Filter with a smoothing parameter (lambda) of 400,000. According to methodological background study[3] of the ESRB, all available data of the credit-to-GDP time series should be used for the production of the gap indicator.

Based on the ESRB recommendation, the standardised capital buffer rate is derived from the standardised credit-to-GDP gap in accordance with the following rule: the capital buffer rate is higher than zero only when the standardised credit-to-GDP gap exceeds 2 per cent, above which it has a linear relationship with the gap such that it takes the maximum value of 2.5 per cent when the gap is 10 per cent. The ultimate value of the standardised capital buffer rate is produced by rounding the result of the previous calculation to multiples of 0.25 per cent.

The Hungarian additional credit-to-GDP gap and the benchmark buffer rate

The characteristics of Hungarian financial intermediation differ in several important attributes from those of the euro area countries, which are in the focus of the ESRB recommendation, hence instead of the standardised credit-to-GDP gap and the standardised capital buffer rate depending on it, the MNB developed a methodology for determining the additional credit-to-GDP gap and the benchmark capital buffer rate depending on it.

First, the definition of outstanding loans in the additional credit-to-GDP gap has become a narrower aggregate: outstanding lending by all domestic financial institutions to resident and non-resident non-financial corporations and households.[4] The reason for this is that the credit aggregate proposed by the ESRB is deemed too broad for Hungary compared to loans extended by the range of institutions that may be directly influenced by the CCB regulation. The largest difference is that the ESRB definition also includes loans granted by parent companies to their domestic subsidiaries, which could be classified as capital grant rather than credit. Taking into consideration the size and classification difficulties of these stocks and the operational mechanism of the countercyclical capital buffer, the MNB narrowed the stock of loans used for the additional credit-to-GDP gap to outstanding lending by financial institutions.

Second, for the additional credit-to-GDP gap the exchange rate adjusted values of the above outstanding lending were used, in order to ensure that exchange rate movements, which are much more volatile than the financial cycle, do not generate wide fluctuations in the values of the credit-to-GDP gap. The exchange rate adjusted figures were gained by converting outstanding foreign currency credit portfolios into forint at each point in time using the exchange rates applied for the conversion into forint in the first quarter of 2015. The pegging of this exchange rate regime ensures that the time series of exchange rate adjusted outstanding loans does not have a structural break at the time when foreign currency denominated loans were converted to forint denominated ones, which is advantageous when sub-dividing the series into a trend and a gap.

Third, for annualised GDP the sum of last four quarters' seasonally adjusted nominal GDP at current price was used, where the departure from the ESRB recommendation is represented by seasonal adjustment.

Fourth, the sub-division of the trend and gap was slightly modified. The use of the univariate HP Filter with a smoothing parameter of 400,000 was kept, but to get more intuitive gap values the filtering commenced from the

[3] European Systemic Risk Board (2014): Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options. *European Systemic Risk Board, Occasional Paper 5.*

[4] The outstanding loans data originates from the national economy's financial accounts data published by the MNB. The credit aggregate used for the credit-to-GDP gap indicator comprises of the following items. In the case of households: housing loans from credit institutions, consumer credits and other loans from credit institutions, housing loans from other financial enterprises and other loans from other financial enterprises. In the case of non-financial enterprises: loans from credit institutions, loans from other financial enterprises, debt securities.

first quarter of 1998 such that in the first four years the division received from the two-sided HP filtering ran for the full time series (from 1998 Q1 to 2015 Q1) was used, and the one-sided HP filtering was used only for the dates thereafter.

The rule for defining the Hungarian benchmark capital buffer rate differs from the standardised capital buffer rate rule included in the ESRB recommendation in two respects. First, the benchmark capital buffer rate depends on the additional, rather than on the standardised credit-to-GDP gap. Second, the lower threshold was raised from 2 per cent to 4 per cent due to two main reasons. One of these reasons is that the optimisation process used in the ESRB methodological background study returns 3.9 per cent as lower threshold based on domestic data. This means that, according to the previous Hungarian experience, the additional credit-to-GDP gap exceeding 3.9 per cent signalled excessive credit growth that also carried the systemic risk of a financial crisis. Another reason for raising the threshold is that the deepening of the Hungarian financial system is expected to continue in the near future, which may raise credit-to-GDP gap values without generating systemic risk.

The Hungarian supplementary indicators

By considering the supplementary indicators corresponding to the domestic features an even more accurate and detailed view of the development of the cyclical systemic financial risks and the underlying processes is obtained, in addition to the additional credit-to-GDP gap. That is, the credit-to-GDP gap indicators are not flawless early warning signs of financial crises. This is reflected by the fact that prior to the former financial crises of certain EU Member States the credit-to-GDP gaps remained low, i.e. they failed to signal the build-up of the systemic financial risks in due course. Furthermore, it is not guaranteed that the credit-to-GDP gap values will also increase to an extent that would signal a warning before a financial crises that have, at least partially, different attributes than those of the previous ones.

The ESRB methodological background study assessed a wide range of the indicators based on consolidated data of the EU 28 member states. The aim of the study is to determine the degree the indicators' values were capable of forecasting past financial crises. The MNB selected the supplementary indicators to be considered for the purpose of defining the countercyclical capital buffer rate applicable to the Hungarian exposures using this methodology, also involving other indicators based on its own data collection and testing the sensitivity of the results. The list of selected Hungarian supplementary indicators covers all the categories recommended by the ESRB. The MNB allocated these indicators to two groups, one of which contains the indicators measuring the overheating of the financial system, while the other group includes those that measure the vulnerability of the financial system to external shocks.

Overheating indicators:

- credit-to-GDP gap indicators with various credit definitions (in addition to the aggregates used for the standardised and additional credit-to-GDP gap, the aggregate of credits extended by the domestic credit institutions to non-financial corporations and households), in various sectoral breakdowns (granted to households, granted to non-financial corporations, total), and calculating with exchange rate adjusted and exchange rate unadjusted outstanding loans;
- Credit-to-GDP gap developed by Hosszú et al. (2015)[5]
- property price in proportion to household income;
- banking sector leverage;
- three-month reference interest rate;
- interest rate spread of the banking sector;

[5] Zs. Hosszú; Gy. Körmendi and B. Mérő (2015): Univariate and multivariate filters to measure the credit gap *MNB Occasional Papers* 118

- ROE of the banking sector;

Vulnerability indicators:

- credit-to-GDP applicable to the global credit portfolio in the ESRB methodological background study;
- Herfindahl–Hirschman-index of the banking sector;
- households' debt service burdens as a per cent of GDP;
- external indebtedness as a per cent of GDP;
- loan-to-deposit ratio of the banking sector;
- ratio of foreign currency loans in outstanding loans by the domestic financial institution to households and non-financial corporations;
- ratio of foreign currency loans in previous outstanding lending including the loans of the domestic non-financial corporations from abroad;
- current account as a per cent of GDP;
- capital adequacy ratio of the banking sector.

Development of the methodology applied by the MNB

The MNB annually reviews and continuously enhances the methodology of determining the benchmark countercyclical capital buffer rate and supplementary indicators supporting the decision to be made on the rate to be applied. The countercyclical capital buffer is also a new regulatory instrument by international standards, and experience with regard to its use and impact is gradually accumulated. The MNB continuously monitors these experiences and also attempts to expand those with its own analyses and research.