Monetary policy instruments of the Magyar Nemzeti Bank

The primary objective of the central bank in conducting its money market operations is to implement an effective transmission of central bank interest rate changes, to assist credit institutions' liquidity management and to contribute to banking sector stability. Endeavours to improve the effectiveness of financial intermediation and enhance competition in the financial market contribute to the implementation of the central bank's goal – to achieve and maintain the price stability.

Basic principles of selecting central bank instruments

For the achievement of monetary policy objectives, a wide range of instruments is available for the central bank. Therefore, the selection of instruments is facilitated by determining certain general basic principles, i.e. aspects of selection.

Instruments are divided into direct and indirect ones, depending on to what extent they rely on **market-conform operation**. Direct instruments include the direct control over credit institutions through the highest applicable loan interest rates or lowest/highest deposit interest rates and the application of credit and deposit limits. Indirect instruments require an efficient operation of financial markets; they include open-market operations (e.g. outright transactions of securities or repo), deposit tenders and bond auctions as well as the regulation of the reserve ratio. A given central bank objective can be achieved using several of the monetary instruments, but the MNB's most important aspect is to use that market-conform instrument which is the most efficient in terms of achieving the given operative monetary policy objective.

Beside the principle of 'one operative objective – one instrument', the central bank strives for a simple, **transparent structure of instruments** and **cost-efficiency**.

When selecting and developing the instruments, the central bank attempts to contribute to **market-building** in the financial intermediary system. It stimulates the operation of the interbank market, and tries to attain that in events when it is possible to redistribute liquidity in the interbank market as well, credit institutions contact one another, instead of using central bank loans or deposits. For a smooth adoption of the euro, a further target is a possible adjustment of the instruments to the ones applied in the euro area.

It is also essential for the central bank to **treat market participants equally**. It is taken into account when selecting its scope of counterparties, striving to attain that each credit institution which can meet the minimum technical requirements has the possibility to use central bank instruments.

Functions of instruments in implementing monetary policy objectives

Within the set of instruments applied by the MNB, the following are distinguished according to their functions:

- the instrument serving as the policy instrument (two-week MNB-bill), which plays an important role in the transmission mechanism;
- instruments intended to reduce the volatility of interbank rates, which support credit institutions' liquidity management;
- sterilisation instruments, which serve the purpose of absorbing the liquidity surplus of the banking system; and
- instruments serving the influencing of the exchange rate directly.

The policy instrument

The purpose of the policy instrument is that the central bank mediates to the market the interest rate level which the central bank regards as optimal. Changing the policy rate has an effect on other, bank and capital market rates and yields as well. The interest rates of most variable rate corporate loans are tied to money market rates, therefore, through influencing the latter, the central bank can directly modify corporations' liability costs and thus their demand for investment goods. In addition, the interest rates on household deposits also follow the changes in short-term interest rates. Accordingly, through influencing the interest rates relevant for households and corporations, the central bank can have an effect on aggregate demand for investment and consumption goods in the economy and households' savings and consumption decision. In addition, changing the policy rate influences aggregate demand through a shift in the exchange rate.

In Hungary, the policy instrument is the two-week MNB-bill available for the central bank's credit institution partners; its interest rate is the central bank base rate.[1] The base rate is set by the Monetary Council, and at the same time with the relevant decision, the other interest rates tied to the two-week MNB-bill rate (e.g. the interest rate of overnight instruments constituting the two edges of the interest rate corridor) also change.[2] Although in terms of influencing economic developments interest rate changes of longer maturities are of importance,[3] it is a general practice that the central bank intervenes through its own policy rate only at the very short end of the yield curve. Thus, on the one hand, it renders partners' speculative activity more difficult, and on the other hand, it helps credit institutions' liquidity management more efficiently. In addition,

[1] Before 2001, no effective central bank instrument was connected to the base rate; it served as a reference basis of provisions of law, and individual elements of earlier refinancing credit facilities were priced to it.

[2] Since mid-2004 the Monetary Council makes a decision on changing the central bank base rate at its second meeting of each month (so-called rate-setting meetings). This, on the one hand is in line with international practice, and on the other hand, most of the information necessary for founding the decisions is published with only a monthly frequency. Of course, if circumstances make it necessary, the Council can decide on changing the base rate at any time.

[3] In Hungary, the 3-month money market interest rates play a prominent role; pricing of numerous bank loan facilities is linked directly to the 3-month benchmark and BUBOR rate developments.

this way market participants' inflation expectations will be reflected in longer-term yields. (For details about the maturity of the policy instrument see Box 1.)

At the same time, despite the short-term instrument, the central bank is able to indirectly influence yields of longer maturities as well using the forward interest rate parity, i.e. longer term yields are moved by expectations regarding future developments in the key policy rate. Accordingly, e.g. the 3-month yield becomes set at a level where the yield of the 3-month investment is equal to the expected level of rolling the two-week investment for 3 months. For example, in the event that the market expects stable two-week central bank rates, the 3-month nominal yield must marginally exceed the two-week one, as the rolling investment means the attainment of compound interest. If the market expects a general declining trend of the policy rate, the shape of the yield curve is inverse, as in the course of rolling the two-week investment, reinvesting is only possible at interest rates which are becoming lower and lower.

Changing the main policy rate gives a *signal* with regard to future developments in interest rates. If the central bank step coincides with market expectations, that is also a signal, and it shows that the market and the central bank assess financial and economic developments similarly. If the central bank's interest rate move deviates from market expectations (or it does not make the decision expected by the market), then market participants, in addition to having access to central bank instruments at terms and conditions different from their expectations, also experience that the central bank evaluates macroeconomic developments differently, which prompts them to revaluate their own interest rate expectations. Thus, the central bank is able to generate changes in the money and capital markets which significantly exceed the direct market impact of changing the interest rate.

The two-week MNB-bill is available for the MNB's counterparties, i.e. those credit institutions which can meet the defined technical requirements, within the framework of the fix rate auction.[4] This means that they can submit their bids to the MNB on a pre-determined day(s), which – in case of a usual market environment – are accepted by the central bank without consideration.[5] Except for extreme cases, on the remaining four days the central bank assists credit institutions to balance their liquidity positions only by its overnight instruments. The advantage of the weekly fixed rate auction compared to the daily auction is that the direct determination of interest rates becomes more subdued due to the less frequent opportunities to make deals, and thus market mechanisms can better succeed. In addition, it prompts credit institutions to pursue more active liquidity management, i.e. to assess their respective liquidity positions in advance and form their expectations more precisely, which improves the efficiency of the transmission mechanism.

Although the MNB considers that the interest rate of the two-week bill is of key importance, the magnitude of the total outstanding amount of the bills does not play a prominent role in monetary policy.[6] The main underlying reason is that the magnitude of that outstanding amount does not have a generally verifiable effect on economic developments. On the other hand, beside its role as the policy instrument, the two-week bill is at the same time the instrument of absorbing the structural liquidity surplus, therefore, the outstanding amount of the bills is mainly influenced

[4] See Table 2 of the part about the standardisation of the eligible counterparties.

[5] At present, counterparties can submit their bids to the MNB once a week, between 10–12 a.m. on Tuesdays. Settlement is on the next working day, when the value of the bills is credited to the MNB from the partners' current account held with the central bank.

[6] However, too low holdings of the policy instrument may cause difficulties due to high concentration of users, whereas very high holdings may limit the effect of raising the central bank base rate at the weak edge of the exchange rate band (if there is an exchange rate band), and may require stronger foreign exchange market intervention. If the central bank operates with a floating exchange rate regime, then it is not obliged to intervene, thus the effect of raising the base rate is not limited.

by external factors on which the MNB has a limited influence only (see Subchapter on sterilisation).

Box 1: Maturity of the policy instrument

When determining the maturity of the policy instrument, the maturity significant during the transmission mechanism is of basic importance. Through household and corporate interest rates, the level of the policy rate influences investment and consumption demand. Therefore, real economy can most directly be influenced by that central bank maturity which is closest to the maturity prevailing in transmission.
However, beside the aspect of transmission, it also must be taken into consideration that in the event that the central bank selects a relatively long maturity for the policy instrument, it facilitates partners' *speculative activity*. (A longer maturity may mean higher potential profit in case of a central bank interest rate decision which meets market participants' expectations.) On the other hand, the maturity of the policy instrument has to suitably facilitate credit institutions' liquidity management as well. Finally, choosing an adequately short maturity, it can be attained that the part of the yield curve over 1 year clearly reflects market participants' inflation expectations (provided that the economic policy is credible), which is an extremely important source of information for the central bank.

In accordance with these criteria, in these days the general practice of central banks is that a central bank in normal market conditions intervenes by its own policy rate only at the very short end of the yield curve, using a maximum one-month maturity instrument.

During recent years, partly due to the above considerations, the MNB reduced the maturity of its policy instrument, which became two-week long from March 1999. At that time it was identical with the maturity of the policy rate applied by the ECB (starting from March 2004 the ECB switched to the one-week maturity). With the policy rate at this maturity, amongst balanced market conditions, the central bank can efficiently influence the 3-month interbank and secondary government securities market yields. At the same time, the MNB also chose the two-week instrument because with the 1-month maintenance period this is suitable for safely absorbing liquidity, and with the two-week MNB-bill, credit institutions can modify their reserve position within the month.[7] Finally, the two-week maturity is short enough not to encourage market participants' excessive speculations with regard to central bank interest rate steps.

Facilitating liquidity management in order to mitigate the volatility of short-term interest rates

The shortest and therefore the most sensitive interest rate of the money market is the yield in the overnight (O/N) interbank market. Those central banks whose key policy rate has an overnight maturity (e.g. USA, Japan), of course intend to tolerate only the smallest possible volatility in the overnight interbank market. For central banks – including the MNB – whose main policy instrument is of longer maturity than that, in terms of the transmission mechanism the overnight interbank yield is important only in terms of its being able to divert market yields in some direction.

The liquidity position of the banking sector significantly influences overnight interest rates, i.e. whether at aggregate level credit institutions have an adequate amount of central bank money

[7] Until the autumn of 1998 the policy instrument and the instrument used for liquidity management within the maintenance period were different. Until then, the maintenance period of credit institutions was two weeks (more exactly, there were two periods within each month), and within this, liquidity problems could also be solved using the one-week deposit (or repo). At that time the 28-day deposit was the policy instrument.

(claim on settlement account held with the central bank). In the course of central bank liquidity management, the central bank determines the conditions of demand and supply in the market of central bank money.[8] The market of central bank money is a special one: on the supply side, the central bank is in a monopolistic position. On the opposite side there are several sources of credit institutions' demand for central bank money: on the one hand, they need central bank money to meet their clients' demand for cash (settlement account balances can be converted to cash), and on the other hand, to transact their daily business (working balances), and finally, to comply with the reserve requirements imposed by the central bank (required reserves).

Usually, there are two ways of central bank intervention into interbank liquidity management. Certain banks regulate liquidity discretionally, i.e. they decide the amounts of liquidity they absorb from or provide for the banking sector. Other central banks directly influence interest rates, and not through the liquidity amounts. This central bank 'stands ready' to deal with credit institutions, i.e. it offers funds or absorb liquidity at pre-announced interest rates, and credit institutions may have recourse to these in volumes at their own will. The MNB belongs to the second category, it is accommodating, partners have unlimited access to central bank instruments. However, the MNB can also use discretional elements (e.g. security purchase, tender, quick tender).

The MNB is using two instruments continuously to dampen liquidity shocks and thus to reduce the volatility of short-term rates: the interest rate corridor and required reserves.

Interest rate corridor

Around the two-week main policy rate the central bank maintains a symmetrical interest rate corridor with overnight maturity, the task of which is to ensure that overnight interbank rates remain in the relatively narrow band determined around the key policy rate.

The top of the interest rate corridor is the loan interest at which the central bank gives overnight loans against security collateral. When credit institutions extraordinarily need short liquidity, but due to some reason they cannot obtain it within the banking sector (in the interbank market), interest rates still cannot increase to extreme heights, as the central bank satisfies all liquidity needs at this moderately high level. Therefore, the level of the interbank overnight rate cannot permanently be higher than the rate ceiling.

Similarly, the interest rate determined by the central bank at which counterparties are entitled to settle overnight deposit with the central bank is called the bottom of the interest rate corridor (rate floor). In the overnight interbank market, the interest rate level sometimes declines, when there is ample liquidity in the market. The rate floor is for stopping the decline in the interest rate level at a relatively low point. At this rate, credit institutions can deposit their excess funds without limitations with the central bank with overnight maturity, thus it will not be in credit institutions' interest to carry out overnight interbank transactions at interest rates below the bottom of the interest rate corridor.

Therefore, the boundaries of the interest rate corridor are maintained permanently. The amount of credit institutions' holdings of securities (which can limit the amount of collateral offered by these institutions in exchange for the loan) is virtually the only 'natural' hurdle to accessing the MNB's marginal lending facility (full allotment).[9]

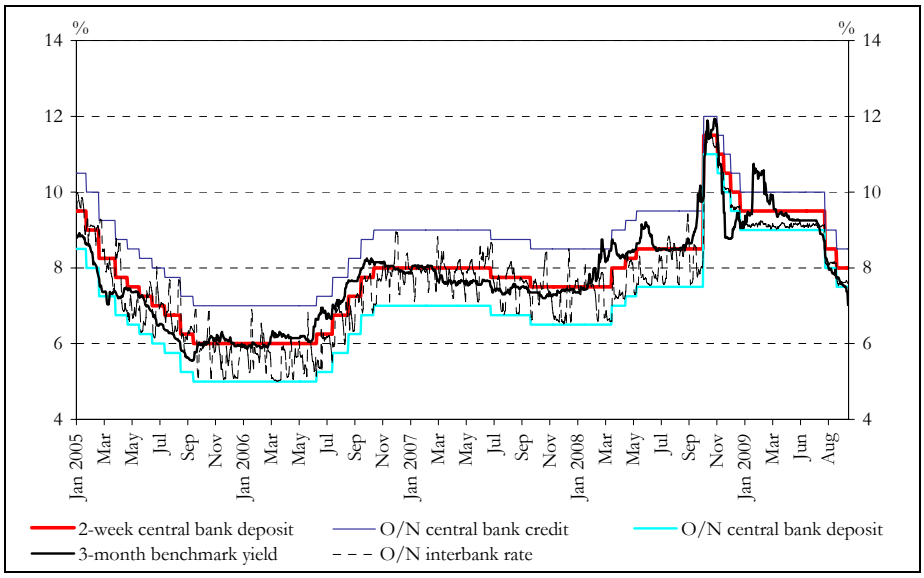
The stabilisation and smoothing of interbank rates are enhanced if the interest rate levels of the instruments at the top and bottom of the interest rate corridor are close to one another. Accordingly, starting from the second half of 1998 the MNB gradually reduced the width of the interest

[8] Antal et al. (2001) write about the MNB's liquidity management in detail.

[9] At present, the central bank's partners can use the instruments constituting the interest rate corridor between 8.30 a.m. and 5.30 p.m. every business day.

rate corridor. The interest rate corridor between 1999 and 2001 was ±2 per cent wide around the key policy rate, then it was ±1.5 per cent wide, and since September 2002 it has been ±1 percentage point wide, similarly to the ECB's practice at that time[10]. At the time of the financial market turmoil in autumn 2008 the MNB narrowed its interest rate corridor to ±0.5%. (See Chart 1 about the changes in the interest rate corridor.)

Chart 1: The central bank base rate, the 3-month benchmark yield and the overnight interbank rate within the central bank interest rate corridor



Required reserves

The original function of required reserves is attributable to prudential factors: the reserves served as a buffer against deposit withdrawals and the fall in liabilities. The significance of this role is much smaller today. At present, the most important function of the required reserves in the MNB's set of instruments is that they help to smooth overnight interest rate volatility,[11] as credit institutions have to meet the reserve requirement only as an average of one month, which allows them to reallocate their liquid assets within the month.

The essence of the reserve requirement is that its subjects have to keep a determined ratio of their funds on an account held with the central bank. MNB Decree No. 10/2005 (VI. 11.) of the Governor of the Magyar Nemzeti Bank on the Calculation, the Method of Allocation and Placement of the Minimum Reserves applies to credit institutions, including Hungarian branches of credit institutions registered in other countries.

The reserve base is generally the sum of liabilities (e.g. deposits) or a specified sub-set thereof. The product of the reserve ratio and the reserve base determines the amount of reserve require-

[10] ECB narrowed its interest rate corridor's width to ±0.5% in autumn 2008, then broadened the band to ±1% at the beginning of 2009 and again narrowed it to ±0.75% as of May 2009.

[11] The reserve requirement may fulfil other functions as well. Accordingly, by actively changing the reserve ratio, theoretically a stable demand for central bank money can be created, which, in turn, may help central bank liquidity management. Required reserves directly reduce the banking sector's liquidity, thus contributing to the absorption of excess liquidity as well. The reserve requirement, in as much as it creates a liquidity shortage in the banking system, increases demand for central bank money, and therefore it contributes to the effectiveness of the transmission mechanism. In the event that the central bank pays a lower interest on the reserves than the market rate, the reserve requirement may also play the role of indirect tax.

ments an institution is required to place with the central bank. Most often, the calculation of the reserve base is based on the daily average of liabilities subject to reserve requirements for a given period (calculation period). The reserve requirement calculated in this manner must be placed with the central bank for a given period (maintenance period).

In Hungary, the reserve base now only depends on the type and maturity of the liability (earlier, for example, the denomination of the liability also played a role). In Hungary, the calculation period is one calendar month (this corresponds to the frequency taxes and contributions are paid), and the maintenance period (also one month) follows the calculation period. The reserve calculation is based on the amount of liabilities at the end of the month. The reserve requirement is met by depositing it on the settlement account held with the central bank. Credit institutions comply with the reserve requirement on the average of the period, but the balance on their settlement account can never dip into the negative.[12] This averaging mechanism provides credit institutions with an opportunity to flexibly manage their day-to-day liquidity.

Despite the fact that the reserve ratio applied by the MNB until 2008 (5 per cent) significantly exceeded the reserve ratio of the euro area (2 per cent), overall, in terms of the reserve requirement system, domestic credit institutions were already in a neutral competition position, as the interest paid on the reserve had been equal to the central bank base rate since May 2004, i.e. taxing of credit institutions' income through the reserve system had been terminated. From October 2008 the MNB has lowered its reserve ratio to 2 per cent in order to support the forint liquidity position of credit institutions'.

Other liquidity management instruments (fine tuning instruments)

Nevertheless, even with an interest rate corridor and a reserve requirement system in operation, it may happen that sudden, substantial liquidity shocks divert overnight yields from the central bank base rate. In order to handle these exceptional situations, the MNB has so-called fine-tuning instruments (tender, quick tender) with short, but variable maturity. These are able to handle liquidity situations within the maintenance period which are much different from those expected by credit institutions. On the one hand, by the use of tenders and quick tenders the effects in Hungary of major transfers of funds caused by unexpected international events can be reduced, and on the other hand, they might facilitate liquidity management, especially on the last days of the maintenance period, which are difficult to plan. In the event of the banking system's temporary liquidity problems, the MNB may consider whether to let interbank rates move significantly within the boundaries of the interest rate corridor, or to prevent disturbing (or unjustified) interest rate volatility applying a tender or quick tender. Tenders are the MNB's discretional means, the central bank can freely determine their maturity, and they can be both liquidity providing and liquidity absorbing. These instruments have seldom been used in normal market conditions, nevertheless the MNB, in order to mitigate the unfavourable effects of the autumn 2008 crisis to the inter-bank money market, besides other measures, introduced FX-swap and liquidity providing tenders.

Central bank sterilisation instruments

The direction of central bank operations is related to the central bank's structural liquidity position against the banking sector. Structural liquidity position is the balance of the central bank's liabilities and claims vis-à-vis credit institutions, developments in which are mainly influenced by those items in the balance sheet of the central bank (so-called autonomous factors) which the central bank cannot directly influence.

[12] In Canada, the reserve ratio is zero, but it must be complied with on average within the period, so financial institutions may have a negative balance on their accounts with the central bank (*zero averaging*).

Box 2: Central bank liquidity terms

Table 1: Structure of the central bank's simplified balance sheet

Assets	Liabilities
A1. Lending to banks	**L1. Borrowing from banks**
	L1.A. Main policy instrument
	L1.B. Other borrowing from banks
A2. Net foreign assets	**L2. Banks' holdings of reserves**
A3. Lending to the government	**L3. Banknotes (and coins) in circulation**
A4. Net domestic assets	**L4. Government deposits**
	L5. Other factors (net, balancing)

The most important autonomous factors determining the central bank's structural liquidity position are the stock of cash in circulation (L3.), claims (A3.) and liabilities (L4.) on the central bank balance sheet vis-à-vis the government as well as net claims on non-residents (A2.), which, in small, open countries, are mainly influenced by the amount of foreign exchange reserves.[13]

$$\textit{Structural liquidity position} = S_p = A2.+A3.+A4.-L3.-L4.-L5. \ (= L1.+L2.-A1.)$$

The central bank *net liquidity position*, which shows the actual direction and magnitude of central bank operations, can be derived from the structural liquidity position by deducting the credit institutions' settlement account balance.

$$\textit{Net liquidity position} = S_p - L2.$$

Within this, the direction of the main policy instrument is shown by the central bank *operational liquidity position*, which results from deducting the amount of non-policy instruments from the net position: [14]

Operational liquidity position = L1.A. = *Net liquidity position* – L1.B +A1.

If this position is positive, the central bank's main policy instrument is a deposit-type one, i.e. it absorbs liquidity from the banking system.

The direction of central bank operations and the developments in the banking sector's structural liquidity position are most often given for the central bank, and are related to the macroeconomic features of the given currency zone. In large, closed economies, the cash demand of the economy typically requires such magnitude of central bank refinancing which exceeds the effect of other liquidity providing factors. On the contrary, in converging, small, open economies, including Hungary, as a result of foreign capital inflows and the central bank's intervention in the foreign exchange market, the banking sector's liquidity position is mostly positive, i.e. the banking system is characterised by structural liquidity surplus. Consequently, central banks in these

[13] Of course, the central bank is able to influence the level of foreign exchange reserves, although current developments in foreign exchange reserves – because of the government's foreign exchange revenues and expenses – are not under the central bank's full control. Therefore, net claims on non-residents are usually listed among the autonomous items.

[14] This relationship is valid in case the central bank has a liquidity absorbing instrument. If a central bank's main policy instrument is a liquidity providing instrument (loan instrument), the operational liquidity deficit will be equal to its amount indicated among claims (negative operational liquidity position).

countries sterilise the liquidity surplus, and apply deposit-type instruments. In the past some years, in addition to the foreign exchange revenues from privatisation, funding a part of the general government deficit with foreign exchange debt also contributed to a further increase in the banking sector's liquidity surplus. As a result, since mid-1995 the central bank's structural liquidity position has continuously been positive. Due to this, the MNB is continuously, although using different instruments, absorbing the banking sector's liquidity surplus (see Box 3 about the central bank's money market instruments). For this purpose too, the MNB is using its two-week policy instrument: its counterparties can place their liquidity at the central bank without quantitative restrictions.[15] This ensures that the liquidity surplus at the banking system level is absorbed by the two-week MNB-bill.

Box 3: Forms of the central bank's money market instruments

Based on their form, the following basic instruments can be distinguished within the MNB's instruments: central bank deposits, collateralised loans, outright securities transactions, repo, issue of debt securities and FX-swap. Outright securities transactions, repos and swaps may be instruments of both liquidity provision and absorption, whereas the rest are exclusively qualified as one-side (active or passive) transactions, in accordance with the banking sector's net liquidity position. Of these instruments, in normal market conditions only the deposit, loan transactions and the issue of debt securities are used regularly by the MNB. Outright securities transactions and FX-swaps are seldom applied by the central bank, while the repo transactions were replaced by other instruments in 2001.

Issue of securities (MNB bill)

The MNB bill is a forint-denominated debt security issued by the central bank; its holder may also use it as collateral for its borrowing transactions with the central bank. The two-week MNB bill is the MNB's main policy instrument from the beginning of 2007, which also serves the purpose of absorbing structural excess liquidity. Earlier the MNB bill was among the central bank's instruments between 1997 and 2002 at two different maturities and with various methods of allotment. Initially, the bill ensured the absorption of the banking system's excess liquidity through maturities longer than that of the key policy rate; later the aim with the issue was to widen the range of marketable money market instruments.

Central bank deposits

In a central bank deposit transaction, a counterparty of the central bank places a certain amount of funds with the central bank under either pre-specified conditions or those evolving at tenders (including maturity and interest rate), regardless of the method of allotment. A central bank deposit remains non-callable during its term. The overnight deposit constitutes the bottom of the interest rate corridor, where the central bank is continuously available for accepting deposits. In addition the two-week central bank deposit was the MNB's main policy instrument till 2007.

Collateralised loan

Repos and collateralised loans constitute the most widely used technical forms of central bank lending. It is the national banks' prerogative to make a choice between them, and their use is generally determined on the basis of past experience and legal considerations. Central banks in many countries of the EMU use both instruments, but the MNB only uses collateralised loans. Since 2002 collateralised loan has had a dual function in the MNB's set of instruments: on the

[15] Earlier for this purpose the central bank applied a typically longer-maturity instrument, different from the key policy instrument. This is still the practice of some central banks.

one hand, overnight collateralised loan has become a monetary policy instrument as the upper limit of the interest rate corridor, and on the other hand, intra-day loan facilitates settlements within business days.

Outright purchases or sales of government securities

Under *outright purchases or sales of government securities*, which qualify as classical open market operations, a central bank trades with securities, primarily government papers, in the secondary market in order to control liquidity supply. Outright operations are initiated by central banks (a discretionary instrument). Nevertheless, they do not exert pressure on the market and, therefore, banks decide on their own, depending on their assessment of market conditions, whether they accept the central bank's offer. However, a precondition for the use of this instrument is that an adequate amount of securities should be outstanding in the market, i.e. there should be developed and liquid primary as well as secondary securities markets in the given country. On the other hand, in case of liquidity absorbing need the central bank also has to have a significant amount of securities. Therefore, classical outright operations have become the decisive instruments of monetary policy in relatively few countries (USA, Great Britain), although their role has increased in enhancing the banking system's liquidity during the 2008 financial crisis. The MNB uses this instrument only in extreme market and liquidity situations (which was the case in 2003 and in autumn 2008).

Repo transaction

The securities repurchase agreement (i.e. *repo transaction*) is the result of two transactions: the first leg of the transaction is the spot sale or purchase of a given security (mostly a government paper), followed by a forward transaction, i.e. the repurchase or resale of the security at a future date specified in advance. Essentially, a repo is a loan provided against collateral, and the difference between the two prices is the interest paid for the loan (repo rate). The advantage of using repo transactions as monetary policy instruments is that the maturity of the available government securities does not limit their use; they are able to efficiently influence the central bank's operative interest rate target, at even, permanently short maturity. Central bank reverse repo is similar to the central bank deposit, but in case of a reverse repo the central bank provides collateral against the deposited amount. Therefore, central bank deposit is simpler than the reverse repo: there is no need for a substantial, homogeneous holding of securities. As the central bank is a reliably paying debtor, nothing would justify the provision of collateral against the deposits placed with it. Repo occupied a central position within the MNB's instruments until December 2001: as a lending facility, the overnight repo rate functioned as the upper limit of the interest rate corridor. Since then this role has been played by collateralised loan.

Fx-swap transactions

A foreign currency-forint FX-swap is a transaction in the course of which one of the counterparties swaps its forint assets in the present into an other currency, then changes them back at a future date. Generally, a swap is a forint-initiated transaction with the central bank: most often, the counterparty borrowing forint uses the foreign exchange as collateral, and pays interest on the forint credit. The MNB operated the overnight swap as a standing facility up to April 2001 under conditions identical to those of the overnight repo. After this date the MNB introduced FW-swap tenders in autumn 2008 again to reduce foreign exchange liquidity strains and to limit the volatility of forint yields.

Instruments for directly influencing the exchange rate

Operations in the foreign exchange market serve the purpose of maintaining the given exchange rate regime and influencing the exchange rate: in order to avoid the appreciation of the exchange rate, the central bank can buy foreign currency in the foreign exchange market (it may intervene), thereby it can increase the quantity of domestic currency in circulation. By contrast, it can sell foreign currency if the domestic currency depreciates in the foreign exchange market.[16] In addition, operations in the foreign exchange market also allow influencing the liquidity of the money market through swap or foreign exchange repo transactions. These latter transactions do not influence the level of the exchange rate directly though.

Beside the indirect effects of central bank interest rates, the MNB can also use operations in the foreign exchange market to influence the exchange rate. In mid-2001, along with the introduction of the inflation targeting regime, the MNB has changed its former narrow-band to a wide-band exchange rate regime (the fluctuation band of the forint against the euro was ±15 per cent). The foreign exchange market intervention at the edge of the band served the maintenance of this exchange rate system: at the strong edge of the exchange rate the central bank automatically offered to buy foreign exchange, while at the weak edge it gave a proposal for selling foreign exchange without an upper quantity limit. This is how it defended the exchange rate of the domestic currency from further appreciation or depreciation.[17] From the beginning of 2008 the MNB has introduced a floating exchange rate regime, i.e. it ceased its former exchange rate fluctuation band. Therefore the MNB no longer applies foreign exchange interventions at the edges of the band, but it can still intervene on the foreign exchange market in order to influence the forint exchange rate or to reduce its volatility.

Another instrument of influencing the exchange rate can be the so-called verbal intervention, when the MNB considers the market exchange rate level or the expected exchange rate path undesirable or unsustainable over the long term from the aspect of the inflation objective. Verbal intervention can be credible if in the event of its failure the central bank is ready to use other means (interest rate step, intervention in the foreign exchange market) as well to attain its targets.

In the narrow-band system prior to 2001 it often happened that the central bank traded (intervened) at the edges of the band, typically at the strong edge. However, after the band was widened, intervention at the edge of the band was carried out only at the beginning of 2003. Then the MNB had to intervene at the strong edge of the exchange rate band; in order to prevent the forint from appreciating outside the band, it bought euro.[18]

The instrument applied in a number of EU countries within the framework of which the central bank *rechannels to the foreign exchange market* the foreign exchange assets originating from the conversion of foreign exchange revenues of the state at the central bank also belongs to foreign exchange market operations. According to the established practice, foreign exchange revenues of the Hungarian budget (EU transfers, privatisation revenues, income from foreign exchange bond issue) are converted into domestic currency at the MNB, and not at the market. The central bank credits the forint originating from the conversion for the budget on the treasury account, from where excess liquidity flows to the banking system as a result of treasury spending. In order to avoid the excessive increase in forint liquidity of the banking system, starting from 2004, every year the MNB sells a part of the net forint conversion of the state against the MNB at the foreign exchange market, while the remaining part is spent on increasing the foreign exchange re-

[16] See Kiss, M. (2005) in detail about the efficiency of central bank intervention.

[17] See Csávás–Erhart (2005) for details of peculiarities of the Hungarian foreign exchange market.

[18] For details of events in early 2003 see Barabás (2003) (editor): Coping with the speculative attack against the forint's band.

serves. By selling the foreign exchange, the central bank does not intend to influence the developments in the forint exchange rate. That is done in the interbank foreign exchange market, in many parts, small amounts and in a price-taking manner.

Development of instruments in the inflation targeting system

Since the introduction of the inflation targeting system in mid-2001, the MNB has made several changes in its set of monetary policy instruments. On the one hand, the purpose of these changes has been to achieve the closest possible harmonisation with international practice and the instruments used by the ECB, and on the other hand, taking into account the experience accumulated in the course of operating the instruments, they have served an increase in efficiency.

An example for these changes was the gradual narrowing of the interest rate corridor described earlier, the result of which is that since the autumn of 2002 the overnight marginal lending facility and deposit facility have constituted a ±1 per cent wide, symmetrical corridor around the key policy rate, which further narrowed to ±0.5 per cent from October 2008. Furthermore, in the course of the gradual transformation of the system of required reserves, the central bank has reduced the reserve ratio, it has paid market interest on reserves, and has simplified the range of liabilities subject to reserve requirements.

Two further changes have also been effected in central bank instruments, which have not been discussed in detail previously: they have affected the collateral management system and the central bank's counterparties.

Reform of the collateral management system

The basic principle related to instruments is that the central bank grants loans to its counterparties only if they have eligible collateral, and this principle is also mandatory in the euro area. At the same time, it may be risky for the MNB that in case of collateralised loans the price of securities pledged as collateral may change during the maturity of the loans.

For a more precise management of this risk, the MNB introduced *daily collateral valuation* in mid-2003.[19] Within this framework, it checks with a daily frequency whether the value of the collateral can provide sufficient coverage if the loan is not redeemed. In the event that the coverage is insufficient, the borrower increases the stock of securities that serve as collateral, or pays back that part of the loan which became uncovered.

In domestic payment systems (Real-time Gross Settlement System/ VIBER and Interbank Clearing System/ ICS), the collateral can be used for taking intra-day credit and collateralised loan of monetary policy purpose. In order to avoid major interruptions in terms of time in the operation of the VIBER caused by the recording of the collateral valuation, at any time within the day it has to be automatic (because in the absence of adequate collateral the VIBER does not perform the transfer). In order to provide for automatism, collateral valuation is carried out by KELER, on the basis of data received from the MNB beforehand.

In terms of collateral, prior to Hungary's joining the EU, the MNB had to prepare for providing information regarding collateral eligible in the euro area in the event that a euro area counterparty wanted one of the member central banks to accept a paper issued in Hungary. Following the adoption of the euro, in turn, in addition to the earlier scope of collaterals, the MNB will

[19] Earlier, the MNB had applied *normative collateral valuation*, in the case of which on the conclusion of the loan agreement the acceptance value of the collateral was determined in a way that there was only an reasonably low probability that the market value of the collateral would decline below this value.

have to be able to accept all the collaterals accepted in the ESCB (European System of Central Banks).

Standardisation of the range of eligible counterparties

Generally, central banks attempt to conduct transactions primarily with market participants through whom they can achieve their monetary objectives in the most effective way, i.e. through whom transmission is the fastest. According to international experience, financial market traditions, the characteristics of the financial intermediary system and of the interbank market play a dominant role in choosing eligible counterparties. The ECB has relations with a wide range of counterparties, similarly to the Bundesbank, whereas the Bank of England has relations with a fairly narrow range of counterparties.[20]

There are two ways in which central banks may regulate the range of eligible counterparties allowed to participate in a given operation. First, they may determine by restricting directly or listing counterparties (e.g. by types of credit institutions). Second, they can use technical criteria (e.g. membership in VIBER or accounts held with KELER) or other conditions (e.g. stipulating the minimum amount of offer) which do not allow certain institutions that would otherwise be eligible to conduct a certain business, or make it very difficult for them to transact with the central bank. These criteria primarily serve the improvement of the efficiency of transmission mechanism.

The MNB standardised the range of counterparties to its applied instruments in several steps by 2004. Domestic currency money market monetary policy instruments are available for those credit institutions subject to reserve requirements which meet the technical criteria required for performing transactions.[21] However, in case of the very rarely used (only in extreme market situations) quick tenders, for the sake of fast completion, only a narrower range of counterparties, i.e. banks can submit offers (other credit institutions are not entitled to), provided that they meet the other technical conditions. Due to the above, the range of counterparties of deposit side transactions is the widest; the KELER securities account required for collateralised loan and securities transactions somewhat narrows the actual range of counterparties.

Table 2: Conditions of using the MNB's forint market monetary policy instruments

	Potential counterparties	Technical conditions	
Overnight deposit, deposit tenders	Domestic **credit institution** subject to reserve requirements	Direct VIBER* or ICS membership**	
Overnight collateralised loan, loan tenders	Domestic **credit institution** subject to reserve requirements	Direct VIBER or ICS membership	Securities account held with KELER
MNB-bill, spot securities transaction	Domestic **credit institution** subject to reserve requirements	Direct VIBER membership	Securities account held with KELER
Deposit quick tenders	Domestic **bank** subject to reserve requirements	Direct VIBER or ICS membership	
Collateralised loan quick tenders	Domestic **bank** subject to reserve requirements	Direct VIBER or ICS membership	Securities account held with KELER

** Real-time Gross Settlement System.*

[20] The counterparties for central bank services beyond monetary policy operations (e.g. central bank settlement account management) are determined on the basis of other criteria as well.

[21] Domestic credit institution counterparties include credit institutions registered in Hungary, foreign credit institutions with registered headquarters in the European Economic Area and branches in Hungary (they have access to the MNB's instruments through their branches in Hungary) and Hungarian branches of foreign credit institutions with headquarters outside the European Economic Area.

*** Interbank Clearing System.*

Comparison of the MNB's instruments with those of the ECB

There are differences compared to the set of instruments of the ECB in two elements of the MNB's set of instruments which are important to mention. The maturity, direction and timing of the policy instrument are different, while in the collateral management system the developments implemented by the ECB to date have to be adopted prior to the introduction of the euro.

The main policy instrument

The MNB's policy instrument is different from the one applied by the ECB from several aspects: in terms of its direction (the ECB uses lending facility) and in terms of its maturity. The timing of the start of the policy instrument and the technical implementation are also different. The differences and their underlying reasons are reviewed herebelow.

In accordance with what was written about structural liquidity surplus, there is a shortage of liquidity in the banking system of the euro area, and this is the reason why the ECB uses lending facility as main policy instrument, whereas the MNB uses liquidity absorbing facility due to the structural excess liquidity in the Hungarian banking system. When Hungary enters the euro area, this excess liquidity will ease the significantly higher liquidity shortage of the euro area. Neither the MNB, nor the domestic credit institutions need to take any specific measures during this process.

Starting from 2004, the ECB shortened the maturity of its policy instrument to one week, while the MNB did not change the maturity of its two-week instrument. Simultaneously with the above change, the ECB harmonised the beginning of the maintenance periods (starting from which counterparties, i.e. the credit institutions have to meet their reserve requirements as an average of one month) with the decision on the policy rate. The intention underlying these two changes was that the ECB wanted to reduce its counterparties' speculative opportunities in relation to the policy rate, as excessive speculation had caused problems in the operation of the policy instrument earlier. In the new system, within one maintenance period the policy rate does not change, and the maturity of the policy instrument does not extend over maintenance periods, therefore, there is no chance for speculations.

The set of instruments applied by the MNB is much simpler: the maintenance period coincides with the calendar months, and does not depend on the date of the interest rate decision. Moreover, the MNB has not changed the two-week maturity of its main policy instrument either. Beside the simplicity of the system, it was also an argument against changing it that the MNB has not experienced any excessive speculation with regard to changing the policy rate. In addition, the Hungarian banking system is exposed to significant liquidity shocks, which are greater than the ones usual in the euro area. They can cause troubles especially when there is not much left of the maintenance period, and thus credit institutions do not have much space for manoeuvre to mitigate the effect of the shock by utilising the averaging mechanism. In the ECB's system, in turn, the use of the last policy instrument is further from the end of the maintenance period (always one week) than in the Hungarian system. Another argument against changing is that as the maturity of the instrument would become shorter, the relationship with the longer term money market yields would weaken. Finally, in case of a one-week instrument, which also functions as a sterilisation instrument, the amount of liquidity released at the same time would grow, which, in turn, would help credit institutions in the event of a potential speculation against the forint.

Another difference between the operations of the two policy instruments is that in the euro area counterparties can use the central bank instrument through variable rate auctions, and the ECB

only determines the minimum bid rate.[22] Accordingly, counterparties can submit their bids at this rate or above this rate, and the ECB decides how much it accepts. In contrast, the MNB announces every week its two-week fix rate auction as standing facility, i.e. it accepts all offers at the pre-determined interest rate. This latter is a much simpler task for the central bank, there is no need to exactly forecast the liquidity needed by the banking system. Due to the much greater liquidity shocks, to prepare a projection like this in the Hungarian environment would be difficult in any case. Finally, in case of an interest rate evolving at an auction, there is higher probability that the resulting yield will be different from the policy rate specified by the central bank.

Collateral management

The result of the changes carried out in the past years is that now the MNB's collateral management system is broadly in line with that of the euro area. However, in the euro area the collateral management system has been reformed in various ways, the most important element of which was the introduction of the 'Single List' of eligible collateral in 2007. Together with this, two important elements were added to the system: the possibility of offering cross-border collateral and using bank loans as collateral. These elements will have to be adopted by the MNB not later than at the time of joining the euro area, which will result in the multiplication of the marketable amount of collaterals potentially available for the MNB's domestic counterparties.

In terms of accepting cross-border collateral, the Hungarian central bank will most probably rather have to get prepared for custody services to be provided to other member central banks in relation to collateral issued in Hungary. The underlying reason is that domestic institutions have little foreign collateral, but the owners of domestic affiliate banks will most probably use the eligible collateral kept with their Hungarian affiliate banks in the course of their centralised liquidity management. This requires the possibility of pledging the collateral kept in Hungary with the MNB's assistance, for the benefit of other central banks of the Eurosystem.

In case of bank loans, according to the current position of the Eurosystem, legal procedures and data handling related to the acceptance of loans and the tasks of maintenance will constitute challenges for the MNB in the coming years.

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[22] The period following the financial turbulance of autumn 2008 is an exception, since the ECB offered loans with full allotment to its counterparties at a fixed rate.

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