

Judit Páles and Dániel Homolya: Developments in the costs of external funds of the Hungarian banking sector*,¹

The high dependency of the domestic banking sector on foreign funds and its open on-balance-sheet foreign exchange position, as well as the considerable increase in sovereign and parent bank credit risk premia due to the sovereign debt crisis, warrant a more accurate mapping of the pricing principles and costs of foreign (primarily parent bank) funds. For this reason, in the summer of 2011 we conducted a survey of the pricing practices of banks at the individual bank level and the evolution of the costs of foreign funds in recent years. Both personal interviews and historical data confirmed that since 2010 the country risks of subsidiaries have been increasingly included in the premia above the interbank reference rates, mainly on maturities of over one year. Accordingly, the price of funds obtained from abroad changed significantly, as the importance of risk-based pricing increased during the crisis. The historical data also suggest that this took place gradually at the system level. Following the onset of the subprime mortgage market crisis in 2007, premia averaged at the system level gradually approximated the credit default risk spreads of the parent banks. From the October 2008 crisis until the autumn of 2009, at the system level parent banks effectively passed their own premia on to domestic subsidiaries. From 2010 on, with the deepening of the European sovereign debt problems, sovereign CDS-based pricing corresponding to the country risk of subsidiaries (i.e. corresponding to the Hungarian sovereign risk in the case of domestic subsidiaries) became increasingly prevalent. At the system level, premia on longer-term currency swaps used for covering the on-balance-sheet open foreign exchange position were typically lower than the premia on foreign funds: the inclusion of counterparty and liquidity risks in prices started only later, and on average up to the level of parent bank CDS spreads at most. All of this has driven domestic banks in the direction of short-term financing and swap-based foreign exchange financing.

MOTIVATION: THE SIGNIFICANCE OF FOREIGN FUNDS IN THE HUNGARIAN BANKING SECTOR

Reliance on foreign funds is high in the Hungarian banking sector, which is also well illustrated by the loan-to-deposit ratio. The liquidity position of banks can be measured with the loan-to-deposit ratio, because due to the relatively low level of customer funds, the raising of (partly foreign) money and capital market funds becomes necessary. While in early 2005 the approximately 120 per cent loan-to-deposit ratio of the Hungarian banking sector was around the average level of the euro area, the level of approximately 180 per cent in October 2008 significantly exceeded the 115 per cent loan-to-deposit ratio of the euro area's banking sector. Since the autumn of 2008, a considerable adjustment has taken place in the domestic banking sector (14 percentage point change in the loan-to-deposit ratio), but

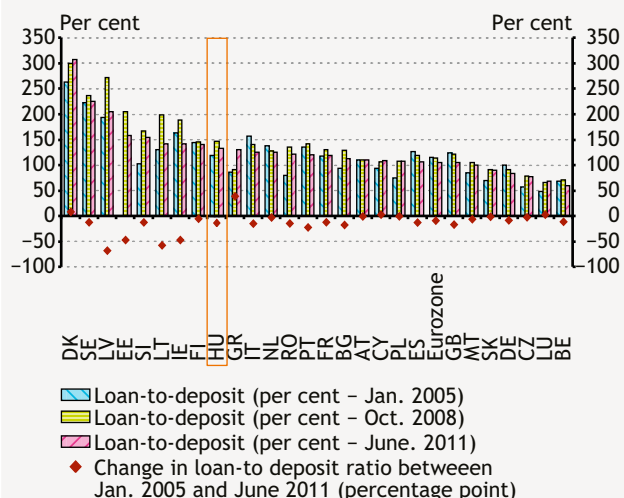
based on comparative data released by the European Central Bank, the 132 per cent loan-to-deposit ratio of the Hungarian banking sector at end-June 2011 was still high from an international comparison (Chart 1). The loan-to-deposit ratios measured in the banking sectors of some developed West European and Baltic countries (Denmark, Sweden, Ireland, Finland, Latvia, Estonia and Lithuania) and in Slovenia exceed that of the Hungarian banking sector.

Based on the loan-to-deposit ratio, foreign funds play a prominent role in the Hungarian banking sector. Among credit institutions operating in the form of a joint stock company, the share of foreign funds within external funds exceeds 30 per cent. During the ongoing financial and economic crisis, the parent banks of the domestic banking sector have provided evidence of their significant commitment: from the 50 per cent level in September 2008, the share of parent bank funds increased to 60 per

* The views expressed in this article are those of the author(s) and do not necessarily reflect the official view of the Magyar Nemzeti Bank.

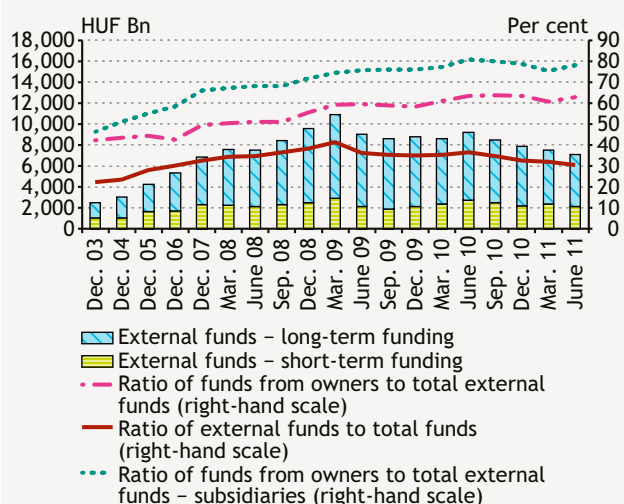
¹ We would like to thank the bank experts who participated in our survey and participants in the discussion within the MNB for their valuable advice.

Chart 1
Comparison of loan-to-deposit ratios of the banking sectors of the European Union



Source: ECB.

Chart 2
Foreign funds of the Hungarian banking sector



Note: Distinction between short-term and long-term funding is based on original maturity.
Source: MNB.

cent by March 2009. It has fluctuated around this level for the past two years, while the share within external funds reached a level of 30-40 per cent (Chart 2). In the case of subsidiaries in foreign strategic ownership, the share of parent bank funds is even higher: from the 68 per cent level in September 2008, it increased to 75 per cent by March 2009 and has fluctuated between 75 and 80 per cent since then.

Taking into account the above statistics, it is clear that the cost of foreign funds plays an important role in the

determination of the costs of bank funds. Our primary objective is a system-level analysis of the costs of (foreign) funds and premia within the group and of market costs of funds and premia observed in the past, as well as an analysis of related fundamental principles. Due to the significant off-balance sheet hedging of the foreign exchange position of the banking sector, it is important to complement the above with a comparison with the prices of synthetic sources of foreign exchange funds (forint funds + foreign exchange swap).

Regarding our analysis, it is important to emphasise that previously we obtained qualitative information on pricing practices during the so-called Market Intelligence visits led by the Financial Stability organisational unit of the central bank. However, from these we could only conclude that the role of risk-based fund pricing strengthened during the crisis; we were only able to estimate the magnitude of the prices of funds from parent banks. Previously, therefore, we basically approximated changes in the premia on the obtained foreign funds above the interbank rates of corresponding maturities by averaging the parent bank credit default swap (CDS) spreads.² However, according to the Market Intelligence surveys of the MNB, anecdotal information and the current survey, the financing costs of domestic banks were determined to an increasing extent and scope by the Hungarian sovereign CDS spread, which reflects country risk.

Considering the above, a more exact examination of the changes in the costs of foreign funds is of importance for several reasons. First, the level of the domestic country risk premium and the extent of its fluctuations have differed greatly in recent years from those of the CDS spreads of the parent banks of domestic subsidiaries. Accordingly, the estimated level of and changes in the premia on foreign funds experienced in the past are also significantly different if they are approximated with the parent bank or Hungarian sovereign risk premia. The risks affecting the European banking sectors and states are interconnected through sovereign exposures, thus in the near future the pricing role of sovereign CDS spreads corresponding to the countries of subsidiaries (the Hungarian sovereign CDS spread in the case of domestic subsidiaries) may continue to strengthen. At the same time, the difference between the Hungarian sovereign and foreign parent bank credit default swap spreads may remain steady or continue to increase in the near future as well, mainly in the case of parent banks whose home countries are less affected by the sovereign debt crisis than Hungary. Secondly, during the crisis, as a result of

² See MNB (2008).

the considerable deterioration in market liquidity, the reliability of secondary market data and the relevance of market quotations declined. Therefore, only limited conclusions could be drawn from these as regards changes in the costs of foreign funds.

Based on our survey conducted among banks, this article first presents the pricing characteristics of the costs of foreign funds, touching upon some basic features of transfer pricing, which is followed by an analysis of the historical data gathered during our survey.

PRICING PRINCIPLES AND BANKING PRACTICE

Our survey was conducted in the summer of 2011. Using personal interviews and questionnaires, with regard to each bank we assessed basic principles for the pricing of foreign funds (primarily that of parent bank funds and funds within the group) and the changes in the costs of funds experienced in recent years. The sample of the survey included the largest credit institutions and branches of foreign banks that play an active role in obtaining foreign funds (altogether eight credit institutions operating in the form of a joint stock company and three branches of foreign banks). The practices of individual banks reflect a wide variety of methodologies, but many common features were found during our survey.

According to general bank practices, the Assets Liabilities Management (so-called ALM) organisational units and the related managerial committees (Assets Liabilities Committee, or ALCO) of banks determine the amount of funds that they will obtain, given current market prices, or at what price they are willing to raise a given amount of funds and at what transfer price they will be passed on to the business areas. In the case of resource allocation within a banking group, basic pricing principles are essentially determined by the parent bank. As is the case with obtaining funds from the market, often only the final price or the general conceptual framework (i.e. not the underlying exact algorithm) is available for the domestic subsidiaries and branches. Within conceptual frameworks, prices are composed of several main components [see, for example, Juhász (2011)]:

- interest rate risk:³ risk stemming from changes in interest rate levels,

- country risk: risk related to activity in a given country,
- term liquidity risk,
- other risks: costs related to hedging, ALM cost, other bank-specific costs.

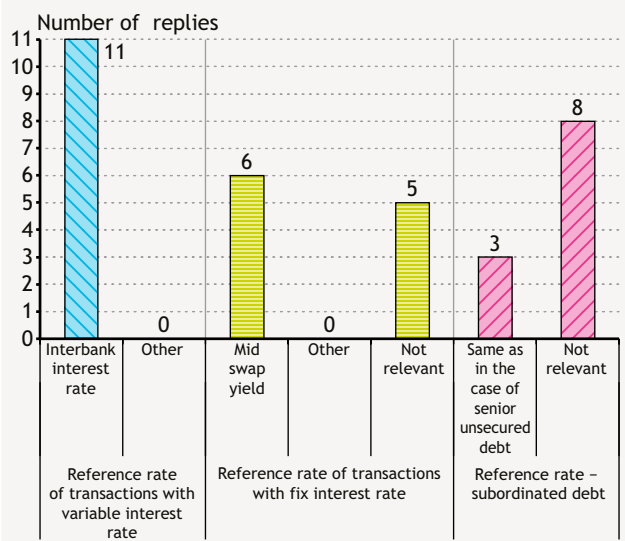
Management of *interest rate* risk is made possible by the bank practice according to which the repricing structures of the items on the asset and liability sides of banks are harmonised.⁴ One of the related possibilities is that banks obtain foreign funds with interest rate conditions corresponding to the repricing periods and structures of corporate and household loans. Accordingly, foreign funds have short repricing periods. Their interest payments contain a variable interest component and a premium fixed for the whole term, resulting in a basic price (reference rate) and a premium component.⁵ Based on our interviews, banks apply interbank reference rates (of the appropriate currency) with 1-, 3- and 6-month, as well as (to a lesser extent) 1-year, maturities (e.g. the 3-month EURIBOR, in the case of a 3-month repricing euro loan). In the case of longer repricing, fixed-yield transactions (the so-called mid-swap yield) are applied as the reference yield. The mid-swap yield corresponds to the mean of the yields of buy- and sell-side swap offers applied in interest rate swap transactions; basically, it expresses the amount of the annual yield, fixed in advance (for the whole term), to be paid by the participating partner for a variable interbank rate (e.g. 3-month EURIBOR) received during a given term. However, it is worth underlining that fixed-yield fund-raising with a maturity of over one year is not relevant for approximately half of the domestic institutions surveyed, but (in terms of their number) a significant portion of funds with a maturity of up to one year is considered as fixed-rate, as they mostly contain only one interest period. In the case of the latter, usually the unsecured interbank rates (LIBOR) are considered as reference yields (Chart 3). According to our survey, the indicator serving as the reference rate is not influenced by the type of the transaction. Thus, for example, at institutions where it is relevant, the reference yield of subordinated debt is the same as that of senior unsecured debt (Chart 3). A difference appears here in the levels of the spreads applied. In a breakdown by types of counterparties, the greatest difference may be that the parent banks of domestic subsidiaries are occasionally more flexible from the perspective of choosing the term of the reference yield (e.g. 3-month EURIBOR, in the case of a 6-month repricing).

³ A good overview of risk types is provided by Jorion (1999) or Crouhy et al. (2006).

⁴ Interest rate risk hedging is possible with off-balance-sheet items (and with interest rate swaps within that). This article does not include a description of their application.

⁵ The issue price is usually 100 per cent.

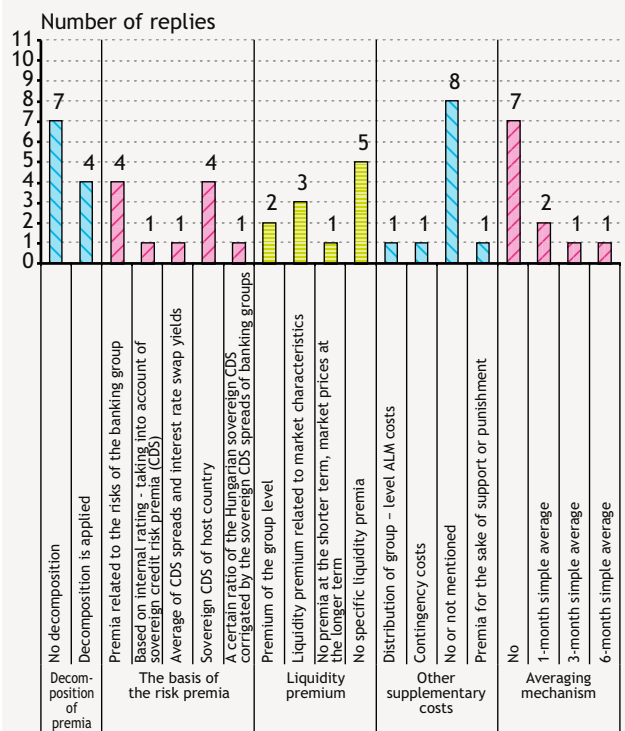
Chart 3
Reference yields of foreign funds according to replies of banks



Source: MNB survey of 11 banks. Eleven institutions were surveyed.

The risk and liquidity premia applied paint a very colourful picture; however, at the system level the inclusion of country risk plays an important role in pricing. First, in the majority (7 out of 11) of institutions surveyed, the premium is not decomposed into the aforementioned risk, liquidity and other premia (based on market share, this comprises 41 per cent of the banking sector). In those cases where there is no decomposition, the premia are typically depicted as 'risk premia' or as liquidity risk in those cases when no differentiation within the group is applied upon pricing. Our survey reveals that, for the majority of banks operating in Hungary, the risk premium used vis-à-vis the Hungarian credit institutions presently reflects the Hungarian country risk (7 banks, which is a vast majority in terms of market share). The sovereign risks of the host country, in turn, are usually approximated with the CDS spreads of appropriate maturity. There is an example where the determination of premia related to the Hungarian country risk (to the subsidiary) is built on the internal ratings of the members in the banking group and not on market information; in one case, domestic sovereign spreads are adjusted for sovereign CDS spreads of the banking group (using weighting that changes over time). In the surveyed sample, it is the practice of 36 per cent of institutions to not apply differentiation according to country risk during the allocation of funds within the banking group (this ratio is lower as a proportion of the balance sheet total). Considering the current high level of the credit default swap spread of the Hungarian state, this practice creates a more favourable opportunity for raising funds (Chart 4). However, the precise methods of determining risk premiums were often revised during the crisis; therefore,

Chart 4
Premia on foreign funds according to replies of banks



Source: MNB survey of banks. Eleven institutions were surveyed.

the survey results presented here expressly reflect the current situation. Based on bank reports, prior to the current crisis, which started in 2007-2008, strict and well-defined pricing principles within banking groups did not exist. However, as a result of the current crisis, the relevant internal rules have become stricter, and risk-based pricing mechanisms have been advanced.

In order to smooth fluctuations in the indicators used as a basis for risk premia, several banks apply averaging mechanisms to determine the premia priced in funds. In order to support smooth operations among business lines (i.e. corporate and household lending), four institutions apply averaging mechanisms. These review periods of one to six months, due to the significant fluctuations in risk premia experienced during the crisis. Without averaging mechanisms, in the case of radically fluctuating market indicators, credit prices may have to be changed often and significantly. Although the majority of credit institutions receive a daily price from the parent bank (Chart 4), due to the typical monthly frequency of determining transfer prices, smoother shifting is implemented in the banks' own business fields. Only three of the institutions surveyed mentioned the application of other premia in addition to the risk and liquidity premia. These other premia are the group-level ALM costs (e.g. so-called margin call requirements), so-called contingency costs to be applied in

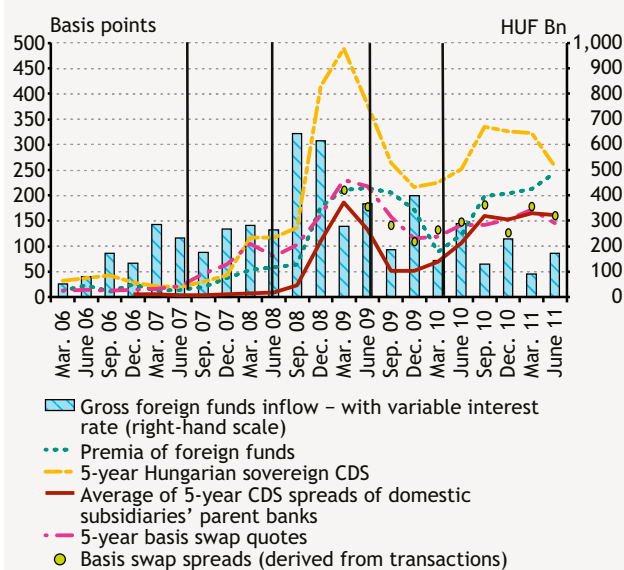
'emergencies', mainly in the case of special loan products, or as a support or penalty in relation to some kind of central business objective.

One interesting question from the perspective of the pass-through of the liquidity and risk premium shocks affecting the domestic banking sector is how the costs of foreign funds are transferred to business lines. The organisational unit of the banking group or affiliate bank responsible for obtaining funds determines a settlement price (transfer price) vis-à-vis the business lines (e. g. corporate and household lending). The aim of the settlement price ('transfer pricing') is to express actual costs and, partly, business policy incentives for business branches. At the same time, the choice of method may have a significant effect on the business activity as well (e.g. it may result in considerable differences where profit/loss arises: in the treasury/ALM field or at the business branches). In the case of newly granted loans, the surveyed banks typically charge the market-based (partially marginal) costs of funds prevailing in the given period to business fields. However, the ALM centres of domestic banks fix the liquidity premia already priced in the loans until the end of the term, and they were/are changed only in the case of unexpected events. The charging of costs is attenuated by the fact that several institutions (8 institutions) determine the prices for business areas on a monthly basis; two institutions determine the prices daily; and one institution does so every 3 months. Although the longer price setting may delay the price adjustment required by the business and market environment, if the price setting is performed too often, it may significantly impair negotiating ability in the pricing of individual, higher-volume deals.

WHAT DO HISTORICAL DATA REFLECT?

Within the framework of our survey, we asked for transaction-level data on the main parameters of newly obtained foreign funds for the period between 2006 and the summer of 2011: their premia, the amount of funds raised, their maturities, currency, length of repricing period and type of interest payment, as well as type of the financing partner and instrument. This transaction-level information allows an examination of premia according to various criteria. We calculated the banking sector level premia in a breakdown by instruments for a scope of loans, deposits and bonds. The premia presented here do not contain price data of mortgage bonds and subordinated debt type fund raisings, as mortgage bonds – given their covered nature – typically have lower premia, whereas subordinated debt elements have higher premia in line with

Chart 5
Changes in costs of foreign funds with a variable-rate
(with a maturity of over a year) (quarterly averages)



Note: The premia priced in foreign funds show the average premia weighted with the new foreign funds inflow in the given quarters. During the analysis, the 5-year CDS spreads are used for representing domestic sovereign risk, because this maturity can be considered the most liquid segment in the CDS market.

Source: MNB, Bloomberg.

their risk ratings. With this simplification, in the period under review, weighted either by amount or number of pieces, approximately 80-95 per cent of gross new issues were included. The majority of banks gave information regarding transactions longer than a month; emphasis is placed on the analysis of liabilities with a maturity over a year.

Based on these data, a significant portion of foreign liabilities with an original maturity of over one year are variable-rate transactions with short (3-6-month) repricing; transactions with a maturity of up to one year are mostly fixed rate ones (because typically they cover one interest rate period). Among variable-rate foreign liabilities, weighted with the amount of the gross fund inflow, the proportion of loans, deposits and bonds repriced every 3 months is approximately 65 per cent. The proportion of instruments repriced every 6 months is 30 per cent. The remaining 5 per cent is basically repriced annually. (Weighted by number of pieces, 3-month repricing accounts for 50 per cent, 6-month repricing accounts for 35 per cent, and 10 per cent is repriced on a monthly basis.)⁶ Repricing every three months is reasonable because it allows for hedging of the interest rate risk appearing on the asset side of the domestic banking sector and related to loans of

⁶ Within the period under review, before and after the crisis there was no significant shift in the distribution of the repricing period at the system level.

similar repricing (i.e. it allows narrowing of the repricing gap). The premia presented here should be interpreted as the average of premia above the interbank rates with maturities and in currencies corresponding to the repricing periods (e.g. the 3-month, 6-month EURIBOR in the case of instruments denominated in euro) weighted at the banking sector level. They approximately express to what extent the banking sector level costs of foreign funds exceeded the three-month USD, CHF and EURIBOR yields on average. Premia weighted by the amount of new issues are given in a quarterly breakdown. Within variable-rate liabilities with a maturity of over one year, the average original maturity weighted by quantity of issues was 3.6 years in the period under review⁷ (in the period as a whole, it was 3.5 years when funds were raised within the group and 4.3 years in when funds were obtained outside the group, in the market). For the sake of comparison with prices of currency swaps, basis swap spreads with a maturity of 5 years are used in addition to actual swap deals. Below is a description of changes in the costs of foreign funds using premia calculated with the aforementioned method. In this analysis, the 5-year CDS spread is used to represent the domestic sovereign risk, because this maturity can be considered the most liquid segment in the CDS market.

Prior to the unfolding of the crisis in October 2008, the domestic banking sector was able to obtain funds with a maturity of over one year at a price that was lower than both the Hungarian sovereign and parent bank spreads. Before the unfolding of the subprime crisis in 2007 H2, risk premia reached low levels globally; domestic banks obtained foreign funds practically at levels corresponding to those of foreign parent banks and Hungarian sovereign CDS spreads (Chart 5). In the period between the subprime crisis and the Lehman bankruptcy in September 2008, the CDS spreads of foreign parent banks and the Hungarian sovereign CDS spreads increased considerably compared to earlier levels; premia priced in the costs of foreign funds with a maturity of over one year followed only partially. First, this is attributable to the fact that, in this period, foreign parent banks with higher risk premia provided less funds for domestic subsidiaries. Secondly, parent banks did not start to immediately and completely shift the premia expected of them to their domestic subsidiaries and branches.

Following the Lehman bankruptcy, at the level of the domestic banking sector, until 2009 H1 the premium on raising foreign funds (within the group) was, on average, close to the risk premium level of parent banks. Following the crisis in September-October 2008, the Hungarian sovereign and parent bank CDS spreads also increased

sharply, but the increase in the Hungarian sovereign credit default swap spread was considerably higher. However, premia on foreign funds almost completely mirrored the changes in the average of parent bank CDS spreads. On one hand, this means that (on average) parent banks shifted their own credit risk premia on to their subsidiaries more directly than in previous periods of providing funds for the latter. On the other hand, it also shows that during placements to affiliate banks, foreign parent banks did not yet apply Hungarian sovereign CDS spreads, which had surged to an extremely high level. This is partly a result of the fact that, during the allocation of funds within the group, the country risks of their subsidiaries and branches were not yet included in pricing, in line with clearly determined basic principles.

From 2009 H2 onwards, the premium on external funds increasingly exceeded the average of risk premia expected of parent banks; from early 2010 onwards, growing in parallel with the escalation of the sovereign debt crisis, it increasingly approached the level of the Hungarian sovereign CDS spread. From 2009 H2 onwards, the sovereign Credit default swaps played an increasing role in determining risk premia above reference yields. This was attributable to the fact that some foreign parent banks started to introduce clearly CDS-based pricing in this period – mainly on maturities of over one year in fund allocations within the group. The temporary decline in costs of foreign funds in 2010 Q1 is basically attributable to the fund-raising of one bank at a more favourable price. The shift from parent bank credit default swaps in the direction of sovereign credit default swaps of the countries of subsidiaries took place starting from 2010 H2 (i.e. in parallel with the strengthening of the debt crisis, which was affecting the peripheral euro area member states, and the increase in country risk premia). The inclusion of country risks came to play an increasing role in parent bank pricing as well. In 2011 Q2, the costs of foreign funds roughly corresponded to the level of the Hungarian sovereign CDS spread. This was also attributable to the fact that in 2011 H1 primarily, those banks raised (non-subordinated) foreign funds whose parent banks clearly stopped considering sovereign CDS spreads (corresponding to the countries of subsidiaries) in their intragroup pricing principles.

For a significant part of the period under review, external direct foreign exchange funds with a maturity of over a year proved to be more expensive than currency swaps. Until October 2008, the premia on obtaining foreign exchange liquidity through currency swaps with a maturity of over one year (above short interbank

⁷ The value shown here does not include the 30-year maturity issue of one of the banks that participated in the survey.

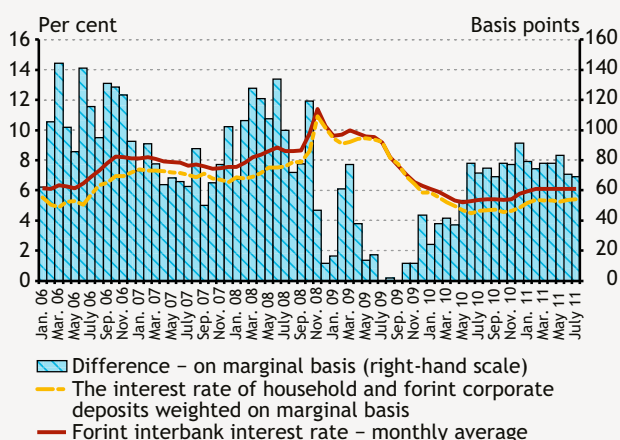
yields with a maturity corresponding to the repricing period) practically reached a level around zero; resulting from their covered nature, the market did not price either the parent bank or the sovereign risk spreads in the transactions (Chart 5). From October 2008 onwards, the spreads of longer-term swaps increased considerably (by some 200 basis points until the spring of 2009), simultaneous with the intensification of FX swap market tensions (Chart 5). The costs of foreign funds increased to a lesser extent, although following the unfolding of the subprime crisis in 2007, as access to direct (mainly market) foreign exchange funds became limited, they had earlier already reached higher levels. Therefore, at the system level their cost exceeded the prices of synthetic production of foreign exchange sources during the swap market turmoil in the autumn of 2008 (and 2009 as well). This is partly attributable to the fact that, compared to direct lending, a currency swap transaction can be considered as a covered instrument. Between March 2009 and end-2009, in parallel with the consolidation of the swap market and the decline in swap market exposure, the gap between foreign funds' premia and currency swap spreads started to widen, because the costs of foreign funds declined more slowly. In that period, the currency swap spreads calculated from the transactions practically mirrored the foreign parent bank CDS spreads, demonstrating that foreign swap market participants were passing on their own costs of funds. Although the gap subsequently narrowed, from June 2010 onwards, in parallel with the acceleration in foreign fund outflows, at the system level the premia on foreign parent bank funds again diverged from the swap spreads with a maturity of over one

year: through premia embedded in swap transactions, parent banks shifted only their own costs of funds (at most) to domestic banks; the country risk of domestic subsidiaries or branches did not appear yet. In addition, one must also take into account that the total cost of obtaining forint funds necessary for the synthetic foreign exchange fund is lower in aggregate than the level of forint interbank rates (in most cases, at the individual bank level as well), as a portion of the necessary forint liquidity is provided by corporate and household deposits. The interests on newly obtained deposits reached a lower level than interbank rates, even during the crisis. Calculating on a marginal basis (i.e. weighted by the amount of newly concluded contracts), in the whole period under review they reached a level that was approximately 70 basis points lower, although its magnitude also fluctuated significantly during the crisis period and among banks (Chart 6). On an average cost basis, taking into account the considerable total amount of sight deposits, the difference was even greater.

Overall, the premia on obtaining funds from parent banks were more favourable for the domestic banking sector than those on funds from the market, mainly due to the more advantageous pricing of short-term funds. In transactions within and outside groups, no significant difference in premia was experienced in the costs of variable-interest rate foreign funds with a maturity of over one year in the case of issues of higher amounts (Chart 7). Nevertheless, it cannot be stated that the premia on obtaining funds outside and within the group were identical at the system level. First, it was typical of several credit

Chart 6
Comparison of forint deposit interest rates weighted with contracts and forint interbank rates

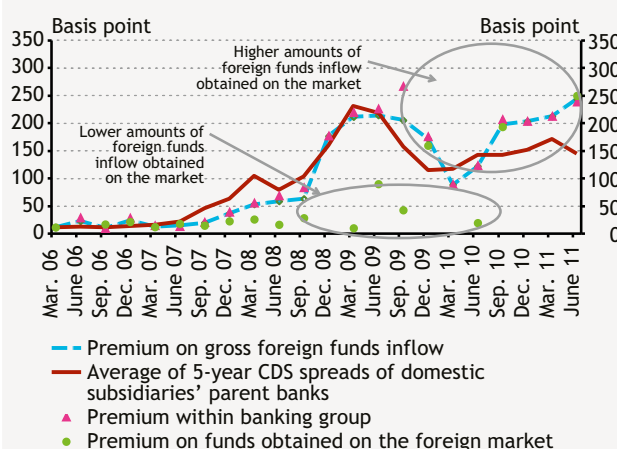
(monthly averages)



Source: MNB.

Chart 7
Changes in costs of variable-rate foreign funds inflow (with a maturity of over a year)

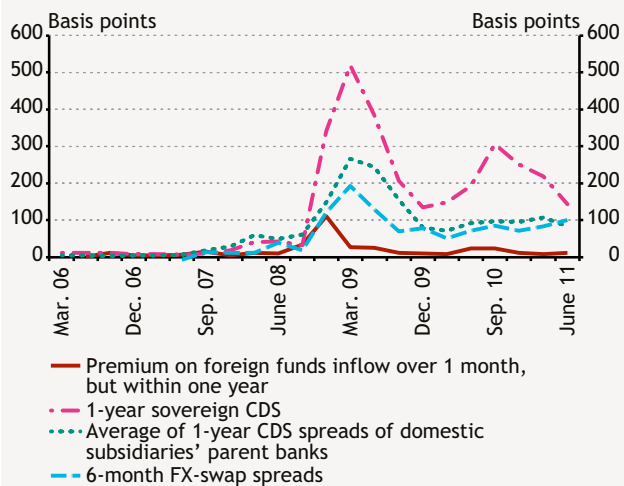
(quarterly averages)



Source: MNB.

Chart 8
Costs of foreign funds inflow over 1 month, but within one year

(quarterly averages)



Source: MNB.

institutions that they obtained foreign funds with shorter maturities, which were priced practically in line with the levels of international interbank rates (e.g. around the EURIBOR). Secondly, not once were they unable to obtain funds from the market. At the system level, in the shorter term, parent bank CDS spreads were not included in the costs of foreign funds at all or only to a much lesser extent, whereas the application of the Hungarian sovereign CDS spread was not typical. One of the underlying reasons is that at shorter maturities, the banks who obtained foreign funds were primarily the ones that did not apply differentiation in pricing during the allocation of funds within the group. In parallel with this, the spreads of swap transactions around 3-6 months did not deviate significantly from the average of the parent bank credit default swaps. This is partly attributable to the fact that other credit institutions had access to greater amounts of foreign exchange funds at more advantageous prices at the shorter maturities, not the ones that obtained foreign exchange liquidity through swaps (Chart 8).

SUMMARY

The findings of our survey on the pricing of foreign funds confirm that the significance of risk-based pricing increased during the crisis. Prior to the current crisis, which started in 2007-2008, strict and well-defined pricing principles within banking groups did not exist. As a result of the current crisis, however, the relevant internal rules have become stricter and risk-based pricing mechanisms have been advanced. Based on the findings of our survey,

starting from 2009 H2 an increasing number of parent banks switched over to an application of Hungarian sovereign CDS-based pricing during the allocation of funds within the group. Considering the current high level of the Hungarian sovereign CDS spread, this creates a less favourable opportunity to obtain funds, compared to the practice where no differentiation according to countries is applied in pricing during the allocation of funds. The methods used for pricing were revised at certain intervals during the crisis; our survey primarily focused on the current state.

Historical data also suggest that risk-based pricing took place gradually at the system level in the case of liabilities with a maturity of over one year. From the summer of 2007 onwards, following the onset of the subprime mortgage market crisis, premia averaged at the system level gradually approached the level of foreign parent bank CDS spreads. Then, from the October 2008 crisis until the autumn of 2009, parent banks practically shifted their own premia on to their domestic subsidiaries. Starting from 2010, in parallel with the intensification of the debt problems of the European government, sovereign CDS-based pricing (corresponding to the country of the affiliate bank) increasingly came to the fore. Funds with a maturity of up to one year did not follow this trend at the system level, which is partly attributable to the fact that mainly credit institutions whose parent banks do not apply differentiation among countries were able to obtain foreign exchange funds with maturities of up to one year. The premia on longer-term currency swaps used for covering the on-balance-sheet open foreign exchange position were typically below the premia on foreign funds; the inclusion of counterparty and liquidity risks in prices started only later, and on average up to the level of parent bank CDS spreads at most. However, at shorter maturities at the system level, premia on foreign funds fell behind, compared to the FX-swap transactions of similar maturities.

REFERENCES

BALÁS TAMÁS AND MÓRÉ CSABA (2007), 'Likviditási kockázat a magyar bankrendszerben', *MNB-tanulmányok*, 69.

CROUHY, MICHEL, DAN GALAI AND ROBERT MARK (2006), *The essentials of risk management*, New York, McGraw-Hill.

CSÁVÁS CSABA (2011), *A fedezett kamatparitás teljesülése és devizaswapok arbitrázsmentes árazása kockázatok mellett*, manuscript, MNB.

JORION, P. (1999), *A kockázatos érték*, Budapest, Panem.

JUHÁSZ VIKTOR (2011), 'A banki transzferárazás egyes kérdéskörei', *Hitelintézeti Szemle*, 12. évf. 2. sz.

PÁLES, JUDIT, ZSOLT KUTI AND CSABA CSÁVÁS (2011), 'The role of currency swaps in the domestic banking system and the functioning the swap market during the crisis', *MNB Occasional Papers*, 90.

MAGYAR NEMZETI BANK (2008), *Report on Financial Stability*, April.

MAGYAR NEMZETI BANK (2010), *Report on Financial Stability*, November.

MAGYAR NEMZETI BANK (2011), *Report on Financial Stability*, April.

VARGA, L. (2008), 'The information content of Hungarian sovereign CDS spreads', *MNB Occasional Papers*, 78.

VARGA, LÓRÁNT (2009), 'Hungarian sovereign credit risk premium in international comparison during the financial crisis', *MNB Bulletin*, July.