



Csaba Balogh – Péter Gábor

*The interbank money market
past and future trends*

CSABA BALOGH AND PÉTER GÁBRIEL

THE INTERBANK MONEY MARKET

PAST AND FUTURE TRENDS

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Following the practice of the European Central Bank, the Magyar Nemzeti Bank wishes to place greater emphasis on money market analysis. Thorough knowledge of money markets is indispensable for the efficient conduct of monetary policy, as the effect of central bank actions is first reflected on these markets. In May 2003, the MNB conducted a questionnaire-based survey of the Hungarian money market, covering 11 domestic commercial banks.* Based on the responses to the questionnaire and regular reports by banks, this paper analyses certain characteristic features of the Hungarian and euro area money markets. Future plans call for regular performance of analyses of this nature.

* The banks participating in the survey were CIB Bank, Citibank, Commerzbank, Deutsche Bank, ERSTE Bank, HVB, ING, K&H, OTP Bank, Takarékbank and WestLB Hungária Bank. The authors wish to express their gratitude to these banks for their kind assistance.

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Summary

This paper analyses the development of the three segments of the interbank money markets in Hungary and the euro area: unsecured lending/deposit transactions, sale and repurchase agreements (repos) and FX swaps.

According to turnover data for the euro money market, unsecured debt transactions constituted the most significant segment of the euro area up to 2000. However, since 2001 the repo market has taken the lead. Transaction volumes in the FX swap market are far lower than in the other two markets. By contrast, in the Hungarian money market, where trading volumes have been rising (albeit at a slowing pace), FX swap transactions are dominant: their volume is twice that of unsecured debt transactions. The repo market in turn is dwarfed by the two other segments in terms of the volume of transactions conducted. The currently much wider bid-ask spreads in all three Hungarian markets are expected to shrink after adoption of the euro.

The evolution of a liquid, flexible FX swap market was the most outstanding development in the Hungarian markets following foreign exchange liberalisation. The gradual rise in turnover can be attributed mainly to foreign participants' vigorous activity. Growth in unsecured loans was slower, due in part to the fact that, as the official interest rate corridor narrowed, the costs of accessing the MNB's facilities fell, and banks in turn began to transact with the central bank more often, replacing part of their transactions with their counterparties in the interbank market. On average, the total amount of overnight central bank deposits amounts to one-third of interbank market turnover. Unsecured debt transactions entered into with foreign banks picked up following foreign exchange liberalisation, and domestic banks now conduct 15%–20% of unsecured debt transactions with foreign participants. Based on information from the Accession Countries, repo markets are underdeveloped in the region, while the importance of the other two segments is roughly equal.

Most transactions mature in less than one month in both the Hungarian and euro area money markets, and transactions with one-day maturity account for 80%–90% of total unsecured deals. The share of transactions with maturities of more than one month is insignificant. Overnight deals are higher as a proportion of repo transactions in the euro area, but the ratio of transactions maturing within one month is similar to that seen in the Hungarian market. A somewhat higher share of the total in the Hungarian market is accounted for by FX swaps maturing within one month.

The percentage shares of cross-border transactions are different in the Hungarian and euro money markets. Whereas the share of non-resident counterparties in the three segments of the euro money market is around two-thirds, they account for nearly 90% of the Hungarian FX swap market and for less than 20% of repo and unsecured debt transactions.

Activity in the Hungarian money markets is concentrated to a much higher degree than in the euro markets: the number of participants in the domestic repo market is particularly low. The FX swap market is the only exception, which is more concentrated than the euro area FX swap market, although not to a much higher degree. But it is characteristic of both segments that, due to their size, the number of participants is considerably lower, which explains the higher degree of concentration to a certain extent. Hungarian data differ little from those for other Accession Countries: the number of active participants is nearly identical.

In Hungary, the vast majority of transactions with the central bank are concentrated on a significantly lower number of large participants than in the euro area. The borrowers' side is more concentrated in the domestic market, explained by the general abundance of funding available to banks. The number of participants grappling with a scarcity of funds is much lower than those with ample funds. With the forthcoming switch by the Bank to liquidity absorbing operations, the banking sector's surplus liquidity is likely to transform into a shortage, resulting in a higher concentration on the deposit side.

The underlying difference between the repo markets of Hungary and the countries of the euro area is that Hungarian banks conduct their transactions mainly with non-bank clients, while euro area banks deal mainly with each other, such transactions accounting for 70%–80% of the total. In the euro area, cross-border repos account for nearly two-thirds of total transactions. By contrast, Hungarian banks' cross-border transactions are marginal as a proportion of the total. The average contract size in the domestic repo market is significantly lower than in the euro market. Currently, only government securities are used as collateral in Hungarian repo transactions, although the share of other securities is also low in euro area repo markets. According to a survey conducted by the MNB, traditional repos are much more widely used in the Hungarian market: banks almost exclusively use such repos.

The Bank's questionnaire-based survey suggests that the obstacles to the further development of the domestic repo market are: (i) the low government securities

holdings of banks with liquidity shortages; (ii) lack of a master agreement; (iii) high supervisory fees which raise the costs of short-term, non-bank transactions; and (iv) continuing uncertainties in the legal environment. Banks' holdings of government consolidation bonds are only marketable with restrictions; the majority of foreign participants are 'buy-and-hold' investors, who as a rule are not willing to offer their securities holdings as collateral for repo. These represent additional factors retarding growth in repos. Although repos were exempted from reserve requirements, which had a positive effect on market development, the importance of this aspect has declined with the reduction in the costs of reserve maintenance. A gradual drop in the banking sector's liquidity surplus and the involvement of the Government Debt Management Agency may give fresh impetus to the repo market, contributing to further development of the government securities market.

The US dollar dominates FX swaps both in Hungary and the euro area. Transactions entered into in Hungary do not give a full picture of FX swaps, as the market in London also conducts a significant volume of forint transactions. The domestic market is virtually fully automated, and the fact that several strategies can be implemented using swaps, from risk-free government securities purchases to synthetic forward transactions, has recently contributed to a gradual increase in volume. However, the strong dominance of the swap market is often a barrier to the further development of other derivatives or spot markets.

Based on the experience of other countries at a similar stage of economic development, Hungary's adoption of the euro is expected to have the greatest influence on the swap market. As the forint will cease to be legal tender, forint/dollar transactions will be replaced by euro/dollar transactions conducted at one of the international financial centres. And with completion of the convergence process, speculation on interest rates will be less intense, with the interest rate swap probably becoming its major tool and replacing FX swaps. In addition to an expected increase in the range of products on offer, this decline in FX swaps may directly facilitate a revival of the repo market.

Introduction

This paper analyses the development of the three segments of the interbank money markets in Hungary and the euro area: unsecured lending/deposit transactions, sale and repurchase agreements (repos) and FX swaps. First, it briefly presents the major types of transactions and then describes the characteristics of the Hungarian markets. The third section compares the repo markets of the two regions which exhibit the greatest differences. Finally, the paper examines the key characteristics of the Hungarian FX swap market.

An overview of the types of transactions

Interbank unsecured transactions are traditional deposit or loan transactions between banks, which they use to provide liquidity to each other up to established limits.

FX swaps are in effect forint loans extended or received against foreign exchange as collateral, as one party to the transaction raises funds in domestic currency by selling a foreign currency spot, which it repays through a reverse transaction at a future date. The interest rate on the loan equals the implied return on the swap. This consists of: (i) the difference between the spot and the forward exchange rate (which in the Hungarian market derives from the interest rate differential of the forint and the foreign currency); and (ii) the cost of funds of the foreign currency. Currency swaps are different from FX swaps in that they are an exchange of cash flows denominated in different currencies at several future dates instead of only one in the case of FX swaps (currency swaps also include cross-currency swaps which are interest rate swap transactions based on different currencies). The latter are used mainly to hedge against interest rate and exchange rate risks and serve speculative rather than liquidity management purposes. Consequently, this paper only deals with them to make certain comparisons.¹

¹ Interest rate swaps are an exchange of cash flows related to interest payments, based on a notional principal amount, over a specified period. One party to the transaction undertaken in the same currency pays a floating interest rate, the other paying a fixed interest rate. In the case of a currency swap which means exchange of principal in different currencies, the interest rate may be either floating or fixed.

The boundaries of a *repo transaction* are less clearly defined compared to the transactions noted above. In the following, the discussion will treat repos in the broad sense, i.e. sell/buy back transactions and securities lending as well as classic repos (or sale and repurchase agreements).²

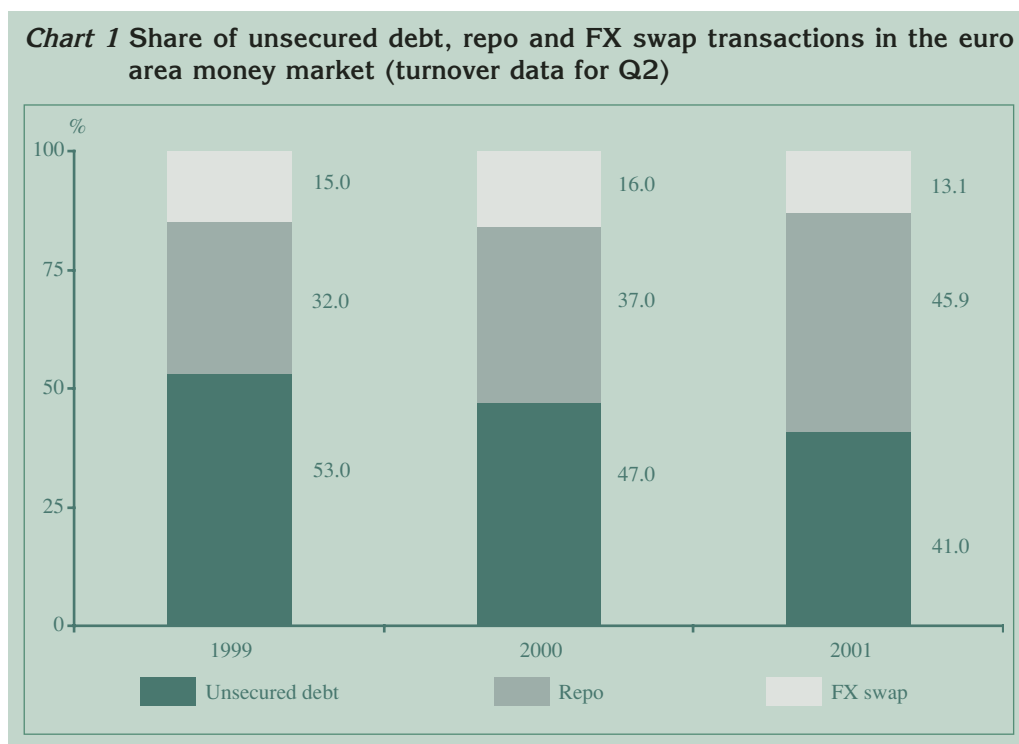
- A classic repo is a sale and repurchase agreement. The parties to the transaction (the seller and the buyer) agree to sell (purchase) a security spot and repurchase (sell) the security at the specified future date.³ Repos may be distinguished by whether they are cash-driven or security-driven. In the case of cash-driven repos, the particular features of the security have no significance – what matters is the deposit/loan transaction. In the case of security-driven repos, in contrast, the buyer of the security needs specific securities for the term of the contract. Using delivery repos, legal title to the securities passes to the buyer. Under hold-in-custody repos, legal ownership remains with the seller, and the security is retained on a segregated account.
- Securities sell/buy back deals involve two classic repo transactions. Entering into such deals simplifies the accounting process, does not require daily collateral assessment and renders legal processes uncomplicated. In addition, compliance with reserve requirements may be avoided.
- Securities lending is similar to security-driven classic repo: the holder lends a specific security for a fee and provides another security, cash or other collateral. Legal ownership of the collateral does not always pass to the lender automatically; however, in most cases title to the special security is transferred to the borrower.

² For a detailed description of the various types of repo, see Szakály and Tóth (1999).

³ Open repos also exist, whereby the maturity of the transactions is not fixed – either of the two parties may initiate termination of the transaction.

1 Market profile and trends in the euro area

According to surveys conducted by the ECB, based on turnover data the euro money market is dominated by unsecured debt and repo transactions. The repo market has been gaining ground, with this segment accounting for the largest share of money market transactions in 2001.⁴ Meanwhile, the volume of FX swaps has remained flat, and the ratio of unsecured debt transactions to the total has declined (see Chart 1).



Total turnover in the money markets grew modestly, by 10%–15% annually in 2000–2001. The percentage share of the repo market increased significantly in the two years under review, due to an average annual increase in turnover of more than 30% and a stagnation in unsecured loan transactions. The swap market showed a

⁴ In 2002, the ECB conducted the survey with 113 banks of the EMU and the United Kingdom. In 2001, the same survey was conducted in 10 EMU countries (Germany and Greece were not included in the sample) and the United Kingdom with participation of 76 banks [ECB (2001), ECB (2002a)].

fairly mixed picture: it grew by more than 15% in 2000, indicating that, following the sharp decline in 1999 caused by the withdrawal of legacy currencies, this segment regained its strength, although volume dropped off slightly again in 2001. The need to reduce credit risk increased due to the planned introduction of capital requirements measuring risks more accurately, and demand for cross-border transactions picked up. These factors contributed to the dynamic development of the repo market.

There has recently been a slight shift towards shorter maturities in money market deals – transactions with maturities of less than one month account for around 90% of the total (*see Table 1*). In this maturity bracket, the vast bulk of overnight deals are unsecured loan transactions, while the share of repos is rather modest (*see Chart 2*). Although repos are dominant in the tom/next, spot/next and other maturities within the one-month maturity bracket, swaps are also conducted. Swaps play the most important role in transactions with maturities of more than one month, followed by repos in second place, and unsecured transactions in the third place, which, however, account for a marginal share.

Table 1 Money market transactions in the euro area in a breakdown by maturity (Turnover data)

	< 1 month	> 1 month
1999	90%	10%
2000	93%	7%
2001	93%	7%

Analysing the maturity profile by item (*see Chart 3*), overnight deals account for two-thirds of unsecured loan transactions, although their share has been falling slightly. Deals with maturities of more than a month are insignificant as a proportion of the total. Transactions between the tom/next and one-month maturities account for three-quarters of all repo and swap transactions. Swaps are mainly undertaken for maturities of over a month. Repos, in contrast, are dominated by the overnight maturity.

Analysing the market by counterparties, cross-border activity in the money market has been growing at about the same rate as transaction volumes and, as a conse-

Chart 2 Share of transactions within the different maturity brackets in the euro area money market (2000 turnover data)

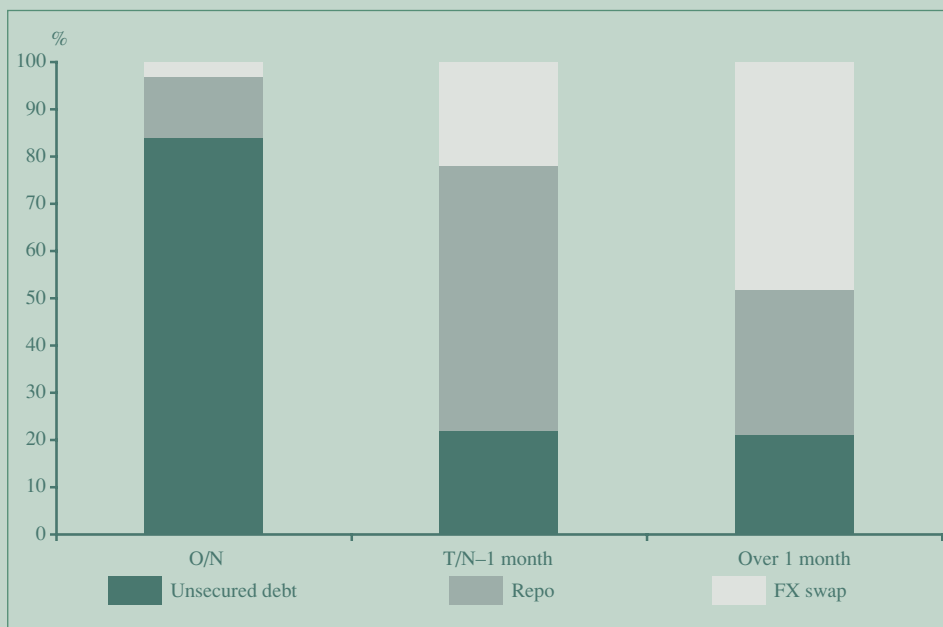
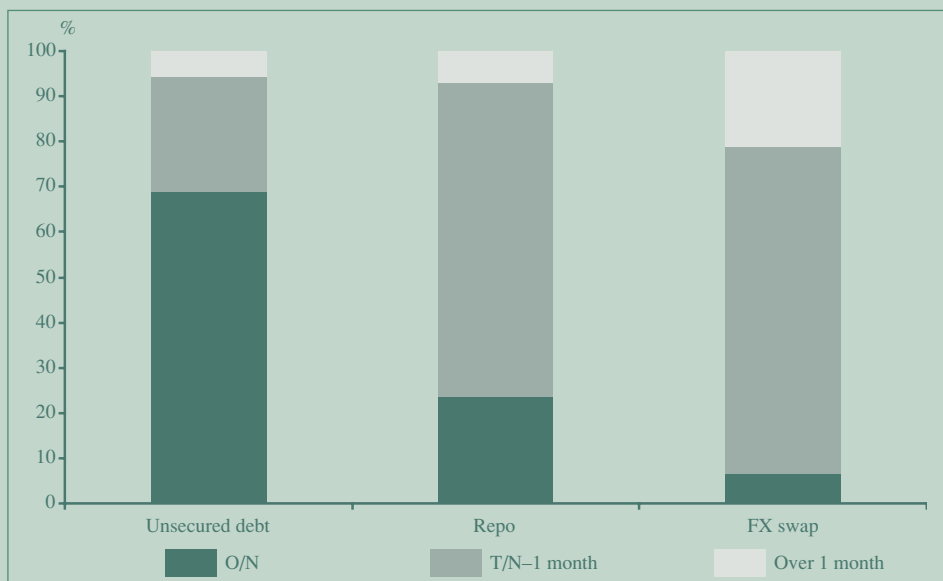


Chart 3 Share of maturity brackets in different transactions in the euro area money market (2000 turnover data)



quence, its share of total money market activity has remained unchanged at around two-thirds. At 70%, the volume of cross-border deals continued to be flat as a share of unsecured debt transactions in 2001. The share of cross-border transactions in the repo market was around 60%, due primarily to the pick-up in euro area trading. According to the survey, two-thirds of the transactions were conducted with non-domestic counterparties.

As regards the concentration of activity, the repo market is much more concentrated than the market of unsecured interbank debt transactions, according to the ECB survey (*see Table 2*). In terms of the degrees of concentration on the borrowers' and depositors' sides, the two markets are in reverse order: whereas lenders are more concentrated in unsecured transactions, borrowers are more concentrated in the market of secured lending. The FX swap market has a low number of participants, with 5 of the 97 banks participating in the survey conducting more than half of the transactions. Accessing the main refinancing operations of the ECB (i.e. the repo facility providing funds for a two-week period) shows broadly balanced ratios.

Table 2 Concentration in the euro area money markets in 2001 Q2

	Main refinancing operation*	Unsecured		Repo		FX swap
		Deposit	Loan	Deposit	Loan	
Share of the 5 largest market participants of total turnover	N/D	32%	20%	39%	48%	54%
Share of the 10 largest market participants of total turnover	34%	45%	37%	60%	62%	74%
Number of banks	567	108	107	81	84	97

* Average for the period June 2000–May 2001. The trend of concentration was upwards towards the end of the period.

According to BIS estimates, the bid-ask spread is approximately 8–9 basis points for 3-month unsecured transactions and slightly lower, i.e. a mere 2–3 basis points, for FX swap transactions. The reasons for this may be that credit risk is more moderate, as the swap market is sufficiently secured, and that a longer-term business relationship between fewer participants in the swap market also mitigates risk.

The example of the Greek market illustrates that the spread in the interbank market narrowed considerably after entry into the euro area (falling from 40–50 to 6–10 basis points). Entry has also been beneficial for the selection of products in the money market, as more sophisticated products, which were hardly in use previously, have become more widely traded. Of these products, interest rate futures, 3-month Euribor futures in particular, and the EONIA swap, which is in effect an O/N indexed swap, have grown especially popular. As the latter is a particularly widely used tool for speculation and hedging at the short end of the yield curve, its developments provide valuable information on expectations of official interest rate changes.

Accession Countries

A 2001 survey by the ECB revealed that unsecured transactions constituted the most important money market segment in two-thirds of the Accession Countries (12 altogether, including Bulgaria and Romania, in addition to the countries acceding to the EU in 2004); whereas in the remaining one-third (including Hungary) it was FX swap transactions. The number of members of this small group is likely to increase once FX liberalisation is implemented everywhere. The repo market was the least developed in all of the countries, and in three countries there was no functioning repo market at all.

As regards averages in Accession Countries, one-half of unsecured transactions were O/N, while T/N–7 accounted for 10%–15% and longer maturities had an increasingly smaller share. Nearly one-third of the transactions in the repo market were either O/N, T/N or S/N, while T/N–7 and 8–29 day transactions accounted for a similar share. Transactions with maturities of over one month barely accounted for 15%. Figures are similar in the case of FX swap transactions, with the exception that the share of transactions with maturities of over one month is slightly higher (25%).

The size of the money market is similar in the neighbouring countries; there were 4–5 participants in the smaller ones, 9–10 in medium-sized markets and 16 in the Polish market.

2 *The Hungarian money market*

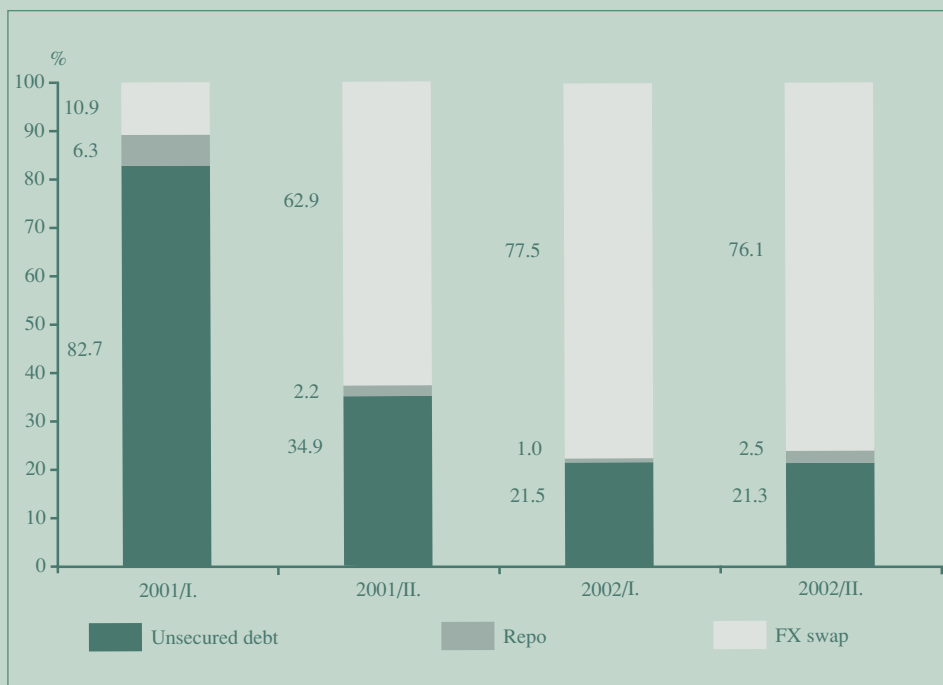
In contrast to the euro money market, the share of unsecured interbank loans in the Hungarian interbank market fell significantly, due to the upswing in FX swap transactions, boosted by foreign exchange liberalisation which was fully implemented in the summer of 2001 rather than by an upswing in the repo market. The volume of both repos and unsecured loans also fell in absolute terms in 2002 H1. At end-2002, however, the repo market started to recover strongly (semi-annual turnover tripled), with unsecured debt and swap transactions growing more modestly (slightly over 15%). In September 2002, the MNB exempted liabilities from repo transactions from reserve requirements. This played a major role in the rising number of repo transactions; but even so, repo transactions only account for 2.5% of all interbank transactions (*see Chart 4*).

Daily turnover in the entire money market rose from approximately HUF 80 billion in 2001 H1 to HUF 358 billion in 2002 H2. Foreign exchange liberalisation brought about an enormous rise, owing to an upswing in swap transactions, and average daily money market turnover had increased by 250% by 2001 H2. Then, growth lost momentum within the space of six months. In 2002 H2, overall turnover only exceeded turnover during the previous six months by a mere 16%.

At end-2002, the average daily volumes of unsecured, repo and swap transactions were HUF 76 billion, HUF 9 billion and HUF 272 billion, respectively. Compared with 2001 H2, this suggests a modest (7.5%) rise in unsecured transactions, and a clear upsurge in the repo and swap market (the former grew by 97% and the latter by 113%).

Aggregate data from a questionnaire-based survey conducted in May 2003 suggest that, looking at 2002 as a whole, the volume of FX swap transactions was twice that of interbank unsecured transactions. This is somewhat lower than the estimate based on data for the entire banking system. This may be due to the fact that, in the data regularly provided, only data on transactions between domestic banks were included in respect of unsecured transactions. The results of the survey left no doubt that after foreign exchange liberalisation Hungarian banks conducted a large number of unsecured transactions with non-residents as well (in our estimate, unsecured interbank transactions conducted with non-residents represented a 15%–20% share of the total in 2002).

Chart 4 Share of unsecured debt, repo and FX swap transactions in the forint money market (turnover data)⁵



Data on outstanding amounts further corroborate the dominant role of FX swaps. Swaps, unsecured and repo transactions accounted for 89%, 8% and 3%, respectively, of the estimated stock, based on turnover data. The fact that repo transactions have become increasingly prominent suggests that, of the three segments, this type of transaction has the longest average maturity, whereas unsecured transactions have by far the shortest.

In terms of maturities, the past 18 months have witnessed a fundamental restructuring of the interbank money market. Overnight transactions have lost their lead to transactions with maturities of less than one week, whereas the share of transactions with maturities of over one week but less than one month has remained unchanged. A slight increase is discernible in the longest maturity bracket (*see Table 3*).

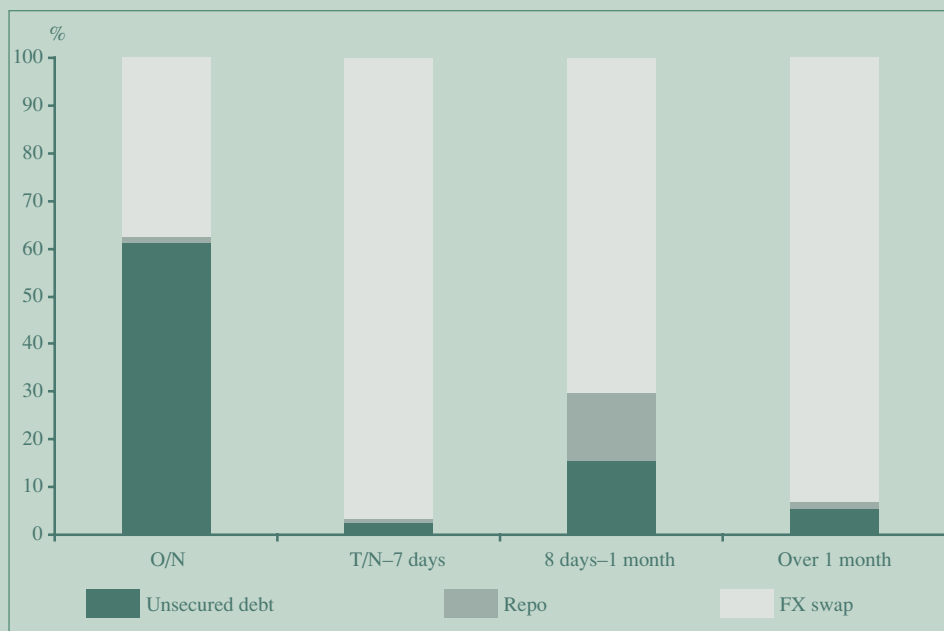
⁵ Data for unsecured loans only include banks' transactions with each other.

Table 3 Total forint market turnover in a breakdown by maturity

	O/N	T/N-7 days	8-29 days	>30 days
2001 H1	63.8%	18.8%	11.6%	5.8%
2001 H2	38.7%	45.4%	9.6%	6.3%
2002 H1	29.3%	55.9%	8.8%	6.0%
2002 H2	29.1%	50.3%	11.2%	9.4%

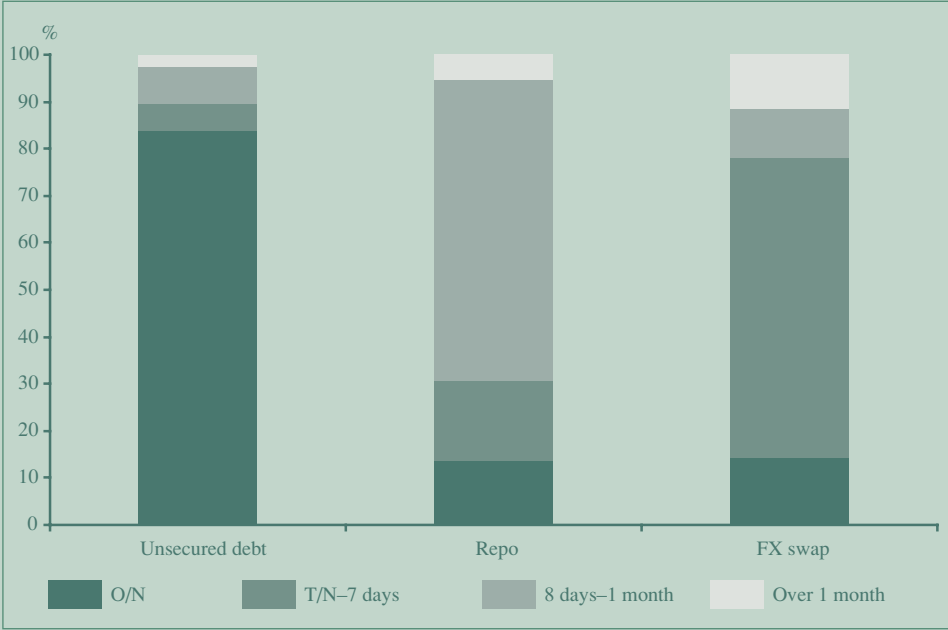
It can safely be assumed that, in terms of the different maturities, unsecured debt transactions are still dominant within O/N transactions, although FX swap transactions also have a significant share, amounting to over one-third. At longer maturities, FX swap transactions outnumber the other two types. The share of repo transactions is not significant over any maturity; only transactions with maturities of over one week but less than one month reach the share of unsecured debt transactions (*see Chart 5*).

Chart 5 Share of transactions in different maturity segments in the forint money market (2002 H2 turnover data)



Within unsecured transactions, O/N transactions amount to 84% of the total, while the number of transactions with maturities of over one month is insignificant (in this segment, transactions with maturities longer than O/N but shorter than two weeks play a key role, with their share approximating 15%, as the two-week deposit is the Bank’s key deposit facility). Both swap and repo markets exhibit a rather similar maturity pattern. The share of O/N transactions is identical (14% in both), and that of transactions with maturities of less than one month, which play a dominant role, is also similar (74% and 81%, respectively). A significant difference in the maturity

Chart 6 Share of maturity segments in different transactions in the euro area money market (2002 H2 turnover data)



bracket of less than one month is that most repos mature in more than one week, whereas swap transactions mature in less than one week, with T/N and S/N deals dominating. The share of transactions with maturities over one month is higher than that of swap transactions (see Chart 6).

Central bank policy measures also influence the development of the interbank market. The manner in which the interest rate corridor, i.e. the differential between the interest rates on the Bank’s overnight loan and overnight deposit facilities, is established determines the band within which interbank interest rates may fluctuate.

Over the past few years, the MNB has gradually narrowed the corridor on both sides of its base rate to $\pm 1\%$.⁶

In the wake of band narrowing, banks temporarily placed O/N deposits with the central bank on several occasions. But since the spring of 2003, they have done so roughly just as often as they did when the interest rate corridor was wider. Not counting the three banks that place deposits with the MNB the most frequently, counterparties turned to the central bank on 31% of working days in the period when the interest rate corridor was ± 2 percentage points wide. After the corridor was narrowed, this ratio initially rose to 41% of working days, and then declined to 30%. Taking all banks into consideration, in effect on nearly every working day there was at least one bank that placed deposits with the MNB. The number of days on which deposits were placed fell only slightly in 2003. The average amount placed was two to three times higher than previously (*see Table 4*).⁷

The number of days on which credit was extended also doubled. The amounts drawn down, however, fell to between roughly one-third to one-quarter of the previous amounts. This suggests that banks were less cautious about their liquidity. On several occasions (mainly during a few month after setting the interest rate corridor at 2 percentage points), credit facilities were used even when the interbank O/N interest rate was in the lower half of the interest rate corridor. Thus, despite a more than 100 basis point spread, banks opted to transact with the central bank.

Interbank rates fluctuated near the Bank's key policy rate in the wide interest rate corridor, in contrast to the narrower band, where they varied more widely, fully utilising the fluctuation range. After the corridor was narrowed, interbank rates were even higher than the interest rate on the Bank's loan facility by 50 basis points on some occasions. Earlier, they rarely crossed the upper limit of the corridor and only by a couple of basis points (*see Chart 7*). (In an environment characterised by scarce liquidity, interbank rates may rise above the interest rate on the Bank's collateralised loan, as banks undertake their deals without offering collateral, the risk

⁶ The $\pm 1\%$ interest rate corridor had undergone a considerable temporary change before excess liquidity generated by the speculative attacks in mid-January 2003 was neutralised – it had been widened to $\pm 3\%$. The narrower corridor was restored in late February.

⁷ A robust increase in the number of O/N deposits in the last 4 months of 2002 can be attributed to a liquidity shock triggered by an unusually rapid decline in the Treasury Account balance. On the last three business days of December, banks placed more deposits with the central bank than during the previous four month taken together.

Table 4 Frequency and size of accessing the MNB's policy instruments

Central bank instrument		Days of accessing as a proportion of working days	Average amount placed (HUF billions)
Overnight deposit facility	± 2% interest rate corridor; June 2001–December 2001	98% (31%)	10 (31)
	±1.5% interest rate corridor; December 2001–August 2002	100% (34%)	15 (38)
	±1% interest rate corridor I.; September 2002–December 2002	98% (41%)	25 (53)
	±1% interest rate corridor II.; March 2003–June 2003	90% (30%)	32 (85)
Repo/ Collateralised loan	±2% interest rate corridor	10%	61
	±1.5% interest rate corridor	12%	15
	±1% interest rate corridor I.	25%	16
	±1% interest rate corridor II.	20%	25

Note: Data in brackets exclude those for the three institutions placing overnight deposits most frequently

of which being offset by higher borrowing rates.) In the narrow corridor, volatility dropped off, in line with expectations; however, this was less deep than the measure by which the corridor was narrowed, as shown by the increase in relative deviation (*see Table 5*).

The Bank's overnight standing facility may in part crowd out interbank transactions, as transactions entered into with the Bank are simpler and entail a low loss of return. Illustrating the intensity with which banks placed overnight deposits, the average amount of central bank deposits accounted for 30% of deposits placed in the interbank market. The picture is somewhat distorted by the fact that the Bank only has information on domestic banks' transactions with each other. Transactions entered into with foreign banks rose following foreign exchange liberalisation, which detracted from the share of transactions conducted with the MNB. However, the volume of overnight deposits with the MNB is higher, even if this fact is taken into

Table 5 Absolute and relative deviation of interbank rates assuming different interest rate corridors⁸

	Absolute deviation	Relative deviation
±2% interest rate corridor; June 2001–December 2001	0.95%	0.45%
±1.5% interest rate corridor; December 2001–August 2002	0.90%	0.48%
±1% interest rate corridor I; September 2002–December 2002	0.73%	0.69%
±1% interest rate corridor II; March 2003–June 2003	0.84%	0.57%

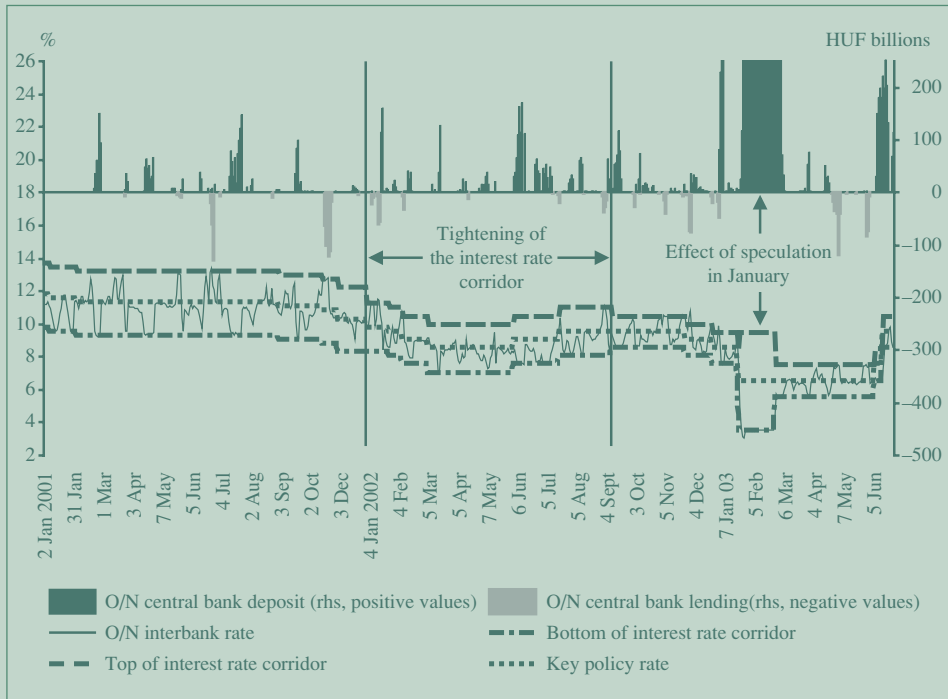
account. High liquidity, characterising the entire banking sector, provides a partial explanation for this, although the Bank mainly absorbs surplus liquidity by using two-week deposits. It could contribute to the further strengthening of the interbank market, if banks attempted to solve their short-term liquidity problems in the market and only accessed the Bank's standing facility in emergency situations.

According to the MNB's survey of counterparties, banks undertake one-half of unsecured transactions with each other, with the remaining transactions distributed roughly equally between other domestic financial intermediaries, non-financial corporations and non-residents. Banks conduct 60%–70% of repo transactions with other domestic financial intermediaries and 20%–30% with non-financial corporations. Non-residents and domestic banks play an insignificant role as parties to repo transactions. By contrast, the overwhelming majority of swaps (88% in 2002) are entered into with non-residents.

Analysing market concentration, the domestic interbank market can be characterised by concentration both in terms of the three markets discussed above as well as access to the central bank's liquidity providing and absorbing instruments. Based on the indicators of the degree of concentration, accessing the central bank's overnight assets and liabilities is concentrated to a higher degree than interbank unsecured transactions (*see Table 6*). The share of the 10 largest institutions is high-

⁸ The relative deviation of interest rates on interbank unsecured transactions has been calculated as the deviation of interest rates from the centre of the official interest rate corridor.

Chart 7 Use of central bank standing facilities and evolution of official and interbank market rates



er than in the euro market, indicating the higher degree to which activity in the Hungarian market is concentrated. Deposit-making with the central bank and other banks is more evenly balanced than borrowing. Whereas there are a great number of participants on the depositors' side, just a handful of large entities act as borrowers. This stands in contrast to the euro market, where depositors are concentrated to a higher degree. An explanation for this may be that the structural liquidity position (surplus) of Hungarian banks is the opposite of the position (shortage) of the euro area banking system. Consequently, Hungarian banks mainly compete with each other on the depositors' side. However, as the date of Hungary's adoption of the euro draws nearer, the banking sector's liquidity shortage is expected to change the Hungarian market as well, with the likely result that banks with surplus liquidity will play a minority role. As a consequence, concentration will increase in deposit-making.

The degree of concentration reflected in swap market data is also high, although it is not significantly different from data for the euro area swap market. The repo mar-

ket is very strongly concentrated: the 5 largest participants conduct virtually all of the transactions, due to the general lack of interest in conducting repos. The underlying reasons for this will be analysed in detail in the section on repo transactions. The number of participants mainly explains why the values are higher than in the euro markets, as significantly less banks are active in each market and, consequently, it is easier to carve out a higher share of the market. However, in the case of interbank deposits, the difference between the degrees of concentration, along with a similar difference between the number of participants, is substantially lower. This suggests that concentration does not exclusively derive from the small size of the market.

Table 6 Concentration of the domestic money market in 2002 H2

	Central bank			Unsecured		Repo		FX swap
	O/N deposit	O/N loan	2-week deposit	Deposit	Loan	Deposit	Loan	
Share of the 5 largest participants of total turnover	55%	69%	61%	38%	48%	99%	97%	69%
Share of the 10 largest participants of total turnover	74%	87%	85%	63%	72%	100%	100%	90%
Number of banks	32	19	30	35	30	9	14	24

Note: This table includes the number of banks transacting in the markets in a given period. The total number of banks was 41. As transaction data on a bank level have not been available, concentration values for repo have been calculated from the outstanding total of secured debt transactions reported by banks on a daily basis.

The distribution of participants is similar in respect of central bank instruments and interbank unsecured transactions, in that half of the banks are active on both the borrowing and lending sides. However, the other half of banks are often only active on one side of transactions. Of the 10 most important banks making deposits with the central bank, 8 are also the largest lenders in the interbank market. This ratio is 10 to 7 in the case of borrowing from the central bank and the interbank market.

Bid-ask spreads may also function as a good indicator of the market's judgement of liquidity in a given segment. According to the Bank's questionnaire-based survey, spreads slightly increase with longer maturities in the case of unsecured transactions. Compared with around 20 basis points for overnight deals, the spread on transactions with maturities of more than one month is above 30 basis points. On average, spreads on repos are higher and much more widely distributed, with banks applying spreads from 20 basis points up to over 100 basis points. In contrast with unsecured deals, spreads on repos do not increase with longer maturities. In the case of swaps, longer maturities are associated with lower spreads. Of the three products, swaps appear to be the most liquid and least risky, based on the spreads which average below 20 basis points. Unsecured interbank transactions stand second and repos third. All this reinforces the view that, currently, the repo market is less developed than the other two markets.

Utilisation of counterparty limits may, in principle, play an important role in making a choice between the various types of transactions. Such limits are set by the entities based on their discretionary decisions and statutory provisions imposed by the Supervisory Authority. All of the banks participating in the Bank's survey apply limits on the three types of transaction. Banks apply various weights in including transactions in the limit: they include repos and swaps with 1%–10% and 4%–10% weights in the limit, respectively. However, they uniformly include unsecured transactions with a 100% weighting. According to the estimates of banks participating in the survey, some 15%–20% of unsecured transactions fail due to the fact that market participants exhaust their counterparty limits, which prevents them from undertaking additional unsecured deals in the market. Interestingly, even if banks exhausted their limits, secured transactions, for example, repos, did not crop up as a real alternative. The reason for this may have been the disadvantages of repos, which will be discussed later (e.g. the short supply of securities, supervisory fees, lack of interest, etc.). It often happens that when limits are exhausted banks succeed in conducting the original transaction (switch) through a third party, while remaining within the limit.

3 Development of the European repo markets

Comparing the domestic repo market with the euro interbank market, the most striking difference is that the euro repo market plays a much more accentuated role in the European money market. In order to investigate the underlying reasons for this, we will present a detailed overview of the euro repo markets, for which we have used the surveys by Ciampolini–Rohde 2000⁹ and the International Securities Market Association (ISMA) launched in the summer of 2001 and published semi-annually,¹⁰ in addition to the surveys conducted by the ECB in 2001–2002.

3.1 Counterparties

According to data on outstanding amounts, one-half of euro area repo transactions are conducted with non-domestic counterparties (equally distributed between euro area and non-euro area counterparties), 40%–50% with domestic clients and the rest with anonymous counterparties (via automated trading systems). Compared with earlier periods, this represents a gradual decline in the importance of domestic transactions and an increase in transactions with non-euro area participants relative to euro area participants (*see Chart 8*). At end-2002, nearly 80% of the outstanding amount was denominated in euro. As regards other currencies, the pound sterling and the US dollar also accounted for an important share of the market.

In a country breakdown, the share of cross-border transactions was the highest in Germany and the Benelux countries, followed by France, the United Kingdom and Italy. Domestic transactions only played a dominant role in Spain (*see Table 7*). On average, banks undertook 60% of cross-border transactions with counterparties domiciled in the United Kingdom. Although this may seem high, it actually indicates a significant rise in the share of transactions entered into within the euro area, as the share of transactions with counterparties located in London would have been much higher a couple of years earlier.

⁹ Using end-February 2000 data, Ciampolini–Rohde (2000) processed the responses from 30 banks in 6 countries.

¹⁰ ISMA (2003, 2002a, 2002b, 2001). This survey was conducted on 4 occasions up to spring 2003. Compared with 46 entities in the first survey, 82 financial institutions, mainly from the EU, the United States and Japan, participated in the latest survey.

Chart 8 Share of different partner types in the euro money market

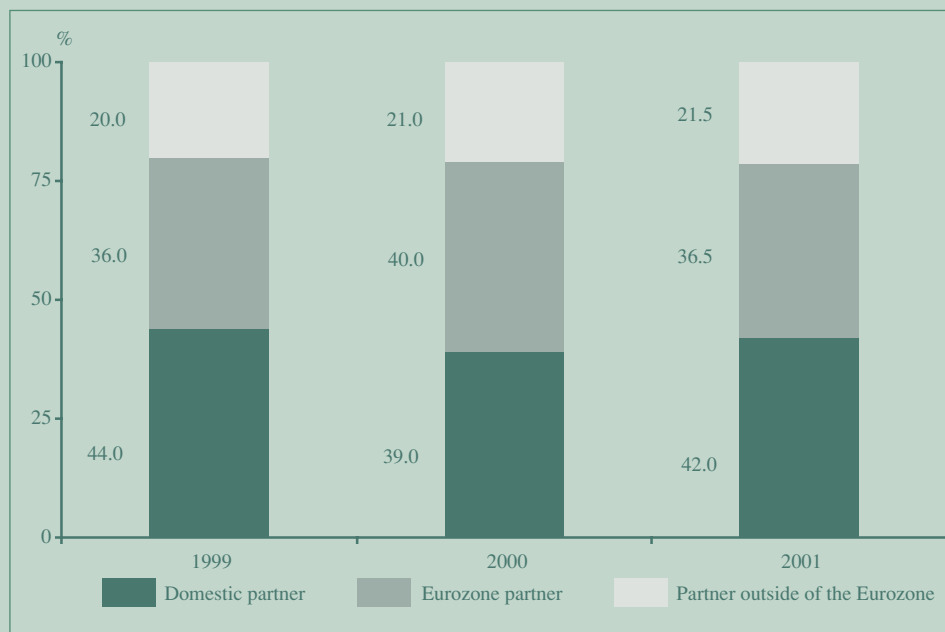


Table 7 Cross-border and domestic repo transactions as a proportion of the total in countries of the EU; per cent

	Benelux	Germany	France	Italy	U.K.	Spain
Cross-border	78	72	60	52	55	15
Domestic	22	28	40	48	45	85

Source: Ciampolini-Rohde (2000)

German, French, Italian and Spanish banks conduct 15%–20% of their domestic transactions with non-bank clients (mutual funds, non-financial corporations, etc.). This is less characteristic of banks located in the Benelux countries and the UK; however, UK banks conduct a relative high proportion (25%) of their cross-border repo transactions with non-bank customers, in contrast to the other countries examined.

3.2 Maturity

Maturities of less than one week dominate the repo market, whereby the outstanding amount in this maturity bracket accounts for more than 36% of the total. Transactions maturing within one month account for 28%, and longer-term and forward repo transactions for the rest. In the period 2000–2002, the percentage share of transactions with maturities of less than a month increased gradually, to the detriment of those maturing within a week. According to turnover data, this bracket even shows a higher degree of concentration: 90% of turnover is in maturities of less than one month.

Also in a breakdown by country, deals maturing within one month account for 90% of banks' transactions in the Benelux countries, France, Spain and Italy, for 85% of transactions by UK banks and for 73% of German banks' transactions. There is a significant difference in maturities depending on whether a transaction is cross-border or domestic. French and UK banks have a higher proportion of cross-border transactions maturing within one month compared to domestic transactions, whereas the same proportion is lower at German and Spanish banks.

3.3 Collateral and transaction size

As regards collateral, German, Italian, UK, French, Spanish and Belgian securities are used most frequently. Some 75% of all collateral securities were issued in the euro area. The variety of collateral securities provides evidence that the repo market of the European countries examined has not yet integrated: it is still split into national markets. There are markets where general collateral (GC) repos are actively traded (the Belgian and Italian markets being the most popular), while in other national markets, for example, in Germany, special repos are dominant. Special repos are security-driven transactions, where it is the properties of the security which matter, rather than the deposit/loan transaction.

Average transaction sizes are different in the two types of repo. Whereas the average transaction size of a general collateral repo is EUR 100 million, it is only EUR 20–50 million in a special repo. Securities of the given national market are predominantly used as collateral in the repo markets, accounting for 60%–70% of transactions. Government securities account for 90% of total collateral securities, although

in Germany the volume of repos conducted with mortgage bonds (*Pfandbrief* repos) has recently been high and continues to rise.

The countries under examination can be classified into three groups based on the types of securities used for domestic and cross-border transactions. Typically, German, Spanish and Italian banks use securities issued in their own countries as collateral for repos (the share of such securities is 90% and 60%–80% for domestic and cross-border transactions, respectively). However, banks in France and the Benelux countries show a less marked preference for domestic securities (used in 50%–60% of domestic repos and 15%–20% in cross-border repos). UK banks conduct the vast majority of both of their domestic and cross-border repos with securities issued in other countries. According to the survey, German and Italian bonds are used as collateral for repos in the six markets taken together. The former are mainly used in special repos, the latter being a popular instrument used in general collateral repos.

3.4 Types of repo

Of the types of repo taken in a broad sense, classic repos account for the majority (70%–80%) of the total, with sell/buy back transactions, both backed and not backed by agreement, and securities lending accounting for the rest. Sell/buy back transactions have risen slightly as a proportion of the total, due to increasing activity in the Italian and Spanish markets, where the share of such transactions is high. Analysed by country, repo markets vary: Italian and Spanish banks prefer sell/buy back transactions, with 94% and 77% of repos accounted for by this type of transaction, respectively. The rest of the market consists of classic repos. Securities lending plays a marginal role. In the other countries, classic repos make up the majority of transactions: they account for two-thirds in the UK and for more than three-quarters in the other three countries.

Ninety per cent of repos are fixed-rate deals, although the share of those with variable rates, mainly in use in the French market, had been rising up to mid-2002. The remaining transactions are accounted for by open repos.

4 Development and comparison of the Hungarian repo market with European repo markets

As of 1 August 2002, the MNB exempted funds raised from non-banks under repo from reserve requirements. Mainly as a result of this, outstanding repos increased strongly up to end-2002, as the costs of reserve maintenance were high (20–30 basis points) in the period, and it was worthwhile for banks to switch part of their liabilities into repo. However, as a consequence of the official interest rate cuts in January 2003 and the increase in the interest rate remunerated on reserves, the charge on banks arising from reserve maintenance fell to around 4 basis points. This was the major explanation for the spectacular drop in outstanding repos in 2003.

In the past, legal problems were also an obstacle to the wider use of repos. However, the Capital Market Act solved some of these problems. The law provided a definition for repo and reverse repo transactions, and, irrespective of the form of enterprise, it exempted repo claims from assets subject to liquidation, as defined under the Bankruptcy Act, provided that the parties entered into a netting agreement with each other. In practice, however, it is often difficult to persuade clients of the advantages of netting agreements, and hence they are not commonly used. There have not yet been any cases of netting agreements being legally enforced, which exposes the lender to legal risks.

Higher transactions costs are also an impediment to a wider use of repos, explained by the lack of a generally approved master agreement (e.g. the Global Master Repurchase Agreement, GMRA). Thus, the contracting parties have to lay down the legal terms in bilateral agreements (e.g. a netting agreement).

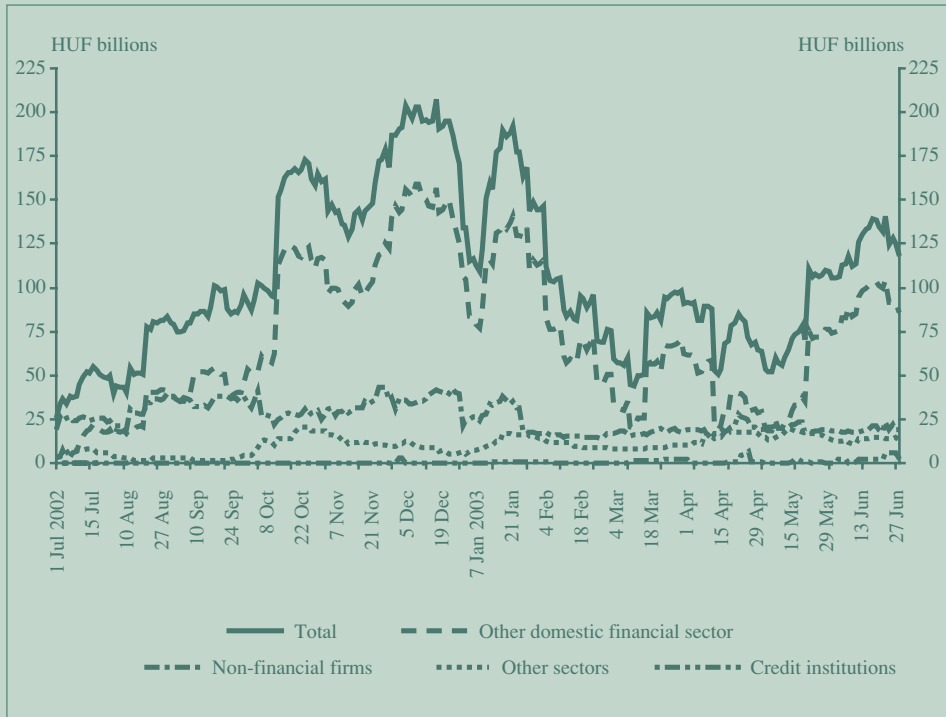
Based on the responses to the questionnaire, banks deem the new supervisory fee, introduced in 2002, to be an obstacle to the further development of the domestic repo market. This is independent of maturity (0.04‰ of the sales contract) and, in contrast with the earlier regulation, it does not maximise the annual fee to be paid by a firm. Although according to an amendment to the Capital Market Act, repos conducted for risk taking and liquidity management purposes which banks enter into with each other or investment firms (including non-residents) are exempted from the fee, the current fee significantly increases the costs of short-term repos. (The 0.04‰ supervisory fee is an annualised interest cost for the seller of the security, equivalent to some 150 basis points on overnight repos, 20 basis points on

one-week repos and 5 basis points on one-month repos.) It is also difficult to decide what counts towards a liquidity management deal (repos are frequently used to cover short securities positions, which in all likelihood do not fall into the category exempted from the fee). The new regulation, therefore, increases the costs of some short-term repos to an extent which no longer makes repos competitive with other money market deals.

4.1 Counterparties

Other domestic financial intermediaries (e.g. mutual funds) and non-financial corporations (e.g. producers and service providers) constitute the two most important groups of counterparties. This also results from the fact that liabilities-side transactions outweigh assets-side transactions, so banks do not conduct their repo deals with each other (*see Chart 9*).

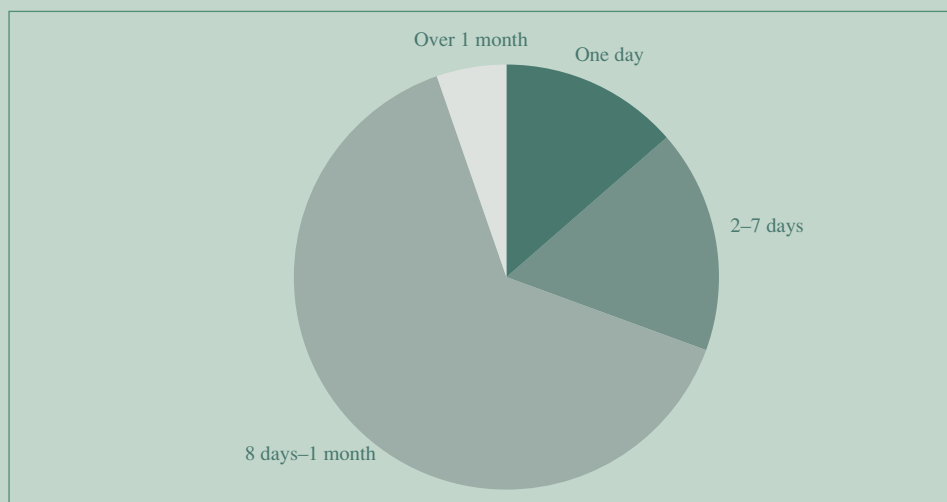
Chart 9 Developments in banks' outstanding repos in the different liability segments



4.2 Maturity

According to the survey, banks mainly raise funds through repo transactions (they act as sellers of securities in the first leg of the transaction). This is underlined by the outstanding amounts, indicating that total liabilities-side repos are more than thirty times higher than total assets-side repos. The overnight, below-one-week and below-two-week brackets account for about equal shares; however, transactions with maturities between two weeks and one month represent the largest percentage share of the total. Transactions maturing within one month account for a mere 5% (see Chart 10).

Chart 10 Share of different maturity segments in repo turnover



4.3 Collateral and transaction size

Although government securities are widely used as collateral in the Hungarian market, mortgage bonds are also expected to gain ground in repo transactions in the near future, due to a sharp increase in their outstanding amount. The absence of limits on banks' domestic bond purchases poses difficulties for those wishing to hold corporate bonds or use them as collateral in repo transactions. That may be attributed to the fact that such clients are often borrowers with levels of borrowing around the large exposure limit. With the expected upsurge in securities lending, security-driven trans-

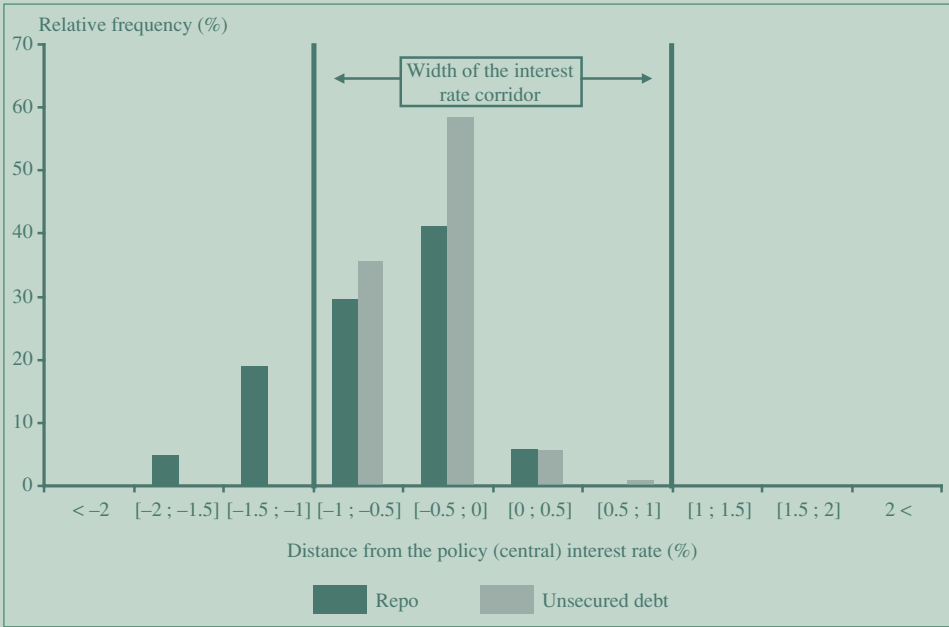
actions may also appear, in addition to widely used general collateral repos. The average transaction size is HUF 800 million (roughly equivalent to EUR 3–3.5 million), which is substantially lower than the euro area average. This gap may be explained by the participants' size and the nascent state of this market segment.

4.4 Types of repo

Looking at repo transactions in the broad sense, hold-in-custody repos (50%) and delivery repos (40%) account for the largest share, followed by sell/buy back transactions and a minimal amount of securities lending.

Development of the repo market may also be illustrated by the distribution of repo interest rates (see Chart 11). The chart plots the distribution of interbank O/N credit and O/N repo interest rates.¹¹ While the band's extremities impose real limits on

Chart 11 Distribution of O/N repo and O/N interbank rates around the centre of the central bank interest rate corridor



¹¹ The reason for selecting this particular maturity is that, in this category, the volumes of loan and repo transactions are equally high.

interbank lending, repo deals lack such characteristics, which may reflect the fact that repos include a number of transactions which are not priced under market conditions. Another indication of the low volume of repos is the relatively more diverse distribution of repo interest rates. The interest rate on repo deals is generally lower than that on interbank lending, which, quite clearly, derives from the underlying cover provided by government securities.

4.5 The future of the repo market: major tenets

Banks believe that the creation of a highly developed, liquid repo market is needed. In addition to the above-mentioned high supervisory fee, which adds enormously to the expenses of short-term deals, banks cite as major barriers the prevailing uncertainty surrounding repos' legal status, along with the shortage of government securities at banks with insufficient liquidity. Due to the lack of a liquid market, only an extremely limited number of consolidation bonds, which feature in great volumes on Hungarian banks' balance sheets, are accepted in repo transactions. Variable-rate government securities also comprise a substantial share within total government securities holdings; however, they are of little use in classic repos.

Another factor hindering the pick-up in repo market activity is related to the fact that buy-and-hold investors, not involved in stock exchange transactions, account for the overwhelming majority of non-residents' large government securities holdings.

With the forthcoming shift by the MNB towards liquidity absorbing operations, banks' general liquidity surplus will steadily decline, likely leading to increased demand for a stronger repo market. Since the repo market is still underdeveloped, spreads are wide and non-residents prefer the FX swap market over repos. The weak attraction of repos has resulted in a situation where hardly any banks (3 out of the 11 surveyed) quote prices for repo transactions on a regular basis.

According to some banks, adaptation of master agreements to the Hungarian market would boost the development of the repo market. Banks have their own sample contracts which they tend to use for transactions, while international master agreements (e.g. GMRA) are reserved mostly for transactions with foreign clients. An amendment to the General Government Act, which entered into force in July 2003, grants the Government Debt Management Agency (ÁKK) the right to undertake secondary market transactions, such as repos and securities lending. The fact

that the ÁKK is bound to make direct repo transactions with primary dealers and sign master agreements with them may make up for the lack of a uniform master agreement in the domestic market. However, cross-border forint repos are still in need of a uniform master agreement. In addition to enhancing the development of the securities market, the ÁKK's repo transactions will mitigate the fluctuations of the Treasury Account balance. The main reason for the high volatility of interbank rates is the current unpredictability of fluctuations in the Treasury Account balance, which prevents commercial banks from making adequate preparations for any move in their liquidity positions.

Furthermore, the ÁKK as a lender will take part in securities lending via a system operated by KELER Rt. With the exception of KELER Rt., it will not transact directly with market participants. Securities lending may also stimulate the development of the securities market by resolving short-term settlement-related problems. Currently, primary dealers accept quotes only with unfavourable conditions for some maturities, due to the small holdings of securities. With securities lending readily accessible, they are also expected to quote securities of lower liquidity for greater amounts and with narrower spreads.

4.6 Repo markets by country

From what has been described above, it is obvious that the differences exhibited by individual European national repo markets are far from insignificant (*see Table 8*). The ratio of cross-border transactions is highest in the Benelux countries and Germany, whose markets are much more open than the Mediterranean countries. In European repo markets, with the exception of Germany, the share of transactions with maturities of over one month is extremely low. With regard to collateral, non-resident government securities are most popular in the United Kingdom, while the Italian, Spanish and German markets are based on domestic securities. As concerns collateral, the German market may be regarded as somewhat peculiar in that, on top of the transactions backed by general collateral, repo deals also frequently involve special collateral and mortgage bonds. With respect to the various types of repos, sell/buy back deals account for the greatest share in Italy and Spain (over 75%), while other markets generally favour classic repos.

With its small share of cross-border and large share of short-term transactions, the characteristic features of the Hungarian repo market mostly reflect those of the southern European model. Typically, Hungarian dealers accept general collateral, which usually takes the form of domestic government securities. However, in terms of the types of repos used, the market in Hungary exhibits more similarities with the Benelux countries.

Table 8 Main characteristic features of repo markets in European countries

	Germany	Benelux	France	U.K.	Italy	Spain	Hungary
Share of cross-border transactions	High	High	Average	Average	Average	Low	Low
Maturity (share of transactions maturing within one month)	73%	90%	90%	85%	90%	90%	95%
Collateral characteristics							
Special-GC Dom.-foreign Gov. sec.- other	Special Domestic Gov. -mortg.	GC D. and F. Gov.	GC D. and F. Gov.	GC Foreign Gov.	GC Domestic Gov.	GC Domestic Gov.	GC Domestic Gov.
Breakdown by type							
Classic	75%	87%	78%	66%	6%	21%	93%
Sell/buy back	14%	6%	22%	27%	94%	77%	6%
Sec. lending	11%	6%	0%	7%	0%	2%	1%

Further development of the repo market is hindered by: (i) differences in legislation for national markets (for example, initial margin and seizure of collateral for non-payment); (ii) differences in netting rules; (iii) the diversity of clearing and settlement systems; and (iv) the peculiarity of the tax regulations governing repo transactions.

With some national markets, progress may have also been spurred by administrative measures. In Germany, non-bank repos with maturities of less than one year were exempted from reserve requirements in 1997. As a result, the stock of repos rose by almost 400% within a year, in spite of the fact that the cost of the earlier reserve requirements was as low as 8 basis points. Nevertheless, the positive changes in administrative and tax regulations on short-term financial instruments

also had a favourable effect on repo markets, which in turn boosted the financial market as a whole. Since 1998, Greece has also experienced an upsurge in funds from repo transactions, fuelled mostly by changes in the withholding tax which gave repos temporary exemption. The extension of tax legislation to cover repos resulted in a significant decline in turnover.

5 The euro FX swap market

The euro FX swap market was the largest segment of the euro swap market in 2001.¹² However, because of the slowdown in spot market activity, growth in the annual volume of FX swaps in 2000 was followed by a fall of 8% in 2001. As a result, its lead over other swap derivatives (particularly, over OIS transactions, i.e. overnight interest rate swaps) diminished considerably. Within the euro area, EONIA swaps are the most widespread OIS transactions. However, they differ from classic interest rate swaps in that their variable-rate leg changes on a daily basis, yet, they are settled only at maturity on a compound interest basis. The use of EONIA swaps makes it easy to speculate on ECB decisions or establish hedging positions. EONIA swaps are useful for linking the markets of interest rate products to those of foreign exchange products, as they reflect exchange rate and interest rate expectations in the simplest way. As seen with Greece, a rise is expected in the popularity of EONIA swaps once Hungary has become a member of the euro area. The trends within the euro swap market closely followed those of FX swap transactions in all currencies – spectacular growth until 1998 was interrupted in 2001 and followed by a modest decline.¹³ This may be attributed to a corresponding decline in all foreign exchange transactions, of which the turnover of spot transactions, another large segment, fell by almost a third. As a result, FX swaps made up over one-half of all foreign exchange market transactions, while the share of spots declined to one-third. The share of FX swaps within the euro market is slightly lower compared with the foreign exchange market as a whole, which is offset by the higher share of spot transactions.¹⁴

In 2001, one-third of all FX swaps were denominated in euros on one side. That means that the euro came second as the most frequently ‘swapped’ currency after the dollar, which was used in 95% of all transactions, with an average daily turnover of USD 600 billion, even though the number of FX swaps involving the euro was a mere third of dollar transactions. They were followed by the yen and the pound sterling with 20% and 15%, respectively. Some 90% of euro swap transactions are

¹² The ECB's (2002a) definition for a swap market include the following transactions: IRS (interest-rate swap), OIS (O/N indexed swap), cross-currency swap and FX swap.

¹³ BIS (2001).

¹⁴ Here, the foreign exchange market is the sum total of spot, forward and FX swap transactions.

undertaken vis-à-vis the dollar, the rest are mostly swaps vis-à-vis the pound sterling or the yen.

The majority of euro swaps come from transactions with a maturity of less than one month (72%), followed by swaps with a maturity of over one month (21%) and O/N transactions. Dollar and the other major currency swaps have a similar maturity distribution, with two-thirds of swaps comprised of transactions with a maturity of less than a week. Looking at transactions with a maturity of over one week, the pound sterling has a share of around 10% of the euro swap market.

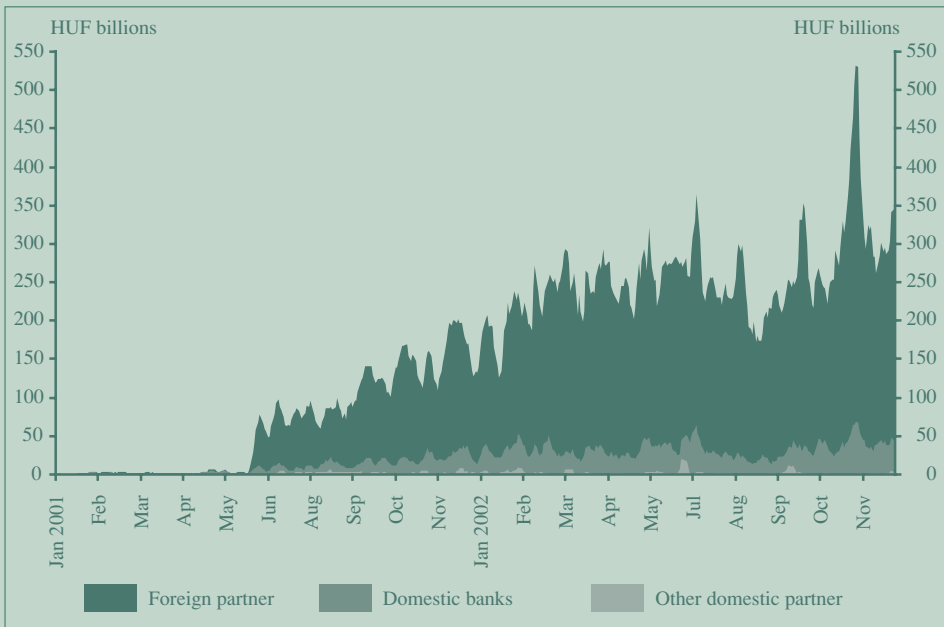
There is no substantial difference among currencies in terms of the geographical distribution of FX swaps. The share of cross-border euro swaps (two-thirds) is only slightly larger than that of swap transactions entered into in the other major currencies. The most important partners are banks and securities firms, followed by other financial institutions (mutual funds and insurance companies) as well as non-financial firms. The share of dollar transactions is lower for non-financial firms; consequently, the yen and the pound sterling have acquired a share of 10% within this segment. Due to firm local banking relations, cross-border transactions account for only one-third of the transactions with non-financial firms. In 2001, the highest value of euro transactions was made in the United Kingdom (34%), which was followed by the US (16%) and the German (9%) markets. That, and the UK's similar share of dollar-based foreign exchange deals, underscores London's leading role in foreign exchange markets. The euro area's increasing role is clearly indicated by the fact that, despite the decline in foreign exchange markets, the German market managed to increase its turnover.

Although the number of market-makers in the euro FX swap market is decreasing, market participants still regard it as a competitive segment.

6 The Hungarian FX swap market

In addition to the underdeveloped repo market, another characteristic feature of the Hungarian financial market is the upsurge in FX swap volumes, which may be linked directly to foreign exchange liberalisation. Non-residents play a vital role on this market (see Chart 12).

Chart 12 Counterparties' share in the turnover of the FX swap market (only transactions in HUF/other currency pairs; 5-day moving average)



Dollar/forint swaps play a major role in swap turnover, which, on the one hand, reflects the importance of investors with accounting on a dollar basis, and, on the other, arises from the dollar's key role in FX swaps at international levels. As the market picked up after the liberalisation, the average daily volume of dollar transactions accounted for over 90% of all swaps (93% in 2002), while the rest were made up of euro transactions, which corresponds to what we have seen with the euro swap market. The role of swap transactions in other currencies is almost insignificant.

Hungarian banks are not required to accumulate reserves on the liabilities they acquire through swaps. Consequently, they may achieve higher returns than with

classic unsecured interbank transactions, and so non-resident clients find swaps more attractive. For domestic banks with a foreign parent, another advantage of swaps over repo transactions is that it is easier to obtain foreign exchange for the former than a security for the latter; consequently, they can raise funds more easily against foreign exchange as collateral.

According to evidence from turnover data, the most frequent swaps are non-overnight ones with a maturity of less than a week (accounting for 64% of all transactions). The reason for this is that currency spot transactions are settled on T+2; in other words, the required cash must be in place on the second day following the day the transaction is undertaken. Foreign customers prefer to conclude the swap agreement on the immediately following day (T+1), in order to cover the spot transaction. For this reason, non-residents consider swaps with a T/N maturity as ideal, as it ensures coverage on T+2. For example, let us assume that at a foreign investor buys forints on the first day (transaction day). He pays currency and receives forints on the third day (T+2). If, however, he prefers not to pay but establish a long forint position, then on the second day (T+1) he enters into a T/N swap transaction, under which he would receive the currency and give forints within a day later (T+2). This way he has neutralised his position established on T+2, without any cash flow in between. If the investor wishes to maintain his long forint position over a longer period, he can enter into T/N swaps every single day.

The other maturity brackets have roughly the same share – O/N transactions have a 14% share, while transactions maturing over one week and over one month account for a 10% share each.

In the case of T/N transactions, it may happen that the implied forward rates that can be computed from FX swap transactions (more specifically, from the differential between the spot and the forward legs) fall outside of the interest rate corridor. This is because T/N transactions are actually forward rate agreements which are capable of making extreme moves when expectations of a central bank interest rate measure grow very strong. (When the central bank sold forints in large amounts, in early 2003, the FX swap market often paid far less than the bottom of the interest rate corridor.) The liquidity of the swap market is higher than that of the unsecured interbank market and the repo market, while its bid-ask spread is lower. Transacting deals is far simpler than in the case of either repo or unsecured transactions, and is practically automatic. Swaps are extremely popular, as they can be used for several purposes:

Credit risk management – forint loans against foreign currency as collateral

In the course of their government securities transactions, foreign investors may keep their funds which have just become available in forint deposits for some time. If the amount is considerable, then, due to the counterparty limit, investors must manage the risk related to the fact that a sizeable amount of funds is kept in a bank in forint deposits. The FX swap offers an excellent solution for this, if the foreign investor sells forints and buys foreign currency on the spot leg of the swap transaction. Thus, the foreign investor practically grants the domestic bank a short-term loan secured by foreign exchange, and so he does not run the credit risk. Following the mid-January 2003 intervention, foreign market participants deposited barely more than one-third of the foreign exchange they had obtained in short-term bank deposits. The major part of their forint amounts obtained through conversion was placed in secured deposits through FX swaps. They sold their forint holdings on the spot leg of the swap transaction, and repurchased it on the forward leg (this way they actually created a forward position; see the strategy described below).¹⁵

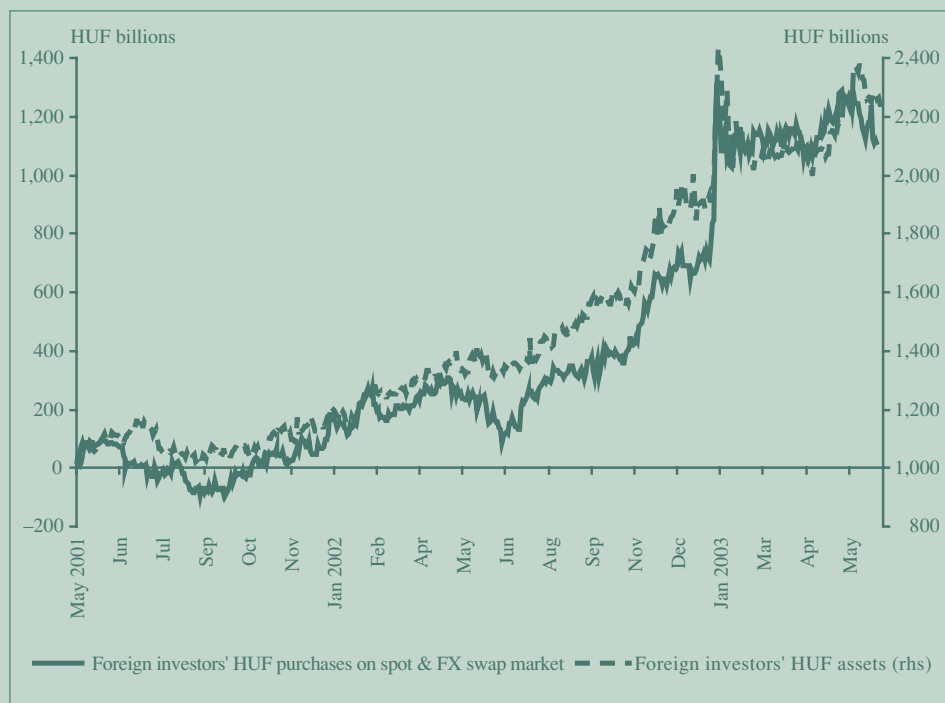
The significance of credit risk management in forint market investments is clearly indicated by the fact that no permanent portfolio of unsecured loans extended to foreign investors has developed. Unsecured loans were only used to meet foreign investors' short-term funding needs. Over the longer term, foreign investors financed their forint investments from funds raised in the FX spot and swap markets (*see Chart 13*).

Synthetic forward positions established for speculative or hedging purposes

By combining a swap with a spot transaction, an investor may establish a synthetic forward position. This may be more favourable than entering into an outright forward transaction, as both the FX spot and swap markets are more liquid than the forward foreign exchange market. A foreign investor can also establish a synthetic position, if he thinks that, due to increased exchange rate volatility, he must hedge the exchange rate risk of his purchases of government securities.

¹⁵ Presumably, at the time of undertaking spot transactions investors intended to establish very short-term positions, speculating on exchange rate appreciation. After it proved unsuccessful, they invested the acquired forint amounts in swaps.

Chart 13 Foreign investors' forint-denominated assets and liabilities arising from currency sales (cumulative data from May 2001)



Thus, in this case the synthetic position is not speculative, as it is aimed at hedging the exchange rate risk.

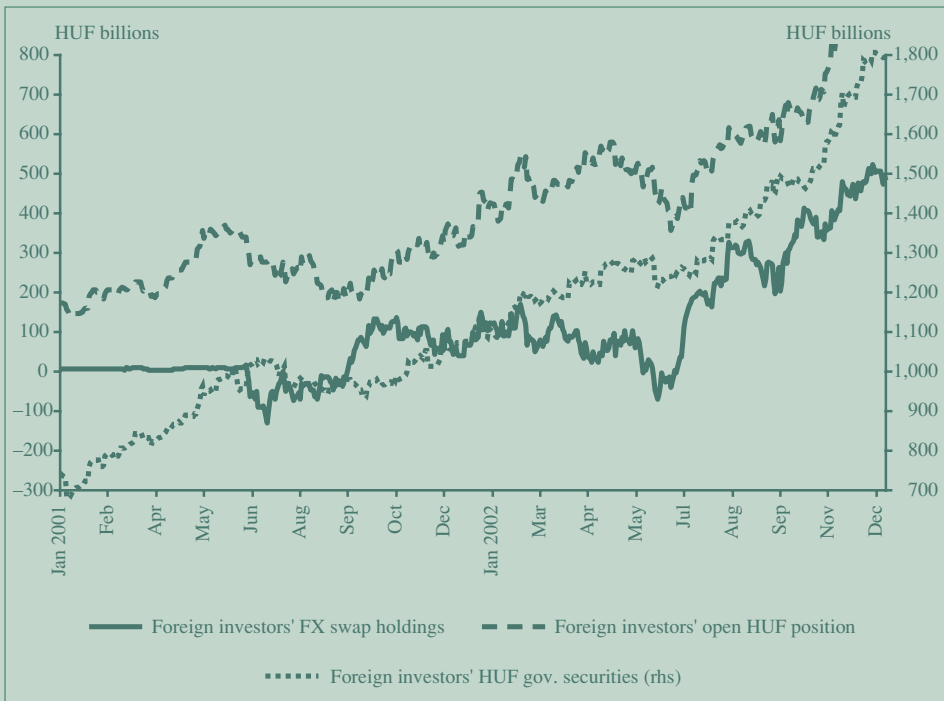
Synthetic forward positions have been created in several periods. Following the events of 11 September 2001, foreign investors cut back their forint spot positions (sold forints) and opened swap positions (*see Chart 14*). Their aim was either to hedge the exchange risk of their government securities holdings or to speculate on a weakening of the forint by creating short forint forward positions. Similar transactions were undertaken in June–July 2002, when concerns surrounding the Polish central bank and the Ministry of Finance undermined confidence in the currencies of the region.

Purchasing government securities with no exchange rate risk

Foreign investors can obtain forint funds through FX swaps and finance purchases of government securities. As investors pay interest on (typically short-term) swaps in forints, they can make a profit on the complete transaction if long-term yields decline. This investment strategy is fundamentally aimed at interest rate speculation.

There are a couple of examples of this strategy dating back from 2001–2002: following Argentina’s second crisis at the end of 2001 and the favourable result of the Irish Referendum in the autumn of 2002, there were simultaneous increases in foreign investors’ government securities holdings and outstanding swaps (see Chart 14).

Chart 14 Foreign investors’ assets in FX swap positions and forint-denominated government securities, and their open forint positions

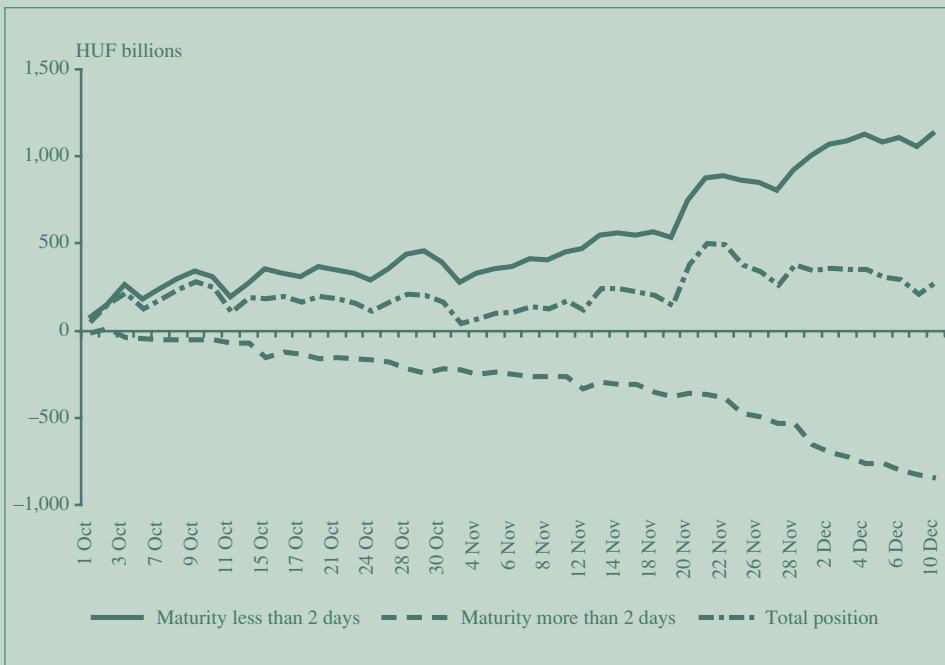


Short-term interest rate speculation

FX swap transactions may be combined to establish positions aiming at speculation on short-term interest rate changes. The essence of this strategy is to enter into a short-term FX swap with a spot leg involving the exchange of foreign currency into forints and a forward leg involving a swap back of principal, and the establishment of a longer-term swap in the opposite direction, in anticipation of an official interest rate cut. Investors pay a variable interest rate on the short-term FX swap position they constantly roll over, while they are paid a fixed interest rate on the long-term swap.

In the euro area, the most significant tool for short-term interest rate speculation is the EONIA interest rate swap. Investors speculating on an interest rate cut build positions whereby they pay an overnight interest rate and receive a fixed interest rate specified in advance. As no similar trading is made in forints, the easiest way for foreign investors to achieve their aim is to undertake swap

Chart 15 Maturity distribution of foreign investors' net FX swap positions; end-2002



transactions. The powerful increase in foreign investors' outstanding net short-term FX swaps and the decline in long-term net swaps may be indicative of expectations of an interest rate cut. Such a situation could be seen at the end of 2002 (see Chart 15).

Pricing an FX swap

The theoretical cost of an FX swap is computed by applying the principles of covered interest rate parity and no arbitrage. This is because FX swap transactions can be undertaken synthetically from two loans granted in different foreign currencies. FX swaps are quoted in swap points rounded to two decimals and are composed of the difference between the interest rates paid on the two loans and the spread. The bid and offer swap points applicable by the swap market-maker can be computed from the bid-offer spreads of the loan transactions, using the formulae below:

$$\text{bid swap points} = \left(\text{spot price} \frac{1 + \frac{(\text{deposit interest rate in the currency bought on the spot} \times \text{number of days})}{360}}{1 + \frac{(\text{loan interest in the currency sold on the spot} \times \text{number of days})}{360}} - \text{spot price} \right) 100$$

$$\text{offer swap points} = \left(\text{spot price} \frac{1 + \frac{(\text{loan interest in the currency sold on the spot} \times \text{number of days})}{360}}{1 + \frac{(\text{deposit interest rate in the currency bought on the spot} \times \text{number of days})}{360}} - \text{spot price} \right) 100$$

The price applied to the forward leg of the swap transaction is a sum of the spot exchange rate and the swap points.

Let us give an example of the above through the pricing of a 2-month USD/HUF FX swap. Swap points are computed on the basis of the following assumptions: the spot price is HUF/USD 230, the HUF bid and offer interest rates are 9.25%–9.5%, and the USD bid and offer interest rates are 1.00%–1.25 %.

a) The market-maker bank sells US dollars and buys forints spot.

$$\text{bid swap points} = \left(230 \frac{1 + \frac{(0.0925 \times 60)}{360}}{1 + \frac{(0.0125 \times 60)}{360}} - 230 \right) 100 = 306$$

b) The market-maker bank sells forints and buy US dollars spot.

$$\text{offer swap points} = \left(230 \frac{1 + \frac{(0.095 \times 60)}{360}}{1 + \frac{(0.01 \times 60)}{360}} - 230 \right) 100 = 325$$

Thus the bid and offer swap points are 306 and 325, respectively. The corresponding forward exchange rates are 233.06 and 233.25. As calculations were made with unsecured loan rates, the actual spread will be smaller than the computed value.

7 Effects of the adoption of the euro on the Hungarian money market

Adoption of the euro is expected to have a significant influence on each segment of the Hungarian money market. The most direct effect will be on swaps. Following withdrawal of the forint, swap volumes may drop significantly. As a considerable part of swaps are HUF/USD transactions, they will be converted into EUR/USD transactions. Investors are highly likely to undertake such transactions in major financial centres with non-Hungarian banks. With the convergence process nearing its end, interest rate speculation is declining, and FX swaps may be replaced by interest rate swaps as the primary tool. Should FX swap market turnover drop drastically, its attractiveness for market participants to use this market for the purposes of granting secured loans may decline. Indirectly, this could be conducive to the development of the repo market.

Similar events took place in the Member States of the euro area. Of the Member States, a more thorough examination was carried out for Portugal. The Portuguese central bank analyses FX market changes annually, on the basis of data provided by commercial banks in their responses to questionnaires. These answers indicate that the 1 January 1999 adoption of the euro triggered major changes in the Portuguese market.

Table 9 Average daily turnover of the Portuguese currency spot and FX swap markets; USD millions

	April 1997	April 1998	April 1999	April 2000	April 2001	April 2002
Spot	1,957	1,834	1,151	925	917	1,014
FX swap	1,304	2,227	693	868	688	438

The greatest decline seen in Portugal was the approximately 70% plunge in FX swap volume (*see Table 9*). This dramatic change was due partly to the fact that, prior to the adoption of the euro, the swap market played a major role in financing securities investments and managing liquidity. Subsequent to the adoption of the euro, its role in fund raising diminished significantly and in the field of liquidity management banks relied increasingly on the traditional, unsecured interbank market. Just before adoption of the euro, a booming interest rate derivatives market devel-

oped in Portugal in connection with speculation on convergence. As a consequence of adopting the euro, turnover in interest rate derivatives fell by 47%. Moreover, there was a drastic drop of 57% in the more significant FRAs, while the volume of interest rate swaps increased slightly.

The probable impact on the money market of joining the euro raises the issue of the required measures to be taken in order to ensure smooth convergence. The greatest problem probably caused by the adoption of the single currency may be related to the fact that the volume of FX swaps, the most developed market segment, is likely to drop the most dramatically. Ideally, at the moment of adoption the conditions for an upturn should be in place for the market segments of major significance in the euro area (primarily the repo market). Obviously, market development depends primarily on market participants' activity; and central banks may contribute mainly by raising and addressing problems.

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Appendix

Questionnaire on the Hungarian money market (Magyar Nemzeti Bank, May 2003)

Summary

Number of banks inquired: 11

- 1) How often did you meet difficulties in providing government securities as collateral for the purposes of collateralised O/N loan transactions concluded with the MNB in 2002?

No. of responding banks: 11

Never	8
Rarely	2
Several time	1
Frequently	

- 2) Specify the percentage distribution of your forint denominated interbank transactions in a breakdown by average daily turnover in 2002!

No. of responding banks: 11

	Unsecured	Secured	
		FX swap	Repo
Arithmetic average	34.2	63.2	2.7
Weighted average on the basis of central bank data	28.6	69.4	2.1

- 3) Specify the average daily turnover of forint-denominated repo transactions (HUF billions) for 2002 in a breakdown by funds raising and lending.

No. of responding banks: 9

	Funds raising	Lending
Arithmetic average	1.0	0.2

4) Please, specify the average daily turnover of your repo transactions in a breakdown by maturity brackets (including transactions concluded with foreigners) for 2002!

No. of responding banks: 9

	O/N	1-7 days	1-2 weeks	2 week-1 month	1-6 months
Total (HUF billions)	2.07	2.00	1.94	5.27	0.20
Distribution	18.0%	17.4%	16.9%	45.9%	1.8%

5) Please, specify the typical BID-ASK spreads you encountered in 2002 in the course of concluding interbank forint transactions, in a breakdown by transaction types and maturity brackets listed in the table (in basis points)!

	O/N	1-7 days	1-2 weeks	2 weeks-1 month	1-6 months
Unsecured transactions No. of responding banks: 10 Arithmetic average	21.4	23.1	24.8	26.3	31.4
Repo No. of responding banks: 5 Arithmetic average	64.4	64.4	57.5	53.5	29.2
Average of the 4 participants transacting the largest volumes of repos	43.8	43.8	39.2	32.5	33.8
FX swap No. of responding banks: 10 Arithmetic average	19.3	16.3	16.8	16.8	15.8

6) Do you apply limits for the listed kinds of interbank loan transactions? How many per cent of the value of the individual transaction types is taken into consideration when limits are specified for your partners?

No. of responding banks: 11

		To the debit of the limit
Unsecured lending	Yes	100%
Repo	Yes	1-10%
FX swap	Yes	4-10%, up to 100% depending on maturity

7) Approximately what percentage of the listed transaction types was concluded with the individual types of client below in 2002?

No. of responding banks: 9

Unsecured transactions	Arithmetic average
Domestic banks	51%
Other domestic financial intermediaries	14%
Other domestic market participants	17%
Foreign market participants	17%

No. of responding banks: 6

Repo	Arithmetic average	Average of the 4 largest repo dealers	Average weighted with repo turnover
Domestic banks	13%	14%	2%
Other domestic financial intermediaries	53%	59%	70%
Other domestic market participants	24%	21%	26%
Foreign market participants	11%	6%	1%

8) What was the percentage distribution of repo kinds of transactions your credit institution concluded of the listed types in 2002?

No. of responding banks: 8

		Arithmetic average	Average of the 4 largest repo dealers	Average weighted with repo turnover
Classic repo	Delivery	33%	58%	53%
	Holding custody	39%	36%	40%
Securities lending	Securities borrowing	13%	7%	1%
	Securities lending	4%	6%	0%
Sell/buy back transaction		15%	3%	6%

9) Please, give brief answers to the following questions!

a) What kinds of contracts underlie your bank's repo transactions? Have they been elaborated by your bank on its own or are they samples adopted from somewhere else?

No. of responding banks: 9

Own	7
GMRA	3
KELER repo facility	1

b) Do you think there is a need for an efficient repo market to develop? Which do you think the major obstacles of a repo market upturn are? Do you think the existence of a Master Agreement would facilitate market development?

No. of responding banks: 11

Needed?		11
Obstacles:	Market size, low liquidity, wide spread	4
	Liquidity surplus	2
	Unclearified and uncertain legal background	2
	Fee charged by the Hungarian Financial Supervisory Authority (Foreign investors)	2
	Foreign investors transact swaps	1
	Scarce securities available for low liquidity banks	1
	Advantage of banks holding consolidation bonds	1
Would a Master Agreement be helpful?	yes 4	no 1
Other help:	Market participation of ÁKK holdings	

c) Are counterparty limits impediments to transactions? If yes, what percentage of the daily turnover of unsecured transactions fail as a result? What prevents the conclusion of secured transactions in such cases?

No. of responding banks: 11

Impediments to unsecured transactions	Yes 10	No 1
Transactions failed	arithmetic average:	16.4%
Impediments to secured transactions	Limits specified by the bank	3
	No repo limit	1
	Insufficient securities	2
	Renders money circulation	1
	Fee charged by the Hungarian Financial Supervisory Authority (foreigners)	1
	Switch is used instead	1
	The forward and fix desks are not connected, forward has no securities	1
	Disinterest	1
The costs of other reserves decreased	1	

d) In which segments of the HQF interbank market (repo, FX swap, unsecured interbank transactions) do you quote prices and how often?

No. of responding banks: 11

	Regular	Ad hoc
Repo	3	1
FX swap	11	
Interbank	11	

e) What information channel serves the purposes of price quotation (e.g. Reuters, Bloomberg, etc.)?

No. of responding banks: 11

Reuters	11
Bloomberg	4
Brokers	6

f) In the diverse segments of the HQF interbank market (repo, FX swap, unsecured interbank transactions) are deals overwhelmingly made with the help of market makers or in a direct contact with the partner?

No. of responding banks: 10

	Market manager	Telephone	Reuters	Brokerage	Bloomberg
Repo	5	4	5	3	1
FX swap	3	1	4	4	
Interbank	3	1	4	4	

g) If you conclude transactions in several segments, what affect the difference between the gains earned on transactions of different types but equal maturities (in addition to the lower risk factor of secured transactions)?

No. of responding banks: 11

Risk and volatility	2
Liquidity	9
Cash vs derivative	2
Access to foreign markets	1
Depo limits	2
Reserve liabilities (the FX swap is cheaper)	2
The MNB is hardly accessible for foreign investors	1

Notes

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