

# Csaba Csávás and Lóránt Varga: Main characteristics of non-residents' trading on the foreign exchange and government bond markets

*Our article analyses the behaviour of non-resident participants on domestic financial markets, which are important from the point of view of monetary policy. Due to the determining role played by foreign investors, understanding their behaviour is essential for understanding the main functioning mechanism of the markets. Among domestic markets, we will examine the foreign exchange market, which has particular relevance to monetary policy, owing to the role played by the exchange rate in the economy. We will also review the domestic government bond market, which is important for the central bank in relation to its role played in the transmission of interest rate policy and with regard to the assessment of the credibility of economic policy.<sup>1</sup>*

## INTRODUCTION

The domestic foreign exchange market takes place on the interbank foreign exchange market, which may be divided into several market segments. We discuss below the spot foreign exchange market, where trading is conducted at current exchange rates<sup>2</sup>, in contrast to forward foreign exchange transactions, where transactions are performed at prefixed forward rates. Despite its name, not only banks trade with each other on the interbank foreign exchange market, but banks also mediate the transactions of companies and institutional investors.

Domestic market maker banks play an important role in the functioning of the foreign exchange market. They regularly provide buying and selling quotes for a given amount of foreign currency. Domestic banks, however, typically undertake so-called open positions only to a limited degree, i.e. positions sensitive to exchange rate movements. Accordingly, if, for example, market makers experience a major euro selling ( forint buying) pressure from their customers, they must shift their quotes in the direction of a weaker euro, so that other customers are willing to buy euro from them at the new exchange rate. Thus, due to their considerable capital strength and risk-bearing capacity, the behaviour of non-resident customers on the foreign exchange market can have a major impact on Hungarian market maker banks and thereby on the forint exchange rate.

Government bonds are debt securities issued by the Hungarian State to finance the general government deficit. The state pays interest on the borrowed amount, which is a fixed rate of interest in the case of most gov-

ernment securities. Government bonds are issued at auctions, which are regarded as in the primary market category. At the auctions, only the primary dealers of government bonds may submit bids, these being typically domestic commercial banks which undertake certain obligations in exchange for the opportunity to take part in the auction (the most important such obligation is regular quoting in an appropriate amount). Primary dealers, however, enable their customers, including foreign partners, to submit bids to government bond auctions through them.

Trading in already issued government bonds is conducted on the secondary market which, similarly to the foreign exchange market, is dominated by the interbank government bond market. The government bonds are mediated mostly by primary dealer banks, although non-primary dealer market makers (e.g. non-resident investment banks) are also present on the secondary market. These financial intermediaries are continuously available with their quotes to their customers who invest in government bonds, whether wishing to sell or buy these. Resident and non-resident investment, pension and other funds, resident insurance companies, local government authorities and, to a lesser extent, resident companies and households buy government bonds for investment purposes. The Hungarian government bonds are listed on the Budapest Stock Exchange; the primary dealers are continuously available with their quotes at the exchange, as well. The stock market turnover in government bonds, however, is negligible compared to turnover on the interbank government bond market, because market participants prefer over-the-counter trading based on direct transaction.

<sup>1</sup> The article is based on the MNB Occasional Paper by Csávás-Kóczán-Varga [2006].

<sup>2</sup> Although deals are made at spot rates, the foreign currencies are generally transferred 2 working days after the transaction (T+2 day settlement).

## IMPORTANCE OF NON-RESIDENTS ON THE FOREIGN EXCHANGE AND GOVERNMENT BOND MARKETS

In the past year, the average daily turnover of the domestic (spot) foreign exchange market amounted to HUF 160 billion. The amount of turnover is prominent in view of the fact that in the whole of 2005, the total value of foreign exchange market transactions corresponded to double the amount of the Hungarian GDP, moderately exceeding rates of other currencies in the region (Polish zloty, Czech and Slovak koruna).

Of turnover transacted by resident banks, the share of non-resident banks currently exceeds 50 per cent. We may thus state that non-residents play a determining role on the domestic foreign exchange market. Nearly half of the above 50 per cent figure is linked to the transactions of London banks, which is not surprising since the City of London represents one of the major centres of the global foreign exchange market. The remaining 50 per cent is divided by half, respectively, into turnover transacted between domestic banks and between banks and companies.

In addition to the share in turnover, the significance of the individual groups of participants is revealed better by the correlation between their daily foreign exchange market turnover and total turnover. If, for example, the two groups have a similar share of turnover in the long term, but one group's share is stable in the short term while the other's fluctuates, in relation to the latter we may assert that its market activity is more important. The highest co-movement of the total turnover was recorded with non-residents' turnover in the past 5 years, indicating that the activity of non-residents is most pronounced in affecting trading on the domestic foreign exchange market (Table 1). The above confirms that the presence of non-residents on the domestic foreign exchange market is important. The corre-

lation (co-movement) between the turnover of resident banks to total turnover and the turnover of non-residents is similarly high, notwithstanding the fact that interbank turnover comprises roughly half of non-resident turnover. The above may arise from the intermediary role of resident banks on the foreign exchange market. Nevertheless, the trading of resident companies contributes much less to total turnover than non-residents, moving in one direction with the other two groups only to a limited degree. Thus, non-residents play a more prominent role on the foreign exchange market than resident companies.

When analysing the distribution of the holders of fixed interest securities, representing the vast majority of Hungarian government bonds, we may conclude that, similarly to the foreign exchange market, non-residents hold a dominant share of the government bond market.

The amount of Hungarian government bonds held by non-resident investors has been on a continuous, dynamic rise since 2001, with slackening growth recorded from early 2004; at the end of April 2006, the amount of such bonds reached the value of HUF 2,700 billion. For a brief period, the share of non-residents in the outstanding amount of fixed interest government bonds exceeded 45 per cent in early 2001, reaching 50 per cent by the end of 2002. In this period, firstly, the rise in the supply of government bonds, the favourable liquidity effect of increasingly large series, and secondly, the basically continuous large interest rate spread between euro and dollar government bonds and forint government bonds established an attractive environment for non-resident investors. Following a slumping trend lasting for nearly one and a half years, from the middle of 2004 the share of non-resident investors stabilised at approximately 40 per cent.

Among the domestic markets of debt securities, non-resident participants hold a major share of secondary market

### Table 1

#### Co-movement of the turnover of foreign exchange market participants

(January 2001 – December 2005)

	Total average daily turnover	Average daily turnover transacted with non-residents	Average daily turnover transacted with resident companies	Average daily turnover between resident banks
Total average daily turnover	1			
Average daily turnover transacted with non-residents	0.96	1		
Average daily turnover transacted with resident companies	0.52	0.32	1	
Average daily turnover between resident banks	0.89	0.79	0.33	1

Note: Correlation co-efficients between the time series in the table; value 1 indicates the closest co-movement (100 per cent).

**Table 2**

**Co-movement of the turnover of participants on the government securities market**

(January 2001 – December 2005)

	Average daily secondary market turnover	Average daily turnover transacted with residents	Average daily turnover transacted with non-residents
Average daily secondary market turnover	1		
Average daily turnover transacted with residents	0.84	1	
Average daily turnover transacted with non-residents	0.75	0.27	1

*Note: Correlation co-efficients between the time series in the table; value 1 indicates the closest co-movement (100 per cent).*

turnover only on the government bond market. From 2001, the share of transactions conducted with non-resident participants continuously rose in the turnover of primary government securities dealers on the secondary market of government bonds. From the beginning of 2004, the share of transactions conducted with non-residents fluctuated at 35-45 per cent, that is, turnover and stock data suggest that non-residents hold roughly 40 per cent of the market of forint government bonds.

Similarly to the foreign exchange market, the close co-movement between total turnover in government bonds on the secondary market and the turnover of non-residents reveals the degree of the impact of non-residents' activity on the volume of turnover on the domestic government bond market. The high correlation between the two time series means that an increase or decrease in the turnover of non-resident investors has an effect also on the development of total market turnover. The total secondary market government bond turnover conducted by primary dealers and their average daily turnover transacted with non-residents was closely correlated between 2001 and 2005; the value of the correlation co-efficient between the two time series is 0.75 (Table 2).

However, on the basis of data, it would be false to claim that only the activity of non-residents determines the total turnover of the secondary market; in this period, the correlation co-efficient between the total turnover of primary dealers on the secondary market and their turnover transacted with residents is even higher in this case, equalling 0.84. This implies that in the analysed period, the activity of both groups has a significant impact on the total turnover of the secondary market.

Following a phase of rapid growth, the share of non-residents first rose above 30 per cent in March 2003 in the turnover of the secondary market and has remained above this level. We also conducted the analysis for a narrower period, characterised by a higher share of non-residents. In this period, the co-movement between the turnover of non-residents and resident participants with the total

turnover of the secondary market was even closer (the correlation co-efficient is 0.95 for both time series). All in all, the results of the above two analyses indicate that resident and non-resident participants have a similar impact on the development of turnover on the secondary market.

**WHY DO NON-RESIDENTS TRADE ON HUNGARIAN MARKETS?**

The trading of non-resident participants on the forint market may be motivated by several factors. One such obvious factor is the government bond purchases of non-residents. If, for example, a non-resident wishes to buy government bonds issued in forints, it may acquire the necessary forints from – but not exclusively – the foreign exchange market. This relationship establishes a connection between the two markets. However, we will see below that it is rare to find periods in which the forint and government securities purchases of non-residents coincide. This is because the developed state of the domestic financial markets enables investors to separate decisions relating to undertaking exchange rate and interest rate risks.

We compared the development of the amount of government bonds held by non-resident investors with the resultant of the forint purchases and sales of non-residents vis-à-vis resident banks, aggregated from the beginning of 2003 (cumulated net spot forint purchase, net change in position). It may be observed that the two indicators generally do not move in parallel; close correlation can be seen only in a few, short periods (Chart 1). Thus, the position-taking of non-residents on the foreign exchange market is typically not linked to the sale-purchase of government bonds. Due to the weak link between the two markets, we will separately analyse below the foreign exchange and government bond markets.

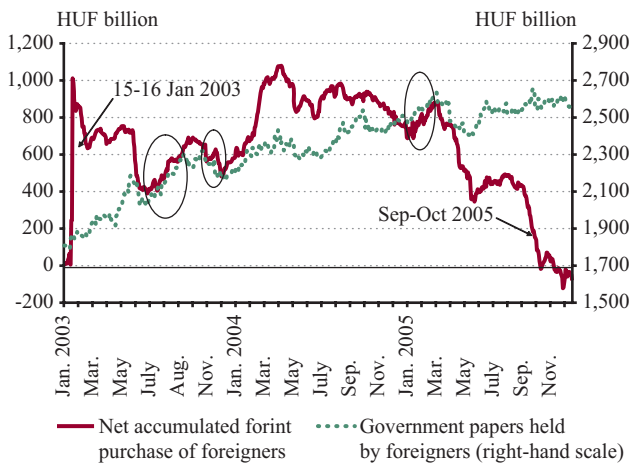
However, it is interesting to examine the periods characterised by close co-movement. Between July and September 2003, non-residents purchased forints and government bonds in a similar amount. Presumably they chose

this strategy because the interest rate increases of the central bank in June 2003 significantly increased the cost of financing the purchase of long-term government bonds with short-term forint loans. In the course of November-December 2003, non-residents sold as much forints as government bonds, but the major changes did not occur on the same days, rather the co-movement was incidental. In the first months of 2005, the two curves also moved in parallel. In this period, the currencies of neighbouring countries were appreciating, likely giving a boost to the buying interest of non-residents on the domestic market, as well.

**Chart 1**

**Government papers held by and net spot forint purchases of non-residents**

(cumulated from 1 January 2003)



Another important motivating factor prompting non-residents to trade on the foreign exchange market is short-term profit, assuming the risk of losses (speculation). A typical example of speculative activity is revealed by the chart above. In January 2003, the EUR/HUF exchange rate reached the strong edge of the intervention band maintained by the MNB.<sup>3</sup> At this point, non-residents purchased forints in large amounts from resident banks, hoping that the strong edge of the band would be eliminated and the forint could further strengthen (Barabás [2003] discusses in detail appreciation speculation). In the autumn of 2005, non-residents sold forints in larger amounts, possibly motivated by the fact that worrying news appeared about the development of the domestic general government deficit. This, however, was not accompanied by a fall in the amount of government securities held by non-residents, that is, the sale of forints was linked to the sale of other forint instruments.

The demand of non-residents on the government bond market may also be motivated by several factors, including

factors similar to those related to the foreign exchange market as well as different ones. For discussion of the above, it is useful to break down market participants into government bond dealers and government bond investors.

The market makers on the secondary market of government bonds include non-resident (primarily London-based) investment banks. These buy Hungarian government bonds (either at auctions or on the secondary market) to later resell these, that is, to trade the bonds.

Non-residents investing in government bonds include investors who purchase such securities in the framework of their long-term investment strategy. In this case, long term signifies the purchase of government bonds in major amounts, with a remaining maturity of several years. Such bonds are typically held until maturity (that is, until the Hungarian state repays its debt incorporated in the government bonds), or are held for several years and not traded actively on the secondary market. In the past five years, investors could purchase Hungarian government bonds at a lower price (with a higher yield) than similar euro or dollar government bonds issued on developed markets. This implies that if the Hungarian economy grows at a stable rate and its level of development approximates the development of west European countries (convergence), the price of Hungarian government bonds increases at a greater pace than the price of euro or dollar bonds (the yield differential narrows). This is why we define these participants as convergence investors. Thus, convergence investors anticipate favourable long-term changes in the price of government bonds and they are less interested in the daily fluctuation of prices.

However, in certain periods, the price of government bonds may fluctuate significantly in the short term, even in the course of several days. In such a case, major profits can be earned within a short time by guessing the time and direction of price changes. The non-resident participants of the government securities market include investors who apply this very same strategy, aiming to purchase bonds at the lowest possible price and sell these securities on the secondary market at a higher price within a short time. We may briefly define the above participants as aiming at short-term interest gains. Thus, these participants think in terms of much shorter periods than convergence investors, and, naturally, they are considerably more active in trading on the secondary markets.

A special strategy aiming at short-term interest gains targets the exploitation of the differential between the lower

<sup>3</sup> The exchange rate of the forint against the euro may move within a +/- 15 per cent band; if the rate reaches the strong edge of the band, the MNB must sell forints to protect the band, while it has a forint purchase obligation at the weak edge of the band.

euro or dollar interest rates and the higher forint interest rate. In this case, non-residents take euro or dollar loans for which they pay lower euro or dollar interest rates. They exchange the borrowed amount to forints and purchase government bonds with it, on which the Hungarian state pays a higher forint interest rate (carry trade strategy). This strategy, however, involves risks, since if the exchange rate of the forint weakens (less euro or dollars can be purchased with the same amount of forints), non-resident investors may even incur losses in euro or dollar terms. Since investors only assume risks in exchange of higher yields, this strategy is applied particularly if the difference between the euro and dollar interest rates and the forint interest rate is relatively large.

By comparing the outstanding amount and turnover data of the government bond market in the longer term, it may be stated that the significant, aforementioned rise in the share of non-resident investors in the turnover of the secondary market at the beginning and in the middle of 2003 may be linked to the changing behaviour of non-resident participants on the government bond market. Between the beginning of 2003 and the middle of 2005, the share of non-residents in the total outstanding amount of government bonds steadily decreased (from 50 to 40 per cent), while their share in the turnover of the secondary market increased from 25 per cent to remain stable above 35 per cent. Thus, in this period the relative activity (compared to the volume of the stock of government bonds in their holding) of non-residents increased significantly on the secondary market. This implies that within the group of non-resident participants on the government bond market, the share of convergence investors fell, while the proportion of other investors, more actively aiming at short-term interest gains on the secondary market, increased.

The trend described above may be linked to the fact that from the middle of 2003, the price of government bonds fluctuated to a greater extent than in the preceding period. For this above reason, an increasing number of non-resident participants saw an opportunity in exploiting the price fluctuations of government bonds in the short term. In addition, the dollar interest rates fell to very low levels in 2003, approximating 1 per cent. In consequence, the application of the carry trade strategy became increasingly widespread on emerging markets (including Hungary) offering higher interest rates. The rise in the share of non-resident investors targeting short-term interest gains may have both a favourable and an adverse effect on the stability of the government bond market. In the event of volatile market sentiment, these fast reacting participants can contribute to amplifying price fluctuations. Investors more active on the secondary market, however, may enhance market liq-

uidity, producing a beneficial effect on smooth trading and the development of prices.

### **ON POSITIVE AND NEGATIVE FEEDBACK TRADING STRATEGIES IN GENERAL**

The term trading strategy defines investors as deciding on the manner of trading on the basis of simple or more complex systems of rules, and they apply these for a certain period of time. With regard to the behaviour of non-residents on the foreign exchange and government bond markets, we will discuss two trading strategies in detail: positive and negative feedback trading strategy. Prior to describing their relevance to the domestic market, we briefly discuss below the main aspects of these strategies.

Positive feedback trading is followed if the investors move their position in parallel with shifts in prices. On the foreign exchange market, this means that a given market participant will buy forints if the forint has strengthened, and sell forints if the currency has weakened. Similar positive feedback trading is followed on the government bond market; on this market investors preferring positive feedback trading buy the securities following a rise in the price of government bonds, and sell these following a fall in their price. Negative feedback traders act inversely – they buy foreign currency or government bonds when their price has fallen and sell these if their price has increased.

Such trading behaviour may result from conscious investor strategies, but it may also evolve for purely technical reasons. Positive feedback trading may comprise a conscious strategy if the investors are of the view that the prices of government bonds and foreign currency will follow trends witnessed in the past. Thus, this behaviour basically corresponds to “chasing” the strengthening or weakening trend currently characterising the market, with expectations targeting the short-term continuation of the trend. In contrast, market participants engaged in negative feedback trading believe that prices will not shift in one direction in the long term, but will sooner or later return to their former value. Accordingly, they expect that a past fall in prices will be followed by a rise, and vice versa.

Positive feedback trading may also arise for technical reasons. Some participants of both the government bond market and the foreign exchange market hedge their portfolios with risk management instruments against excessive losses. The most widely used and also simplest such instruments are the so-called stop-loss limits. The stop-loss limit signifies the setting of a price significantly lower than the purchase price (on the foreign exchange market, this may

correspond to a stronger or weaker exchange rate, depending on whether forint or euro is purchased). If the price/exchange rate of the government bond/foreign currency in the portfolio of the investor falls below this prefixed level, he automatically sells his asset to avoid losses resulting from a possible further fall. Thus, a sale will follow a previous fall in prices, that is, the consequence of the application of stop-loss limits corresponds to the result of the positive feedback strategy.

Negative feedback trading may also be caused by technical factors. Certain investors may determine in advance the price level at which to close their position (profit taking). They may also authorise their bank to automatically process this transaction if the price of the government bond or the exchange rate reaches a prefixed level. In this case, upon the strengthening of the price or exchange rate, selling pressure arises at a level on the government bond market and the foreign exchange market, causing a shift in the direction of weakening.

Thus, investors following negative feedback trading stabilise the development of prices on the government bond and foreign exchange markets, for they buy following a fall in such prices or exchange rates, and due to this subsequently arising demand the fall in prices/exchange rates may slacken, halt or even an increase may follow.

In contrast, investors having a tendency to follow positive feedback trading may strengthen fluctuations in market prices, for they sell their instruments following a fall in prices, and this subsequent supply further accelerates the decrease of prices. For this reason, this strategy is also called as momentum trading. The term derives from such behaviour giving momentum to the price or exchange rate. Thus, participants following a positive feedback trading strategy may destabilise the market of government bonds and foreign exchange.

## **POSITIVE AND NEGATIVE FEEDBACK TRADING ON THE DOMESTIC MARKETS**

We analysed the presence of positive and negative feedback trading on the domestic foreign exchange market by comparing two indicators. One indicator is the daily change in the HUF/EUR rate expressed as percentage. The other indicator is basically the same as illustrated in Chart 1, that is, the total amount of forints purchased or sold by non-resident investors in one day vis-à-vis the domestic banking system. In the comparison we examined whether non-residents purchased forints if the forint strengthened on the given day before, and whether a weakening forint was followed by a sale. The

methodology applied for the analysis basically corresponds to a widely cited method (Kim-Wei, 1999).

In the course of the analyses, we divided the most active non-resident participants on the domestic foreign exchange market into two groups: Anglo-Saxons (institutions based in London and New York) and non-Anglo-Saxons (based anywhere else). The division was motivated by anecdotal information, according to which Anglo-Saxon banks mediate the transactions of non-resident customers with major capital strength, capable of even impacting the development of the whole market. Also on the basis of anecdotal information, we consider it likely that real money investors, participants thinking in terms of a longer time horizon (e.g. non-resident pension funds, insurance companies adopting a more conservative investment policy), are linked to non-Anglo-Saxon banks. Thus, the behaviour of these two foreign groups may vary. (Kóczán-Mihálovits [2004] discuss in detail the various participants of the global foreign exchange and bond markets.) We will analyse the 2003-2005 period on the basis of available data. In addition to analysing the complete period, we will separately perform an analysis for the first and second half (equal in length) of the period. Based on the results, we will determine whether any changes have occurred in the market behaviour of non-residents in the meantime.

We analysed positive feedback trading with the following method. The trading days were classified into 5 groups (quintiles) of identical size, depending on the rate of change in the exchange rate of the forint against the euro on the preceding day. We then examined how many forints non-residents purchased or sold on average on days belonging to the individual groups. If, as a result, the comparison of the upper quintile (when the forint strengthens) with the lowest quintile (weakening forint) indicates that the average change in the net position of non-residents is significantly larger in the former case, we may conclude that positive feedback trading characterises a given group of non-residents.

The first row of Table 3 indicates that between January 2003 and June 2004, non-resident investors followed positive feedback trading. However, by dividing non-residents into Anglo-Saxons and non-Anglo-Saxons, we may observe that the individual groups behave differently. While Anglo-Saxon investors tended to follow positive feedback trading, this was not the case in relation to non-Anglo-Saxons. (See results in greater detail in Csávás-Kóczán-Varga [2006].) In this period the exchange rate of the forint fluctuated within a wide band; by following the strategy of momentum trading, the Anglo-Saxons were in search of a reference point relating to the future trend of the exchange rate. By virtue of its nature, positive feedback trading possibly strengthened the volatility of the exchange rate in this period.

**Table 3**

**Test results of the positive and negative feedback trading of non-residents on the foreign exchange market**

	Total non-residents	Anglo-Saxon non-residents	Non-Anglo-Saxon non-residents
January 2003–July 2004	+	+	∅
June 2004–December 2005	-	-	-
January 2003–December 2005	∅	∅	∅

*Meaning of the symbols: “+”: positive feedback; “-”: negative feedback; “∅”: no significant positive or negative feedback. We broke the time series in the middle of 2004 because this methodology requires large samples.*

**Table 4**

**Test results of the positive feedback trading of non-residents on the government bond market**

	Direction and significance of feedback
January 2001–December 2005	+
January 2001–May 2003	+
June 2003–December 2005	∅

*Meaning of the symbols: “+”: positive feedback; “∅”: no significant positive or negative feedback.*

Between July 2004 and December 2005 our results were contrary to the above. In this period, both groups of non-residents followed negative feedback trading, selling forints following a major strengthening of the rate and buying forints following a weakening of the rate. The exchange rate shifted in a narrow, 5-6 per cent band in this period, accompanied by volatility lower than earlier. The growing role of negative feedback trading is possibly related to strengthening domestic lending denominated in foreign currency in this period, likely to have stabilised exchange rate expectations. Negative feedback trading probably contributed to the relative stability of the exchange rate.

When examining the whole period (2003-2005), we did not detect positive/negative feedback trading of non-residents, owing to the fact that the varying strategies applied in the two periods neutralised each other.

Since positive feedback trading can destabilise the government bond market similarly to the foreign exchange market, it is also useful to carry out an analysis of momentum trading in relation to the government bond market. By applying the described methodology, we are looking for an answer to the question whether a change in the price of government bonds on the day before affected the government bond purchases of non-resident investors, and, if so, in which direction. Contrary to the foreign exchange market, this analysis may not encompass the study of differences between the strategies of Anglo-Saxon and non-Anglo-Saxon investors because we do not have adequate data on the government bond market for classifying non-

resident participants. On the basis of available data, however, we may conduct the analysis of a longer period, extending from the beginning of 2001 to the end of 2005.

We use changes in the MAX index to determine changes in the price of government bonds on the preceding day. The MAX index indicates the daily change in the price of an imaginary government bond portfolio. The value of the index is calculated as the weighted average of the price of government bonds in the portfolio, that is, if the price of the securities rise, the value of the index also increases, or decreases if prices fall. The composition of the imaginary portfolio, used for determining the value of the MAX index, is determined on the basis of the quantity of the outstanding amount of government bonds. Changes in the index value, therefore, well reflect the development of prices characteristic for the whole government bond market. We analyse the reaction of non-resident investors to price developments of the past through the change in the amount of government bonds in their holding, since, if such amount increases on a given day, this implies that on that day non-residents purchased more government bonds than the amount they sold. The larger the increase, the greater the certainty of concluding that the majority of non-residents were on the government bond market as buyers and to a lesser extent as sellers.

The first row of Table 4 indicates that, on the basis of our results, in the full analysed period (between January 2001 and December 2005) non-resident investors, on a group level, tended to adjust their position in parallel with shifts in

prices on the previous day. (See results in greater detail in Csávás–Kóczán–Varga [2006].)

We observed above that the behaviour of non-residents on the secondary market changed in the middle of 2003, probably owing to the fact that the share of convergence investors fell within the group of non-resident participants, while the number of investors targeting short-term interest gains and more active on the secondary market increased. We therefore divided the above five-year period into pre-change and post-change parts, and analysed the degree in which non-resident participants followed positive feedback trading between January 2001 and May 2003, and June 2003 and December 2005 (Table 4, second and third row). The results suggest that in relation to the first period, non-residents typically bought government bonds in parallel with price changes of the previous day. Thus, they demonstrated uniform behaviour on a group level, tending to follow positive feedback trading. In the period after the middle of 2003, however, it could not be proved that non-resident investors followed a positive feedback trading strategy on a group level. Thus, our results indicate that from the middle of 2003, the earlier uniform reaction of non-resident participants ceased in relation to the price changes of the previous day. This implies that, within the group of non-resident participants, investors assuming a greater role in the period of greater yield fluctuations, and more active on the secondary market, do not tend to modify their position in parallel to price changes of the previous day, that is, these include investors adopting a positive, as well as a negative feedback trading strategy.

## CONCLUSIONS

Non-resident investors play a determining role on both the foreign exchange market and the government bond market; their share of the turnover of these markets is 50 and 40 per cent, respectively. Upon analysing the daily development of turnover, we may say that non-residents play a greater role on the foreign exchange market than resident companies. On the secondary market of government bonds, resident and non-resident participants have a similar effect on turnover.

When examining the motivating factors underlying the trading of non-residents, we may conclude that both markets have participants which aim to gain profit by exploiting the short term shifts in yields and prices. There are also non-residents on both the foreign exchange and the government bond markets following longer term strategies, particularly convergence investors on the government bond market.

Between January 2003 and June 2004, non-resident investors had a tendency to follow positive feedback trading on the foreign exchange market, which likely increased the volatility of the exchange rate in this period. In contrast, our analyses suggest that negative feedback trading was followed between the middle of 2004 and the end of 2005, which is likely to have contributed to relative exchange rate stability. Between January 2001 and May 2003, non-residents typically followed positive feedback trading on the government bond market, as well. In the past two years, however, the earlier uniform reaction of non-resident participants ceased in relation to the price changes of the previous day. That is, these include investors following a positive, as well as a negative feedback trading strategy.

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