

Developments in Government Interest Expenditure for Hungary, 2000–2015*

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In this study, we examine the changes in interest expenditure between 2000 and 2015, and in this context, focus particularly on analysing the impact of decreasing yields on the government securities market observed over the past three years. The annual change in interest expenditure can be categorised into several factors based on a methodology similar to the decomposition of government debt, and the summary discloses the details of the trends characterising the four periods which can be distinguished over the past 15 years. From among these factors, we gave precedence to the analysis of the changes in yields as this factor exerts a stronger influence on the developments in interest expenditure than any other factor. Based on a regional comparison, in addition to a supportive international environment, domestic factors have also strongly affected the favourable developments of the government securities market in recent years. From the Hungarian developments, we should highlight the fact that interest rate cuts together with the Self-financing Programme, which mitigated Hungary's external vulnerability, has had a tangible impact on the developments in Hungarian government securities' yields, and as such, due to the substantial contraction in interest expenditure, exerted a favourable effect on the balance of the general government. Finally, we also present the imputed interest expenditure entailed by the reorganisation of the pension system, and the study argues that these should be managed separately from actual interest expenditure.

Journal of Economic Literature (JEL) codes: E42, H50, H62, H63

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1. Introduction

In this study, we analyse developments in accrual-based government interest expenditures between 2000 and 2015, with the objective of identifying factors which facilitated the substantial decrease of approximately 1 percentage point of

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GDP in general government interest expenditure since 2013. Independent analysis of the levels and changes in government expenditure is relatively infrequent in international literature, as interest expenditure is generally analysed in close correlation with government debt, since interest payment has a causal relationship with the underlying stock of debt. However, the developments seen over the past three years in Hungary justify an analysis expressly focusing on interest expenditure, since due to Hungarian and international factors, the government's interest expenditure is declining at a much faster rate than the drop in the debt ratio observed year after year. One notable and favourable outcome of decreasing interest expenditure is that it facilitates compliance with the Maastricht deficit target, without deficit reduction measures reducing government demand. In turn, a disciplined fiscal policy has an impact on sustainability, as the debt reducing effect of the primary surplus decreases the country risk premium, which may be reflected in the further decline of yields and interest expenditure. To enable us to analyse in detail the reasons underlying the changes in interest expenditure, we present a methodology suitable for separating the various impacts which determine interest expenditure. Our results confirm the assumption that in recent years the decrease in government securities market yields was the key determining factor behind the reduction in interest expenditure. However, when further analysing developments between 2000 and 2015, other interesting questions can be identified, such as why, despite the increase in the level of debt, interest expenditure did not increase in 2000. In the study, the period under review concludes with the close of 2015, and therefore we did not provide details regarding subsequent developments and measures taken by the central bank.

In the second chapter, the study presents the background based on Hungarian and international literature. In the third chapter, we discuss recent developments in government interest expenditure, while chapter four explains in detail the decomposition methodology that helps us to identify the various factors underlying the changes in interest expenditure. In chapter five, we divide the past fifteen years into four periods based on the decomposition. According to our calculations, the prime explanatory factor was the fluctuation of yields, which was mainly attributable to a low international yield environment and the improving risk assessment of Hungary, due to favourable domestic macroeconomic developments; the role of the Hungarian central banks' measures are also important. Chapter six presents developments in nominal and real interest rates, highlighting developments that took place after 2013, while also discussing developments in implied interest rates in a regional comparison and in the light of the changes in the debt profile. In chapter seven, we cover the settlement-related specifics of the so-called imputed interest expenditure stemming from the reform of the pension system, i.e., a current issue concerning the statistical time series of interest expenditure; and we argue that, based on economic logic, these should be managed separately from the interest expenditure within the primary balance. In the last chapter, we draw conclusions.

2. Background

From among the publications discussing similar topics, we would like to highlight the study of *Barabás et al. (1998)*, which analysed the impact of financing government debt with marketable government securities. In this study, the authors analysed the changes in “expanded consolidated government debt”, which accounts for outstanding debt in the government sector and that of the MNB, i.e. two separate institutions, taking part in the financing at that time in a consolidated manner. This may have been justified then, since it was the MNB that took out the foreign currency debt due to the fact that only the MNB had access to foreign markets, and the interest charged on this debt was also paid by the central bank.

Therefore, the government deficit did not comprise the interest payments on external funding taken out at market rates, only the burdens associated with the low interest HUF loans of the government outstanding to the MNB. For that reason, the authors produced the operational balance of the general government from the volume changes of the aggregate balance of the government sector and of the MNB, which contains the primary balance and the real interests. While analysing the consolidated outstanding debt, they summarised their results related to real interest rates, developments in debt, privatisation and the adjustment performed in 1995. They discovered that the implicit real interest rates of government debt consistently exceeded the growth of the economy between 1988 and 1997, causing the debt ratio to increase. The debt increasing effect could be decelerated only by the adjustment performed in 1995, as it resulted in a surplus on the primary balance, but it had a negative impact on economic growth. The substantial (approximately 15-percentage point) contraction in debt that followed was caused by the debt repayment made from the proceeds of privatisation.

It was concluded from the quantitative results that sustainable growth and convergence to developed economies can only be realised in tandem with additional debt reduction. But for the timely reduction of the debt ratio, “the at least 1.5–2 per cent structural surplus of the primary balance measured against GDP is necessary” (*Barabás et al. 1998:1*). Privatisation proceeds did not change the net financial position of the government, and indebtedness remained substantial despite the repayments financed from the proceeds, which, according to the authors, had a restrictive effect on the growth of the Hungarian economy.

However, this study focuses primarily on changes in the accrual-based interest expenditure of the general government, which is only one part of the paper presented as a background. With regard to this, and in view of the following features, it is not justified to use the methodology applied by the above study:

- Today, it is no longer necessary to consolidate the MNB and the government sector recorded in the statistics as two separate subsectors, as the National Bank

no longer becomes indebted in the name of the government, i.e. all government debt can be found in the balance of the government sector.

- During the period analysed in this study, the inflationary environment differed significantly from the era of high inflation after 1990.
- The structure of government debt is significantly more stable (and more transparent) than the debt structure at the time of the political changeover.

Current interpretation of consolidated interest payments of the general government and of the central bank

It should be noted that the consolidated examination of government debt, the balance of the central bank, as well as the paid interest expenditure in connection with the government's foreign currency debt may also be justified at present, but for a wholly different reason, as discussed by *Barabás et al. (1998)*.

Baksay et al. (2012) analysed how the change in the proportion of foreign currency within government debt affected the compliance of central bank reserves, and the profit and loss of the central bank. The government's foreign currency debt increases the central bank's interest expenditure and offsets the interest savings achieved by the government on its foreign currency debt. When analysing the process in detail: the foreign currency obtained from foreign currency issuing, on the one hand, increases the central bank's foreign exchange reserves, and on the other hand, the government converts it to domestic currency at the central bank, then utilises it (spends it), which, in turn, increases domestic money market liquidity. The central bank must sterilise the increased liquidity in line with inflation targeting, and the central bank pays the base interest rate¹ on the sterilisation asset. In this way, the difference between the yields of advanced economies and Hungarian market yields is the central bank's net interest loss, because the central bank can invest its foreign currency reserves at lower interest rates, while it pays a higher domestic interest-rate for the sterilisation portfolio. In consolidated terms, the foreign currency debt loses its apparent advantage of having a lower interest rate than that of government securities issued in the Hungarian currency.

Ardagna et al. (2004) studied the impact exerted by the primary balance and government debt on the level of interest rates influencing the interest expenditure of the budget. When reviewing the data of 16 OECD countries between 1960 and 2002, they found that a 1-percentage point deterioration in the primary balance, as a percentage of GDP, triggers approximately 10 basis points of growth in the case of long-term yields. Based on their results, global factors also have a tangible effect on the long-term end of the yield curve of a given state.

¹ Specifically from September 2016, after the introduction of the cap of the three-month deposit stock, it pays the sterilisation average interest-rate: the weighted average of the base interest rate, the preferential deposit interest-rate equivalent to the base rate and the interest rate of overnight deposit.

Orbán and Szapáry (2006) analysed the reasons underlying the high government deficit and its macroeconomic impacts, pointing out the Hungarian phenomenon, also analysed in our current paper, that the interest expenditure of the general government between 2002 and 2006 practically stagnated, despite increasing debt. The authors noted that the consequence of a continuously increasing government debt may be a high interest payment of the government which may only be covered by the excessive taxation of the income generated by Hungarian sectors. Due to increasing debt, a portion of household savings is financing the government instead of private sector investments (crowding-out effect). It was also emphasised that the upward drift in debt goes hand-in-hand with the increase in risk premium, which, in turn, may have an added negative impact on fiscal policy as it increases real interest rates.

Izák (2009) examined the link between the primary balance, government debt and, among others, interest expenditure in post-socialist EU member states. The result offered by the paper, principally of interest from the perspective of this analysis, is that between 1999 and 2006 from among the studied countries, only in Poland was the average real interest rate higher than the economic growth. This indicates that in Poland, a surplus of the primary balance was needed to stabilise the debt, while in other countries the GDP-proportionate government debt remained stable, despite a negative primary balance, due to economic growth.

Tóth (2011) investigated the developments in government debt from the aspect of sustainability. Although the author analysed the development of debt, he drew significant conclusions from the aspect of this paper as to how real interest rates influence debt. The reduction of debt between 1999 and 2001 was primarily supported by developments in the primary balance and by economic growth, while the real interest rate, expressly noteworthy from the aspect of this study, had only a slight debt increasing effect.

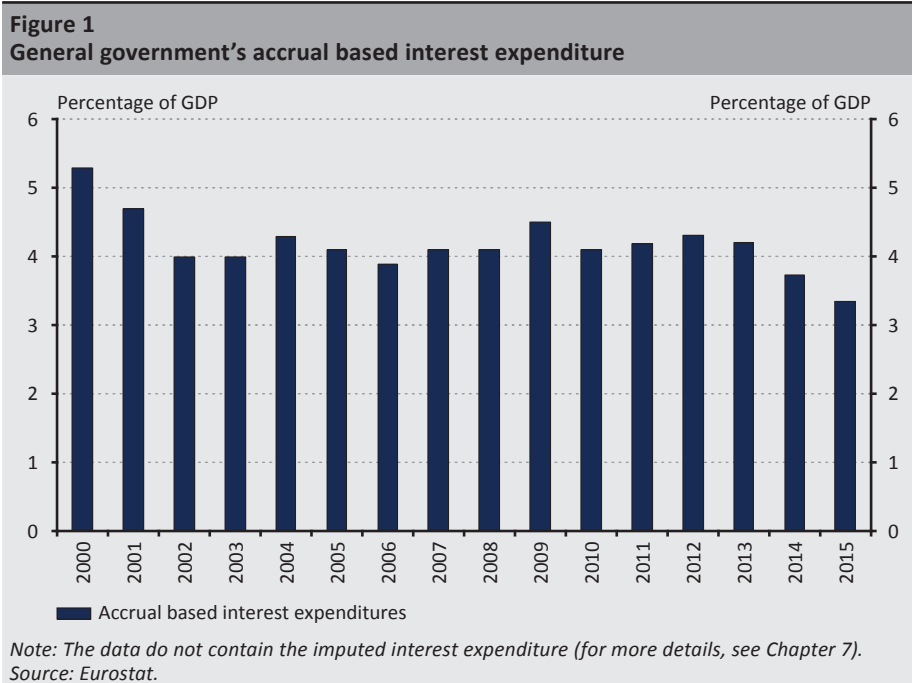
According to *Tóth*, the period between 2002 and 2010 may be divided into two parts: while from 2002–2006 and 2007–2010 debt grew to an equal extent, these two periods are still different in terms of the factors initiating the increase. Between 2002 and 2006, increasing debt stemmed exclusively from developments in the primary balance, which was only partially offset by economic growth. However, between 2007 and 2010, the primary balance of the budget did not have any actual debt increasing effect, and the upward drift in the debt ratio was caused by the real interest rate, the downturn in the economy and the weakening HUF exchange rate. Based on the results of the author, the real interest rate had the same debt increasing effect during both periods. All of these facts are in line with the results of *Baksay et al. (2013)*.

The *Bundesbank (2013)* study analysed the developments in interest expenditure in EU member states, with a distinct focus on Germany, similar to the descriptive

part of this paper. The study states that changes in yields may have a much more significant impact than any other factor on the developments in the government's interest expenditure. In Germany, for example, gross interest expenditure as a percentage of GDP dropped from 3.3 per cent to below 2.5 per cent of GDP as part of a longer process between 2000 and 2013, as the average interest paid for the outstanding government debt diminished sharply. Similarly, debt increased in several EU member states between 2000 and 2015 while government interest expenditure decreased significantly.

3. Interest expenditure in Hungary in the recent period

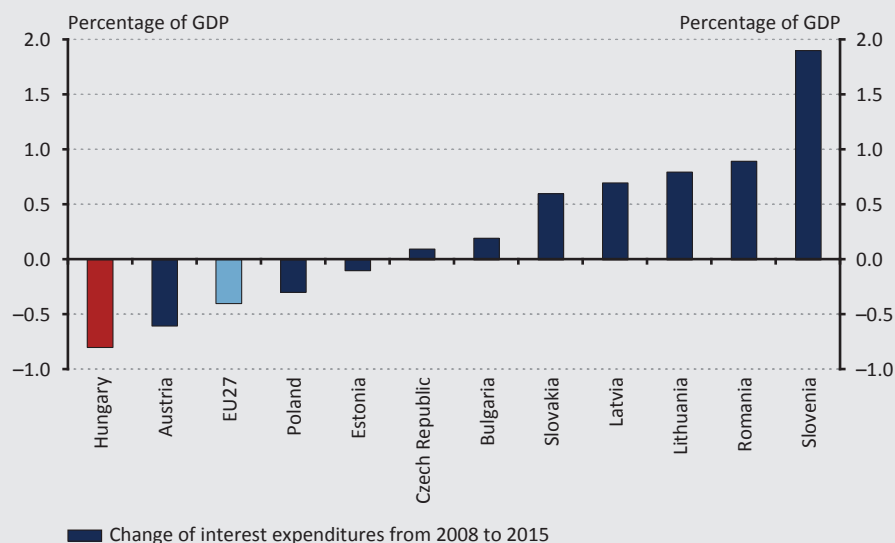
The interest expenditure of the general government decreased significantly between 2013 and 2015, falling by approximately 1 percentage point as a proportion of GDP. The dynamics of the contraction that occurred during the past years was outstanding during the period under review, i.e. between 2000 and 2015, and only the reduction between 2000 and 2002 was of an equal extent. However, during these two periods, these factors contributed to the positive trend to different degrees² (Figure 1).



² For the detailed summary, see Chapter 5.

The contraction in interest expenditure is outstanding in a regional comparison, that is the reduction can largely be explained by factors specific to Hungary (Figure 2). The contraction of interest expenditure of such an extent and the increasingly rapid reduction of the debt ratio in parallel with this is outstanding in the region and for the EU as a whole. The reduction was primarily aided by decreasing yields and the growth of the economy.

Figure 2
Changes in interest expenditure between 2008 and 2015



Note: The data do not contain the imputed interest expenditure (For more details, see Chapter 7).
Source: Eurostat.

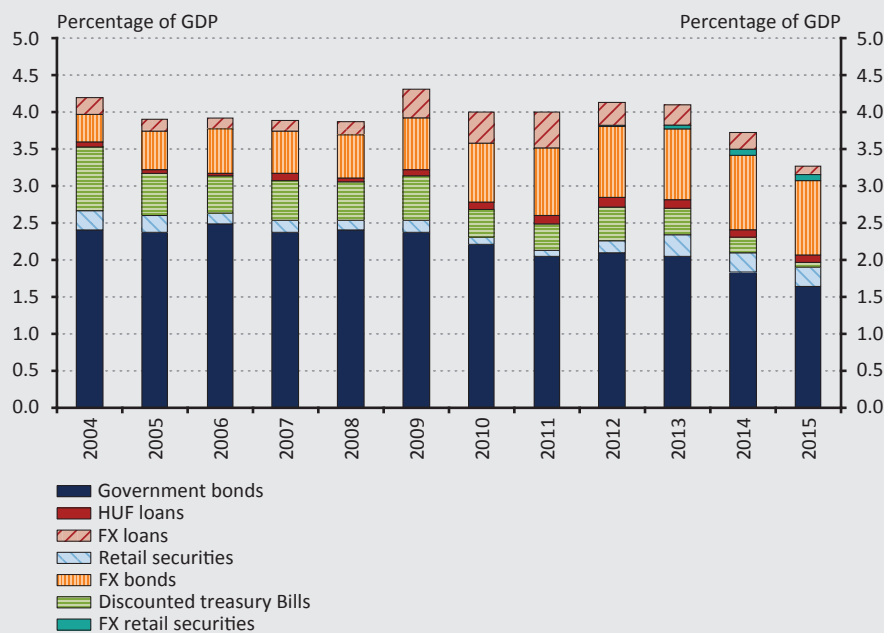
According to the forecast of the European Commission, within the EU the accrual-based interest expenditure of the general government decreased to the greatest extent in Hungary, probably falling by 1.4 per cent of GDP between 2013 and 2017.³ The interest environment is low worldwide and interest rates declined over the past years in parallel with the monetary easing programmes of the world's key central banks, but within the EU the general government's interest expenditure as a percentage of GDP decreased the most in Hungary. This outstanding reduction is especially notable as during the same period, Hungary completely switched to market financing, and increasingly, to domestic financing (Kicsák 2016a).

Due to the aforementioned reorganisation of debt structure, the structure of interest expenditure also changed. The fact that the total interest expenditure of foreign currency and HUF bonds increased in proportion to the overall interest

³ Also see Kicsák (2016b).

payment, while the interest expenditure of loans decreased demonstrates the shift to market-based financing. The interest rate of securities issued for households also increased, but the pace of this increase was considerably lower than what would be implied by the increase of nearly HUF 4,000 billion in the stock of government securities held by households. Due to the favourable effect of the decrease in Hungarian yields, the GDP-proportionate interest payments of HUF bonds and HUF government securities held by households have been continuously declining since 2013, despite the upward drift in the weight of HUF-denominated securities. The substantial drop in the interest expenditure of foreign currency loans was caused by a substantial erosion of the portfolio, as the key objective of the Hungarian debt management strategy is to lower the proportion of foreign currency within public debt. After 2010, the full repayment of the EU-IMF-loan and the prepayment of other foreign currency loans continuously supported the achievement of this objective.

Figure 3
Summary of the interest expenditure of the central government by instruments



Source: ÁKK (Government Debt Management Agency).

4. Methodology applied for the decomposition of the change in interest expenditures

As part of this decomposition, we sought to separate the impact of some basic macroeconomic developments within the annual change of GDP proportionate interest expenditures. To this end, we used a methodology similar to the decomposition of developments in public debt.

To measure the impact associated with the changes in yields, the starting point was the straightforward mathematical average of secondary market benchmark yields.⁴ The product of the change in average yields in specific years (r) and the stock of HUF debt produces the total effect of yield changes. Due to the repricing period of public debt (in a 1-year period, nearly 1/3 of the debt is repriced), one third of the overall impact affects the first year, while the remaining two thirds are distributed among the following years in such a way as to affect the start of the period more strongly, whereas the following years are less affected. The repricing period used in the study applies the maturity structure of previous years as a reference, and thus going forward, the repricing period may change if the maturity structure of the debt changes.

$$eff_{\Delta r} = \sum_{i=0}^9 \frac{(r_{t-i} - r_{t-i-1}) \times debt_{t-i}^{HUF}}{GDP_{t-i}^{NOM}} \times \frac{x_{i+1}}{100} \quad (1)$$

where x is the repricing in each years

and $x = [32, 11, 11, 10, 9, 7, 5, 5, 5, 5]$

The effect of the real growth of the economy (eff_{g_real}) arises as the difference of two GDP-proportionate interest expenditures: the interest expenditure of the given year (exp^{int}) in proportion to the real GDP (GDP_{real}) of the same year (measured at the price fixed in 2010), and the interest expenditure of the given year in proportion to the real GDP of the previous year. We calculated the effect of nominal growth (eff_{g_nom}) using the same method, with the difference that the denominator includes the nominal GDPs. If we deduct the annual effect of the real GDP from the effect of the nominal GDP, we obtain the effect of the GDP deflator (quantifying the effect of the nominal GDP is nevertheless also indispensable for presenting the effect of the debt ratio).

$$eff_{g_real} = \frac{exp_t^{int}}{GDP_t^{real}} - \frac{exp_t^{int}}{GDP_{t-1}^{real}} \quad (2)$$

$$eff_{g_nom} = \frac{exp_t^{int}}{GDP_t^{nom}} - \frac{exp_t^{int}}{GDP_{t-1}^{nom}} \quad (3)$$

⁴ For the sake of simplicity, we used the mathematical average, as it only slightly deviates from the weighted averages, where the weights are selected in such a way that the average time to maturity of the portfolio matches the actual average time to maturity of the debt.

$$eff_{GDP_defl} = (3) - (2) \quad (4)$$

The effect of the nominal change in debt ($eff_{\Delta debt_nom}$) is the product of the spread between the nominal debt of the given year and of the previous year, and the implied interest rate of the given year. The effect of the change in nominal debt and nominal growth together yield the effect of the change in the debt ratio.

$$eff_{\Delta debt_nom} = \frac{(debt_t^{nom} - debt_{t-1}^{nom}) \times \frac{exp_t^{int}}{debt_{t-1}^{nom}}}{GDP_t^{nom}} \quad (5)$$

$$eff_{\Delta debt_rate} = (3) + (5) \quad (6)$$

We can calculate the effect of the fluctuations in exchange rates in two steps. As the first step, we calculate the increase or decrease in debt stemming from revaluation, and then the implications these movements have on the interest rate. The revaluation of foreign currency debt entailed by fluctuations in exchange rates (rev_t) is the product of the spread between the average EUR/HUF exchange rate of the given year and of the previous year and the stock of foreign currency debt. We obtain the effect of revaluation on interest expenditure by multiplying the revaluation and the average implied interest rate.

$$rev_t = \frac{debt_{t-1}^{FX}}{exc_{t-1}} \times exc_t \quad (7a)$$

$$eff_{\Delta exc} = rev_t \times \frac{int_{nom}^{imp}}{GDP_t^{nom}} \quad (7b)$$

where exc_t is the annual average exchange rate

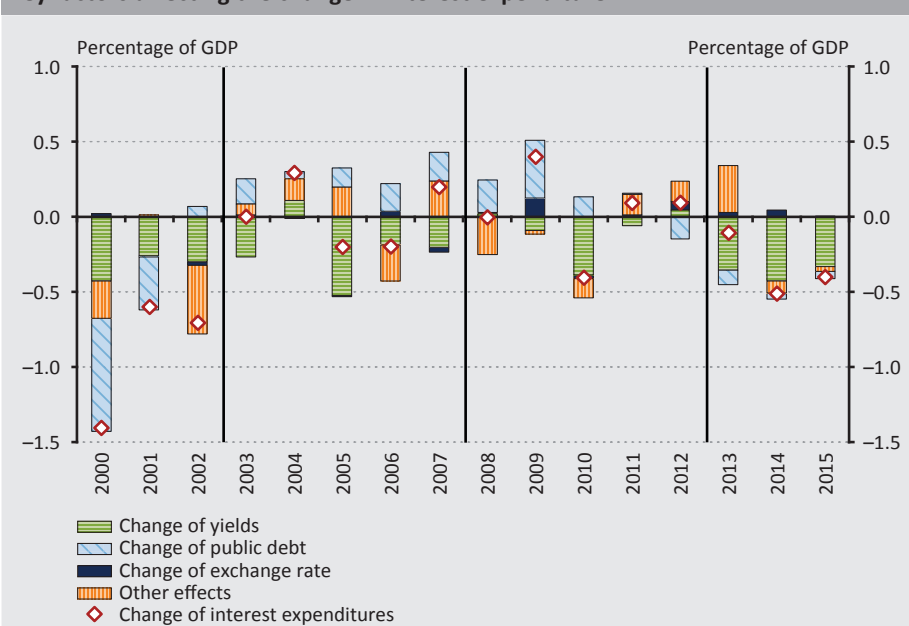
$$\text{and where } int_t^{imp} = \frac{exp_FX_t^{int}}{debt_{t-1}^{FX}} \quad (8)$$

and int_{avg}^{imp} is equal to the average of the period between 2000 and 2015 of int_t^{imp} .

5. Principal factors determining the fluctuation of interest expenditure

The GDP-proportionate reduction in interest expenditure was largely initiated by decreasing market yields entailed by economic growth, the programmes implemented by the central bank over the past 3 years, the favourable macro-economic conditions in Hungary and the supportive international environment. The nominal increase in debt and exchange rate fluctuations primarily supported a growth trend. In this chapter, we principally attempt to decompose and quantify the core effects within the changes in interest expenditure (Figure 4, red rhombus), and based on the available data summary for the years elapsed since 2000 into 4 periods.

Figure 4
Key factors affecting the change in interest expenditure



Note: The data do not contain the imputed interest expenditure.

Source: Based on data provided by the Government Debt Management Agency (ÁKK), Eurostat, HCSO and MNB.

5.1. Factors affecting the changes

From 2000–2001, the change in the debt ratio contributed to the decrease in interest expenditures, while between 2002 and 2010 it produced a continuous increase, and then after 2010, it once again caused interest expenditure to decrease. The decrease in the debt ratio had the most significant effect on interest expenditure in the years 2000 and 2001, substantially contributing to the reduction of expenses. Thereafter, between 2002 and 2010, the GDP-proportionate debt increase augmented interest expenditures by an average of 0.2 percentage points. The unfavourable effect was the most pronounced

in 2009, when expenditures increased by 0.4 per cent of GDP due to the increased level of debt. As opposed to that, after 2010 debt reduction supported the decrease in expenditure each year, which amounted to an average of 0.1 per cent of GDP.

The effect of exchange rate fluctuations that took place after 2000 was negligible on interest expenditure, but in terms of its amount, it tended to increase expenditures. Based on our estimate, using the average annual exchange rate as our reference, the revaluation in 2009 and 2012 may have increased the GDP-proportionate interest expenditure by 0.1 percentage point (rounded), while in other years, the impact may have been less. During the entire period, the overall impact of exchange rate fluctuations contributed to the increase in interest expenditure by nearly 0.3 per cent of GDP.

Capturing the effect of yield fluctuations is more difficult than the other factors, as it took several years for such yield fluctuations to have an effect, instead of in the given year due to repricing of public debt. For this very reason, the yield fluctuation that took place in a given year has a partial effect on the subsequent years. In order to quantify the annual impact, in addition to recognising yield fluctuations, it is imperative to know when public debt was repriced, as the yields belonging to different maturities have a varied effect on developments in government interest expenditure. Based on the quarterly maturity structure data of the past 5 years, nearly 1/3 of debt is repriced within 1 year, more than half of debt is repriced in a period of 3 years, while nearly 100 per cent of the debt is repriced in 10 years (based on *Ádám et al. 2015*).

The yield fluctuation during the period under review had a turbulent effect on interest expenditure, but in general, it supported the reduction of expenditure, especially over the past 3 years. The yields adjusted with the effects of repricing (see Chapter 4, formula (1)) contributed to a tangible decrease in interest expenditure between 2000 and 2002. Between 2003 and 2007, yields evolved hectically, but the ample liquidity characterising the entire world predominantly supported the decrease in expenditure. In 2008 and 2012, however, as a result of the crisis, a tangible yield increase was observed, which in turn caused interest expenditure to increase. During that period, the change in yields contributed by an average of 0.1 per cent of GDP annually to the reduction of interest expenditure. We can articulate a trend-like and continuous decrease in yields since 2013, which in itself caused interest expenditure to decline by an annual average of nearly 0.4 per cent proportionate to GDP. Furthermore, we can state that the trend observed in the fluctuation of yields influences the change in interest expenditure more than any other factor.

Other effects may arise partly from the estimation inaccuracies of some effects that cannot be classified under the above mentioned factors. The taking out of the EU-IMF loan in 2008 may have distorted the estimation, while its repayment may have an effect to the contrary in 2013. The most notable debt management operations observable in the other effects are the repurchase and switch auctions

and the government securities market repurchase agreements. These operations may increase the inaccuracy stemming from the estimation of the repricing of yields, thus accelerating or impeding actual repricing.

5.2. Periods that can be differentiated

From 2000–2002, interest expenditure decreased substantially, dropping by an annual average 0.9 per cent of GDP. During these years, the reduction in the debt ratio and the reduced yields also had a tangible impact. In 2002, the increase in the debt ratio caused interest expenditure to grow, but overall expenses decreased (in 2002, we can see by way of the other effects that the increase in the stock of debts had only a minor effect on interest payments).

From 2003 until the outbreak of the crisis in 2008, interest expenditure slightly increased annually on average. In most of this period, the debt ratio increased yearly to much greater extent. During this period, yields evolved in a fairly volatile manner, but they largely decreased. Due to the globally low yield environment, we saw a more significant effect primarily in 2005, causing interest expenditure to decrease. As the result of the high global risk appetite, the fluctuation of yields supported the overall decrease in interest expenditure.

The GDP-proportionate level of expenditure did not substantially increase after 2008 either, since although market yields increased significantly, most of the debt did not come from the market, but from the IMF and the EU. These foreign currency loans had an interest rate considerably more favourable than the market rate. Accordingly, foreign currency loans slowed the increase in interest expenditure, but they had an unfavourable effect from several aspects. Their concentrated maturities made debt management more difficult in the ensuing years, they increased the foreign currency proportion of public debt making the economy more sensitive to exchange rate fluctuations, and ultimately they indirectly increased the central bank's interest expenditure.

As opposed to the previous period, after 2013, the interest payment of the general government decreased in excess of 0.3 per cent of GDP on average, which is typically attributable to the contraction of yields. The decline in yields in and of itself would have resulted in a 0.3–0.4 percentage point decrease in expenditure at an annual level, but this was dampened in 2013 by other factors. During these three years, the decrease in the debt ratio and economic growth had a favourable impact on interest expenditure.

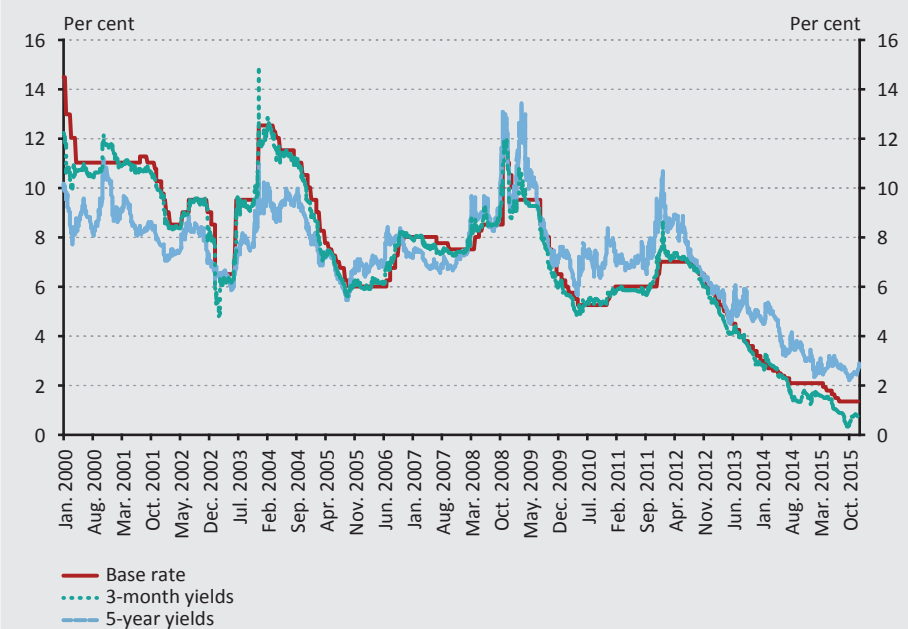
6. Developments in yields

6.1. Yields on the government securities market

Over the past 15 years, several Hungarian and international factors have had a significant effect on the yields on Hungarian government securities market. At the start of 2000, in a high inflationary environment, the level of Hungarian base rates

and yields closely following such base rates evolved at around 10 per cent or above. Thereafter, at the end of 2003 and at the beginning of 2004, the financing costs of the Hungarian public debt may have increased largely due to country-specific reasons. Four years later, the global financial crisis already found Hungary in a vulnerable state and this is also visible in the increase in government securities market yields, while the high yield environment characterised the entire world during this period. The European sovereign debt crisis also caused yields to increase and the high yield level reached its peak in the middle of 2012 (*Figure 5*).

Figure 5
Developments in the base interest rate and of yields of secondary market government securities



Source: ÁKK, MNB.

After 2013, the favourable international environment, the Hungarian macroeconomic indicators and the improving risk perception of Hungary as well as the interest rate cuts by the central bank contributed substantially to the decrease in government securities market yields. The MNB's monetary policy, as part of which the Monetary Council kept the focus on the Hungarian inflation process in line with the primary objective of the central bank, had a favourable effect on the yields of government securities from a fiscal aspect. As a result of low yields and the gradual repricing of debt, the decline in interest expenditure may further continue in the coming years.

From August 2012 until the end of the period under review, i.e. until the close of 2015, the base rate dropped by 565 basis points from the starting value of 7 per cent (since then, it has decreased by another 45 basis points to 0.9 per cent). As a result of this development, secondary market yields dropped by an average of 490 basis points until the close of 2015 (and at the end of July 2016, the average yield reduction had already reached 560 basis points). Short-term yields decreased more substantially, falling by 590 basis points on average, while long-term yields decreased by some 420 basis points. During the easing cycle, the short-term yields moved closely together with the decreasing base interest rate and after the announcement of the Self-Financing Programme, as the result of increasing demand, continue to follow the interest rate cuts and are actually evolving at a lower level than the Hungarian base rate. Long-term yields followed the base interest rate cuts sometimes closely and at other times in a more relaxed way, but overall they had a tendency to decline. This is attributable to the fact that, although the base interest rate is primarily influencing short-term yields, the long, credible interest easing cycle goes together with a decline in the long-end of the yield curve (Kicsák 2015:4).

The central bank's programmes contributed greatly to the decrease in yields and the increased demand for government securities. In addition to the international environment, the favourable prospect of the Hungarian economy and the disciplined Hungarian fiscal policy, the measures taken by the MNB also supported the strong decline in the Hungarian government securities market yields.⁵

1. *During the 24 uninterrupted interest rate cuts of the 2-year easing cycle, which started on 29 August 2012, the Monetary Council decreased the central bank's base rate from 7 per cent to 2.1 per cent (MNB 2014b). The start of interest rate cuts was made possible by the improving international environment, and then favourable developments in Hungarian factors and international risk appetite also contributed to the continuation of the cycle for two years. The low inflationary environment in Hungary and stable inflationary expectations, the increasingly disciplined fiscal policy and macroeconomic developments all supported the uninterrupted monetary easing.*
2. *The Self-Financing Programme announced on 24 April 2014⁶ had an impact on the government securities market, owing to the adjustment of market players immediately after its announcement and even prior to the actual introduction of the programme. The objective of the Self-Financing Programme (MNB 2014a) is to strengthen the financing of public debt from internal, Hungarian sources and to mitigate the external vulnerability of the Hungarian economy.*

⁵ For listing the programmes, we used: Kicsák 2015:1–2.

⁶ For the detailed description of the phases of the Self-Financing Programme, please refer to: Csávás – Kollarik 2016.

- a. As the most crucial component of the first phase of this measure, as of 1 August 2014, the 2-week deposit became the main policy instrument, replacing the previously used 2-week bond and only partner institutions are authorised to keep these instruments with the central bank. The central bank deposit is not an eligible security for the MNB's loan instruments, and therefore demand increased for other, more liquid instruments, primarily government securities.
 - b. At that point, the central bank also introduced an interest rate swap instrument (as of 16 June 2014) for institutions within its circle of counterparties in order to mitigate their interest rate risk.
 - c. Another key component of the measure is that foreigners and non-bank Hungarian investors are not permitted to keep their HUF liquidity in the central bank's main policy instrument, and part of the funds excluded from the main policy instrument may also increase demand for government securities.⁷
3. From 25 March 2015, the Monetary Council relaunched the easing cycle during which the base interest rate decreased to 1.35 per cent until the end of 2015, after five consecutive interest rate cuts of 15 basis points each.⁸
 4. *On 2 June 2015, the MNB announced the second phase of the Self-Financing Programme*⁹ (MNB 2015 and Csávás – Kollarik 2016). As a result of this new programme phase, gross external debt decreased further, foreign currency debt declined and the proportion of Hungarian investors increased within the financing of government debt (Nagy – Palotai 2015).
 - a. The most essential component of this change was that from 23 September 2015, the 2-week deposit was replaced by the 3-month deposit as the main policy instrument, which is available for banks without any quantitative restrictions.
 - b. Parallel to this, from the end of 2015, the central bank defined a limit of HUF 1,000 billion for the stock that can be kept in a 2-week deposit, so in this way the 2-week deposit fulfilled a liquidity management function. (The two-week deposit instrument was phased out in April 2016 as part of the third phase of the Self-Financing Programme.) The maturity of the new main policy instrument is longer than the 30 days that can be taken into account for short-term liquidity coverage, and therefore banks exchanged a part of their central bank deposits for government securities in order to comply with liquidity rules.

⁷ For more details, see: Kolozsi 2014, and Hoffmann – Kolozsi 2014.

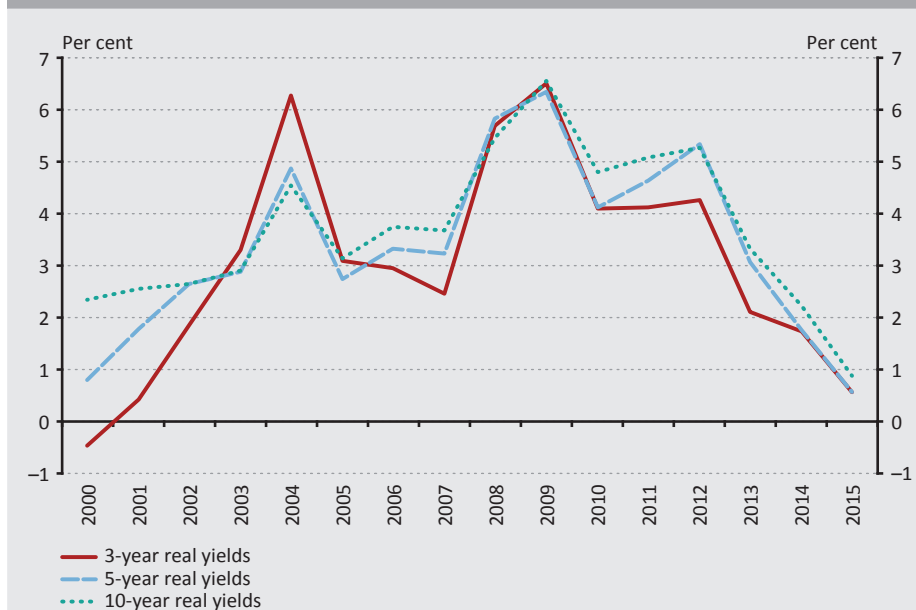
⁸ The period analysed in this study continues until the close of 2015. Since then, the base interest rate has decreased by an additional 45 basis points to 0.9 per cent.

⁹ However, the period examined by the study closes on 31 December 2015, and therefore we present neither the details of the third phase of the Self-Financing Programme nor the impact of the cap of the 3-month deposit.

- c. Also as part of the second phase, the previously available overnight interest rate corridor became asymmetric instead of the ± 100 basis points band. Banks could place deposits with the central bank at an interest rate 125 basis points lower than the base interest rate, while the interest rate of the overnight central bank collateralised loan was 75 basis points higher than the interest rate of the main policy instrument.
- d. Both the maturity (one-week instead of two-week and three-month instead of six-month) and the pricing (the spread on the base interest rate was cut from 50 basis points to 25 basis points) of traditional loan instruments changed as well.
- e. The interest swap instruments continued to support banks' liquidity management.

In terms of the sustainability of debt, the real yield of government securities is also quite relevant, which, however, showed strong volatility during the years under review. Between 2000 and 2007, the forward-looking real yield¹⁰ of HUF-denominated bonds calculated with the GDP deflator fluctuated below 4 per cent, in tandem with

Figure 6
Developments in forward-looking real yields



Source: Government Debt Management Agency, HCSO, MNB.

¹⁰ We averaged the GDP deflator in all three cases with a forward-looking approach for the entire maturity of government securities, since investors in government securities may decide concerning the expected return based on their expectations regarding the developments in prices when it comes to the formation of market yields. When forecasting the GDP deflator, we used the MNB's Inflation Report for December 2016 as reference.

the global abundance of liquidity and high risk appetite (apart from 2004), signifying that it only slightly reacted to the gradual increase in the government debt ratio. The global financial crisis revealed the structural and financial problems of the Hungarian economy. The short-term and long-term sustainability of government debt was questioned and the country risk premium immediately spiked as a result of which yields on the government securities market significantly increased.¹¹ The forward-looking real yields remained at a high level until 2012, which was followed by a substantial decrease, and from 2013 as a result of the above detailed reasons (more favourable international environment, country specific factors, lower central bank base rates etc.), and real yields dropped to 1 per cent (*Figure 6*).

6.2. Implied interest rates

The implied rate is the interest rate that shows the actual paid interest in proportion to the outstanding debt. We can calculate the implied interest rate in several ways, depending on for which year we take the interest payment into account, i.e. the interest paid in the given year may be linked to the outstanding debt of the previous year or the current year. For example, in the case of a loan with a longer maturity, interest must be paid for the previous outstanding stock, but the interest paid for very short-term government securities (for example three-month discount treasury bills) relates to the stock of the given year, and interest must also be paid for government securities issued during the year.¹² If the proportion of the various instruments within the stock of outstanding debt is more or less constant, there is no major difference in the result. Considering the above, we express the interest payment in proportion to the weighted average of the previous year's and the current year's debt in such a way that we convert the foreign currency debt to Hungarian currency at the average annual exchange rate.

$$int_t^{imp} = \frac{exp_t^{int}}{\omega \times debt_t^{nom} + \omega \times debt_{t-1}^{nom}} \quad (9),$$

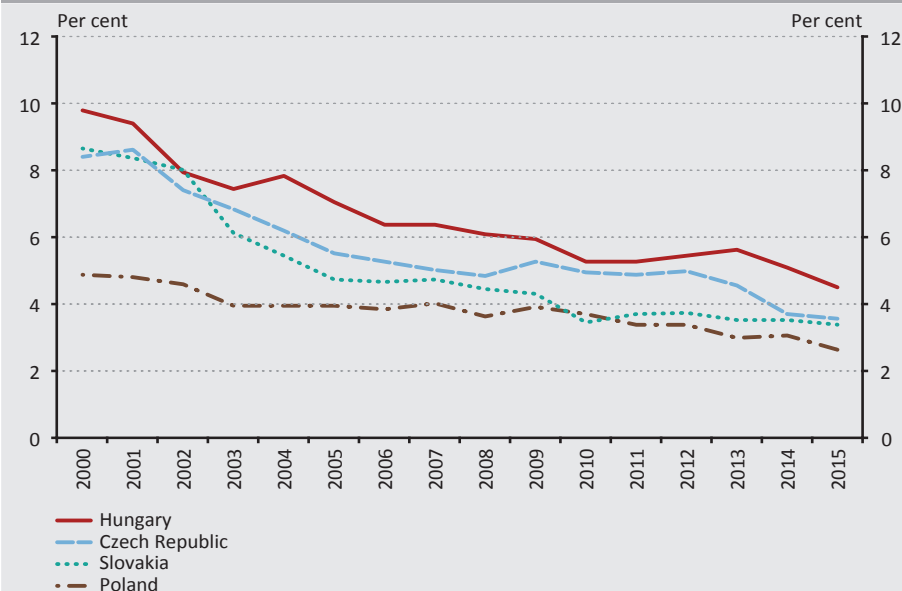
where in this case $\omega = 0,5$

Implicit interest expenditure consistently declined throughout the examined period, both in Hungary and in the region (Figure 7). Many different factors contributed to the decline, with one of the most notable being the contraction of inflation and the improving risk perception of the region, also appearing in the decline in interest rate spreads. Nevertheless, the robust easing policy of regional central banks also played a key role.

¹¹ At the end of 2008 and the beginning of 2009, the mistrust of investors was so high that Hungary temporarily suspended the issuance of government paper (apart from short-term discounted treasury bills).

¹² On an accrual basis, interest expenditure must always be claimed for the remaining part of the year for government securities issued during the year, but the interest expenditure should only be shown in the payments statistics if the interest payment actually took place (that is, the cut-off date of the interest payment falls on a day after the issuing date within the year).

Figure 7
Developments in the implied interest rate of government debt in the region



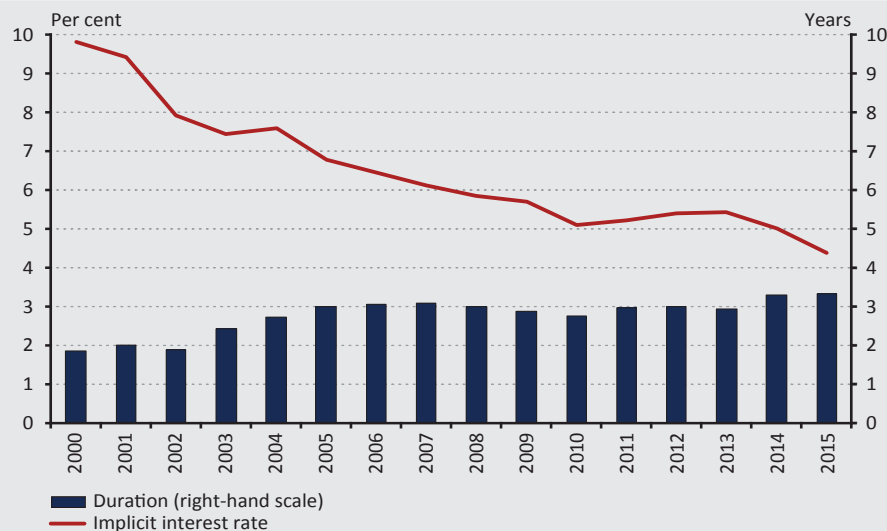
Note: The data do not contain the imputed interest expenditure (For more details, see Chapter 7).
 Source: Eurostat.

In a regional comparison, the implied interest rate decreased the most in Hungary following the crisis. The implied interest rate was and still is the highest in Hungary from among the V4 countries, which is generally attributable to the high spreads expected due to the “inherited” large debt. However, following the crisis, Hungary’s implied rates tangibly declined by 1.6 percentage point, in excess of the typical 1–1.3 percentage point contraction in other countries of the region.

The decrease in the implied interest rate is especially favourable given the fact that the duration of the Hungarian debt has increased by more than six months since 2010. This denotes that the decline in the implied rate ensued despite the fact that in the interim the proportion of long-term debt increased within government debt, which in itself points to higher interest payment in general. The increased duration promotes a debt profile with lower rollover risk, the cost of which is higher interest overall (Figure 8).

The increase in implied interest rates in 2012 and 2013 may have been partially generated by the pre-financing of the IMF-EU loan, which first necessitated the increase in foreign currency issuing, and then later on, an increase of the issuance of HUF. The loans taken out from international organisations had to be repaid in a concentrated manner, and during that period market yields were higher than the interest rates of loans. Later on this changed, and as a result of the continuous

Figure 8
Implied interest-rate (percentage) and duration (year) of Hungarian government debt



Source: OECD, Eurostat

Note: The data do not contain the imputed interest expenditure (For more details, see Chapter 7).

contraction of market yields, the yield of HUF bonds were lower than the interest rates of the foreign currency loan extended by the European Union when the last instalment of the EU loan was repaid. It should be noted that the low interest rate of foreign currency loans was only apparent, since the issuance of foreign currency indirectly increases the amount of deposits placed with the central bank by commercial banks, and as such, the interest expenditure of the central bank. This effect does not occur when HUF-denominated bonds are issued.

7. Imputed interest expenditure

Following the reorganisation of the pension system in 2011, the statistical approach settled a stock of liabilities within the general government sector of the same size as the assets taken over by the state (MNB 2014c).¹³ Based on the ESA-2010 methodology, the government sector takes over the households' assets and the liabilities of the same size upon the transfer of assets, leaving the net position of the government sector unchanged. But according to this methodology the social security sub-system remains a redistribution system, so it cannot have any pension liability. Rather, the stock of liabilities equivalent to the amount taken over must be

¹³ We may also apply another approach: According to Kiss – Kékesi (2011:44) "because in 2011 the majority of the private pension fund members moved back to the public pension system, for the purpose of the analysis we can regard this as if the pension reform (namely, the introduction of private pension funds - the author) did not take place."

stated as a social security contribution advance. The asset registered as advance may be settled in the future within the government sector as transfer revenues at the same time as pension payments are made for members, which reduces the government's liabilities until they are exhausted.

Characteristics of the former national account methodology

The ESA-95 methodology treated the move of members as an asset transfer, when households transferred their assets from private pension funds into the public pension fund, causing the pension payment liability of the funds to cease, while the balance of the public sector increased by the total amount of the transferred assets. This approach had regard primarily to the specifics of the social security system.

As long as the liabilities arising from the pension reform exist within the public sector, the statistics account for interest expenditure in connection with it, which it calls imputed interest expenditure. This is necessary because according to the argumentation of Eurostat, the assets taken over may represent interest income for the state, or if they utilise it to reduce debt, it results in the reduction of interest expenditure. The statistics account for 3 per cent interest expenditure annually for the current outstanding stock. No actual interest payment takes place, but this is

Figure 9
ESA interest expenditure and imputed interest



Source: Eurostat, MNB.

taken into account among public interest expenditure as charges payable for actual debt.

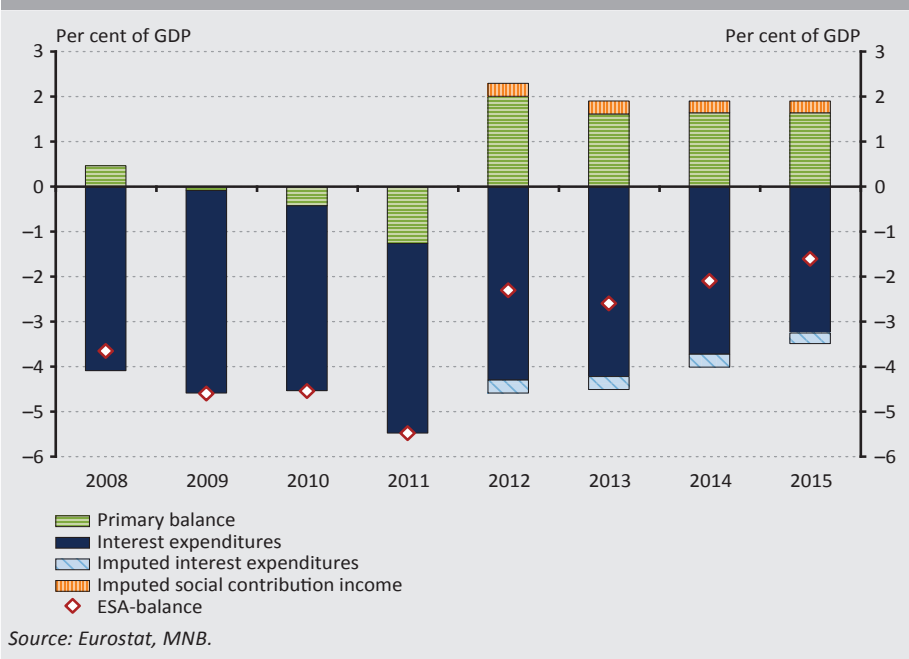
The settlement as per the new methodology improves the balance slightly in the specific years, while during the entire period the enhancement equals the amount of the transferred assets. The imputed contribution revenues continuously increase, as an increasing proportion of the members moving back to the public system are retiring, and in parallel with this, outstanding liabilities are declining and the related imputed annual interest expenditure is also shrinking. Initially, the balance of imputed revenues and interest expenditure is close to zero in the specific years, while later on it gradually becomes positive, and its sum as seen through the entire perspective (between 2012 and 2046) will precisely match the HUF 2,855 billion that the state actually took over (Table 1).

Table 1 Impact of assets taken over and the related stock of liabilities on the balance <i>(billion HUF)</i>											
	2011	2012	2013	2014	2015	2016	2017	2020	2030	2040	2046
1. Stock of liabilities taken over	2,791	2,846	2,855	2,851	2,845	2,836	2,823	2,766	2,286	1,150	0
2. Imputed contribution revenues		84	87	89	92	95	97	106	143	192	225
3. Imputed interest expenditure		84	85	86	86	85	85	84	71	39	7
4. Impact on balance (2–3)		0	1	4	6	9	12	23	72	153	218
Source: MNB 2014c.											

In our opinion, this imputed expenditure should not be regarded as interest expenditure in economic terms. Although the transferred assets do not entail any liabilities – in line with economic logic – government debt does not increase, while traditionally interest payment is made for the instruments that generate the debt. This purports that the accounted “interest” is considered interest expenditure based on the new statistical approach, however, the imputed stock of liabilities is considered “other liabilities”, and therefore it may be more logical to regard this “interest expenditure” as an expense within the primary balance. Moreover, no real cash movement or payment is linked to the imputed interest expenditure (Figure 10).

To that end, it becomes clear to present interest expenditure without imputed interests and match it with the imputed contribution revenues within the primary balance. The adjustment appears more well-founded economically, and therefore the MNB uses this methodology in its analytical publications (Inflation Report, Public Finance Report), thereby deviating from the official statistics. This change reduces

Figure 10
ESA balances with and without imputed interest



both primary revenues and the interest expenditure compared with the official data, but it does not influence the extent of the ESA balance. The official statistical publications of the MNB include the official data.

8. Conclusion

The government's interest expenditure has substantially decreased over the past three years. The contraction was primarily caused by the decrease in government securities market yields, which was greatly assisted by the central bank's programmes undertaken in a favourable international environment. The fact that interest expenditure decreased the most in Hungary after the crisis and according to the forecast of the EU and of the MNB this contraction will remain outstanding in Hungary until 2017, supports the assumption that Hungarian factors play a key role.

In our paper, we delineated the fluctuation in accrual-based public interest expenditure into its key components, using a methodology similar to the decomposition of the changes in government debt. As part of this delineation, we sought to separate the impact of basic macroeconomic developments within the annual change of GDP-proportionate interest expenditure, such as the fluctuation of yields, the fluctuation of exchange rates and the fluctuation of the debt ratio.

In our analysis, four clearly distinct periods can be identified following the year 2000, based on how various macroeconomic factors contributed to the changes in interest expenditure. Between 2000 and 2002, interest expenditure shrank by 0.9 per cent of GDP on annual average, which was simultaneously prompted by the contraction of yields and of the debt ratio. Between 2003 and 2007, interest expenditure fluctuated at around 4 per cent of GDP as a result of increasing debt – causing expenditure to rise – and low yield levels characterising the global economy, causing expenditure to shrink.

After the onset of the crisis the level of debt spiked and economic growth slowed, and thus public interest expenditure increased substantially in 2009. However, increasing yields were counterbalanced by the fact that government debt was financed by international organisations at an interest rate lower than the market yields prevailing at that point in time. Afterwards, from 2013, the general government's interest payment dropped in excess of 0.3 percentage points of GDP on average. The MNB's Self-financing Programme and declining yields supported by the easing cycle contributed to this the most, but also the continuous contraction of the debt ratio was of benefit.

In analysing the interest expenditure, it must be considered that following the reorganisation of the pension system in 2011, the statistical approach accounted for a stock of liabilities of the same size as the assets taken over by the state, for which interest expenditure is imputed (*MNB 2014c*). The interest imputed for the stock of liabilities continuously augments public interest expenditure as from 2012, while parallel to this, the statistics also impute contribution revenues. It improves the balance of the general government slightly on an annual level until the complete attrition of the stock of liabilities, and during the entire settlement period (until 2046) it improves the balance at a value corresponding to the assets taken over.

In our study, we argue that the imputed expenditure may not be regarded as interest expenditure in economic terms, as interest payment is a function of outstanding debt, while this stock of liabilities does not increase government debt. For this reason, we present interest expenditure without the imputed interest, and the MNB publishes the data correspondingly in its analytically focused publications. Therefore, interest expenditure and the surplus of the primary balance are both lower than the official statistics while the ESA balance remains unchanged.

1. Schedule

Table 2 Summary of the main data analysed in the study																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
	HUF Billion																
Gross ESA interest expenditures (without imputed interest expenditures)	702	721	696	766	913	916	935	1,035	1,100	1,185	1,115	1,172	1,231	1,278	1,213	1,115	
Public debt	7,340	7,954	9,574	10,982	12,296	13,585	15,612	16,757	19,372	20,471	21,799	22,721	22,414	23,076	24,514	25,402	
HUF	4,726	5,530	7,205	8,297	9,040	9,647	11,053	11,466	11,607	10,990	11,549	10,958	12,676	13,368	14,766	16,442	
FX	2,614	2,424	2,370	2,685	3,256	3,938	4,558	5,292	7,765	9,481	10,250	11,763	9,738	9,708	9,748	8,961	
GDP at 2010 price	22,167	23,004	24,039	24,960	26,209	27,358	28,412	28,540	28,794	26,904	27,086	27,557	27,115	27,690	28,810	29,717	
GDP at market price	13,322	15,383	17,422	19,077	21,024	22,471	24,153	25,560	27,072	26,297	27,086	28,166	28,661	30,127	32,400	33,999	
	EURHUF exchange rate																
Average EURHUF exchange rate	260.0	256.7	243.0	253.6	251.8	248.1	264.2	251.3	251.7	280.3	275.3	279.4	289.3	297.0	308.6	309.8	
	Per cent																
GDP growth	4.2	3.8	4.5	3.8	4.9	4.4	3.8	0.4	0.8	-6.6	0.7	1.7	-1.6	2.1	4.1	3.1	
Interest expenditures as a per cent of GDP	5.3	4.7	4.0	4.0	4.3	4.1	3.9	4.1	4.1	4.5	4.1	4.2	4.3	4.2	3.7	3.3	
Net interest expenditures as a per cent of GDP	4.8	4.0	3.6	3.7	3.9	3.8	3.6	3.8	3.6	4.0	3.8	3.7	3.9	4.0	3.5	3.2	
Public debt as a per cent of GDP	55.1	51.7	55.0	57.6	58.5	60.5	64.7	65.6	71.6	78.0	80.6	80.7	78.2	76.6	75.7	74.7	

The table continues on the next page.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	Per cent															
Average 3-Month yield	10.9	10.7	8.9	8.2	11.1	6.8	6.9	7.6	8.8	8.4	5.4	6.0	6.9	4.1	2.1	1.1
Average 12-Month yield	10.8	10.5	8.9	8.2	11.0	6.8	7.1	7.5	8.9	8.4	5.5	6.1	6.9	4.1	2.2	1.1
Average 1-Year yield	10.7	10.3	8.9	8.0	10.7	6.8	7.3	7.4	9.0	8.6	5.6	6.2	7.1	4.1	2.3	1.2
Average 3-Year yield	9.8	9.1	8.4	7.8	10.0	6.9	7.6	7.2	9.4	9.3	6.7	7.0	7.5	4.8	3.6	2.1
Average 5-Year yield	9.1	8.6	7.8	7.3	9.2	6.8	7.4	7.0	9.2	9.3	7.0	7.4	7.7	5.2	3.9	2.7
Average 10-Year yield	8.5	8.0	7.1	6.8	8.2	6.6	7.1	6.7	8.2	9.1	7.3	7.6	7.9	5.9	4.8	3.4
Average 15-Year yield		6.7	6.9	6.7	7.8	6.5	7.0	6.5	7.9	8.9	7.3	7.6	7.9	6.3	5.2	3.7
Source: ÁKK, Ameco, Eurostat, KSH, MNB.																

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