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Contents

Vol. 15. Issue 2., June 2016

STUDIES

DISCUSSION

BOOK REVIEW

CONFERENCE REPORT

The interaction between fiscal and monetary policy in Hungary over the past decade and a half*

György Matolcsy – Dániel Palotai

After the introduction of inflation targeting in 2001, fiscal and monetary policy were out of sync for 12 years, which wreaked havoc on the Hungarian economy due to the close relationship and interaction between the two. After 2013, on the back of the fiscal reforms of the previous two to three years, and the subsequent monetary policy reforms restored the desired harmony, which contributed to achieving the objectives of the two parties, including price stability, financial stability and sustainable fiscal policy, while also laying the groundwork for long-term growth. This paper investigates which mix of fiscal and monetary policy has shaped the past 15 years and the channels through which fiscal and monetary economic policy of different activity or dominance impacted each other, and the degree of success of their (co)operation. The model devised by Eric Leeper provided the conceptual and theoretical framework for our study, while the actual data and experiences are drawn from Hungary's economic history of the past 15 years. This paper also takes a closer look at the causes, objectives, main elements and impact of the turnaround in fiscal policy that took place between 2010 and 2013 and in monetary policy after 2013.

Journal of Economic Literature (JEL) Classification: E52, E63, O23

Keywords: monetary policy, fiscal policy, economic policy consistency, fiscal dominance theory, Hungarian economic history

1. Introduction

The relationship between two key areas of economic policy, fiscal and monetary policy, is decisive in terms of the success of economic policy. The theory of fiscal dominance[1] elaborated by *Leeper* (*1991*) provides a compelling theoretical framework for investigating their relationship. Put in simple terms, Leeper examined the type of monetary policy required and allowed by a restrictive and an

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

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[1] The latest Handbook of Macroeconomics dedicates an entire chapter to the topic of the fiscal dominance theory, a testament to its relevance (see *Leeper and Leith (2015)*).

expansionary fiscal policy (tight or loose) and vice versa, and also what happens when the two policies do not conduct compatible strategies.

In the following section, we present the past 15 years of Hungarian economic policy based on Leeper's theory. As we will see, Leeper's approach is highly suitable for demonstrating instances where harmony could not be achieved between the two economic policy decision-making powers, instances where it could be achieved but was deficient, and instances where true harmony was achieved. It is apparent that the success of economic policy hinges upon the cooperation of these two factors, and Hungary's most successful period was the time when fiscal and monetary policy took advantage of the available synergies, while its least successful period was the time when one functioned but pushed the other into a constrained situation, eliciting increasingly unsuitable responses.

The first part of this paper presents Leeper's theory in simplified terms, the second part addresses the period characterised by flawed fiscal policy (2002–2009), the third part looks at the three years when fiscal policy would have enabled cooperation but monetary policy failed to seize the opportunity (2010–2012), and the fourth part looks at the harmony between these two policies and the achievements of this constellation so far (2013–2015). In the final chapter, we draw our conclusions.

1.1. The fiscal dominance theory

In Leeper's theory, both fiscal and monetary policy can be active or passive depending on the degree to which they follow their original target. We can distinguish between fiscal or monetary dominance depending on which economic policy decision-maker is active and which is passive. We will now define these targets and behaviours more precisely.

The goal of monetary policy in the model is to steer the inflation rate towards the target at the end of the forecast horizon. Monetary policy is active (or tight) if it consistently follows this target in terms of the decisions made, and is passive (or loose) if it allows itself to diverge from the target towards higher inflation.[2] Leeper defines opposing active and the passive roles for fiscal policy as compared to the monetary decision-making. Fiscal policy is active (or expansionary, loose) if it allows a deficit which is higher than the sustainable budget deficit, and is passive (or tight)

[2] In keeping with the spirit of Leeper, in other words, according to the *monetary policy rule* (or Taylor rule), when inflation exceeds the inflation target by 1 per cent, then — as the real interest rate calculated as the difference between the nominal interest rate and inflation must increase — the nominal interest rate grows by more than 1 per cent (compared to the valid nominal interest rate alongside on-target inflation).

if it ensures long-term equilibrium.[3] We can distinguish between fiscal dominance (active, expansionary fiscal policy and passive, accommodative monetary policy) and monetary dominance (active monetary policy and passive fiscal policy) depending on the casting of the active and passive roles. In addition, there are of course active-active and passive-passive economic policy mixes.

Monetary dominance refers to an active monetary policy coupled with a passive fiscal policy in the Leeperian sense. The central bank follows its inflation target strictly, and therefore fiscal policy has no other choice but to remain passive (or contractionary in the fiscal sense), otherwise its long-term sustainability would be disrupted. Leeper considers this type of economic policy mix to be the default case, which guarantees a stable cooperation possibility between the two main economic policy branches.

Fiscal dominance refers to the economic policy combination where fiscal policy is active (expansionary) while monetary policy is passive (loose). Fiscal policy therefore allows excessively high deficits which cannot be sustained over the long run. In order to maintain the long-term budget balance of the consolidated general government, Leeper's model calls for the central bank to abandon its inflation target and to allow higher inflation to emerge, i.e. to conduct a loose monetary policy. As a result, as the central bank generates seigniorage revenue which it can transfer to the budget, or otherwise put, can inflate away debt. Of course, this matter is far more complex in reality, with numerous legal and credibility constraints alongside economic ones, but Leeper's model addresses the question in the above specified manner. Fiscal dominance therefore ensures the long-term sustainability of the general government, not by keeping the primary balance in equilibrium, but by generating higher inflation than warranted, that is, at the price of the central bank – partly or entirely – abandoning its original target and adopting a passive (loose) policy.[4]

Fiscal dominance has prevailed in several countries during certain periods. For instance *Blanchard* (*2004*) demonstrates that until 2003, the Brazilian economy could be closely described using the theory of fiscal dominance, where active fiscal policy led to a high deficit, but the central bank essentially did not react to the inflationary pressure materialising around 2002 by raising interest rates. *Fan, Minford and Ou* (*2014*) argue that a model where a regime based on fiscal

[3] Based on Leeper, according to the *fiscal policy rule*, when debt in real terms exceeds a threshold, the budget surplus must increase.

[4] Under fiscal dominance, the so-called wealth effect also increases the prevailing inflation alongside an expansionary fiscal policy. In this sense, households hold more (nominal) assets due to higher transfers and/or lower taxes (or put more simply, "people have more money left") and this higher perceived wealth spurs households to spend more, further pushing up inflation.

dominance appears provides an accurate description of England in the 1970s. *Davig and Leeper* (*2008*) examine time series pertaining to the US and identify periods shaped by fiscal dominance before the 1980s. It should be noted that in the early 1980s, a change of monetary regime took place in the US: the former passive monetary policy (necessary for maintaining an active fiscal regime) was supplanted by an active monetary regime (after the appointment of Paul Volcker as chair of the Fed).

The question arises as to what happens when – in contrast to the previous scenarios – monetary and fiscal policy are both active or passive. It can be foreseen in the original model (*Leeper 1991*) that when monetary and fiscal policy are both active or passive, a state of equilibrium cannot be achieved.[5] The central bank therefore plays a pivotal role in achieving system stability: it must know whether fiscal policy is currently active or passive and pursue an appropriate strategy.

We can see that the central bank is unable to give an adequate response in the context of active (expansionary) fiscal policy. It can only choose to either – partly or entirely – abandon its target or strictly follow the target (remain active). In the former case, inflation rises above the defined target, while in the latter case the long-term equilibrium of the consolidated general government is not achieved, and this may ultimately lead to bankruptcy or crisis in extreme cases.

Davig and Leeper (*2008*) generalise this analysis by investigating what happens when an economic policy mix is currently not sustainable, but has a certain probability of becoming sustainable in the future. According to their results, if the current system is unstable (for instance because monetary and fiscal policy are both active), the system nevertheless continues to remain stable if there is at least a small chance of fiscal policy becoming passive in the future. In other words, even a seemingly unsustainable economic policy combination may be tolerated by investors if they expect a future turnaround in policy.

The following section presents Hungarian economic policy of the past 15 years in the above specified framework, adding in advance that in our view, Leeper's terminology is not always fitting from an economic policy decision-maker's perspective. On the one hand, in Leeper's model active and passive policy means different things with regard to prudence on the fiscal and the monetary side. While monetary activity means keeping inflation on target at all costs, fiscal activity is an unsustainable and spendthrift policy. Consequently, fiscal dominance in fact refers

[5] If both policies are active, the long-term budget balance of the consolidated general government is not achieved. Fiscal policy accommodates an elevated deficit, while the central bank keeps inflation low, ultimately disrupting the budget and leading to a crisis. If both policies are passive, the budget deficit is low but the central bank nevertheless accommodates high inflation. This is a less relevant combination.

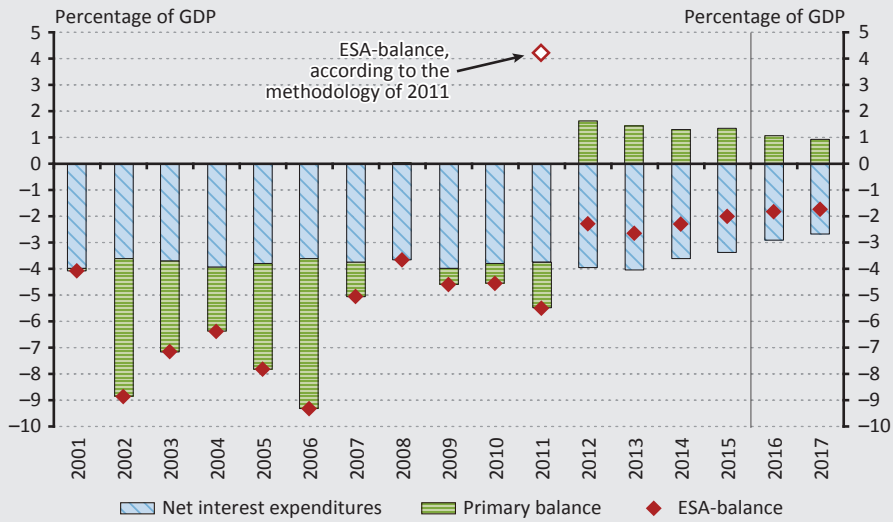
to a mix of the economic policy defined by fiscal policy, the most central element of which lies in the fact that fiscal policy is in and of itself unsustainable and requires a monetary policy response. At the same time, monetary dominance does not in fact refer to a dominant, decisive monetary policy, but rather to a central bank that purely follows the inflation target using the tools at its disposal. In a nutshell, true cooperation is not possible under fiscal dominance, as the central bank can either opt to allow inflation or to conduct an excessively tight policy, while cooperation is possible under active monetary policy (referred to as monetary dominance by Leeper). Finally, it should be emphasised that in Leeper's model, dominance refers to an economic policy combination, rather than to "importance".

2. Fiscal dominance, powerless monetary policy, lack of harmony between the two main branches of economic policy (2002–2009)

After presenting the theory of *fiscal dominance*, it is worth looking at the developments in Hungary's economic policy in practice within this framework, alongside the resulting developments in the main macro variables over the period between the introduction of inflation targeting in 2001 and 2010. In advance of the findings, it can be said that the period of Hungarian economic policy between 2002 and 2010 was a wasted period, mainly due to irresponsible fiscal policy (mildly referred to in Leeper's model as active). This cannot be offset by a loose monetary policy aiming to inflate away debt, nor by an excessively tight monetary policy sacrificing growth. The behaviour of irresponsible fiscal policy from 2002 in theory left no room for harmony between fiscal and central bank policies for most of the period under review. Needless to say, this does not exonerate monetary policy from the errors made in this period, which led, amongst other things, to the spread of foreign currency lending.

Looking at the relationship between real economic growth and a balanced budget, we can see that perhaps the two most essential factors of sustainable development and convergence did not concurrently prevail in the Hungarian economy during any single year in the 2002–2010 period. The external global boom strongly driving the 2000s and the consistently overly expansionary fiscal policy (from 2002) led to real economic growth (until 2006), but did not result in a balanced, responsible fiscal policy by any means (*Figure 1*).

Figure 1
Developments in the budget balance and its main components from 2001



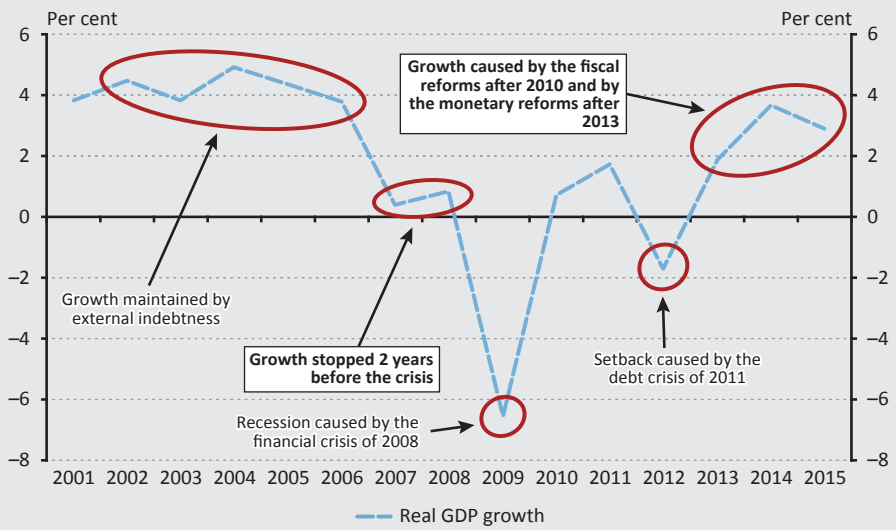
Note: The years 2016–2017 are the MNB's forecast included in the March 2016 Inflation Report. According to the statistical rules valid at the time, the budget registered a 4 per cent surplus, but the statistical methodology was later modified retroactively, resulting in a budget deficit for the year according to current figures. The reason for this was that after the EU's adoption of the ESA2010 statistical methodology in 2014, the increase in wealth stemming from the assumption of pension fund assets by the state cannot be recognised as government sector revenue in the year of the transaction (in contrast to the earlier rule).
Source: Eurostat, MNB

The growth rate of the Hungarian economy, which expanded at around of 4 per cent until 2006, was unsustainable as the fiscal policy of the governments in office prior to 2010 generated permanent structural imbalances. Under fiscal dominance, they characteristically attempted to induce growth through a high general government deficit (averaging 7.9 per cent between 2002 and 2006 and 6.4 per cent between 2002 and 2010) and to conceal the mounting structural problems within the economy's structure. As a result of the hefty tax burden on labour income – even by international standards – and the unwarrantedly lax social welfare system, by the mid-2000s Hungary had come to exhibit one of the lowest employment and activity rates in Europe.[6] Low net lending of the household and corporate sector was typically coupled with an elevated budget deficit, resulting in a substantial twin deficit. The rapid rise in the national economy's net external borrowing gave rise to

[6] *Matolcsy–Palotai (2014)*

a growing external vulnerability risk, exacerbated after 2003 by the rapidly rising popularity and dynamic spread of foreign currency-based household housing loans (*Figure 10*). Growth without stable macroeconomic foundations – employment resting on a broad base, and internal and external macro-financial balance – therefore lost steam in 2006 and essentially ground to a halt in the two years preceding the onset of the global money and capital market crisis in 2008 (*Figure 2*).

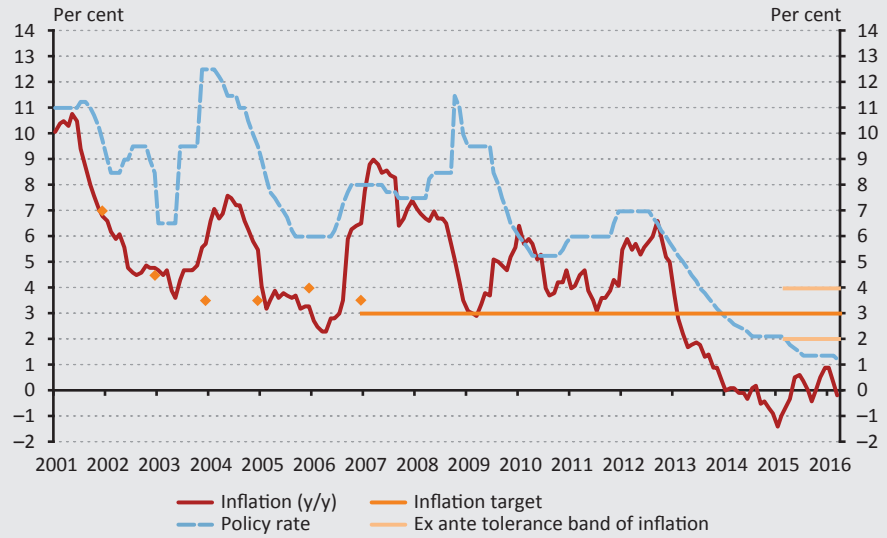
Figure 2
Growth rate of the Hungarian real economy between 2001 and 2015



Source: HCSO

This flawed dominant fiscal policy, essentially founding growth on external indebtedness, with no structural reforms aimed at bolstering domestic factors of production, and which maintained an unwarrantedly high fiscal deficit, led to elevated inflation, which the central bank – unsuccessfully – attempted to offset with a persistent excessively high key policy rate, focusing solely on its primary statutory mandate (price stability). The Hungarian consumer price index typically exceeded the inflation target defined within the framework of the MNB's inflation targeting regime introduced in 2001 (*Figure 3*); in other words, the central bank was unable to fulfil its primary role despite the high policy rate.

Figure 3
Developments in the policy rate and inflation from 2001



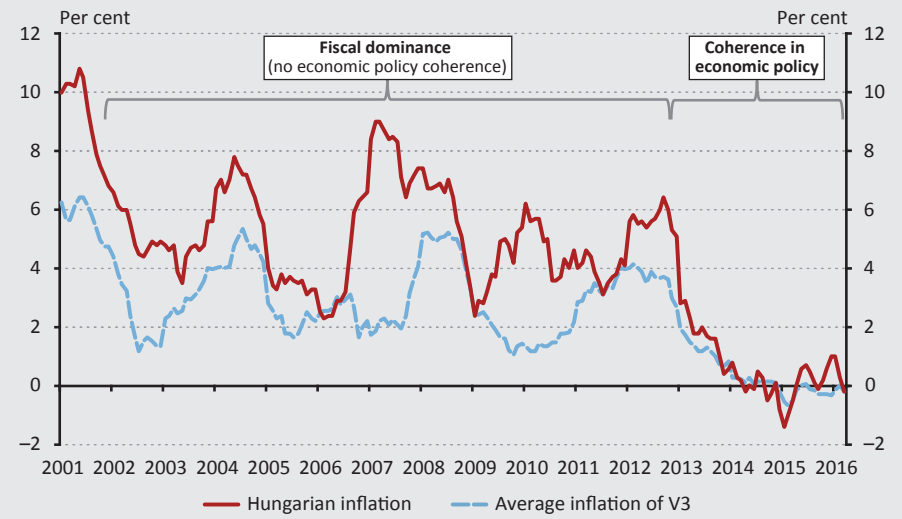
Source: MNB, HCSO

Persistently high inflation in Hungary is attested by the fact that in the 2001–2014 period, the inflation rate was, on average, 2.5 percentage points higher in Hungary than the average registered in Poland, the Czech Republic or Slovakia (V3) (*Figure 4*). This is a significant difference in inflation, which essentially disappeared from early 2013 once fiscal and monetary policy came into sync: the difference shrank to 0.3 percentage points in 2013–2015 compared to the earlier 2.5 percentage points.

Inflation remaining persistently far above the target was detrimental to the Hungarian economy, unnecessarily eroding not only the real value of property and investment instruments, but also real household wages and the profits realised by corporations, which also exerted a negative impact on aggregate domestic demand. The boosting of inflation by fiscal policy and its maintenance at an unwarrantedly high level served the purpose of reducing the real value of government debt in the absence of structural reforms and in lieu of cutting back the primary government deficit.

One of the most detrimental consequences of this flawed policy – by forcibly achieving a higher nominal base interest rate and yield curve higher than what would have benefited the economy – was to drive the Hungarian private sector towards foreign currency-based loans available at far lower interest rates than domestic loans, with Swiss franc loans accounting for the lion's share and euro loans for a smaller portion. For a long time – until the onset of the 2008 crisis – the significant interest spread, accompanied by a stable and relatively strong

Figure 4
Average inflation in Hungary and the Visegrad-3 from 2001



Source: Eurostat

forint, may have exacerbated foreign currency indebtedness, which prevented economic agents from perceiving the exchange rate risk. The pegged exchange rate regime prevailing between 2001 and 2008 may have also played a part in the aforementioned process and the emergence of the unfavourable economic policy mix.[7] Economic agents' foreign currency indebtedness within the economy wreaked havoc and also substantially eroded the efficiency of the MNB's monetary policy transmission mechanism (as the majority of loans thus lost their direct interest rate sensitivity), and also resulted in high exposure to exchange rate risk in international comparison, in both the private and public sector. In addition, high forint interest rates burdened the government budget with high interest expenditures, further swelling the budget deficit and government debt.

Due to the flawed management of economic policy after 2002, Hungary's economy was weakened significantly in its fundamentals, was unable to grow in a stable manner, was characterised by high inactivity and exhibited a twin deficit and indebtedness, making it one of the most vulnerable economies in the entire European Union. In this condition, it found itself faced with the 2008 global money and capital market crisis. This significant negative external shock filtered through very rapidly to Hungary, and Hungarian economic policy was unable to react adequately.

[7] *Csajbók–Hudecz–Tamási (2010)*

Due to this precarious vulnerability and in the wake of the sudden outflow of foreign institutional investors, Hungary's government securities market essentially froze immediately. To address this issue, to stabilise the capital position of Hungarian commercial banks and to increase the formerly insufficient central bank foreign exchange reserves, the Hungarian government and central bank management in power at the time were compelled to seek assistance from the IMF and the European Union, and to drastically hike the key policy rate. The loan package contracted from international creditors further swelled public debt (with the burden of repayment passed on to the government in office after 2010), and once again tied the hands of the government's economic policy.

Developments in the general government gross debt-to-GDP ratio can serve as a good measure of economic policy successfulness, as this macroeconomic indicator incorporates the impact of changes in the primary balance, general government interest expenditures, inflation, exchange rate and real growth changes. A testament to the fundamentally flawed economic policy conducted between 2002 and 2010 is that, despite the positive external global economic environment, the extremely expansionary fiscal policy and elevated inflation, it failed to stimulate the real economy to the extent that would have been needed to scale back the government debt ratio (or at least maintain it). Instead, the general government debt-to-GDP ratio, which stood at barely 52 per cent in late 2001, had climbed to 66 per cent before the crisis and to over 80 per cent by late 2010 (*Figure 5*), while Hungary continuously and increasingly lagged behind compared to the development of its regional neighbours in terms of GDP per capita.[8] In this regard, we can confirm that the economic policy characterised by strong fiscal dominance conducted up to 2010 was a failure and was barely able to produce any economic growth after 2006, while disrupting the macroeconomic balance.

3. Turnaround in fiscal policy and consolidation of the budget (2010–2013)

A sharp change in the fiscal policy conducted during the first decade of the second millennium – which was characterised by high government deficits and a permanently rising general government debt ratio – occurred after 2010. The government that took office at that time defined the sustainable reduction of Hungarian general government debt, which was high by both regional and broader international standards, as a declared objective, in addition to bringing the general government deficit as a share of GDP to below the 3 per cent defined under the Maastricht criteria. Along with these key objectives, injecting dynamism into the real economy by increasing employment, combatting the shadow economy and reducing the economy's external vulnerability, and as part of this, phasing-out

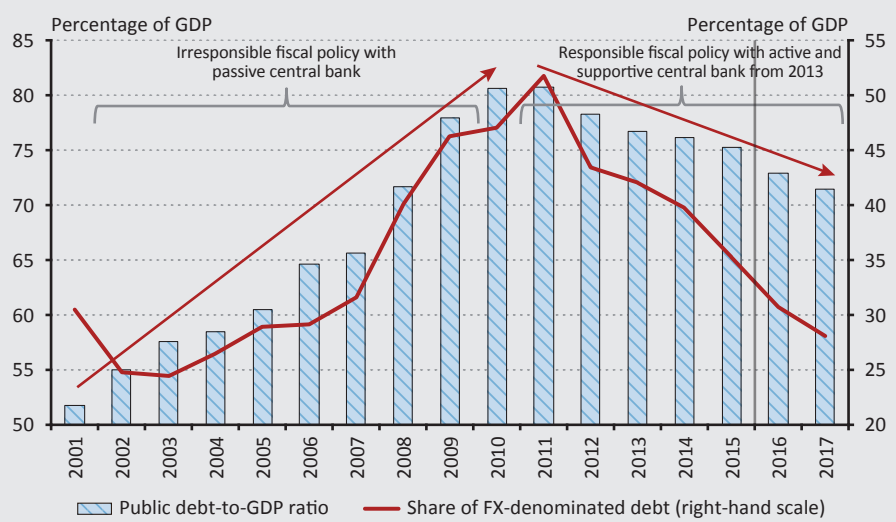
[8] *Matolcsy (2008)*

foreign currency lending became priorities for economic policy. After the reversal of the negative macroeconomic trends prevailing prior to 2010, meaningful progress was made in all of these priority areas, and thus "the former growth model based on substantial external indebtedness was replaced by the opportunities for a more sustainable convergence path relying instead on domestic financing".[9]

In terms of the link between fiscal and monetary policy, the most important consequence of the outcomes of fiscal policy was that they put an end to the earlier detrimental fiscal dominance and paved the way for cooperation between the two areas while respecting each other's autonomy but ultimately serving the same objectives. Nevertheless, monetary policy was not yet aiming for harmony with government policies during this period, and was unable to make most of the opportunity afforded by fiscal consolidation. There was neither price stability nor financial stability, and the management of the Magyar Nemzeti Bank at the time also did not support the Hungarian government's economic policy.

The primary objective of the fiscal turnaround that materialised after 2010 was to interrupt the negative trend of the sharply rising general government (gross) debt-to-GDP ratio prevailing since 2002 and to set this on a downward path (*Figure 5*), without impeding the economic recovery from the years of recession, but rather by

Figure 5
Developments in the government debt trajectory and the foreign currency ratio of debt from 2001



Note: The years 2016–2017 are the MNB's forecast included in the March 2016 Inflation Report.
Source: MNB

[9] *Matolcsy–Palotai (2014)*

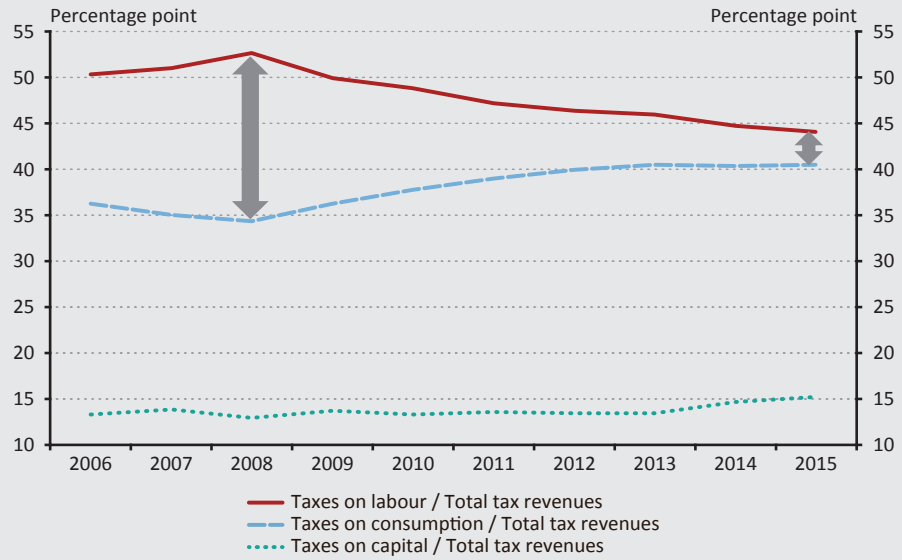
fostering this recovery. High government debt – and the elevated foreign currency ratio and the excessive non-resident portion within this debt – carried substantial macro-financial vulnerability and important real economic risks as well. The general government stressed the importance of scaling back public indebtedness by enshrining this objective in the debt rule and elevating it to the constitutional level in the Fundamental Law adopted in 2011.

The first and most important tool for reducing the debt ratio was to restrict the deficit ratio as a percentage of GDP to a low level. The drastic improvement in the general government balance was not only called for by the substantial indebtedness generated by the irresponsible fiscal policy of the 2000s, but also by the European Union's fiscal obligation. As perhaps the only case in Europe, right from the time of Hungary's accession to the European Union (in 2004), it was continuously under the Excessive Deficit Procedure (EDP), as it failed to meet the 3 per cent deficit ratio defined under the Maastricht criteria. The persistent breach of this criterion entailed the risk of suspension of EU cohesion funds, especially in the years following the global money and capital market crisis of 2008 and the European debt crisis of 2011, when Brussels strove to enforce compliance with the European Union rules more strictly than before. The government could not risk losing the EU funds, which significantly bolstered the economy, and therefore responded by consolidating the budget in meaningful and sustainable manner.

The government intended to consolidate the budget without negatively impacting households' disposable income to the extent possible, while creating a fair sharing of burdens based on the broadest possible base by involving multinational corporations. A set of so-called unorthodox fiscal instruments (including special taxes levied on the financial, retail, telecommunications and energy sector) were one of the key elements to create this fiscal leeway. The other key element was increasing the rate of sales taxes (including excise taxes and the upper VAT rate). Along with increasing the role of taxes on consumption, another core economic policy objective was to scale back the high taxes on labour incomes. This direction of the restructuring of the tax structure coincides with the competitiveness-boosting concept, as well as international experiences and recommendations, and aims to shift the centre of gravity in taxation from income-type taxes to sales taxes. The fiscal policy conducted after 2010 made sure to consistently enforce these two approaches, as a result of which these two types of taxation accounted for roughly the same weight within the Hungarian tax regime by 2015 (*Figure 6*).

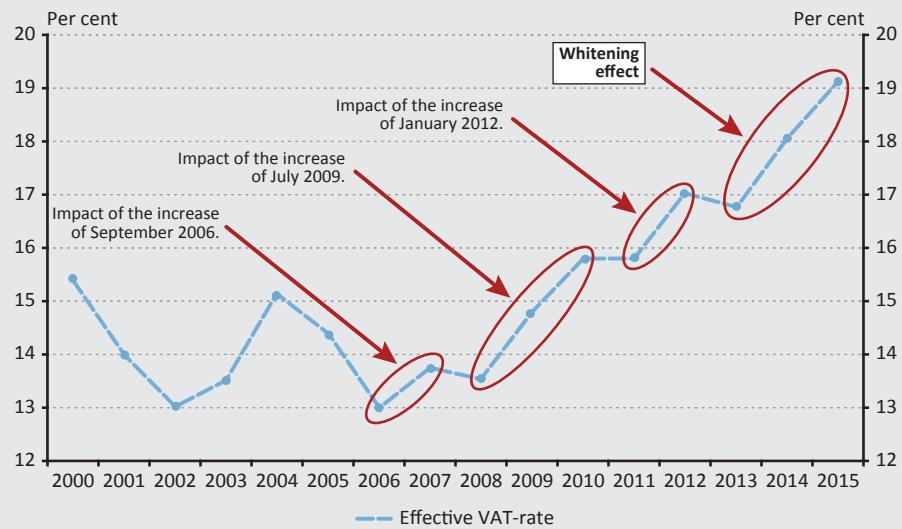
The linking of retail sector transactions to the National Tax and Customs Administration database using on-line cash-registers also significantly contributed to increasing the weight of consumption taxes. This step plays a major role in the fight against the shadow economy, as attested by the increase in the estimated effective VAT rate in 2014–2015 (of 2 percentage points), along with the increasing expansion of retail sales volumes (*Figure 7*). This means that sales tax revenues

Figure 6
Changes in Hungarian tax structure



Note: Eurostat data are only available until 2012, so the 2013–2015 figures are the MNB's calculation.
Source: Eurostat, MNB

Figure 7
Developments in the effective VAT rate and the underlying causes of its changes in Hungary



Source: MNB

linked to consumption were successfully increased without hiking the VAT rate, which also decreased the competitive disadvantage of companies lawfully paying tax compared to their tax-avoiding peers.

The social and economic target groups supported on a priority basis by the fiscal policy conducted after 2010 – similarly to the 1998–2002 cycle – were once again families and small and medium-sized enterprises (SMEs). In an effort to improve the income position of families, the government created a flat-rate, proportional personal income tax (PIT) regime, and introduced and is continuously expanding the institution of the family tax base incentive that offers significant support to families with children. The introduction of the flat-rate PIT regime not only reduces the burdens on labour, but also incentivises work intensity and reduces the concealment of income by reducing marginal tax rates to the regional level. Along with the PIT regime, the Job Protection Action Plan was also introduced, in the context of which the government specifically targeted the employment of groups characteristically disadvantaged on the labour market (the unemployed below the age of 25 or above the age of 55, mothers returning from maternity leave, unqualified individuals and the long-term unemployed) by vastly reducing employer contributions for these groups.

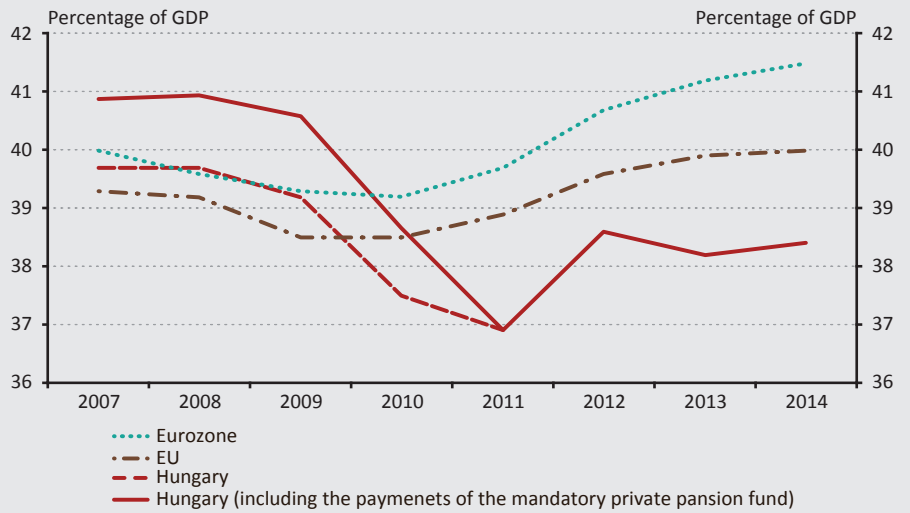
The government fostered SME sector profitability and competitiveness by significantly expanding the discounted (10 per cent) corporate tax rate – increasing the upper threshold to HUF 500 million – and by introducing discounted small entrepreneur tax schemes (KATA ["small taxpayers' itemised lump-sum tax"], KIVA ["small business tax"]).

Coupled with an increasingly dynamic Hungarian economy and the reduction of the shadow economy, and despite the protracted global real economic slump, the tax and pension reform supported by these novel measures contributed to the increase in the revenue side of the budget balance, while implementation of the Széll Kálmán Plans ensured the structural reform and adjustment of expenditure side. One of the priority objectives of these schemes was to tighten the excessively lax social welfare system in place prior to 2010 and to channel individuals capable of working from inactivity back to labour market activity, in light of the fact that prior to 2010, Hungary's activity and employment rate were among the lowest in Europe. The extension and state support of the public work programme and the addition of educational programmes was also a key element of the economic policy of providing "work instead of benefits".

In the wake of the significant restructuring of both sides of the budget, in 2012 the general government's primary balance as a percentage of GDP exhibited a surplus for the first time in 12 years, and the general government deficit-to-GDP ratio dipped well below three per cent, to 2.3 per cent, stabilising at a similar level in the subsequent years (*Figure 1*). A special achievement lies in the fact that the

restructuring and consolidation of the government budget was achieved while the total tax burden relative to GDP decreased by 1.5 percentage point according to Eurostat data, and by roughly 2.5 percentage points if we factor in mandatory private pension fund membership fees compared to the period preceding the 2010 change in government, thus dipping below the European Union average (*Figure 8*).

Figure 8
Developments in tax centralisation in Hungary and the European Union between 2007 and 2014



Source: Eurostat, MNB

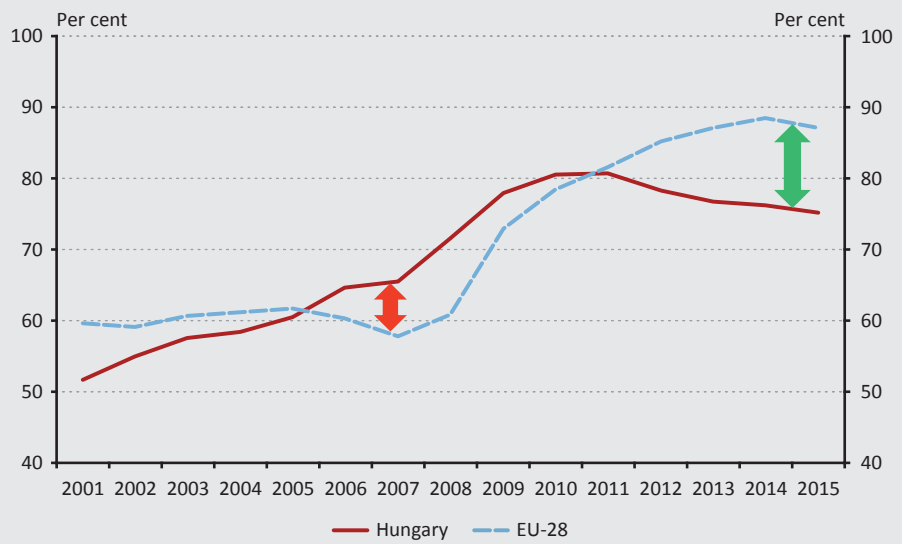
Following the fiscal turnaround, in 2013 the European Union's Excessive Deficit Procedure was finally lifted against Hungary after nine years. This is a significant achievement not only because the constant economic policy threat of suspension of EU funds was removed, but also because the Hungarian government's fiscal policy was finally also recognised as successful internationally, despite the criticism.

The (expected) developments in the central bank's profit/loss also played a role in the lifting of the Excessive Deficit Procedure. The opposition of the central bank and fiscal policy of the time is attested to by the fact that in late 2012 the MNB forecasted a central bank loss of HUF 203 billion for the following year, based on which the European Commission deemed additional budgetary adjustments as warranted. However, the new central bank management that took office in March 2013 demonstrated that this could be avoided, and the MNB closed 2013 in the black.

As a result of the sustainable consolidation of the government deficit and the government measures taken to foster and spark economic growth, government debt-to-GDP ratio was stabilised by 2010–2011 and gradually decreased from 2012 in spite of the European economic slump caused by the financial, economic and debt crisis.[10] The debt ratio, which stood at a historical peak of over 80 per cent in 2011, was reduced by over 5.5 percentage points by late 2015 (*Figure 5*). Meanwhile, the foreign currency ratio of government debt also decreased continuously and substantially: it peaked in 2011 (52 per cent) before shrinking to 35 per cent by late 2015, which may have reached 32 per cent by 2016 Q2 with the repayment of the last instalment of the EU-IMF loan package.

It should be noted that the average debt ratio of the 28 European Union member states was still 11 percentage points lower than the Hungarian debt ratio, but the average debt-to-GDP ratio in the European Union has been continuously on the rise ever since, in contrast to Hungary, approaching 90 per cent. By late 2014, the average debt ratio in the EU was over 12 percentage points higher than the Hungarian figure, and this difference may have been sustained in 2015 despite

Figure 9
Developments in general government gross debt-to-GDP ratio in Hungary and the European Union



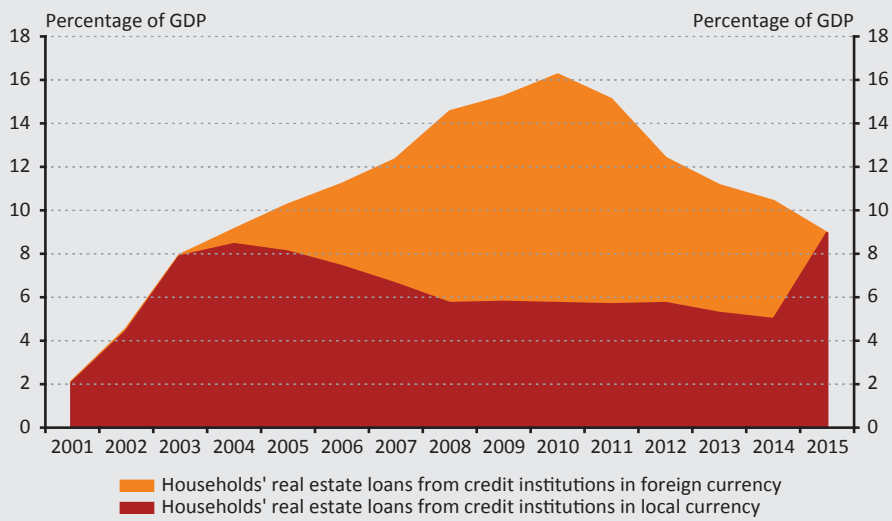
Note: There were no actual 2015 data available for the EU time series for the time being, so we used the latest 2015 European Commission estimate.
Source: Ameco, MNB

[10] *Baksay–Szalai (2015)*

the expected decrease in the EU's average debt ratio (*Figure 9*). The upward debt trend in Hungary between 2002 and 2010 reveals that Hungary was unable to take advantage of the sound economic conditions of the 2000s, and not even real economic growth (of approximately 4 per cent) fuelled by external borrowing and characteristically above-target inflation were able to offset the debt-increasing effect of the budget deficits that were persistently high at the time (6–7 per cent on average).

Resolving the situation of foreign currency debtors and a gradually phase-out foreign currency-based lending was a key economic policy priority, along with comprehensive fiscal consolidation. This was warranted by the fact that by 2010, the majority of private sector loans were denominated in foreign currency, which rendered the entire Hungarian economy highly sensitive to exchange rates. Besides the fact that such a high prevalence of foreign currency loans significantly dampened the efficiency of the Hungarian monetary policy transmission mechanism, it also created an exceptional source of macro-financial vulnerability, salient even by international standards. The economy's exchange rate sensitivity became significant: in addition to the exchange rate depreciation, the rising burdens of foreign currency debtors substantially eroded households' and corporations' income position and profitability, while also posing a significant and systemic risk for the entire financial system, which was reflected in the rapid rise of non-performing loans after the

Figure 10
Developments in the household sector housing loans contracted from credit institutions



Source: MNB

onset of the 2008 global crisis. Foreign currency-based mortgage loans in the retail segment implied the biggest issue, as the weight of these loans spiked after 2003 (*Figure 10*) and the increasing related repayment burdens put hundreds of thousands of citizens at the risk of losing their home.

To address this issue, which had become pressing by 2010, as a first step the government essentially prohibited foreign currency mortgage lending to households and rolled out measures that helped avert a social catastrophe. It imposed a moratorium on evictions, reduced households' foreign currency exposure through the early repayment scheme, introduced the institution of the exchange rate cap and set up the National Asset Management Agency for the socially most vulnerable citizens. The government assistance did not provide a total solution in 2012, but broadly and materially improved the situation of foreign currency debtors. The government was unable to achieve a total solution, because in order to convert foreign currency loans to forint, the central bank's foreign exchange reserves were needed for the conversion in order to maintain financial stability. At the time however, the government could not count on the central bank's support.

The positive developments that occurred in the general government deficit and government debt as a share of GDP, and the significant reduction in external indebtedness led to a substantial improvement in Hungary's risk perception in the course of 2012. Hungary's improving market perception translated not only to a narrowing of risk spreads (e.g. CDS), but also to a significant reduction in government securities market yields (*Figure 11*).

The establishment of internal macro-financial balance created significant leeway, and the decreasing inflation outlook (to which the government measures contributed significantly) called for the easing of monetary policy in 2012. However, the key policy rate cut only began "hesitantly" in August 2012, prompted by the votes of external Monetary Council members at the time, in opposition to the votes of the internal members. The leeway for the easing cycle which subsequently lasted for over three years was therefore ensured by the progressively improving fiscal credibility created by the post-2010 budgetary consolidation, which in addition to falling inflation and increasingly anchored inflation expectations, was also fostered by the global rise in the risk appetite of international investors.

4. Satisfactory harmony between fiscal and monetary policy and the resulting outcomes (from 2013)

March 2013 marked a new period for monetary policy once the new central bank management took office, and also marked a new era in terms of fiscal and monetary policy cooperation in Hungary. From this date forward, the Magyar Nemzeti Bank (MNB) used, along with its main policy instruments, various novel

and innovative instruments and schemes to meet its primary objective (achieving and maintaining price stability), and attempted – without prejudice to its primary objective – to support "the maintenance of the stability of the system of financial intermediation" and "the economic policy of the government using the instruments at its disposal" (*Article 3 (2) of Act CXXXIX of 2013*). An adequate economic policy mix in combination with a prudent fiscal policy is one that achieves a positive equilibrium outcome (as in Leeper's model) and the attainment of the objectives of both economic policy branches (sustainable budget, price stability).

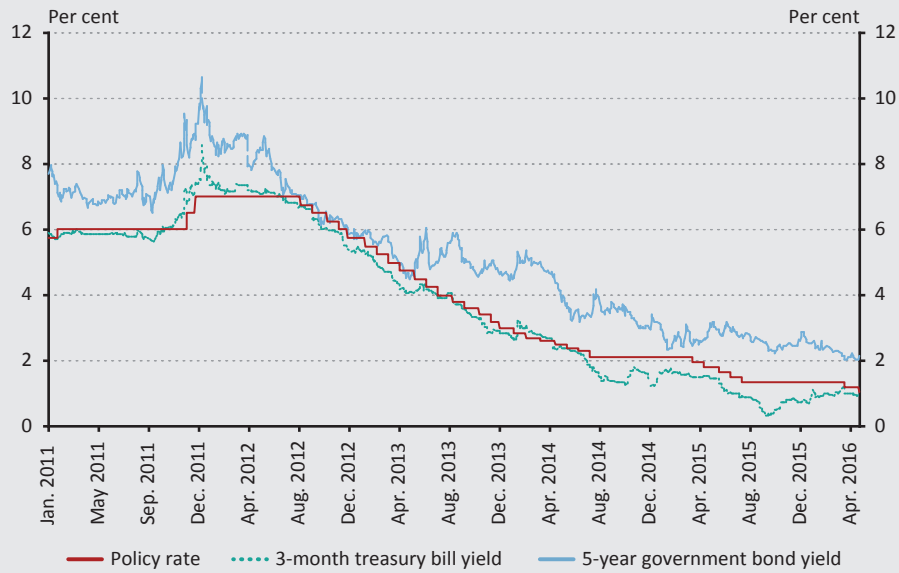
Since 2013, several aspects of the central bank's efforts have exerted a positive impact on fiscal policy. The following section presents the main steps of the turnaround in the monetary policy and the achievements thereof based on these key measures and schemes: (*i*) the easing cycles, (*ii*) the Funding for Growth Scheme (FGS), (*iii*) the Self-Financing Scheme, (*iv*) active cooperation in the forint conversion of foreign currency household loans, which also improved the monetary transmission mechanism, and more recently, (*v*) the Growth Supporting Programme (GSP).

4.1. Reform of monetary policy through active, innovative monetary instruments

i. The easing cycles. The persistently above-target inflation before 2013 started to fall in Hungary (and globally) after 2013, partly due to slack domestic and external demand and partly due to negative cost shocks, which posed the threat of deflation in other places. This risk only materialised formally in Hungary in the form of a negative consumer price index in 2014–2015, to which the multi-step government administrative price cuts – referred to as utility cost reduction – contributed significantly (*Figure 3*). The annual consumer price index had already fallen below the 3 per cent inflation target by early 2013 and had practically reached zero at the end of the year, therefore inflation fell significantly and persistently short of the level deemed optimal by monetary policy. This, in and of itself, warranted a steady easing of monetary conditions, as did the performance of the Hungarian economy, which fell short of its potential level.

In an effort to address these issues and promptly remedy them, the new central bank management decided to continue the prudent, consistent easing cycle launched in 2012 by the external members. To meet the inflation target and concurrently stimulate the real economy, the key policy rate, which stood at 7 per cent in August 2012, was cut to 1.05 per cent by late April 2016 (*Figure 11*). The reduction of the key policy rate to a historic low point occurred in several cycles.

Figure 11
Developments in the Hungarian central bank base rate and government security yields from 2011 onwards



Source: MNB, Government Debt Management Agency

ii. The Funding for Growth Scheme. Bank lending activity has slowed substantially due to the Hungarian real economy's performance, falling significantly short of its potential, and commercial bank deleveraging. In response, the MNB decided to implement novel instruments, starting with the rollout of the "Funding for Growth Scheme" (FGS) in June 2013, which was similar to the Bank of England's "Funding for Lending" scheme, but also different in many aspects. In the context of this scheme, the central bank grants refinancing loans at 0 per cent interest to commercial banks, which in turn lend to the SME sector at an interest margin of no more than 2.5 per cent, supporting purposes as new investment financing, working capital financing, EU grant pre-financing and foreign currency loan replacement. A total of some 31,000 companies accessed HUF 2,100 billion in funding under the two pillars of the scheme. The FGS, introduced as a provisional instrument, therefore achieved the market-building and growth objectives defined by the MNB at the time of its launch. At the same time, the FGS plays an increasingly decisive role in banks' standard product range, which may impede a return to market-based lending in the long run. The central bank therefore

launched its Growth Supporting Programme in early 2016 to help banks revert to market-based lending by gradually phasing out the FGS and announcing a new funding scheme providing positive incentives.

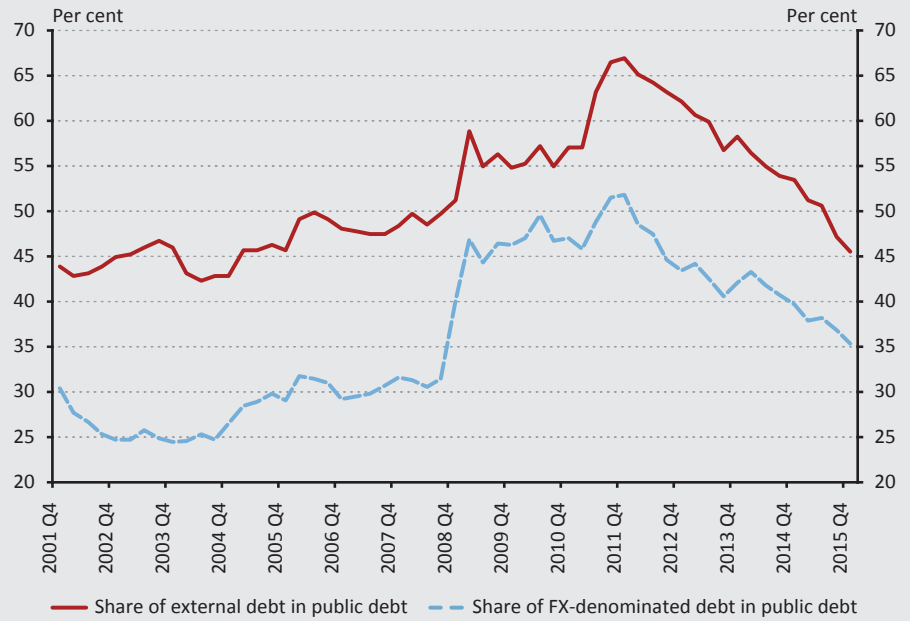
iii. The Self-Financing Scheme. The MNB rolled out additional unconventional instruments in 2014 in an effort to reduce Hungary's external vulnerability. The central bank's Self-Financing Scheme fosters the reduction of external and foreign currency-denominated gross public debt, which had continuously risen until late 2011; this programme was launched by the MNB in the summer of 2014 and expanded in 2015–2016 in several steps.

In the context of the scheme, the central bank's main policy instrument and other elements of its toolset were transformed with the intention of prompting Hungarian banks to keep their liquid funds in non-central bank liquid instruments eligible to be pledged as collateral, instead of the MNB's sterilisation instrument. Given the nature of Hungarian financial markets, this primarily meant government securities. As the first step of the Self-Financing Scheme, the main policy instrument, the two-weeks bill was converted to a deposit, followed by the introduction of the central bank's conditional interest rate swap (IRS) facility which drives Hungarian banks towards longer maturity non-central bank securities, primarily government securities, by managing interest rate risk. By announcing the second phase of the scheme in 2015, the MNB continued the transformation of its monetary toolset, spurring banks to reduce their funds held in central bank instruments. One of the main elements of this effort was to extend the maturity of the two-week main policy instrument to three months, further supported by additional measures.[11]

The Self-Financing Scheme fostered a substantial improvement in the Hungarian economy's financing structure, and specifically of government debt, and greater reliance on domestic funding, which significantly reduces Hungary's macro-financial vulnerability. In addition to fostering domestic financing, the Self-Financing Scheme also allows the debt manager to finance the bulk of its foreign currency maturities from forint funding, allowing a reduction of the foreign currency ratio of government debt and thus significantly mitigating exchange rate exposure (*Figure 12*).

[11] The two other key elements of the transformation of the toolset implemented in the context of the Self-Financing Scheme are the gradual restriction and phasing-out of the two-week deposit at the end of April 2016 and the central bank IRS facilities.

Figure 12
Non-resident ownership and the foreign currency ratio within Hungarian government debt from 2001



Source: MNB, Government Debt Management Agency

iv. The forint conversion of foreign currency household loans. A constructive relationship is also essential in other areas besides the direct channels between the two main branches of economic policy and the mutual impact mechanisms. The forint conversion of foreign currency household loans is a prime example of an economic policy area affected by both fiscal and monetary policy. The central bank played a pivotal role in the introduction of the government measures to bail out foreign currency debtors and in the phasing-out of schemes involving substantial systemic – including monetary transmission, financial stability and growth – risks. As the leading institution of the Hungarian banking system, the MNB assumed a proactive, and even an initiatory role in the negotiations between the banking sector and the government, in providing professional guidance and supplying the foreign currency liquidity needed to phase out foreign currency household loans (supplying approximately EUR 9.6 billion).

The timing, the professional competence and the constructive negotiations between the parties were instrumental in the successful phasing-out of foreign currency household loans.[12] The uniformity decision by the Curia (which is the

[12] *Kolozsi–Banai–Vonnák (2015)*

Supreme Court in Hungary) passed on 16 June 2014 laid the legal foundations for implementing the series of steps preparing and allowing settlement and forint conversion. The implementation was preceded by numerous industry debates and consultations, given the many options and potential scheduling for the phasing-out of foreign currency loans. Due to the high level of foreign exchange reserve adequacy, the MNB opted for single-step conversion. In light of the nature of conversion, the conversion exchange rate first had to be fixed, which required close cooperation between the three parties (the government, banks and the MNB). What is more, the plan had to be implemented while making sure that money and capital market players did not obtain any information on the method, timing and fixed exchange rate of forint conversion, as any potential market speculation based on this information could have undermined complete and successful forint conversion.[13]

The foreign currency tenders linked to the phasing-out of household mortgage loans were conducted in autumn of 2014 and in early 2015, while the forint conversion tenders for personal and vehicle loans were conducted in August and September 2015; consequently, Hungarian households closed 2015 having essentially cleared their balance sheets of foreign currency loans.

v. The Growth Supporting Programme. The new Growth Supporting Programme (GSP), launched on 1 January 2016, is aimed at promoting banks' return to market lending by gradually phasing out the FGS and by introducing the Market-Based Lending Scheme (MLS) as a positive incentive. The aim of the programme is to support a smooth return by banks to market-based lending as the FGS is phased out, and to expand the stocks of corporate and SME loans by a targeted amount of HUF 250–400 billion in 2016, corresponding to annual lending growth of 5–10 per cent. During the third, phasing-out pillar of the FGS, the MNB provides an additional HUF 300 billion in funding twice for the purpose of lending to the Hungarian SME sector (half in foreign currency). In addition, the Market-Based Lending Scheme (MLS) aims to provide positive incentives for banks' credit market activity. As part of the scheme, the central bank's toolset was supplemented with an interest rate swap conditional on lending activity (LIRS) and a preferential deposit facility to foster bank liquidity management. These targeted central bank instruments contribute to boosting lending through access conditions, as participating banks must commit to increasing their stock of loans granted to SMEs by one quarter of their LIRS volume used. The MNB is also working on creating a corporate credit reporting system that allows banks to assess credit risks as accurately as possible.

[13] *Nagy (2015)*

4.2. Positive growth and fiscal impacts of the turnaround in monetary policy

The easing cycles of the key policy rate, the persistently low level of the main policy instrument and the rollout and extension of the FGS and the MLS also foster the real economy and an increase in growth potential by promoting investment and employment, along with the primary objective of achieving and maintaining price stability.

Stimulating the economy using monetary instruments in such a context not only serves the attainment of central bank objectives, but also of fiscal policy objectives, which are mutually reinforcing processes. As the real economy expands, so does employment, the outflow of wages, the volume of consumption and investment spending, generating sales and income tax revenues while budgetary spending on labour market benefits is reduced. These may all contribute to an improving budget balance on both the revenue and expenditure side.

In addition, an improving general government balance as a percentage of GDP reduces the government debt ratio, which in turn improves the country's risk perception. Improving investor sentiment reduces risk spreads and leads to a decline in the yield curve. These generate an improvement in the budget balance not only through the primary balance, but also by reducing interest expenditures. The decline in yields stemming from credibility creates more room for maneuver, *ceteris paribus*, for interest rate cuts, and the repeated feedback continues until inflation and real growth reach the optimal level desired by the economy's structural factors, which entails the appropriate adjustment of the central bank base rate.

The above impacts can also be estimated in quantified terms. According to the calculations of the MNB's experts, the central bank has supported nearly half of the economic growth achieved since 2013 through its monetary policy, and has contributed significantly to real GDP growth by supporting increased investments. The reduction in the key policy rate over the past three years substantially boosted the Hungarian economy's performance, by approximately 1.5 per cent, and contributed to bringing inflation closer to the target level by over 1.5 percentage points.[14] This development was fostered by the growth impact generated by the Funding for Growth Scheme, which is estimated to have contributed to stimulating the economy in 2013–2015 to a similar degree as the easing cycles.[15]

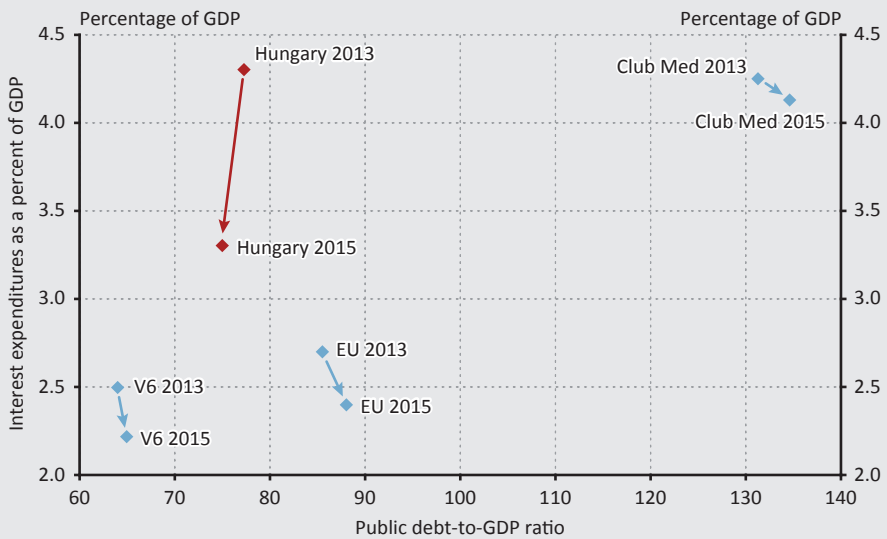
Likewise, the impact of central bank policy on the government's interest expenditures is also significant. Thanks to the greatly improving risk perception in the wake of the disciplined Hungarian fiscal policy, the central bank's easing cycles (totalling 595 basis points) and the Self-Financing Scheme, Hungarian government

[14] *Felcser–Soós–Váradi (2015)*

[15] *Magyar Nemzeti Bank (2016)*

securities market yields have decreased significantly over the past period of more than three years (*Figure 11*). Compared to a baseline scenario assuming the yields prevailing in August 2012, the interest savings generated by the declining yield curve may amount to over HUF 300 billion in 2015 and HUF 410 billion in 2016. The former amounts to nearly 1 per cent, while the latter amounts to 1.2 per cent of GDP, and this figure may reach up to 1.7 per cent of GDP.[16] The fiscal leeway afforded by lower interest expenditures may allow the implementation of additional national competitiveness-boosting schemes while adhering to disciplined financial management and maintaining a low deficit. According to the European Commission's 2015 forecast, the reduction of the Hungarian budget's interest expenditures between 2013 and 2015 may be salient by both regional and European Union standards, and the reduction of its debt ratio, partly stemming from the former, is exceptional (*Figure 13*).[17]

Figure 13
Changes in interest expenditures and government debt between 2013 and 2015



Source: Kicsák (2015)

The reduction of the yield curve and of the central bank's key policy instrument is able to not only improve the budget position, but also influences the central bank's profit or loss. This is because the central bank pays interest on the majority of its

[16] *Kicsák (2015)*

[17] *Kicsák (2015)*

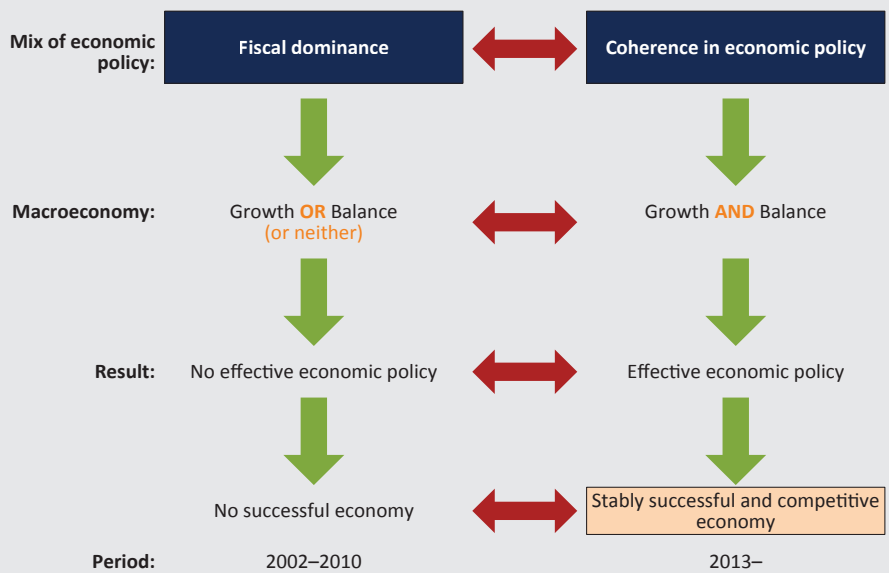
balance sheet liabilities through its sterilisation instrument, which features the key interest rate, and therefore a reduction in interest improves the MNB's profit or loss.

A positive side effect of the interest rate cuts started in August 2012 is that they help avoid central bank losses and the related budgetary reimbursement of losses. In the wake of the interest rate cuts continued in 2013, and of the rising exchange rate profit stemming from an exchange rate that was weaker than previously expected and higher conversion (such as the prepayment of the IMF loan), the central bank loss expected for the end of 2013 was annulled, with the MNB even posting a nearly HUF 30 billion profit that it was able to maintain in 2014 and 2015, thus avoiding being an additional burden for the budget.[18]

5. Summary

The relationship between fiscal and monetary policy, as well as the points of contact and correlations between these two branches play a key role not only on a theoretical level, but also in the effective conduct of monetary policy and the active shaping of macroeconomic developments. Due to fiscal dominance, fiscal balance and real economic growth could not be achieved simultaneously in the

Figure 14
Economic policy dominance and its outcomes in Hungary



Source: MNB

[18] *Matolcsy (2015)*

Hungarian economy between 2002 and 2010, and neither balance nor growth prevailed between 2007 and 2010. Following 2010, a fiscal turnaround, followed by a monetary turnaround took place in two steps. The former gave rise to fiscal balance, while the latter took the necessary steps for achieving price stability and financial stability, building on budgetary stability. The independent but constructive harmony that emerged between the two economic policies after 2013 is reflected in the sustained improvement in Hungary's macroeconomic developments (real growth, inflation, employment, government deficit, external and internal indebtedness, vulnerability, risk perception).

On balance, a harmonious and fruitful cooperation between the two economic policy branches forms an essential basis for concurrently achieving macro-financial balance and dynamic growth (*Figure 14*).

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The controversial treatment of money and banks in macroeconomics*

István Ábel – Kristóf Lehmann – Attila Tapaszti

This paper offers a basic overview of the practical aspects of money creation. A brief presentation of the history of money and a critical summary of the commonly accepted theories highlight the current understanding of the emergence and operating characteristics of money in the modern economy. We follow the distinction between inside and outside money creation. Inside money is jointly determined by the private sector's need for money, together with the banking system's money creation potential. This paper focuses on inside money along the lines of the endogenous money theory. We demonstrate the main features of money flows and the money created by banks. Outside money is created by the state (not the private sector), and its creation can only be indirectly influenced by the money demand of the private sector. A brief overview of the historical process of the emergence of money provides a framework to assess and compare the main elements of the chartalist and metallist concepts of money. Concerning the current debates about the role of the banks in money creation, we compare three theories focusing on money creation. These three theories treat the role of banks in money creation differently. The endogenous money theory based on a convincing description of money flows offers a reliable interpretation of the current monetary policy. One striking conclusion of the endogenous money theory is that banks do not need savings in advance to lend, as lending in itself is considered money creation.

Journal of Economic Literature (JEL) Classification: E40, E50, E51, E59

Keywords: endogenous money theory, money creation, fiat money, money multiplier, outside money, inside money

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1. Introduction

People's view of microeconomics based on their own observations is often far removed from what actually happens in the economy. Not because their world view is distorted, subjective or because their ideological or religious beliefs influence it, but because they cannot perceive the restrictions, forces and dynamics resulting from macroeconomic constraints. This problem is indicated by the fact that the same economic category often reflects a completely different content in the macro and the micro approach. For example, it is widely known that increasing savings at the level of individuals is a laudable virtue, while at the macro level it is often a hindrance to recovery because it dampens demand. At the individual level, indebtedness is associated with recklessness, while demand is boosted most through borrowing, since if we did not want to spend, people would not incur debt. Savings and debt are linked to money, so one might suspect that our view of money may be hampered by similar contradictions. This paper concentrates on certain contradictions of money theories. Among the theories aimed at clearing up the mysteries surrounding the origin of money, we will briefly touch upon those that are the most widely accepted. In describing the interpretations and formulating our doubts linked to them, we seek to gain a deeper understanding of the role banks play in money creation.

Since its inception more than two and a half thousand years ago, money has undergone several changes. The circumstances of its origin, however, may provide a basis for distinguishing between the misconceptions and the apparent facts about money. For the modern man, gaining an insight into the mechanism of money creation is even more important than learning about the origin of money. Even today, several conflicting theories of modern money creation are widely held. Identifying the correct and accurate mechanism of money creation among the competing misconceptions is also vital, because only a verified theory – or one that seems to be verified by the facts of the modern economy – can provide a useful tool for managing or at least understanding the understanding the current problems.

2. Is money an innovation to reduce transaction costs?

This chapter reaches a conclusion different from the commonly accepted economic thinking described in textbooks. Arguments against money theories hinging on the reduction of *transaction costs* are based on two unresolved questions. First, it should be clear *whose* transactions are examined, and it is also important to know *what types of transactions* of the participants are being analysed. Both questions remain unanswered in most money theories.

The direct exchange of goods (barter) is complicated and makes the exchange of goods very difficult. Many theories attributed the emergence of money to the fact that it facilitated the temporal and spatial separation of selling and buying goods and of the parties concerned. If goods are not exchanged directly for goods, the buyer of a good does not have to be a seller of another good at the same time, and they do not have to find an extremely rare occasion for the exchange when the buyer wishes to buy exactly the good offered by the seller, and vice versa. Not to mention the fact that the value of the goods sought to be sold and bought may be different, and the difference cannot be settled by dividing up the goods. This problem is solved if money acts as an intermediary in the exchange of goods.

It is important to determine the circumstances when barter can be substituted by money in the exchange. Money is only accepted by the seller if it carries value. But what lends value to money? Let us assume that gold represents this value. The metallist commodity money theory flourished and became widespread based on such assumptions. It seems an obvious hypothesis, but surprisingly gold nuggets have basically never been used as a means of payment (with the exception of the California Gold Rush). *Goodhart* (*1998:411*) considered this exchange a form of barter, since he believed that gold nuggets were not suitable for fulfilling the role of money, as both the seller and the buyer knew little about its value, while both of them knew the precise value of beans.[1] Determining the value of a gold nugget required an expert, which added to both the duration and the costs of the transaction. *Gierson* (*1977*) confirmed that precious metals emerged as means of payment in parallel with minting. This suggests that the sign put on the metal during minting solved the problem of assessing the value of precious metals. The imprint indicated the value, and therefore people did not have to weigh the metal and analyse its composition every time. Thus the coinage, with the minted imprint solved the problem of identification. However, together with the imprint, another element was also introduced, namely the authority that was legally allowed to engage in minting. This leads us from the concept of metallist commodity money to chartalism. According to the chartalist theory, the "value and utility" of money is not linked to its inner metal content, but to the power of the state. As the imprint identifies, it only takes one more step to disregard the significance of metal content, and to replace gold with a paper print. Thus, the value of money does not arise from its metal content.

[1] *Goodhart* (*1998*) presents a detailed overview of the origin and nature of money. His article had a marked influence on the present study. The history of money is presented from another aspect, the safe asset function, by *Gorton* (*2016*), who gives a detailed account of the events in today's global financial crisis, which confirm the essential nature of precisely this function.

The involvement of the state authority had a beneficial effect of reducing transaction costs, which fostered the spread of money. Several events in history suggest that the origin of money is not linked to the exchange between individuals.[2] *Quiggin* (*1949*) gives a more detailed account of this while providing an overview of the "primitive" forms of money in ancient societies. In such societies, money did not serve commercial purposes, its power or status aspects were more important. In other words, status and authority was more central in the inception of money than the transaction element. From this perspective, the reduction of transaction costs was a collateral benefit of the emergence of money, but not its underlying goal or reason. Readers familiar with the accounting of economic transactions know that money creation is the same as incurring debt. Money is recognised on the assets side of the balance sheet, while the debt incurred is entered on the liabilities side. When a king builds a castle from the money, his money on the assets side turns into a pile of stones, but his debt on the liabilities side is retained. The debt is an obligation to accept the money minted by him from his subjects when they pay their obligations. This is similar to the situation when a state institution charged with printing banknotes does so. This process is regulated by strict laws, but the same strict laws stipulate that taxes, duties and consideration for all state services may only be paid in domestic currency. One of the most important innovative features of money is that it improves the efficiency of tax collection. As long as the fiscal function of the person in power was constrained by the physical necessity to visit all his subjects with his entourage during the year and eat all their products deemed appropriate by him as a form of taxation, no vast empires could be established, not even when the entourage expanded over time.

According to chartalists, facilitating taxation is the key function leading to the emergence of money. Chartalists dispute the core assumption of the metallist theory that the value of money is derived from its metal content or gold backing. This theory does not view money as a kind of good with exchange value and does not stress its function as a means of exchange, but emphasises its function as a means of payment and record-keeping. In the metallist approach, the market functions as the dominant element, and the state does not play a special role in either the creation of money or its functions. By contrast, the chartalist theory maintains that all "means of payment" emerge as generally accepted money only because the authority declares that people and organisations are required to pay and keep records of certain obligations against the state in that currency. For example, the king may finance a war by giving his soldiers coins, and levy a tax on his subjects, demanding that everyone pay one coin to the treasury. This makes these coins instantly fit for circulation, as taxpayers seek to obtain them in exchange for goods.

[2] *Clower* (*1984*) listed several problems with attributing the existence of money to some form of transaction cost reduction. Divisibility, durability and transportability are clearly beneficial features, but the existence of money itself cannot be derived from these.

The mark minted on one side of the metal is used for determining its value. *Graeber* (*2011*) and *Gierson* (*1977*) both convincingly argued in support of this hypothesis. According to *Graeber* (*2011*), the metallist monetary systems using money with an inherent value and the chartalist monetary systems using money without an inherent value have alternated cyclically over the course of history. Money with an inherent value became widely used in periods characterised by widespread conflicts or wars, as trust in the weakening central authority was undermined.

The chartalist approach to money appears in the works of several well-known economists. For example in a book by Adam Smith: "A prince, who should enact that a certain proportion of his taxes should be paid in a paper money of a certain kind, might thereby give a certain value to this paper money, even though the term of its final discharge and redemption should depend altogether upon the will of the prince" (*Smith 1952 [1776]: 160, quoted in Bell 2001:154*). The general description of the chartalist theory of money was published by *Knapp* (*1924*). *Bell* (*2001*) summarises the gist of Knapp's complex argumentation as follows: when the money used for paying taxes and for the services carried out in state offices is stipulated by law, no metal-related feature of the money plays a role in the decision; therefore, this theory basically refutes the metallist theory of money. Money becomes a generally accepted means of payment because it enables people to pay their obligations to the state. The "tokens"[3] declared by the state to be accepted as a means of payment are the banknotes.

In economic settlements (bookkeeping), it is self-evident that every transaction is reflected as a mirror image on the side where an asset or liability concerned is recorded. When the state creates money, it incurs debt. When it pays wages or buys goods, it finances this expenditure by issuing debt. And it can only incur debt when there is someone who is willing to accept its debt securities (government bonds, paper money). This means that these must carry value, which is derived from the obligation to pay taxes in the given currency. Those tokens are regarded by individuals as money that can be used for paying the obligations toward the state. Such tokens can be used by anyone for this purpose, which also makes them a generally accepted means of payment. The private sector accepts the state's debt certificate and treats it as an asset in its books that can be used to pay taxes (debt). In the books of the state, the same money is debt, as an obligation to take back the money that was issued, for example to accept it when people pay taxes.

The money created is the debt of the issuer, and the creation of money represents the creation of a means for income centralisation. In order to make the security embodying the issued debt widely acceptable as a means of payment with

[3] The word "chartalist" originates from the Latin "charta", which basically means paper. *Bell* (*2001:155*) cites *Knapp's* (*1924:31*) argument that the value of the token received in a cloakroom is derived from the fact that it embodies the promise that we will get our coats back.

value, the state only has to proclaim that obligations toward the state need to be paid in the same currency. This basically means that the state accepts its own debt. Therefore, the value of money is not related to any kind of "coverage" or any inherent monetary value: it can be simply derived from the fact that it was officially proclaimed to be accepted for paying obligations vis-à-vis the state. It is an important feature of the chartalist theory of money that, in addition to the payment function, money can also fulfil an accounting function by appearing on both sides of the balance sheet. In this sense, money represents one party's agreement to hold the debt of another party in their portfolio. My money is the state's debt (*Wray 1998*).

The state may play a central role in money becoming money, but this is not an inevitable part of the process. Foley (*1987*) pointed out that anybody can create money by incurring debt, but this requires that recipients accept the money thus created in payment transactions as well. The debt issued by someone only qualifies as money creation only if the debt is accepted by others. When it issues stamps, the post office incurs debt, a liability to be met later, namely to deliver the packages bearing its stamps to the recipients. These stamps have a value from then on, as whoever has them can use them as a means of payment, albeit only for fulfilling their payment obligations for the postal services. The fact that stamps cannot be used for paying taxes is a crucial limitation, and that is why such stamps cannot become a widespread means of payment.

Banks also can create generally accepted money, since people can pay taxes from bank loans. We would note, however, that the banking system's potential for money creation is limited by credit demand. Credit demand hinges on factors that may be influenced by the government's decisions, but are driven by economic considerations. The money transferred to a bank account can be used for paying taxes. Therefore, banks also have a money creation function. This becomes especially clear when one examines the process of banks' money creation itself. Whether banks act as intermediaries between savers and borrowers in transferring already existing money or they create money themselves during their operations is a question equally important from the perspective of macroeconomics, finance and banking as well. This has significant consequences for micro and macroprudential regulation and for the tasks of banking supervision.

2.1. Three theories of money creation: Intermediation, money multiplier, endogenous money theory

There are three important and widely accepted theories discussing the macroeconomic role of banks and money.[4] All three are in conflict with each other in explaining even the basic facts, and yet still they live in peaceful coexistence in textbooks. According to one of the theories, banks simply act as intermediaries in

[4] In this chapter we follow *Werner's* (*2015*) arguments.

channelling savings to borrowers, and play no part at all in money creation. Banks do not create money, they create liquidity by providing long-term loans from short-term funds.[5] This is called the *theory of financial intermediation* by the banking system. This approach can be considered to have been the most widely accepted in recent decades. Another set of theories maintains that individual banks are unable to create money, since they cannot print banknotes, but the banking system as a whole can create money in a manner governed by the central bank. This can be achieved through the money multiplier determined by the commercial bank's reserve ratio, which in turn is controlled or at least influenced by the central bank. This is called the *money multiplier theory*. In textbooks on macroeconomics, this is still the most frequently cited theory.[6] This is all the more surprising, since most central banks in developed economies ceased to rely on this theory and to shape their monetary policy through the required reserves a long time ago. According to the third theory, banks may create money independently from the central bank through lending,[7] but lending conditions are influenced by the central bank's monetary policy. In other words, the central bank and the commercial banking sector combines a complex system of money creation, in which the money flows observed in reality are shaped by the interactions and mutual adjustment of the parties. This is called the *endogenous money theory*. Due to some features of the period after the crisis, this approach has gained in popularity once again, and many researchers present their results in relation to this approach as fundamentally new realisations. However, the theory is so old that its origin can hardly be traced (*Werner 2014a,b; 2015*). It is not new in Hungary either: one need but cite Miklós Riesz's works as an example (*Riesz 1980*). *Száz* (*1989*) gives a very good overview of this approach and the theory. Yet probably the most original proponent of this approach in Hungary was Mária Augusztinovics who believed it was self-evident that "money is created through lending, and it is eliminated when the loan is repaid"[8] (*Augusztinovics 1965*).

2.2. The financial intermediation theory

Banks and other financial enterprises perform financial intermediation between savers and borrowers. Investment funds, even if they typically do not grant loans, buy bonds issued by companies and thereby transfer investors' money to

[5] *Dewatripont, Rocher and Tirole* (*2010*) provides an excellent analysis of the theory of banks as intermediaries.

[6] For example in the textbooks following the neoclassical revolution that unfolded in the wake of *Samuelson's* (*1948*) seminal work.

[7] The fact that banks create money out of nothing is a widely accepted phrase in the literature. This radically distinguishes the approach from other theories – based on the required reserve ratio by the central bank (money multiplier) or the intermediation of savings – but it entails the risk of disregarding important elements. Such an important element for example is the fact that in the absence of credit demand, banks' "ability" is limited. It is important to point out that money creation mostly entails purchasing power redistribution and the assumption of an obligation by an economic entity.

[8] We will not discuss whether debt is negative money, i.e. whether the repayment of debt eliminates money. When money is taken to a bank to settle a debt, we do not think that the bank will shred the banknotes to eliminate the money. The interpretation of the cited expression, however, raises further questions that we will address when discussing balance sheet settlements.

companies. *Gurley and Shaw's* (*1960*) seminal book emphasises that banks and non-bank financial institutions basically perform the same function in financial intermediation. A simplified model of financial intermediation shows that out of 100 units of savings, banks create the reserves necessary for safe functioning, e.g. using 1 unit for this purpose, which they deposit with the central bank, where they receive (normally low) interest on it. The remaining 99 units are then extended as loans. Investment funds also manage their liquidity, but they do not necessarily have to put aside reserves for day-to-day payments, since the liquidity can be obtained by selling securities.[9] To put it simply, we can say that out of 100 units of savings they buy 100 units of shares, i.e. the whole amount may be used for investments (direct financing). From a financing perspective, this is the same "intermediation" as if it happened through a bank. The main distinctive feature is that the prudential regulation of banks and non-bank financial institutions is significantly different, and therefore "intermediation" by investment funds is outside the regulation of banks. The stricter regulatory provisions with respect to banks are attributed to the fact that banks should not gamble with depositors' money by taking up investment risk, but in the case of investment funds, there is no repayment guaranty, the clients accept that the risk is borne by themselves.

According to the theory of financial intermediation, banks do not create money individually or collectively, i.e. at the level of the banking system. This theory can be used easily in several economic models, since it basically implies that the money created (or rather not created) by the banking system can be left out of these models,[10] and therefore banks' behaviour is not important. In the majority of such models, money is simply a unit of account used to record income flows, but the theory does not say anything about money creation or the role played by banks in it. This theory is more like a theory of banking than a theory of money. This theory, which disregards the behaviour of banks and its impact on money flows, was called into question during the global financial crisis, and recently many attempts have been made at integrating banks' behaviour into macroeconomic models.

2.3. The money multiplier theory

The money multiplier theory is based on the assumption that commercial bank's reserves held at the central bank are an important element of the financial intermediation process. The money multiplier theory goes one step further than the intermediation theory. Although it still describes individual banks only as financial intermediaries, at the macro level it acknowledges the money creating potential inherent as a whole in the banking system. Deposits may be multiplied

[9] It is no coincidence that in the case of such transactions some days pass between the order and the settlement.

[10] The general shortcomings of representation of the role of banks in these models and the importance of changing this is portrayed in detail in *Jakab–Kumhof* (*2015*).

in the banking system, since spending a loan extended from a bank's deposits may generate deposits at another bank, which may produce another loan and another deposit in the banking system. This deposit–loan multiplication can be influenced by adjusting the reserve requirement. This gives us a theory that provides monetary policy with a simple instrument for shaping money flows.

The multiplier theory is described in most macroeconomic and financial textbooks as a basic, self-evident principle. In practice, however, employing this principle for the analysis of money flows has advantages, but also serious drawbacks. We would emphasise the latter when judging the theory, but first we have to briefly present the principle of multiplication itself.[11] In the following, we examine the credit multiplication process resulting from the expansion of deposits based on the example by *Siklos* (*2001:322–328*) (with minor changes).

Demand deposits (current account balance) of Company C1 increased by HUF 1 million because it performed a contract for the state. The company holds an account with Bank B1. Banks are required to hold in reserve 5 per cent of the demand deposits to be able to make current payments and transfers.[12] The required[13] reserve ratio (rr) is 5%. In excess of this, the bank still has additional funds (reserves) of HUF 950,000 from the HUF 1 million increase. Bank B1 deposits this temporarily at the central bank as an excess reserve.

Company C1 transfers HUF 1 million from its deposit to Company C2, which increases the current account balance of Company C2 with Bank B2, while overall the demand deposits and reserves of Bank B1 decrease by the same amount. The increase in its demand deposits is used the same way by Bank B2 as by B1, i.e. B2 deposits it at the central bank as a reserve. Overall in the banking system (when viewing the two banks together), the transfer transaction does not entail any growth in deposits and the reserve requirements also remain the same. However, there is still a surplus of HUF 950,000 in reserves in the banking system. This should be used by the bank where it appears, for example by extending loans or investing in securities.

The excess reserve of Bank B2 should be used for accepting Company C3's loan application and granting a loan of HUF 950,000 in bank money. From the loan, Company C3 repays its debt against Company C4. Company C4 also holds an account

[11] A more detailed and accessible description of the process supported by accounting relations can be found in the textbooks by *Száz* (*1991*) és *Siklos* (*2001*).

[12] We present a simplified description of the reserve requirement process. We only highlight the liquidity necessary for ensuring that transfers are processed without interruption, and we do not discuss the other monetary policy goals the reserve requirement system may have.

[13] It would be more appropriate to use the term "target reserves" instead of "required" by regulation, because what really matters in the money creation process is the level of reserves that the commercial banks would want to hold (target).

at Bank B2, and therefore the bank records an increase of HUF 950,000 in deposits at the same time when the loan is extended, out of which 5 per cent is put in the required reserve, but this still leaves it with excess reserves of HUF 902,500.

This process increased the deposits in the banking system to HUF 1.95 million. But this increase continues, as there are still excess reserves in the banking system, which generates further lending or investments, provided that credit demand allows this expansion. The banking system seeks to reduce its reserves to the level of the reserve requirement and attempts to lend out the excess reserves. Therefore the process can continue. If all excess reserves in the banking system are used for lending, the lower the required (or targeted) reserve ratio, the more deposits are generated. In our example, the sum of the required and excess reserves generated in step (a) was HUF 1 million, which was produced by the initial increase in deposits. If all the HUF 1 million is distilled into required reserves and no excess reserve remains in the banking system that could be used for lending, bank lending generates a HUF 20 million increase in deposits in the context of a 5 per cent reserve ratio.

Money multiplier describes the additional deposits and loans generated by the increase in excess reserves in the banking system which can be used for lending. In order to show the relationship between this process and the amount of money, we start our analysis with the central bank's balance sheet.

The amount of money in circulation (*M1*) that the private sector can use for payments is the sum of all the cash and demand deposits (*Siklos 2001:326*). The change in the amount of money in circulation is due to the change in the amount of cash and demand deposits. The process of money supply in the above example starts in step (a), at the level of individual banks, Company *C1* deposited[14] HUF 1 million in Bank *B1*. This reduced the amount of cash in circulation by HUF 1 million, while the stock of demand deposits increased by the same amount, i.e. the amount of money in circulation did not change. However, at the level of the banking system, the amount of money expanded by HUF 19 million due to the process of multiplication.

According to the theory, the central bank can influence the amount of money through several channels. It can increase the required reserve ratio and print money, which can be issued by purchasing foreign currencies or securities (government securities).[15] Government securities purchases and the accumulation of foreign

[14] Above in step (*a*) we assumed that the increase of HUF 1 million in deposits does not originate from the cash in circulation but from the state budget. If the revenue of the company is from a direct budget expenditure, then the state has created so-called "outside" money with this step. From the perspective of the multiplier, however, the nature of the initial step that induced the growth in deposits is irrelevant.

[15] For the purpose of distinguishing it from the creation of fiat money, the money created by the central bank (or the *Treasury* in the United States of America) is called outside money, while the money created by banks is called inside money. In practice, in the case of developed economies, 90 per cent of the money supply is created by banks (*Goodhart 1998*), but as a result of quantitative easing, today this figure is closer to 97–98 per cent.

exchange reserves both boost the money supply, since the central bank pays for the foreign exchange and the government securities in forint. This process is referred to as controlling the money supply through changes in the monetary base (*M0*). The monetary base is the sum of the cash in circulation and the central bank reserves. All in all, it can be stated that the central bank can influence M1 money supply by changing the monetary base (M0) as follows:

$$\frac{M1}{M0} = \frac{(cr+1)}{(cr+rr)} \qquad (1)$$

where cr=CUR/DEP is the ratio of cash to deposits and rr=RES/DEP is the required (or targeted) reserve ratio.

This formula follows the textbook conventions and highlights the concept of monetary policy (and money creation) that the central bank controls the money supply by changing the required reserve ratio. This formula assumes that banks do not hold reserves in excess of the required reserves because it is too costly. This is precisely the assumption on which the theory that the money supply is controlled through the required reserve ratio is based. In reality, however, especially after the crisis, the monetary base also expanded through the bloating of banks' excess reserves, but this did not lead to the multiplication of the money supply in the real economy.

*The money multiplier model described above suggests that the central bank can easily influence the money supply by adjusting the items on the assets and liabilities sides of its balance sheet***.** This influence, however, cannot be exerted fully and perfectly on either side.[16] The amount of cash in circulation is shaped by the cash-use habits of the public and banks' reserve decisions, and it does not depend solely on the size of the monetary base and the multiplier. As the monetary base is the sum of the cash and central bank reserves, it is difficult to control it, since banks' excess reserves can substantially change their size. This means that the formula describing the key to the central bank's control over the money supply is *unstable*. The parameters can be determined without difficulty at any time *ex-post*, but looking ahead they can usually change easily and unexpectedly. This is like pushing on a string. The central bank has several instruments at its disposal for influencing money flows. All in all, we may venture to claim that the central bank, should it wish to do so, could exert a relatively tight control over the monetary base even with considerable uncertainties,[17] but the price for this control would be volatile fluctuations in interest rates. Nevertheless, the broad monetary aggregates could

[16] See *Siklos* (*2001:478*).

[17] Recently "helicopter" money has become a hotly debated issue. If we take into account this instrument as well, the central bank has an even better chance to influence the monetary base. At what price it would be able to do so is another matter.

not be controlled, not even at this price, because it would also be influenced by the portfolio decisions of economic actors.

The other, even bigger problem with controlling the money supply through the required reserve ratio is that the size of the multiplier is also uncertain. In reality, the creation of (bank) money does seem like a sort of multiplication. Nonetheless, money creation in the form of bank money is determined by credit demand and not a multiplier. The process of bank money creation can be described by a cause and effect relationship, which is not a matter of a simple ratio. The theory of endogenous money supply assumes a relationship which is quite the opposite of the one suggested by the money multiplier theory: the monetary base itself is endogenous too, and it is the result of endogenous credit, since it is created by the central bank in response to the lending activity of commercial banks. The belief that the multiplier is determined by the required reserve ratio is based on very radical simplifications and assumptions which are out of touch with reality.[18] We do not know anything about the potential pace of iteration among individual banks in the whole banking system, and therefore we cannot know how many members are aggregated, which makes the result of our calculations of the multiplication process uncertain. The textbook construction of the multiplier is convincing and, on account of the simplification, it may be a very effective presentation tool, but no practical analysis should be based on it. There are further problems with controlling money supply. The very concept of money itself is hard to measure. Based on liquidity and flow features, several categories of money can be distinguished. The series *M0, M1, M2, M3* can be continued, and it may be useful to capture the categories of money in a continuum that enables an infinite number of divisions (*Barnett 1980*).

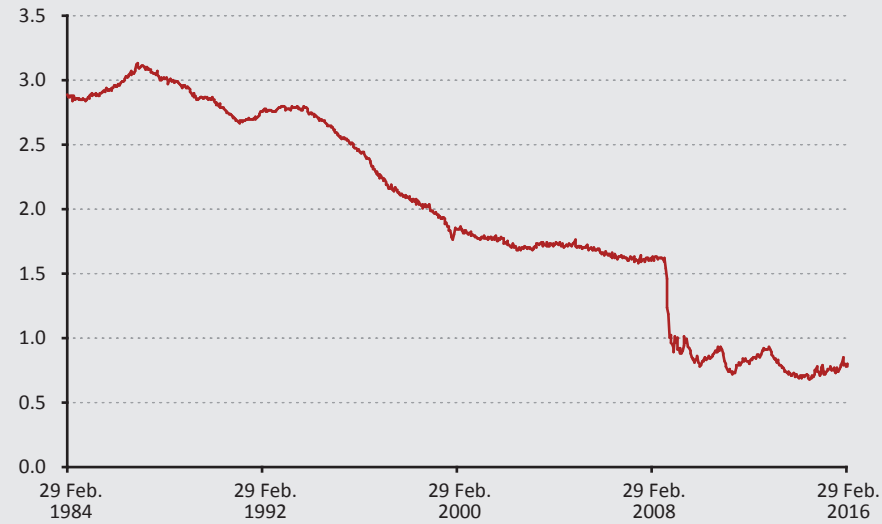
2.3.1. Money multiplier in reality

Figure 1 shows the development of the money multiplier over time, or more precisely the M1 money multiplier indicator of the Federal Reserve Bank of St. Louis. The chart clearly illustrates the instability of the multiplier in the past decades. The direct causes of the changes will not be discussed here. Nonetheless, the development of the indicator shows that the Fed's interventions in the wake of the 2008 crisis considerably expanded the monetary base, which, however, was not reflected in lending, and therefore the multiplier dropped significantly.

Due to the uncertainties surrounding the money multiplier, by the late 1990s most central banks had abandoned the approach of controlling the money supply via the required reserve policy. In many cases this also meant that central banks abolished the reserve requirement, i.e. in the textbook model rr would be 0, which would mean the creation of an infinite amount of money. Instead of controlling the

[18] This has been asserted by many people. For a detailed discussion, see *Keen* (*2011*).

Figure 1
M1 money multiplier of the Federal Reserve Bank of St. Louis, 1984–2016



Source: Bloomberg

money supply, central banks shifted to influencing interest rates, which is currently integrated into an inflation targeting framework in many places.

2.4. Endogenous money theory

The endogenous money theory states that money creation happens at the moment when banks extend a loan.[19] This single step, however, has radical consequences. In this manner, banks can extend loans without collecting any kinds of deposits for funding, because lending instantly creates money.[20] This is hard to accept, since we might believe that in order to provide someone with money that can be spent, banks need to acquire it first, as they cannot print money. While it is true that they cannot print money, they can keep accounts. The moment the loan is extended, it appears on the client's account. This is a bookkeeping entry, and the money registered here was not transferred from another account or intermediated from the savings of another economic actor. In creating a credit debt, the bank

[19] In this sense, exogenous money is the money the emergence of which cannot be directly inferred from the credit demand of economic actors. An example for this is the central bank money created through quantitative easing or the money created by the central bank by purchasing the government securities issued in order to finance the general government.

[20] This money creation is markedly different from the one involving the state, and the two are usually distinguished at the conceptual level as well. The money created by banks is called inside money, while the money created by the state is called outside money. In practice, however, when we pay in a shop, we do not know the way the cash we use was created, which, fortunately, is irrelevant to those who sit on the other side of the till as well.

generates a client deposit with the amount credited to the borrower's account, over which, from this moment on, the client may dispose. This deposit, however, was not brought into the bank by anyone, it was created by the bank by crediting it in their own books.

Superficially, the amount credited to the account of the borrower appears to be a deposit, but as the condition for increasing the balance on the current account,[21] *the client undertook a future payment obligation to the bank as described in the documentation of the bank loan.* At the macro level, credit growth entails an expansion of the money supply. This boosts the effective demand (consumption and investments), since it would make no sense to take out a loan at interest if people did not want to spend it on buying goods. If the loan is used to repay debts, we offset a potential loss in demand, which would occur if we repaid the debt from the savings accumulated by reducing our spending.

2.4.1. The accounting of loans

Any company can extend loans, but the accounting representation of the transaction is different in the case of banks and other companies. This difference is shown in *Table 1*. Lending by a company (non-financial enterprise or non-bank financial enterprise) means the realignment of its assets. Among the company's assets, a receivable against the borrower appears, and the balance of its bank account shrinks by the same amount. Banks usually only extend loans to their clients, and expect borrowers to keep their accounts at their institution. When a bank grants a loan, its assets increase by the amount of the loan, which is credited to the client's account, and therefore on the assets side its client deposits increase by the same amount.

Table 1

Changes in the balance sheets of companies, non-bank financial intermediaries and banks after the accounting of loans

Company		Non-bank financial intermediary		Bank	
Assets	**Liabilities**	**Assets**	**Liabilities**	**Assets**	**Liabilities**
Loan: +100		Loan: +100		Loan: +100	Client's current account balance +100
Deposit: –100		Deposit: –100			
Balance: 0	0	0	0	+100	+100

Source: Werner (2014:73)

[21] Throughout the paper the terms current account balance, deposits or demand deposits of a company are used as synonyms.

Banks create money through lending. The idea that lending is money creation is not new. There have been many people who believed in this concept. We could mention *Hawtrey's* (*1919*) work, but *Werner* (*2015*) states that one of the earliest major books of the theory was the one written by *Henry D. Macleod* (*1856*) (*Werner 2015:6*).[22] *Basil Moore's* (*1988*) book, which is still influential today, played a central role in the modern-day reinterpretation of the endogenous money theory.

In the next section, we detail several types of transactions that can be linked to money creation. Various types of transactions are examined, including ones involving commercial banks and ones involving the central bank. Using these examples, we illuminate the economic substance of money flows. The balance sheets used in accounting provide an accurate picture of financial processes, and therefore we present the process of the transactions through these balance sheets.

In *Table 1*, we showed that different types of companies record lending in their balance sheets differently. This is analysed in more detail below. If a loan is extended to Company "A", the balance sheet of a commercial bank changes in the way shown in *Figure 2*. Lending affects the assets and the liabilities side of the bank's balance sheet at the same time. On the assets side, the new loan is recorded, while on the liabilities side a deposit of the same amount is credited. In other words, the act of lending creates its own source, and the cornerstone of the whole process is credit and not savings in the traditional sense. Thus, the subject of both the loan and the deposit transaction is Client "A". Other accounting items and consequences related to the operation of the bank such as the capital requirement, the required reserve ratio and other regulations and regulatory requirements may hamper the bank's lending activity. These effects are analysed later.

Figure 2
The balance sheet of the commercial bank extending a loan to Company "A"

Assets	Liabilities and equity
Reserves at the central bank (required reserve, other and excess reserve items) and cash	Previous Deposit
Previous Loans [1] ***New Loan ('A' company)*** [3]	***New deposit ('A' company)**** [2] Other liabilities (net) [4]

** Balance increase credited to the borrower's account by the lending bank, [2]=[3]*
Source: Authors' compilation

[22] Others also cite the works by Marx, Wicksell and Keynes.

The promise of Client "A" to pay back the loan becomes a generally accepted means of payment through this transaction. In other words, the bank performs a transformation: the individual debt of Participant "A" becomes a generally accepted liability (with higher liquidity) against the bank. In fact, due to the state's deposit insurance schemes, the amount that appears as the increase in the client's current account balance and designated on *Figure 2* as "new deposit" may potentially become a receivable against the state within the framework of deposit insurance. It is important to note that deposit insurance means a conditional and therefore limited obligation by the state, but in general the state's intention to ensure the uninterrupted functioning of the whole banking system suggests a sort of unlimited implicit guarantee. When viewing bank lending as money creation, it is important to bear this in mind, since this fact also indicates the practical significance of money creation through lending by individual banks.

In parallel with lending (or rather after lending), commercial banks create reserves in line with the regulations. Central bank reserves mean the commercial bank assets (various deposits, required reserves) held on an account with the central bank. The increase in required reserves is settled by the bank by reallocating some of its excess central bank reserves to the required reserves. Should a bank not have enough reserves, the missing liquidity is offset by interbank borrowing or a central bank loan. The latter assumes money creation by the central bank: as we have pointed out earlier, in the complex system of money creation, the decisions of the central bank and commercial banks all play a role.

All in all, it can be stated that banks do not act as intermediaries with respect to savings, but basically allocate purchasing power among economic actors in line with certain market, business and economic considerations.

Here we have presented the first moment of the act of money creation, but it is worth examining some further steps in the transaction and the resulting consequences for the central bank.

Figure 3
Commercial banks' balance sheet when using deposits while transferring funds to a client within the bank

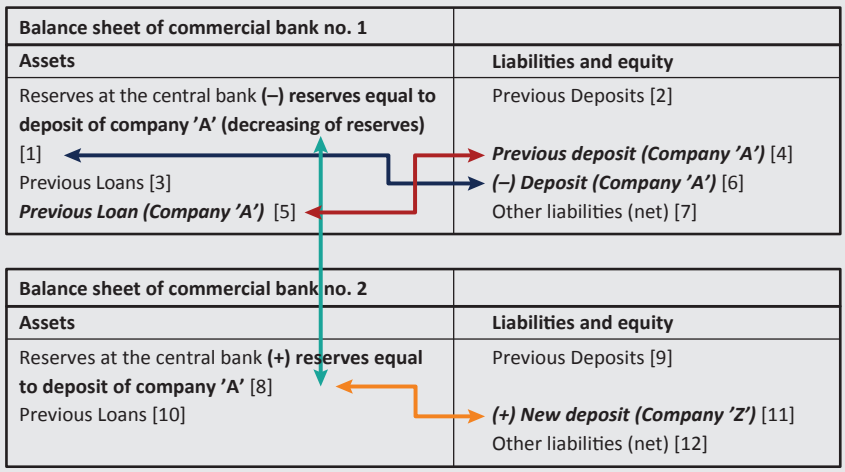
Assets	Liabilities and equity
Reserves at the central bank (required reserve, other and excess reserve items) and cash	Previous Deposits
Previous Loans [1] ***(+) New Loan (Company 'A')*** [3]	***(+) New deposit (Company 'A')*** [2] ***(–) Deposit (Company 'A')*** [4] ***(+) New deposit ('B' vállalat)*** [5] Other liabilities (net)

Note: (+) Loan (Company "A") = (+) Deposit (Company "A"), [3]=[2], [4]=[5].
Source: Authors' compilation

If, after the loan is extended, Company "A" buys a product from Company "B", and settles the purchase with an intrabank transfer, then the transaction entails only a realignment on the liabilities side of the bank. At the end of the process, the increase in the account balance of Participant "B" finances the loan of "A". *It is important to underline that this is a result of the borrowing and the subsequent use of the loan by "A", not a financing act or a reason enabling the loan.*

If the initial loan is used for a transfer outside the bank, the situation is different (Figure 4). In this case, the transaction between two banks within the banking system can only be settled in central bank money, and through the bank accounts held with the central bank.[23] This transfer affects the reserves of both banks held on their accounts with the central bank, reducing the account balance of the bank initiating the transfer and increasing it in the case of the recipient bank, as if it was a case of "reserve transfer".

Figure 4
Using deposits in interbank transfers



Note: [4]=[5], [1]=[6], [1]=[8], [8]=[11].
Source: Authors' compilation

Due to the "transfer" of reserves, the liquidity of both banks changes. Banks' liquidity management focuses on central bank money. Liquidity management seeks to ensure that the given commercial bank always has available funds with the central

[23] In theory, commercial banks can keep accounts for each other. In such a scenario, the transfer is settled as an intrabank transaction with the amount credited on the account of Bank "B" held with Bank "A", and therefore the money does not leave the bank. For the sake of simplicity, in this paper we will assume that commercial banks interact with each other through their accounts held with the central bank. Transfers are thus settled in an interbank transaction.

bank for making interbank transfers for their clients. Interbank settlements are carried out through banks' accounts held with the central bank. Nothing prohibits banks from keeping accounts for each other and from settling their transactions through these accounts, but we do not deal with this in this paper. We assume that banks settle their transactions through the central bank. The endogenous money created by banks does not influence banks' accounts held with the central bank at the moment of money creation, but when clients use the loan granted to them for buying something from the client of another bank or transferring a portion of it to someone else, that transaction does have an impact on the balance of banks' accounts held with the central bank.

It is possible that banks' clients only do business with intrabank clients. This does not change the liquidity of banks. In this case, liquidity management is limited to adjusting the composition of the required reserve and managing the potentially arising demand for cash. The other extreme is when, after the loan is extended, clients transfer the full amount to another bank without receiving any transfers to their own accounts. In this case, banks' liquidity management has to acquire a stock of central bank money equivalent to the full amount of the client's loan. Of course, the real cases are between these two extremes in most instances, and the netted interbank settlements further reduce demand for central bank money.

Central bank money can be acquired in several ways, for example by issuing bonds, interbank borrowing, a loan received from the central bank or a capital increase. Interbank lending is presented in *Figure 5*.

Figure 5
Commercial banks' balance sheet during interbank lending

Balance sheet of commercial bank no. 1	
Assets	**Liabilities and equity**
Reserves at the central bank **(+) reserves equal to interbank loan** [1]	Previous deposits [2]
	(+) interbank loan [3]
Previous loans [4]	Other liabilities (net) [5]

Balance sheet of commercial bank no. 2	
Assets	**Liabilities and equity**
Reserves at the central bank **(–) reserves equal to interbank loan** [7]	Previous deposits [8]
(+) interbank deposit [9]	
Previous loans [10]	Other liabilities (net) [11]

Note: [1]=[3], [1]=[7], [7]=[9].
Source: Authors' compilation

In addition to interbank lending, central bank money can be included in bank financing through a capital increase, by issuing bank bonds,[24] and of course the central bank money held at the bank may increase/decrease during the day-to-day operations of the bank, depending on the decisions of the clients. In the case of a well-functioning interbank market, i.e. when the participants of the banking system completely trust each other, the amount of central bank money available at the given institution usually does not limit lending, as participants can smoothly manage their temporary shortfalls in central bank money on the interbank market. *In the case of the potential interruptions on the interbank market, the financing loans extended by the central bank may provide a solution for ensuring liquidity.* And in the case of a bankruptcy, the state deposit insurance ensures the convertibility to central bank money to a certain limit.

Thus, in practice, the amount of central bank money depends on both the decisions by the central bank and the banking system. The banking system influences the banking system's liquidity through central bank operations. The commercial banking sector *as a whole* does not directly influence the aggregate balance of its accounts held with the central bank, i.e. it cannot create central bank money. At the level of the sector as a whole, banks' decisions can only influence the realignment among the individual central bank instruments, i.e. they only determine the structure of O/N deposits, longer-term deposits and required reserves. This statement assumes that we *disregard government security purchases* on the market. *Indirectly, however, the lending activity of commercial banks does have an impact on the level of central bank money. This is because the central bank adjusts to the central bank money demand of the commercial banking sector by actively monitoring it and intervening in the case of potential tensions. Therefore, central bank money demand can be derived from credit demand and endogenous money creation itself on the one hand, and from the structural characteristics of the commercial banking sector on the other hand (e.g. the intensity of interbank lending or the limits allocated by the banks to each other for these transactions).*

A large government securities market would, of course, profoundly change this situation. Therefore, we discuss an illustration focusing on buying and selling government securities as follows.

In the case of buying government securities (on the primary market), the realignment occurs on the liabilities side of the central bank's balance sheet (Figure 6), between the central bank deposits of commercial banks and the account of the state held with the central bank. In this sense, quantitative easing, which is currently used

[24] Except when it is bought by a client in the same bank, but in such a scenario the demand for central bank money diminishes due to the bond funds that have lower liquidity.

extensively, only means a swap of assets on the assets side of the players other than the state: government securities with different yields and maturities are exchanged for central bank money, which, in the case of non-bank players, appears in the form of commercial bank deposits. If we assume that the government securities market is liquid and stable enough, the direct effect of quantitative easing on the banking system is not pronounced, since actually two assets with similar liquidity and the same issuer, the state, are exchanged. Of course, indirectly, by pushing down the yields on government securities, quantitative easing may boost the prices of risky assets.

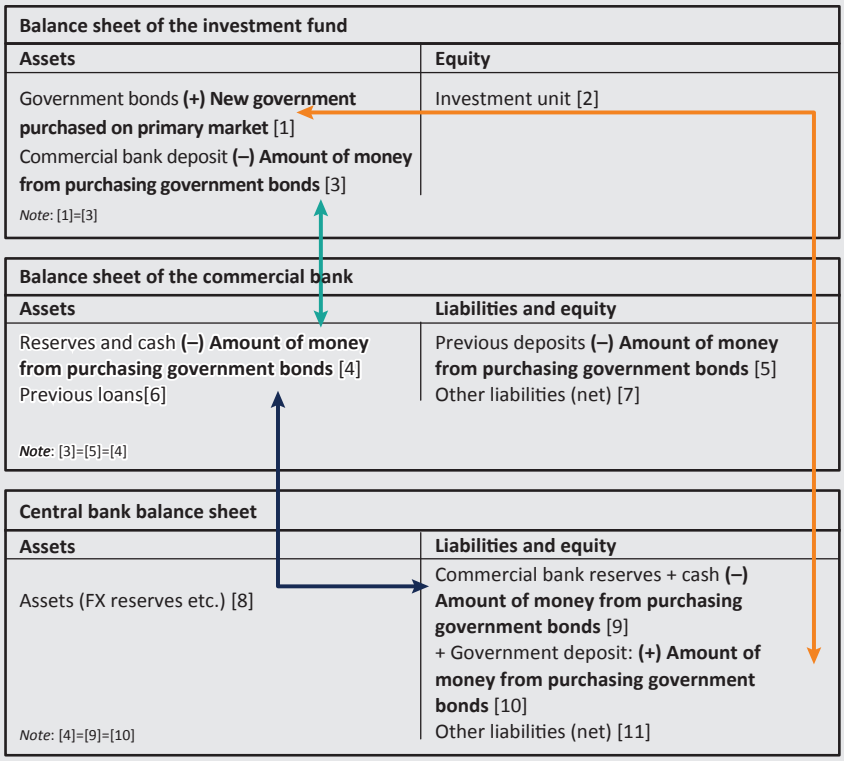
If the central bank does not buy government securities but buys other, less liquid instruments that are difficult to sell, the situation is different. In this case, the intervention may improve lending, but not by expanding the central bank money supply, but rather owing to the cleansing of commercial banks' balance sheets. In this manner, an expected loss of uncertain size is removed from banks' balance sheets, which may boost lending.

The expansion of the central bank's asset purchases could prompt higher monetary categories (M2, M3, etc.) to gravitate towards M0, which in turn may contribute to a drop in yields and changes to the liquidity of the individual asset categories, but we do not address these effects here.

The analysis of a direct capital injection by the central bank (helicopter money) discussed on several forums nowadays is also beyond the scope of the present paper. Normally, this would mean a realignment on the liability side of the central bank's balance sheet from the central bank's capital elements to the deposits of commercial banks held with the central bank. The assets side would remain intact, i.e. in the future the stock of central bank money would not be reduced automatically as it would in the case of a normal quantitative easing measure, in which, in the absence of a potential reinvestment by the central bank, happens eventually when the bonds mature.

In the case of quantitative easing, when the central bank buys government securities, the increase in the stock of central bank money can be considered as an exogenous factor from the perspective of the banking system, i.e. its developments cannot be directly derived from the demand for central bank money arising from endogenous money creation by banks. In this case, the expansion of the stock of central bank money is exogenously given for the banking sector. This fact also means that the widespread criticism that commercial banks keep the money with the central bank rather than lending it to the real economy is misguided. Central bank money, just like in other cases, cannot be considered a traditional liability that

Figure 6
Changes to the balance sheets after government security purchases on the primary market

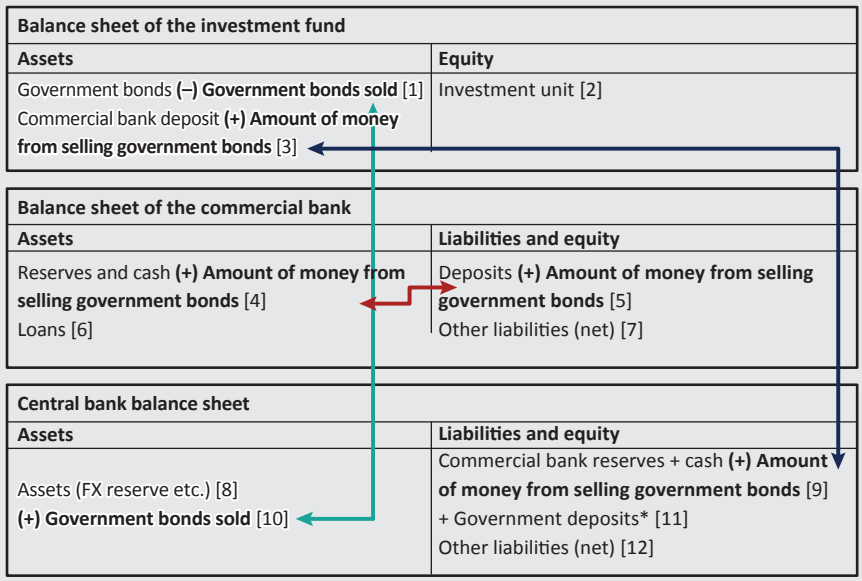


Source: Authors' compilation

can be lent out. It is rather an instrument at the disposal of commercial banks that can be used for meeting the transactions needs linked to lending and for ensuring liquidity. In other words, the lending activity of commercial banks does not influence the amount of central bank money created through quantitative easing, and it does not disappear from the balance sheet of the central bank even if lending in the real economy gains momentum.

The money created by commercial bank ceases to exist at the moment when the loan is repaid, i.e. the obligation assumed by the borrower and at the same time the obligation assumed by the bank (deposit) ends.

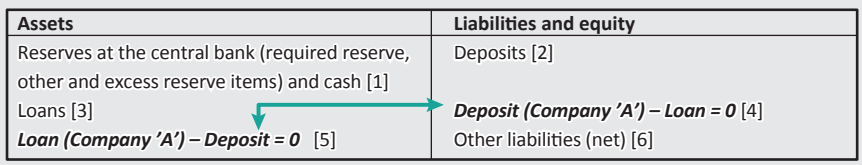
Figure 7
Quantitative easing – Government securities purchases by the central bank



Notes: [1]=[10], [1]=[3], [3]=[5]=[4]=[9]=[10]

** Also includes the amount raised from issuing government securities if it has not been used since then. If transactions were carried out with the private sector (e.g. paying the wages of public sector employees), this portion is also recorded among the commercial bank deposits held with the central bank.*
Source: Authors' compilation

Figure 8
The cessation of commercial bank money



Note: [4]=[5]=[0].
Source: Authors' compilation

2.4.2. The limits of money creation[25]

It does not follow from the endogenous money theory that money creation has no limits. The volume of credit changes constantly as a result of the complex correlations between economic actors' decisions. The practical limits of money creation are determined by financial regulators, capital adequacy requirements,

[25] The work of *McLeay, Radia and Thomas* (*2014a;b*) gives a good account of endogenous money creation. In the following, we base our description on that.

reserve requirement regulations, liquidity rules and lending risks. The central bank influences lending activity by adjusting the price of central bank money and using other monetary policy instruments.

Banks also need to manage the risks associated with new loans. One of the ways to manage *liquidity risks* may be to attract relatively "stable" deposits. This means deposits that depositors are unable or unwilling to withdraw in large amounts at the same time, i.e. in the case of which banks, during liquidity management, only need to plan for a negligible potential use outside the bank until maturity. This is because banks try to ensure that a portion of their deposits is kept in time deposits with a certain maturity in order to mitigate liquidity risk.[26] Depositors, however, expect to be compensated for having deposits with longer maturities, which is costly for banks, and hampers lending. In the case of demand deposits, the higher liquidity risk is offset by the lower interest rate. Banks' lending activity may also be limited by *credit risk considerations*. Banks can protect themselves against this by keeping an appropriate amount of capital. But loans always pose some risk to banks, and therefore, when setting the price of loans, credit institutions also take into account the costs of loan loss provisioning. If banks expand their loan portfolio, the anticipated average loss is expected to rise, which, from a profitability perspective, also limits banks' lending activity and the money creation potential. In addition, losses beyond a certain limit may also affect compliance with capital adequacy rules.

The behaviour of households and companies may also limit the banking system's ability to create money. The behaviour of the non-bank private sector influences the ultimate effect exerted by the lending activity of the banking system on money supply. In the absence of credit demand, the framework provided by the central bank and the commercial banking sector is only necessary, but not sufficient conditions for money creation. Therefore, the economic actors that obtain the newly created money may decide to eliminate it at once, for example by repaying previous loans. The behaviour of economic actors has a significant influence on the amount of money in the economy, which in turn has inflationary implications. If the new loan is not eliminated at once, but increases spending by economic actors, the process may create inflationary pressures. The improving capital adequacy of commercial banks indirectly boosts lending capacity, but this is not a sufficient condition to jump start lending.

Central bank monetary policy may also limit the money creation potential of the banking sector. By influencing interest rates, central banks' monetary policy influences demand for loans. In simple terms, if the price the banking system pays for accessing central bank money increases, it raises the costs of lending as well as the cost of deposits created by commercial banks. This also increases the costs of banking services. The central bank acts as one of the most important "production

[26] Banks can also mitigate liquidity risks by holding assets in their balance sheet that are liquid or that can be liquidated easily.

and service" input for commercial banks, and provides them with central bank money The costs of this process are passed on to the customers. Therefore, the base rate has a direct impact on the lending rates and indirectly, via other channels, it affects banks' lending opportunities.

3. Summary

When generating loans to their clients, commercial banks create money. The disbursement of the loan does not require the prior collection of additional funds, since as the loan is approved, the amount is credited to the account of the client kept by the bank. This act also creates the source of the loan. Lending is not the financial intermediation of savings in the sense that banks do not need to directly collect savings for lending or to reallocate them from somewhere else.

In using the loan, the client may transfer the obtained funds to another bank. The bank maintaining the account provides liquidity for completing the transfer. Liquidity management ensures the availability of an adequate amount of central bank money on the accounts of commercial banks held with the central bank, so that the bank can fulfil the payment orders initiated by their clients. The funds for this can be obtained by collecting deposits, taking out interbank loans from other banks or the central bank, or by other means. The costs of acquiring funds may influence banks' lending activity through this channel. However, the real limit to lending is determined by credit demand.

The credit demand of companies and households can be influenced by many factors. The interest rate policy of the central bank affects lending costs via several indirect channels, and the cost of loans obviously influences credit demand as well. Credit demand, however, also depends on the performance of the economy, the general conditions of supply and demand as well as business prospects and expectations.

The active management of the amount of central bank money does not directly determine the endogenous money creation in the economy, although it does exert an impact on it through the effect on its costs.

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Review of Hungarian EU transfers – at the border of two fiscal periods*

Anna Boldizsár – Zsuzsa Kékesi – Péter Koroknai – Balázs Sisak

The paper examines the extent to which the sectors and regions of Hungary benefited from the EU grants of the 2007–2013 programming period, the degree to which they managed to absorb the allocation available for them and the amount Hungary can still expect to receive after 2015 in relation to the previous programming period. In addition, the paper also reviews the shaping of payments related to each operational programme. In respect of the new programming period, the authors review the changes in the allocations available to the member states and the funds that can be used for specific purposes, and also present the challenges of the 2016 drawdown plans based on the experiences of the previous period. In addition to the quantitative analysis of the Hungarian figures, the available data are also analysed in a regional comparison thereby making the priorities of the individual countries comparable in terms of development purposes. As a result, the authors establish that in the new programming period – in line with the shrinking size of the EU budget – the cohesion funds for Hungary will slightly decrease; however, the amount is expected to be distributed among the various economic policy objectives more evenly and the structure of the grants may be more favourable in terms of economic growth.

Journal of Economic Literature (JEL) Classification: E22, E60, F30,

Keywords: European Union, transfers, cohesion policy funds, investments

1. Introduction

Funds from the European Union play an important role in the development of the external balance position via transfers financing the investments and the increase in the disposable income of the economy. In addition, a considerable part of the funds are capital transfers supporting investment, and thus monitoring and evaluating them is also important when analysing the dynamics of investments

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

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(*Keresztély 2013*). Accordingly, in this paper we primarily try to identify the projects for which Hungary used the EU grants from the 2007–2013 programming period, the degree of utilising the available total allocation and the amount Hungary can expect to receive in connection with the previous cycle after 2015. As regards the new cycle, we review the changes in the total allocation available for the Member States and the funds that can be used for the various objectives; in addition, based on the experiences of the previous cycle, we present the challenges of the plans related to the drawdown of funds in 2016. In addition to analysing the Hungarian figures, we also analyse the available data in a regional comparison. On the other hand, it should be emphasised that this paper essentially uses a volume-based approach and does not intend to present the impact of the EU funds on the various macroeconomic variables and the efficiency thereof.[1]

In terms of their economic content, the transfers are classified as current and capital transfers. The current and capital accounts in the balance of payments reflect the absorption of transfers; this is the amount that increases the disposable income of the individual sectors and, *ceteris paribus*, net lending.[2] Accordingly, the EU transfers work toward reducing the economy's external indebtedness. Current transfers are consumption-related grants increasing the disposable income (e.g. direct agricultural subsidies), which are stated in the balance of payments among the secondary or other primary incomes. By contrast, capital transfers are typically investment-financing grants, stated in the capital account. The size of the received grant may also be examined in two ways: the gross transfer is the amount that the country receives from the EU as grants, while the net transfer also considers, in addition to the grants received from the EU (revenue), payments made to the EU (expenditure).

The transfers received by Hungary are provided by a variety of funds. A large part of these funds originates from the Cohesion Fund and the Structural Funds (European Regional Development Fund, European Social Fund),[3] the key objectives of which is to achieve convergence, improve regional competitiveness and expand employment. In addition, the EU provides separate funds for the support of

[1] This paper was prepared by the staff of the Macro Finance and External Balance Department, which is in charge of the central bank's *Report on the Balance of Payments*. The authors relied on the experience gained in the preparation of the *Report*, but the paper presents the topic of EU transfers in much more detail than allowed for by the narrow bounds of the *Report*, which discusses past processes, and also includes an analysis related to the new cycle.

[2] It is also important to note that this reflects the accrual-based value of the transfers. By contrast, the financial account reflects the disbursed EU transfers in the change in foreign exchange reserves, since the state converts the transfers received in euro to forint at the central bank, thereby increasing the central bank's reserves and the economy's external assets. Thus, the funds that increase net lending via the current and capital accounts may be interpreted in the financial account, through the increase in foreign exchange reserves, as an outflow of foreign funds (i.e. by receiving and absorbing the EU transfers, *ceteris paribus*, the economy's dependency on external finance decreases).

[3] Since 2013 European Structural and Investment Funds.

agricultural and rural development through the European Agricultural Guarantee Fund and the European Agricultural and Rural Development Fund. In addition to these grants of substantial volume, grants in smaller amounts are also available for cultural and youth programmes, consumer protection and other objectives.[4]

The amount and allocation of the EU financing funds is coordinated by the European Commission. After determining the total allocation available for grants, the funds are allocated among the objectives (convergence, regional competitiveness, European regional cooperation, employment) and the Member States. When determining the financial allocation of the individual Member States the "population eligible for grants, national and regional prosperity and the unemployment rate" are considered, followed by the decision on the acceptance of the operative programmes defined by the Member States (*European Commission 2007*).

The allocation and absorption of the funds is the result of a long process; the fiscal commitments are implemented by funds and objective at annual level. On the other hand, the funds available for absorption are not lost automatically at the end of the programming period. The grant allocation may be drawn down until the end of the second year after the closure of cycle (n+2 rule);[5] thus the European Commission only withdraws those funds in respect of which no payment request was received until that date. As a result of this, it was possible for the absorption of the grants from the 2007–2013 programming period to continue in 2014 and 2015 (*European Commission 2007*).

2. Absorption of EU transfers in the past

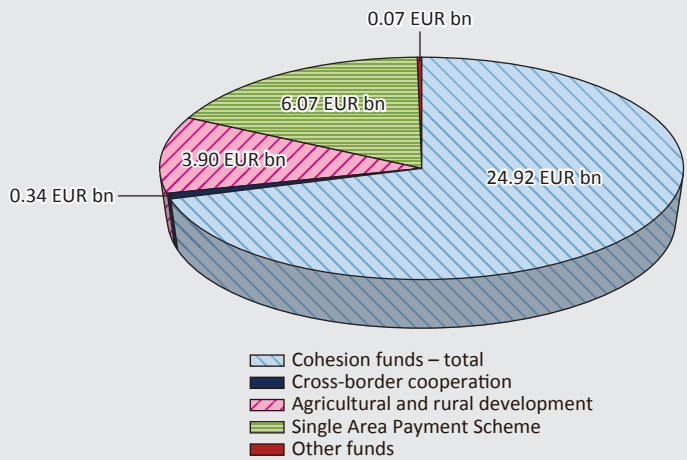
Based on the commitment made by the EU in the 2007–2013 programming period, Hungary was entitled to a grant of EUR 35.3 billion (almost HUF 9,900 billion calculated at EUR/HUF 280, the average exchange rate of the period), accounting for roughly 35 per cent of the country's annual GDP. The largest part of the allocation came from the Structural Funds and the Cohesion Fund; these funds amounted to EUR 24.9 billion (HUF 7,000 billion) (hereafter we shall refer to these two Funds as cohesion policy funds). In addition, the inflow of direct agricultural subsidies in the amount of EUR 6 billion (HUF 1,700 billion) and the rural development grants in the amount of EUR 3.9 billion (HUF 1,000 billion) also accounted for a major part of the allocation. A smaller part of the absorbed funds, i.e. roughly EUR 0.3 billion (HUF 100 billion) was used as part of the cross-border cooperation. Due to the

[4] For more information on the financial assets allocated to the EU's community policies see: the website of the EU Communications Service and its publication "Cohesion policy 2007–2013": *http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2007/publications/guide2007_hu.pdf.*

[5] An n+3 rule, based on similar principle, applied to Portugal, Greece and the Member States that acceded to the EU in 2004 (including Hungary) until 2010.

principle of additionality, the grants received from the EU were supplemented with the necessary own contribution, provided by the Hungarian budget in the amount of roughly EUR 7.2 billion (HUF 2,000 billion) (*MNB 2016*).

Figure 1
EU commitment for Hungary in the 2007–2013 programming period
(EUR billion)



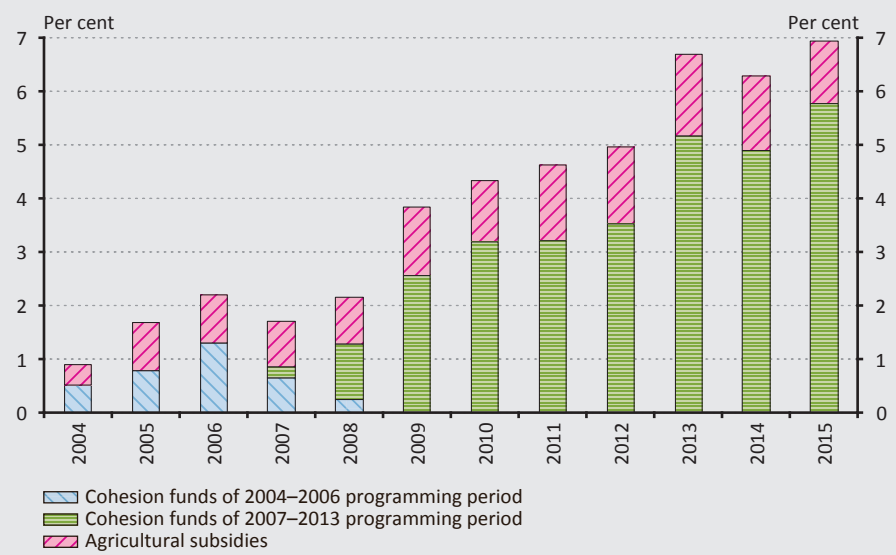
Source: MNB

The financial allocation provided by the EU is determined in foreign currency, and thus the amount of EU grants to Hungary is also influenced by the development of the forint exchange rate. Since parties eligible for grants always submit the invoices in forint, upon the depreciation of the forint less foreign currency is sufficient for the settlement thereof. The programming period was planned at an exchange rate of EUR/HUF of 280, and thus in parallel with the depreciation of the forint the value of the EU grants expressed in forint increased considerably during the period. As a result of this, the anticipated HUF 9,900 billion value of the funds available for absorption may be exceeded by roughly HUF 380–400 billion, as a result of which a higher number of projects may be implemented from the grants allocable to the 2007–2013 period (*State Audit Office of Hungary 2015*). On the other hand, the depreciation of the exchange rate – through the import content of the investments – also generates higher costs than planned, which curbs the increase in the number of projects. As long as the currency effect on the expenditure side falls short of the increase in the forint value of the grants, depreciation of the exchange rate may result in the implementation of more investments.

2.1. General trends in EU transfers

Between 2007 and 2015, domestic agents absorbed transfers in a net amount of EUR 33.4 billion. The amount of absorbed EU grants peaked in 2015, after the end of the 2007–2013 programming period, which was rendered possible by the n+2 rule.
The absorption of the transfers originating from the previous cycle, which appeared in the balance of payments, accelerated after 2009; at that time, the net transfer absorption was already around 3 per cent of GDP, compared to the previous level of 1 per cent. "Unused funds from the Cohesion and Structural Funds can still be drawn down within the next two years following the individual EU programming periods. This occurred in the 2004–2006 programming period, when almost 30 per cent of the allocation was absorbed in 2008 and 2009. In the 2007–2013 programming period, the EU grant allocation – which increased considerably, i.e. by 24 per cent of GDP compared to the previous period – was implemented with gradually increasing absorption.[6] In the two years after 2013 the inflow of EU funds was around 6–7 per cent of GDP, which was rendered possible by the n+2 rule." (*MNB 2016, p 24*) It

Figure 2
Distribution of the gross inflow of the EU transfers by programming periods
(as a per cent of GDP)



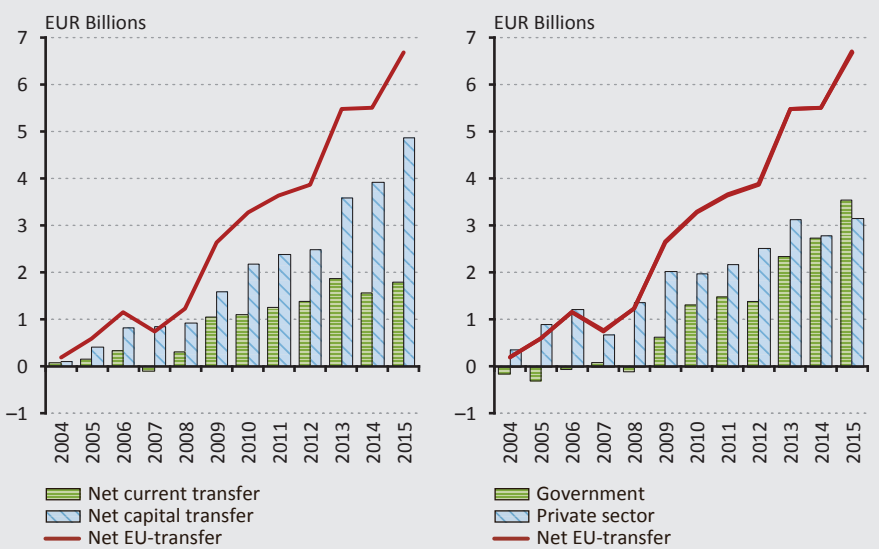
Source: MNB

[6] The substantial absorption of the funds of the 2007–2013 programming period only started from 2009; in 2007 and 2008 the funds of the previous programming period were typically still being absorbed.

should be noted that the fluctuations in the EU grants are essentially attributable to the drawdown of the Cohesion and Structural Funds, while the agricultural subsidies, amounting to roughly 1 per cent of GDP (which to a lesser degree also contain the subsidies from the Rural Development Fund) are distributed relatively evenly between the years (*MNB 2016*).

Capital transfers supporting investments accounted for an increasing part of the absorbed grants, while by 2015 – contrary to the former trends – the transfers received by the state exceeded those of the private sector. In recent years, the absorption of capital transfers increased from 1–2 per cent of GDP close to 5 per cent. These funds typically support the implementation of some sort of investment, and hence this sharp increase also had a substantial effect on the dynamics of investments. By contrast, net current transfers increased only moderately after 2009, amounting to only 1.5–2 per cent of GDP annually at the end of the period. The largest part of these current items are agricultural subsidies determined on the basis of area, independently of projects, and thus the absorption of those is more stable than that of capital transfers. The Member State payments are also included in the current items. The funds necessary for the EU budget are provided by the payments of the Member States, where the largest revenue is generated by

Figure 3
Current/capital and sectoral breakdown of the net EU transfers*
(as a per cent of GDP)

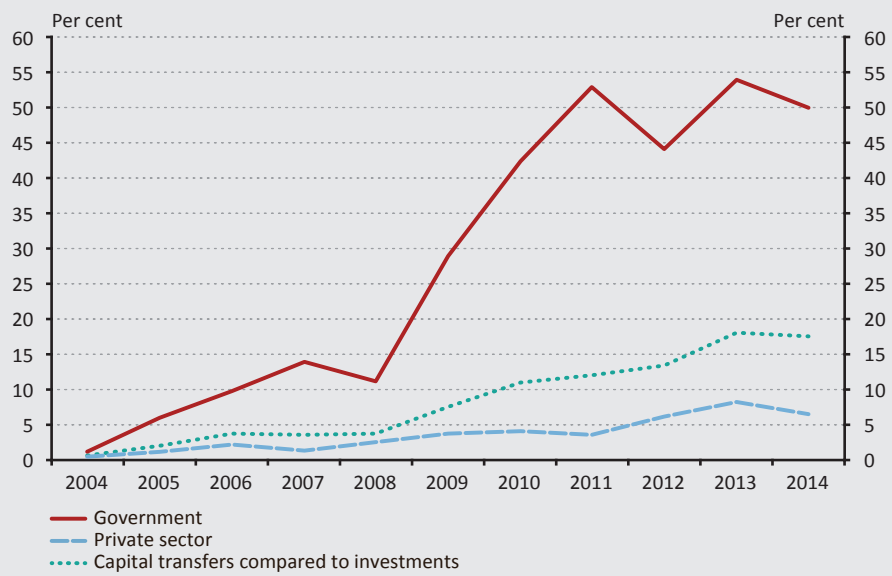


** In addition to the grants received from the EU, this also considers payments to the EU. Payments to the EU reduce current transfers.*
Source: MNB

the GNI-based contribution paid at a standard rate and by the VAT-based payments. During the programming period, Hungary's payments to the EU predominantly appeared among the general government expenditures and steadily accounted for around 1 per cent of GDP (for more details on payments made by Hungary, see the Annex). Up until 2013, the EU grants absorbed by the private sector substantially exceeded the absorption by the state. However, since then – presumably with a view to ensuring a faster drawdown of funds due to the end of the 2007–2013 programming period – the transfers received by the general government started rising quickly and by 2015 the state had already absorbed more transfers than the private sector.

The role of capital transfers increases both within public and the private investments. Public investments implemented from EU funds and public capital transfer absorption sharply increased after 2008. In 2011, the ratio of EU transfers within public investments already exceeded 50 per cent and it was also at a similar level in 2013–2014.[7] Within private sector investments, the ratio of investments financed from EU funds remained at a lower level, but gradually increased, and hence after 2011 it accounted for 5–8 per cent. One interesting question is to what extent

Figure 4
Developments in the rate of capital transfers compared to investments



Sources: Eurostat, European Commission

[7] The large public enterprises developing and operating infrastructure also form part of the general government sector (e.g. Nemzeti Infrastruktúra Fejlesztő Zrt., Magyar Közút Nonprofit Zrt.).

the principle of additionality was enforced under the high ratio of investments implemented from the transfers: in addition to the own contribution related to the grants, the EU also prescribes the type of investments that the beneficiary country should implement to avoid that the grants finance the budget deficit (this paper essentially analyses the direct data of the sources, and hence the issue of additionality could rather be the topic of research focusing on the impacts of the EU funds).

2.2. Cohesion policy funds

In the 2007–2013 programming period, via the tools of cohesion policy, the EU used a significant part of its budget to strengthen economic, social and regional cohesion in the EU. Within this, the EU set the objective of promoting convergence (by supporting the poorest regions, which fell 75 per cent below the Community average), as well as regional competitiveness and employment. The financial funds for the objectives are provided by the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (CF). The objective of the ERDF is to reduce inequalities between regions, the ESF focuses primarily on employment and education developments, while the CF supports the countries where gross national income (GNI) per capita is below 90 per cent of the EU average – the latter mostly finances large-scale developments in the area of environmental protection and transport.

In the 2007–2013 programming period, funds in the amount of EUR 24.9 billion were allocated to Hungary via the structural funds (ERDF, ESF, CF), supplemented by the national contribution in the amount of almost EUR 4.4 billion (a little more than 15 per cent). A significant part of the funds granted to Hungary was allocated to the convergence objective, while the largest part of the projects were financed by the European Regional Development Fund and the Cohesion Fund (*Lehmann–Nyers 2009*). The framework for the drawdown of the amounts allocated to Hungary is provided by the National Strategic Reference Framework (NSRF). Within that framework, Hungary defined a total of 15 operational programmes: seven sectoral, seven regional and one implementation operational programmes. During the programming period, the largest grants were received by the Transport (TOP), the Environment and Energy (EEOP) and the Regional (ROP) Operational Programmes (*NDA 2012*). The table below summarises the key features of the operational programmes in the 2007–2013 programming period:

The time profile of payments under the individual operational programmes was rather heterogeneous; nevertheless, by the end of 2015 the Hungarian state paid the total allocation of all operational programmes, while there was overspending in most of the programmes. Of the operational programmes, the run-up of the regional operational programmes (ROP) was one of the most even. Within that group, it is worth highlighting the Central Hungary Operational Programme,

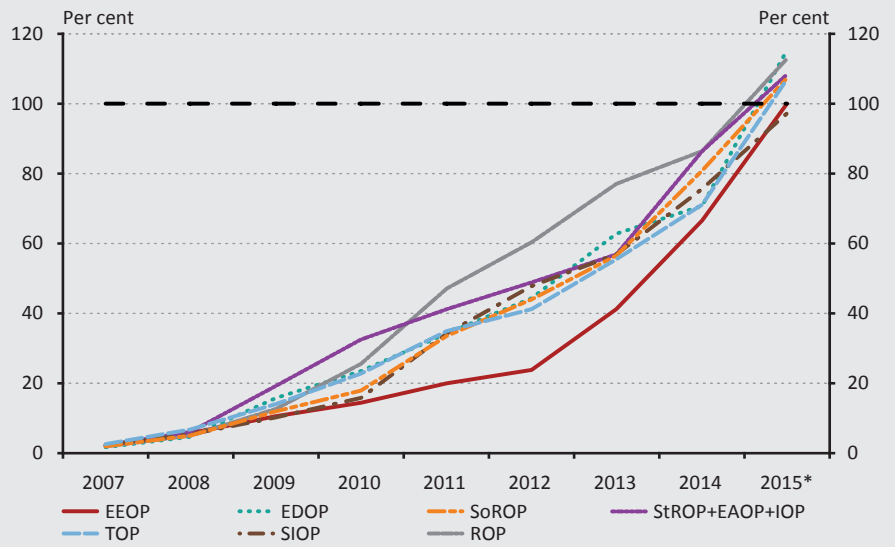
Table 1
Convergence of disadvantaged areas

	EUR bn	Fund	Aims
Sectoral Operational Programmes			
Economic Development OP (GOP)	2.9	ERDF	Stable economic growth, improving productivity
Transport OP (KÖZOP)	5.7	ERDF/CF	Development of transport
Environment and Energy OP (KEOP)	4.5	ERDF/CF	Increase labour productivity, reduce social differences (training, education, healthcare)
Social Renewal OP (TÁMOP)	3.5	ESF	Development of education, healthcare, labour market and social service infrastructure
Social Infrastructure OP (TIOP)	1.8	ERDF	Reducing environmental issues
Electronic Administration OP (EKOP)	0.3	ERDF	Development of IT in public administration
State Reform OP (ÁROP)	0.1	ESF	Increase the level of administrative system's performance and services
Regional Operational Programmes (ROP)			
Central Hungary OP (KMOP)	1.5	ERDF	Improve the quality of life, increase employment rate, create new jobs, convergence of disadvantaged areas
South TransDanubia OP (DDOP)	0.7		
Central TransDanubia OP (KDOP)	0.5		
West Pannon OP (NYDOP)	0.5		
South Great Plain OP (DAOP)	0.7		
North Great Plain OP (ÉAOP)	1.0		
North Hungary OP (ÉMOP)	0.9		
Operational Programme for the implementation of European Cohesion Policy			
Implementation OP (VOP)	0.3	CF	Technical support
Sum	**24.9**		

Source: State Audit Office of Hungary (2015)

in which the payments were made the fastest. In addition, the payments of the West Transdanubia and the South Transdanubia, and the South Great Plain regions were executed better than the average. On the other hand, the projects implemented in the North Great Plain, North Hungary and Central Transdanubia regions confirmed completion of the projects by invoices more slowly than the average. The rest of the operational programmes can be regarded as “tail-heavy”, i.e. they were characterised by the acceleration of payments in the final years. One possible exception to this is the implementation operational programme (IOP): due to the objective of the programme (technical assistance) these funds were drawn down relatively evenly. Partially due to the substantial size of the projects, the Environment and Energy operational programme (EEOP) paid almost 80 per cent

Figure 5
Payments by the individual operational programmes



** Estimation*
Sources: SMIS, HST

of the grants very slowly, only after 2012. Since the total allocation of the latter programme is extremely high, it can be stated that a considerable portion of the EU grants in recent years was paid for environmental purposes.

"Overspending" also occurred in the case of the operational programmes, which were not steady though. Overspending means that the Hungarian state typically paid EU tender funds in higher amounts than the allocation provided by the EU. This is necessary to ensure that no funds are lost should the Commission have any objection. The excess invoice portfolio can be used as a "cover" for the potential problems that may arise subsequently in the case of items already settled with the Commission, instead of the potentially unsuitable invoices submitted or to be submitted, or in the case of suspended payments for financial adjustment.[8] Among the operational programmes, the largest overspending in nominal terms can be observed in the case of the transport (TOP) and economic development (EDOP) programmes. Both of these are amongst the operational programmes with higher allocation, and thus the overspending is presumably also attributable to the intention to be able to submit new invoices for the purpose of financial adjustment or to replace invoices potentially disputed by the EU. In addition, overspending

[8] If the Commission and the Hungarian authorities are able to agree on the degree of the financial adjustment, the grant deducted from the disputed investments may be reallocated to new projects. In this case, the amount deducted from the disputed investments most probably has to be covered from the national budget.

may also signal the popularity of the programmes, the objectives of economic policy, as well as the strengthening of the economy's growth potential. It should be noted that the "popularity" of EDOP may also be supported by the fact that in the new programming period, despite the decrease in the total allocation, the funds planned to be allocated here are substantially higher than in the 2007–2013 programming period. On the other hand, the social infrastructure (SIOP) projects, and the overspending of the EEOP and StROP programmes are negligible. The overspending in respect of the rest of the programmes is around 5–20 per cent.

Based on the data available until the end of December 2015, it is unlikely that any loss of funds from the 2007–2013 programming period will be suffered, i.e. the Hungarian State has paid the available total allocation of EUR 24.9 billion in full. Based on the information available at the end of 2015, it can be stated that the European Union has already paid a substantial part of the allocation for 15 operational programmes (around EUR 22 billion) and, based on existing invoices, Hungary may receive further grants from the EU in the amount of EUR 2.9 billion in relation to the 2007–2013 programming period (*Figure 6*):

i. Up to December 2015, the Hungarian state submitted invoices in the amount of *EUR 0.2 billion*, the payment of which can be expected in 2016.

ii. Suspended amounts or amounts not submitted due to suspension account for a large part of the allocation not paid by the European Commission *(EUR 1.4 billion)*. It is the transport programme (TOP) that is most affected by the suspensions; at present TOP payments of EUR 573 million are suspended. The Commission interrupted the payments of TOP back in December 2013 due to the so-called asphalt mixer case,[9] and it was suspended in summer 2015 as no agreement could be reached on the degree of financial adjustment. In addition, there are also some disputed items in the case of the Social Renewal (SoROP) and Social Infrastructure (SIOP) programmes.

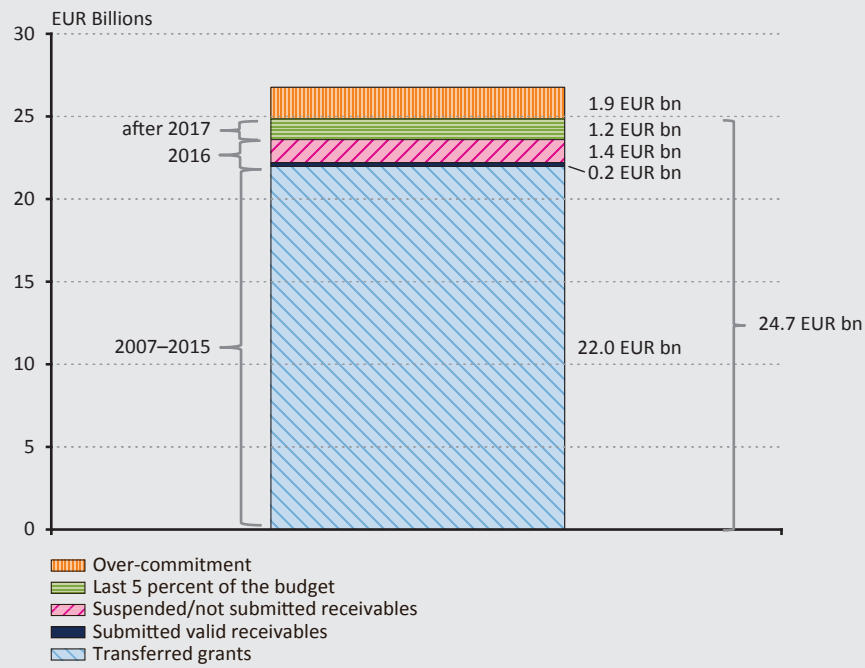
iii. According to the rules, the EU does not transfer the last 5 per cent of the grants, around *EUR 1.2 billion* to the Member State until completion of the full review of the grant given (in relation to the 2007–2013 programming period the Commission is expected to make the payment in 2017–2018).

According to the available data, Hungary has over-secured itself by EUR 1.9 billion, i.e. by almost 8 per cent of the total allocation. Taking all operational programmes into account, overspending ran to roughly EU 1.9 billion, i.e. the EU tender funds paid by the Hungarian state exceeded the allocation provided by the EU by this amount; accordingly, irrespectively of the pending disputed items, a loss of funds

[9] According to the EU, the Hungarian rules were discriminative, as they permitted the delivery of asphalt for the road construction only for suppliers with business seat located within a distance of 50 kilometres.

is unlikely due to the substantial overspending. On the other hand, it should be also noted that although Hungary performs extremely well in terms of absorption, it does not necessarily mean that the impact of the projects on economic convergence was also the greatest in Hungary. For example, *Heil–Nagy* (*2013*) found that due to focusing on absorption the projects implemented from the cohesion funds were predominantly short and less complex, while a major impact on the economy can be rendered probable typically in the case of more complex, innovative and hence longer projects. More efficient absorption of the funds would be facilitated by the application of supplementary policies that increase the fund absorption potential of the less-developed regions (e.g. by establishing a background structure related to research and development), which would be an extremely time-consuming measure. A further consequence of the full allocation of funds is that although, thanks to the last two years, Hungary was able to draw down the grants of the 2007–2013 financial cycle in full, due to the administrative burdens of the previous cycle the issue of tender notices and the conclusion of the contracts related to the new, 2014–2020 programming period was only able to start later.

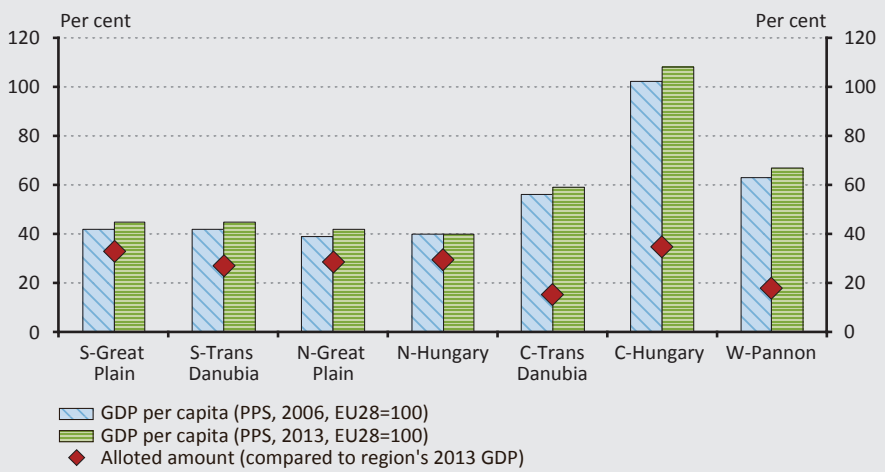
Figure 6
Absorption of the cohesion policy grants of the 2007–2013 programming period up to end-December 2015



Source: Hungarian State Treasury

As regards the regional absorption of transfers received by Hungary, the largest volume of funds was received by Central Hungary, but support for the less-developed regions was also considerable. In Central Hungary, GDP per capita substantially exceeds the average of the rest of the county and is slightly above the EU average. There was a substantial increase in the region's GDP per capita between 2006 and 2013, which was also supported by the transport and infrastructure investments (underground line 4, extension of M0 ring) implemented during the period. In terms of GDP per capita, the two most developed regions, after Central Hungary, are West and the Central Transdanubia regions. These regions received less EU grants in proportion to their GDP compared to the less-developed regions, but in spite of this convergence to the EU average was more significant in these two regions. In the less-developed regions of the county, GDP per capita compared to the EU28 countries was around 40 per cent both in 2006 and 2013. This shortfalls in these areas remained substantial despite the significant inflow of EU funds – reaching 30 per cent of GDP on average in 2013 – which suggests that the rate of convergence is also influenced by the geographical location of the regions. Nevertheless, it is probable that without the absorption of the EU funds the negative consequences of the crisis would have resulted in an even more severe lag in the growth of these regions.

Figure 7
Absorption of EU transfers, by regions



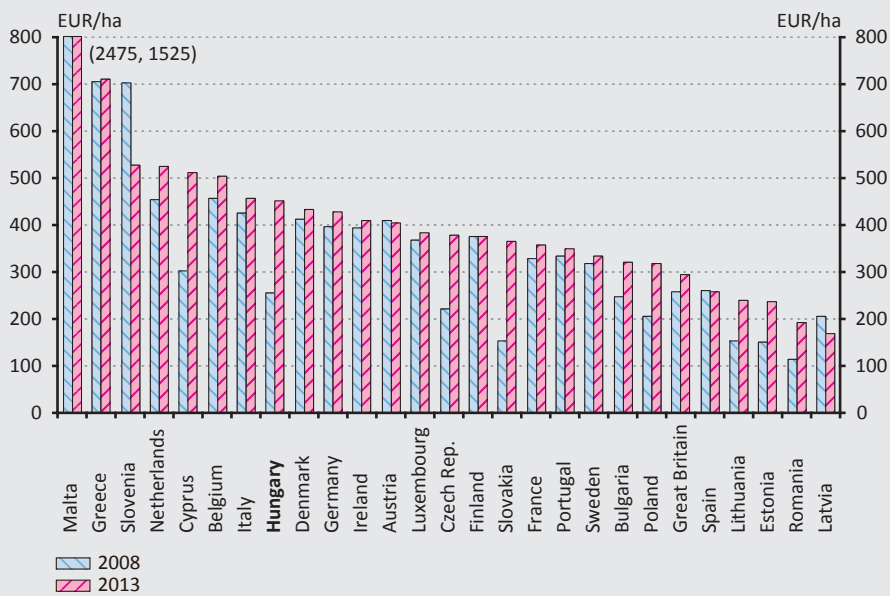
Source: Standardised Monitoring Information System (SMIS), HCSO, Eurostat

2.3. Agricultural and rural development subsidies

One type of agricultural and rural development subsidies are the direct producer and agricultural market subsidies, while the second pillar is the rural development grants. The Common Agricultural Policy (CAP) is the European Union's agricultural subsidy scheme, from which Hungary receives agricultural grants from two sources. A significant part of the EU funding provides direct subsidies to producers and the agricultural market from the European Agricultural Guarantee Fund (EAGF). The second pillar of the agricultural subsidy scheme is the European Agricultural Fund for Rural Development (EAFRD), which provides the rural development grants. From the date of accession until 2013 Hungary received funding from these two sources in the total amount of EUR 12.5 billion.

The level of agricultural and rural development subsidies received from the EU was already high in Hungary in 2008 and increased further in the 2007–2013 programming period (*Figure 8*). As a result of the gradually increasing direct subsidies, by 2013 the agricultural grant per hectare increased by more than one and a half times; with this, among the countries that joined the EU in 2004 it is Hungary that receives the highest amount.

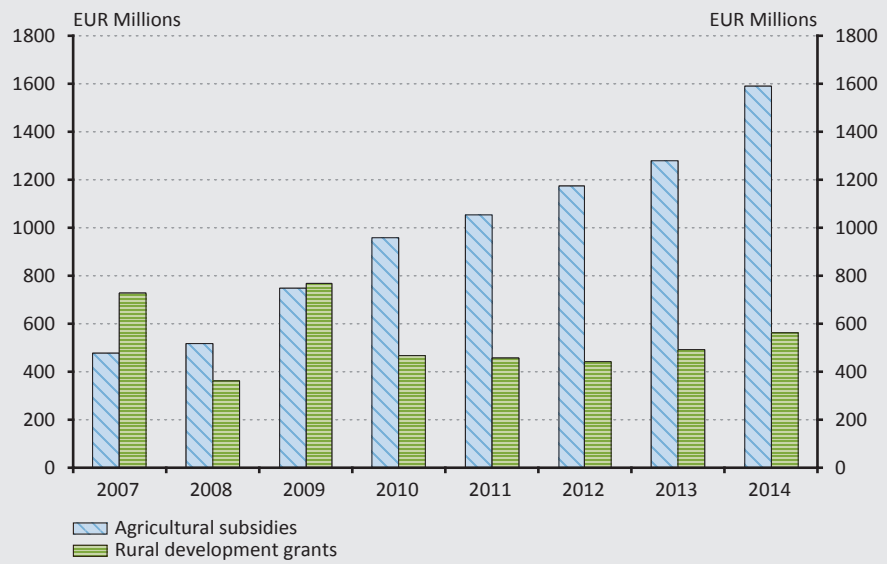
Figure 8
Member States' agricultural subsidies per hectare in 2008 and 2013



Source: State Audit Office of Hungary (2015)

Since EU accession, access to subsidies from EAGF, as the first pillar of the common agricultural policy, has gradually expanded for Hungary; the different financing rule also contributed to the gradual increase in the absorption of the grants. For the newly acceded countries in 2004 the amount available for drawdown was 25 per cent of the EU15 average, and this ratio gradually increased year by year, to reach the subsidy level of the EU15 countries by 2013. A substantial part of the EAGF funds (95 per cent) was used for direct area aid, while the remaining part (5 per cent) was used for other grants. The direct producer grants can be drawn down in respect of land where agricultural activity is pursued primarily. The system of absorbing direct subsidies differs from those customary for funds originating from other organisations of the European Union. The payment to beneficiaries is executed in the given fiscal year, the full amount of the subsidy allocable to the period is absorbed, and thus there is no need for the n+2 years rule. Accordingly, the data related to the absorption of direct subsidies can be quantified already after the closing of the respective year. The available allocation has gradually increased since accession, which was also reflected in the higher absorption of the grants: the direct producer grants received by Hungary increased more than threefold from the level of EUR 0.5 billion in 2007, to approximate EUR 1.6 billion by 2014 (*Figure 9*).

Figure 9
Agricultural and rural development subsidies from the EU



Source: State Audit Office of Hungary (2015)

The second pillar of the European Common Agricultural Policy is the rural development subsidy scheme, provided to the Member States by EAFRD. The purpose of these subsidies is (*i*) to improve the competitiveness of the agricultural and forestry sector; (*ii*) support environmental protection; (*iii*) improve the quality of life in rural areas; and (*iv*) encourage the diversification of economic activity in rural areas. The rural development subsidies, in contrast to direct producer subsidies, are not transferred automatically to the users of the funds, but are allocated through tenders similarly to development funds. Similarly to the cohesion policy funds, the projects must be implemented within n+2 years after the assessment of the tenders, i.e. after the closing of the programming period the grants can be drawn down for another two years. As a result of this, the rural development subsidy allocation was drawn down in almost full.

3. International experiences

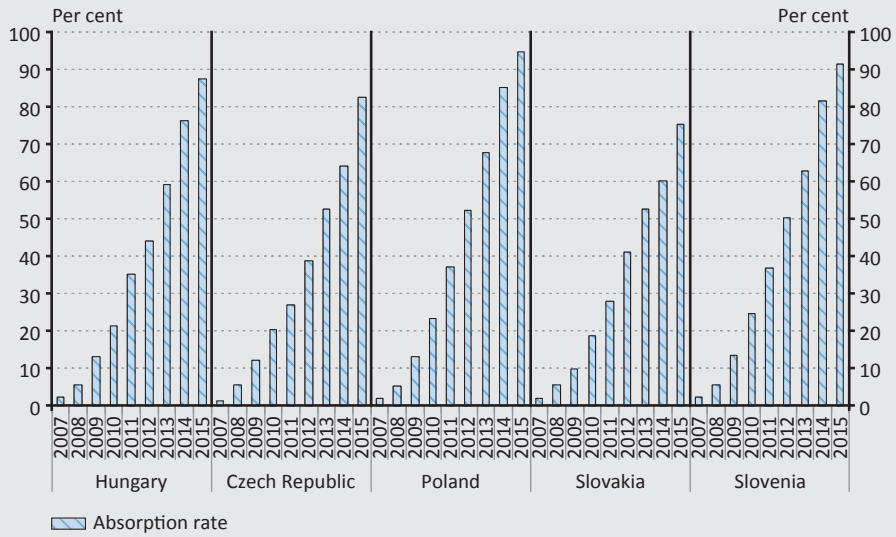
The Cohesion and Structural Funds essentially finance investments to reduce and eliminate the regional difference within the European Union. The purpose of these funds is to enable the Member States to reduce their handicap and underdevelopment compared to the core countries of the EU. For this reason, it is important to ensure that the countries that joined in 2004 use the grants for the realisation of these objectives. Accordingly, in Section 3 we present the international comparison prepared on the absorption of EU funds.

3.1. Absorption ratios

Most countries have already drawn down the bulk of the cohesion policy funds; nevertheless, the absorption of funds by the Hungarian economy may be deemed outstanding by international comparison. By the end of 2015, Hungary had drawn down almost 90 per cent of the available funds, which is a favourable ratio compared to the countries in the region and the Member States as well. In the Visegrád countries, the absorption of cohesion policy funds is similar; however, the Hungarian absorption rate is exceeded only by Poland, where the rate was above 90 per cent.[10] The high drawdown of funds by Poland was supported by the very efficient institutional system performing the distribution of the grants, as well as by the high ratio of infrastructure investments (*State Audit Office of Hungary 2015*). In the region, Slovenia's absorption of funds exceeds that of Hungary, while Slovakia lags behind the level of the countries in the region, which may be partly attributable to the fact that the EU stopped several large public investments and payments due to suspected fraud and corruption (*State Audit Office of Hungary 2015*).

[10] The absorption rates show the amount transferred by the European Commission from the available allocation to the given Member State rather than the effective use of the EU transfers. The EU does not transfer the last 5 per cent of the grants to the Member State until the completion of the full review of the grant given (in relation to the 2007–2013 programming period the Commission is expected to make the payment in 2017–2018).

Figure 10
Trends in the drawdown of cohesion policy funds
(as a per cent of the total allocation)



Source: European Commission

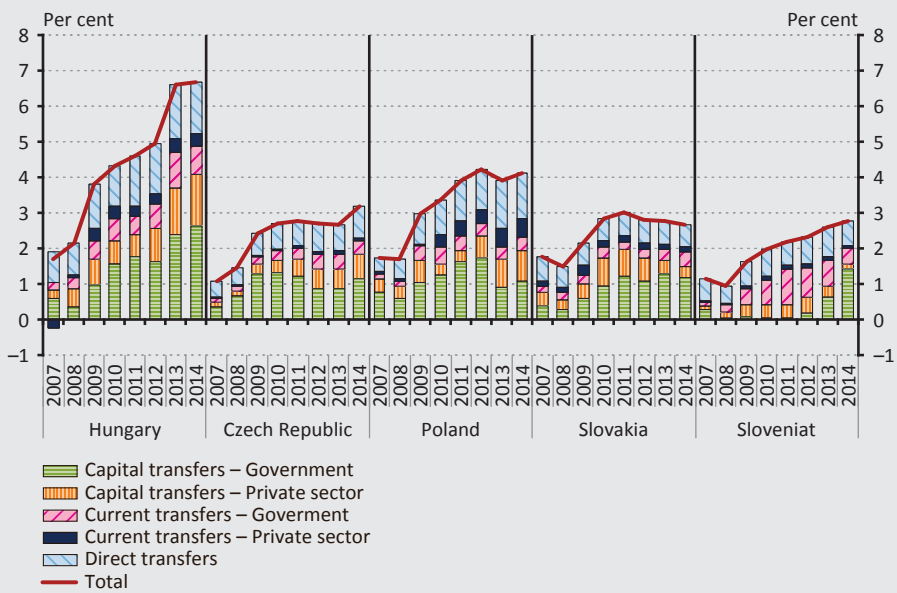
3.2. Sectoral breakdown

*Although the drawdown of cohesion policy funds evolved similarly in the countries of the region, the absorption of funds as a per cent of GDP significantly outstrips the regional level in Hungary***.** In addition to the absorption rate, it is also worth comparing the extra funds provided for the implementation of the investments as a per cent of GDP in the individual countries. Based on the absorption of the EU funds as a per cent of GDP, Hungary's performance was outstanding among the countries of the region, and despite the fact that the grant drawdown rate was higher in Poland, the absorption exceeded the Polish level as well. The inflow of transfers during the period was the most uneven in Hungary among the countries in the region: it started slowly in the first years of the programming period (*KPMG 2013*), but after a gradual increase in 2014 it already amounted to more than 6 per cent of GDP. The outstanding absorption of EU transfers supported the general government to larger degree, and the private sector to a lesser degree.

Examining the EU funds absorbed in the countries in the region, it can be seen that the role of the public sector increased during the period, and the capital transfers increased at an accelerating pace, exceeding the inflow of current transfers by 2013. Similarly to the absorption of funds by Hungary, in the Czech Republic a large part

of the grants – around 50 per cent – was received by the state and 20 per cent by the private sector, while the remaining part of the transfers was drawn down in the form of direct aid (e.g. area aid). In Poland, the ratio of the funds flowing to the private sector is higher, i.e. around 25 per cent, while public absorption reached a lower level, around 45 per cent. The structure of the EU grants flowing into the Polish economy has changed over the years: the ratio of absorption by the private sector increased to almost one-third of the funds in 2013–2014. While a large part of the transfers is often used by the public sector through the implementation of high-value investments, in Poland an increasingly large part of the grants was absorbed by the private sector, but this did not entail a decrease in the funds. This is related to the fact that in Poland investments increased significantly in the period under review, while in the new programming period it may face similar challenges as Hungary in terms of investment financing.

Figure 11
Breakdown of absorbed transfers by sectors and type
(as a per cent of GDP)



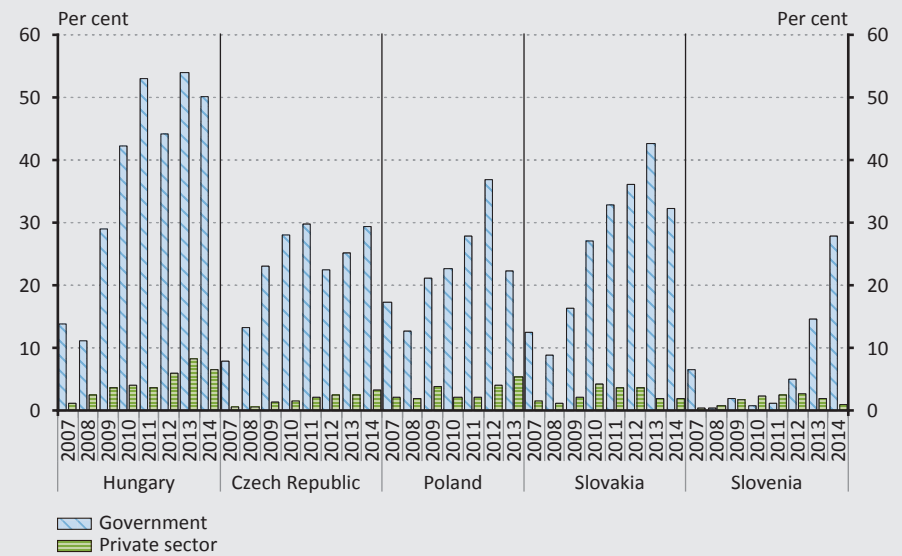
Source: European Central Bank

3.3. Role of transfers in investments

Among the countries in the region, capital transfers played the strongest role in Hungary both in the public and private sector investments. Between 2007 and 2014, Hungarian public investments amounted to around 4 per cent of GDP, 40–50 per cent of which was financed from capital transfers received from the EU; thus, the

implementation of these projects did not increase the budget deficit. On the other hand, private sector investments significantly exceed those of the state: on average they amount to 17 per cent of GDP. The received capital transfers play much smaller role in the financing of private investments; nevertheless, the ratio thereof is higher than the regional level. The weight of EU grants is also more significant in public investments than in the countries in the region, where less than 40 per cent of all public investments are implemented with the use of EU funds. Among the countries in the region, the structure of the financing of public investments has changed to the largest degree in recent years in Slovenia, since the ratio of EU funds – as a result of the strict fiscal policy of Slovenia – has increased from a low level at an accelerating pace. On the whole, due to the significant role of capital transfers, the financing of the investments may represent the largest challenge for the participants of the Hungarian economy after the change of the programming period.

Figure 12
Ratio of the capital transfers to investment in the region



Sources: European Commission, Eurostat

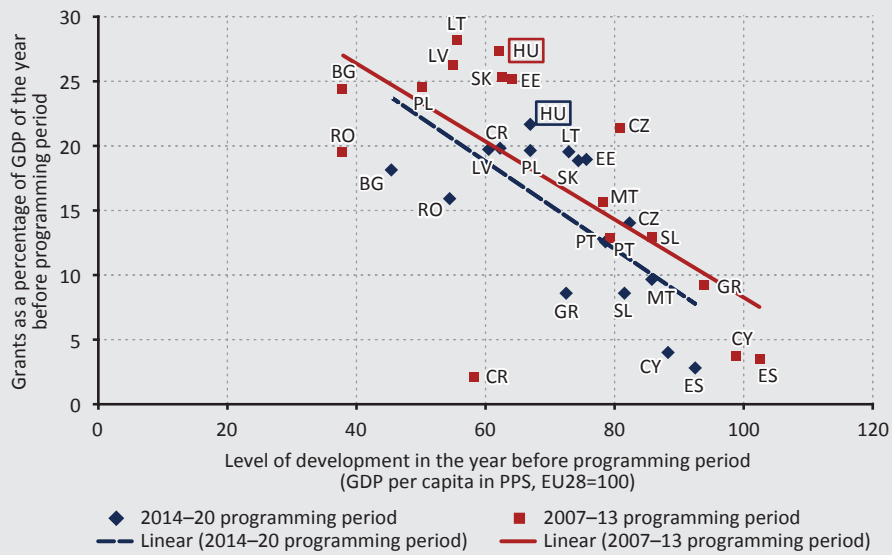
4. The new programming period

4.1. Change in the transfer allocation to the individual countries

As regards the budget of EU grants, Hungary belonged to the winner countries in both programming periods compared to its maturity. The budget of the aids granted by the cohesion policy essentially depends on the relative development; the

more developed a country is, the less aid it can expect (*Figure 13*). Accordingly, the developed Western countries received only negligible aid from the cohesion policy funds in both programming periods. In the 2007–2013 programming period within the group of supported countries, the Central and Eastern European countries received significantly higher aid than the South European states, compared to both their development and GDP. Among the preferred countries, support for Hungary in the previous period was particularly high. The preferred status of the Central and Eastern European countries is preserved in the 2014–2020 programming period as well. Compared to the relative development, Hungary remained among the front-runners; moreover, compared to 2013 GDP it received the highest grant allocation. Nevertheless, it is obvious that at the EU level the total grant budget has decreased substantially for the 2014–2020 period, as the relative development has also improved significantly in the vast majority of the supported countries.

Figure 13
Relation between EU grants and relative development in the individual programming periods



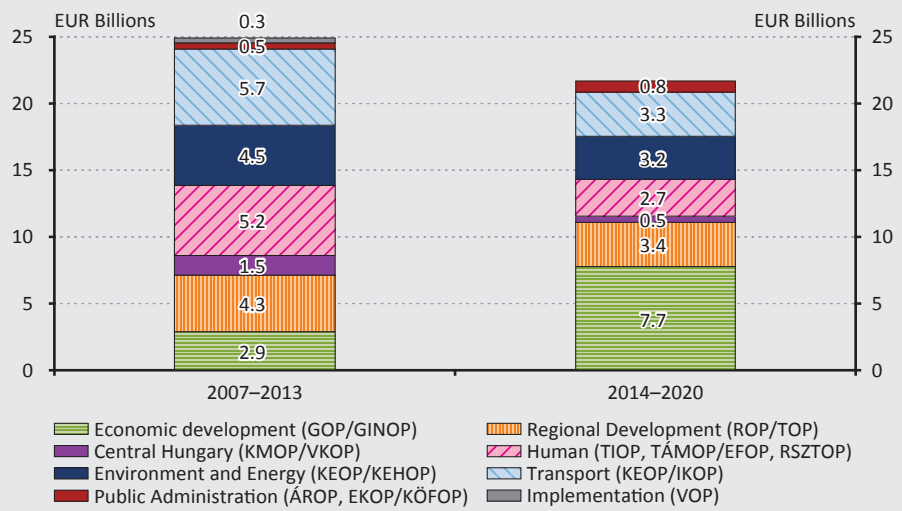
Source: European Commission, Eurostat

4.2. Trends in funds available for individual objectives

Although in the new programming period the budget allocated by the cohesion policy decreased slightly in nominal terms, the structure of the grants may be more favourable for economic growth. In the new programming period, within the framework of the Partnership Agreement, Hungary may absorb – in addition

to the annual agricultural aids – grants of EUR 25 billion (EUR 22 billion from the cohesion policy funds, EUR 3 billion for rural development grants), which slightly falls short of the allocation in the previous programming period. In the 2007–2013 programming period, the transport infrastructure had the highest weight among the supported objectives, but social convergence also received considerable support. The areas important in terms of the economy's competitiveness, such as support for small and medium-sized enterprises, education and research and development, benefited from relatively less support. In the new, 2014–2020 programming period, the support funds are distributed more evenly among the various objectives, while the funds usable for environmental protection[11] and employment increase. On the whole, the amounts available for the development of the economy – according to the communication by the government – may significantly exceed the values of the previous period.[12] The major part of the funds allocated to economic development is provided by the Economic Development and Innovation Operational Programme (EDIOP): this includes funds to be used for growth in tourism, the expansion of

Figure 14
Change in the development objectives in the fiscal periods based on the operational programmes



Source: Prime Minister's Office

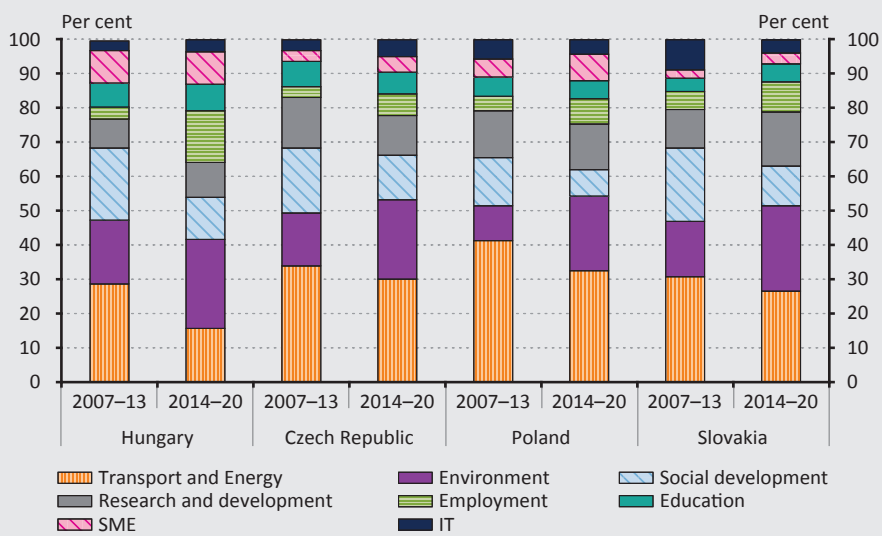
[11] It should be noted that although at the level of the operational programmes the ratio of funds usable for environmental protection has decreased, it increased when taking all funds together, since grants from the other operational programmes may also be used for this purpose.

[12] According to the intentions of the government, the economic development goals will be served, in addition to the Economic Development and Innovation Operational Programme (EDIOP, EUR 7.7 billion), primarily by the allocations of the Territorial Development Operational Programmes (TDOP, EUR 3.4 billion) and the Competitive Central Hungary Operational Programme (CCHOP, EUR 0.5 billion).

the production capacity of small and medium-sized enterprises, for research and development and for the improvement of competitiveness, while – instead of the separated operational programmes of the previous period – several funds aimed at promoting higher and more efficient employment also appear here. The "Road to Labour Market" programme and the programmes supporting flexible work and the employment of low-qualified workers permit the more efficient utilisation of human resources, which is especially important, because the development of human resources, in addition to infrastructure, may result in the more efficient absorption of the EU funds, as these factors may strengthen the potential growth of the economy in the longer run as well (*Allard–Annett 2008*).

The processes with regard to the utilisation ratio in supported areas are similar in the Visegrád countries: the ratio of public road and railway infrastructure investments is decreasing, while that of environmental investments is increasing. In the previous programming period, the largest portion of the grants in the Visegrád countries was used for transportation and energy infrastructure investments; e.g. in Poland these accounted for more than 40 per cent of the total allocation (*Figure 15*), which may have been attributable to the relative underdevelopment of the public road network. However, in the new programming period the ratio of the grants related to social infrastructure and activity will decrease in all four countries. On the

Figure 15
Areas supported by cohesion policy



Note: The composition of the individual areas has changed for the 2014–20 programming period; therefore, in the classification of the areas of use we used different terms than the official terminology.
Source: European Commission

other hand, the volume of EU resources available for environmental protection will increase everywhere; in the new programming period, in Hungary it may exceed the ratio of the infrastructural investments. It should be noted that the EU resources for the development of employment are increasing to an outstanding degree, and – compared to the other countries – support for the SME sector may remain significant, while in the case of grants used for research and development Hungary's lag compared to the region will decrease.

4.3. Acceleration of payment of EU funds in 2016

According to the baseline forecast of the Inflation Report of March 2016, the amount of EU transfers that may be absorbed by Hungary may fall by roughly EUR 3 billion in 2016 compared to the previous year. At the beginning of the new programming period, the payment of EU funds according to (Hungarian and international) experiences will fall substantially short of the values measured in the last years of the programming period (*Babos–Kiss 2016*). In addition, payments in the first years of the new period were also complicated by the fact that the determination of the allocations to the individual countries for the new period, the breakdown of the amounts to operational programmes and priorities, and the conclusion of the cooperation agreement proved to be such a time-consuming exercise that it was only possible to announce tenders for the absorption of the funds belonging to the 2014–2020 programming period from the end of 2015.

The government took several measures to ensure the drawdown of the EU funds faster and in a large amount, to prevent economic growth in 2016 from being curbed by the deceleration in transfers and to minimise the risk of loss of funds in the new programming period. The government already recognised the risk of a decline in EU funds last year, and thus from mid-2015 it continuously took measures to avoid a larger-scale decrease in payments of EU transfers and a more significant deceleration of the economy. The most important measures are as follows:

i. In August 2015, the government decided that – in order to avoid losing EU funds *– it will announce all Hungarian tenders by mid-2017 for the 2014–2020 period.*

ii. In November 2015,[13] a government resolution decided that the winning bidders would get higher *supplier advance* (50 per cent instead of 30 per cent) –in addition to the faster payment of EU funds, this measure may significantly improve the liquidity of the corporate sector, which may also boost the sector's investment activity by reducing the chain debts.

iii. In addition, grants received for reducing energy expenditures will be allocated to larger institution facility managers (public institutions, churches, civil

[13] Hungarian Official Journal, 24 November 2015

organisations) instead of households, which will contribute to the faster absorption of funds by *increasing the concentration of expenditures.*

iv. In the new programming period, the ratio of repayable funds is significantly higher: as part of the package of policies, the government – as a general rule – *also allocates non-repayable EU funds to most repayable funds.*

v. It may also accelerate payments that in the case of numerous projects the *preparation costs may be advanced by the central budget.*

vi. In January 2016,[14] the heads of certain ministries were ordered to prepare a *terms of reference containing the quarterly breakdown of the budget figures,* which – due to the rather short deadline, but generous incentive system – may generate higher interest in the drawdown of funds.

vii. By *increasing the expert capacity* efforts are made to reduce the time of assessing the bids.

According to the government's expectations, as a result of these measures the Hungarian absorption of EU transfers from the Cohesion and Structural Funds may reach HUF 2,048 billion in 2016 – on the other hand, based on the historic figures the payment of the said amount appears to be rather ambitious. Accordingly, the objective of the Hungarian government is – calculating using a budget exchange rate of EUR/HUF 310.80 and an own contribution of 15 per cent – to pay EU funds this year roughly in the equivalent of EUR 5.7 billion from the seven-year allocation of almost EUR 25 billion, which would represent the absorption of 23 per cent of the total allocation. In order to demonstrate the weight of the task burdening the public institutional system, it make sense to examine this amount from several respects.

i. On the one hand, in the previous programming period, the execution of payments of similar magnitude required more than two years.

ii. On the other hand, it is worth mentioning that while, in respect of the appropriated funds, over-appropriation of the EU funds (utilisation over 100 per cent) already materialised at the end of 2013, in the area of payments this was realised only two years later, by the end of 2015. Since the public institutional system presumably dealt with the tenders of the previous period even at the end of 2015, to avoid the loss of EU funds, the appropriation of the EU funds to a larger degree by accepting bids may commence only at the beginning of 2016, followed by payments with a delay – this delay may be offset by the higher advance payment.

iii. Finally, in comparison with the previous period, the government's objectives with regard to payments to be made in 2016 in respect of the individual operational

[14] Hungarian Official Journal, 22 January 2016

programmes may also be regarded as ambitious: in the previous period, only 10–15 per cent of the allocations could be paid within three years, while this year's objective typically accounts for 20–25 per cent of the allocations. On the other hand, the success of this may be significantly supported by the fact that in the new programming period it is typically the operational programmes that performed well in the previous period which have higher allocations– i.e. the government focused not only on economic policy objectives and strengthening the growth potential of the economy, but also considered the popularity of the programmes and the speed of the drawdowns from the programmes.

Table 2
Comparison with the payments of the previous period

Operational Programmes		Budget (EUR bn)	Payment target in 2016 (EUR bn)	As a percentage of the budget	In the previous programming period (2007–2009)
GINOP	Development and Innovation Operation Programme	7.7	1.6	21	16
TOP	Territorial Operational Programme	3.4	0.8	22	13
VEKOP	Competitive Central Hungary Operational Programme	0.5	0.2	37	18
EFOP	Human Resources Development Operational Programme	2.6	0.6	22	11
RSZTOP	OP for Supporting Socially Disadvantaged Persons	0.1			11
KEHOP	Environment and Energy Efficiency Operational Programme	3.2	0.7	23	14
IKOP	Integrated Transport Development Operational Programme	3.3	0.8	23	11
KÖFOP	Public Administration and Services Operational Programme	0.8	0.2	23	16
	Rural Development Programme (EMVA), Hungarian Fisheries OP (HOP)	3.5	0.8	23	17
Sum		**25.1**	**5.6**	**22**	**14**

Source: Authors' work, Hungarian Official Journal, SMIS

5. Summary

The grants received from the European Union have a significant impact on the Hungarian economy: in addition to the positive impact on external balance, it is also worth emphasising their role in supporting investment. Towards the end of the 2007–2013 programming period, the absorption of EU transfers gradually increased; net grants – reduced by contributions – reached 5–6 per cent of the GDP. Current transfers remained relatively stable, and hence the increase can be primarily attributed to the investment-supporting capital transfers. As a result of the accelerating payments, it is unlikely that there will be any loss of funds from the 2007–2013 programming period, i.e. the Hungarian State has paid the available total allocation of EUR 24.9 billion in full. In excess of the total allocation, overspending of roughly EUR 1.9 billion also occurred, which may help avoid the loss of funds as a result of pending disputes. On the other hand, in addition to the absorption approach, it also makes sense to examine the impacts the received grants may have exerted on the Hungarian economy. This paper did not intend to quantify all impacts, but it is worth emphasising that the transfer from the EU supported public investments to a substantial degree, i.e. over 50 per cent – on the other hand, in the case of the private sector, this ratio is substantially lower, i.e. around 5–10 per cent. As regards the regional absorption of the transfers received by Hungary, Central Hungary received the highest volume of funds, but support for the less-developed regions was also substantial, which may have contributed to the fact that they managed to reduce their shortfall compared to the EU average to a slight degree. In terms of a regional comparison, it is worth noting that although the drawdown of cohesion policy funds was similar in the Visegrád countries, as a per cent of GDP the highest grant was received by Hungary, which is primarily attributable to the fact that – similarly to the new, 2014–2020 programming period – Hungary received a favourable total allocation compared to the country's maturity. The support resources are allocated more evenly among the various objectives in the new programming period in respect of Hungary, and thus the amounts available for economic development – as stated by the government – may significantly increase compared to the lower values of the previous period. On the other hand, in 2016 the absorption of EU transfers is expected to fall significantly, despite the government's measures, which can be explained by the gradual pick-up in payments in the new period.

Annex: Budget revenues of the EU and Hungary's contribution

The resources of the European Union predominantly originate from the Member States' contributions. The European Union's own sources of revenue can be broken down into three main categories:

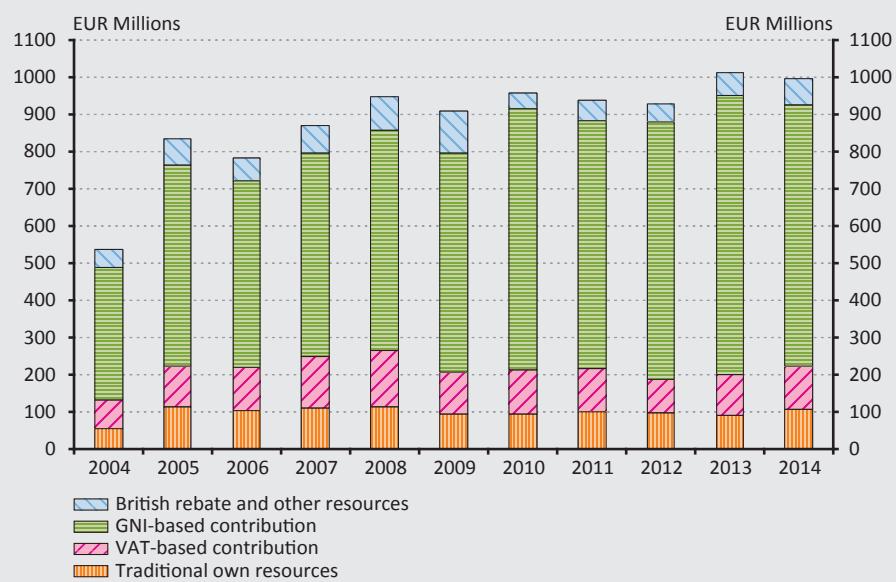
i. *GNI-based contributions:* The Member States pay a certain defined percentage of their gross national income to the budget. These funds account for a substantial part of the EU's budgetary revenue (in 2014 more than two thirds). The GNI-based contribution is a so-called "balancing resource", meaning that the rate of the contribution to be paid is determined in such a way that helps avoid a budget deficit.

ii. *Traditional own resources:* The customs duties imposed on non-EU countries and the sugar levies originating from the common organisation of the sugar industry constitute the traditional source of the EU's revenues since 1970. The Member States are obliged to pay 80 per cent of the levies and duties collected by them to the EU budget, while they may retain the remaining 20 per cent to finance their collection costs.

iii. *Value added tax-based contributions:* The basis of the Member States' contribution is the estimated value added tax revenue; a certain percentage of this must be paid to the budget.

The largest part of fiscal expenditures are financed from the own resources contributed by the Member States; however, the EU also earns other revenues of

Figure 16
Hungary's contribution to the EU budget



Source: European Commission

lesser significance. Such revenues may include the tax on the income of employees of EU institutions, penalties imposed on enterprises violating competition law or other rules, or the retained earnings from previous years. The own resources are supplemented by the *compensation* of the budgetary imbalances between the contributions of the Member States. The "UK rebate" of 1984 reduces the contribution of the United Kingdom, which in 2007 was adjusted by the impact of the contributions of the newly joined Member States.

Hungary's Member State contribution was around EUR 0.8–1.0 billion annually, the major part of which comes from GNI-based resources. The ratio of the traditional own resources from customs duties and sugar levies, and the VAT-based contribution is roughly the same, representing a burden of around HUF 100 million for the Hungarian budget. The amount of contributions under other titles – the largest part of which is the UK rebate – was around HUF 50–70 million in recent years. Hungary's annual budget contribution amounts to almost 1 per cent of GDP – with this, among the newly joined 12 countries, the contribution as a percentage of GDP was the lowest in Hungary (albeit the difference between the countries is negligible).

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Key features of the Chinese bond market*

Zsanett Sütő – Tamás Tóth

In the 21st century, China ranks among the global leaders based on quantitative factors, not only from a real economy perspective but also from a financial one. It is the largest exporter and one of the biggest economies in the world. Based on the IMF's decision, the Chinese currency will be included in the SDR basket containing the major currencies of the world. Currently, the world's third largest bond market is found in China. It is huge both in real economy and financial terms, and foreign investors are gradually being granted access to this market, at the pace and to the extent determined by Chinese regulators. The onshore bond market that has been opening up at an increasing pace recently and the offshore bond market that will mark its 10th anniversary next year may be uncharted territory for financial institutions. Entry to the market may be facilitated by gaining information about the characteristics of the market. This article presents the key features of the Chinese bond markets from both the issuer and the investor side, examining the individual market segments as well, and pointing out the opportunities and expected paths of development on the markets. In addition, we demonstrate how the Chinese bond markets fit into the political efforts targeting the achievement of global currency status for RMB.

Journal of Economic Literature (JEL) Classification: F65, G15, O16

Keywords: China, bond market, dim sum, onshore market, renminbi

1. Introduction

Over the past 15 years, the Chinese bond market has expanded from practically nothing to the *third largest market in the world.* Despite this, the country's debt-to-GDP ratio can still be considered relatively low, as the growing indebtedness can be mostly seen in the mounting debt of the private sector. China had several reasons to consciously strive for the establishment and continuous development of its bond market. First, as most Chinese corporations still acquire funding by issuing shares and taking out bank loans, guiding companies to the bond market would *foster the diversification of the credit risk that has accumulated in the banking system.* Second,

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

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the investments in infrastructure and construction which have (until now) been the engines of economic growth require further sources of finance (*Goldman 2015*).

The role of the Chinese renminbi in world market transactions has expanded drastically in the past 5 years. The Chinese currency has become the *second most widespread currency in trade finance,* and with respect to payment transactions it ranks among the top 5 (*Horváth–Teremi 2015*). The renminbi plays an increasingly important role in the foreign exchange reserves of central banks, which may be boosted further by the November 2015 decision of the IMF, pursuant to which *the Chinese renminbi will be included in the SDR basket*[1] from October 2016. *Hungary received RQFII quotas of RMB 50 billion in June 2015, which enabled Hungarian financial institutions to access Chinese onshore market investments (MNB press release, 27 June 2015).*

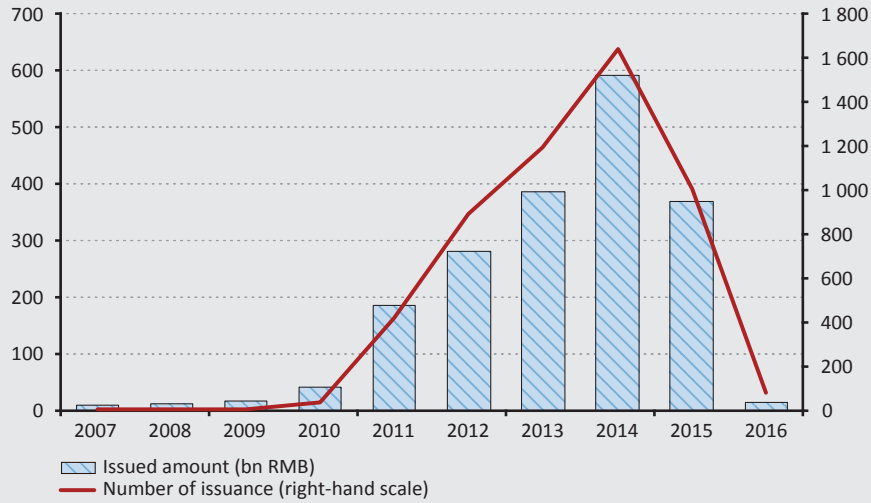
Due to the lack of the full convertibility of the Chinese currency and Chinese capital controls, two types of bond markets have emerged: *the onshore and the offshore markets.* Bonds denominated in onshore renminbi (CNY) and issued by foreign players on the onshore bond market are called panda bonds, while those issued on the Hong Kong offshore market by foreign participants and denominated in offshore renminbi (CNH) are called dim sum bonds. *Access to the former market is restricted,* although the Chinese authorities are seeking to loosen the constraints, while the latter is readily accessible for investors.

2. Dim sum bond market

The offshore renminbi (CNH) bond market, or dim sum market, was established in the second half of 2007, but the number of issues only jumped in late 2010. The establishment and development of the market was primarily *supported by the increasing role of the renminbi in external trade, the accumulation of renminbi deposits in Hong Kong, the growing renminbi financing and lending need of financial and non-financial institutions, as well as the efforts of the Chinese government aimed at promoting the renminbi.* Investors generally agreed that the *Chinese currency would continue to strengthen*, and thus non-residents showed increasing interest in renminbi investments. As access to the onshore bond market was highly restricted due to Chinese capital controls – although these restrictions later started to be relaxed – initially the alternative available for foreign investors was the offshore renminbi market. On both the issuer and the investor side, the popularity of the dim sum market was also enhanced by the *quite loose regulation*. In Hong Kong, basically any issuer can freely issue bonds denominated in offshore renminbi, and obtaining permission from the Chinese regulators is only necessary when the funds thus acquired are used on the onshore market.

[1] The SDR (Special Drawing Rights) is a settlement and reserve currency used by the IMF. The value of the SDR is determined based on the value of the currencies included in the SDR basket. The SDR basket includes the following currencies: the US dollar, the euro, the Japanese yen and the British pound, and, pursuant to the IMF's decision on 30 November 2015, from 1 October 2016 it will also include the Chinese renminbi.

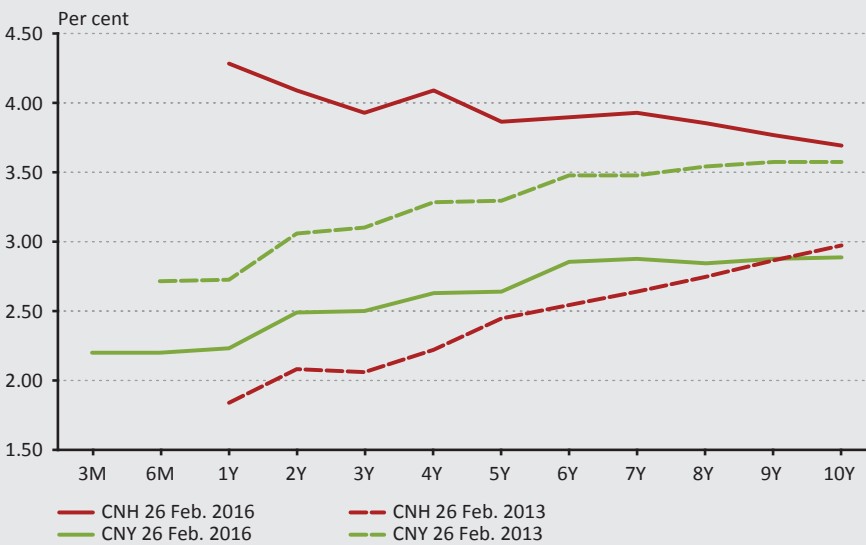
Figure 1
Offshore renminbi issues
(CD and bond)



Source: Bloomberg, March 2016

Until 2014, yields on the offshore market were well below those on the onshore market, and thus *obtaining funds was much cheaper on the offshore market.* This was exploited by both Chinese and international issuers in order to cut their interest

Figure 2
Yield curve of CNY and CNH government securities



Source: Bloomberg, 26 February 2016

expenses. The substantial difference in yields was principally attributable to the restricted access to the onshore market: despite the lower yields, investors who did not have access to the onshore market were willing to buy offshore bonds in order to profit from the expected strengthening of the Chinese currency.

In 2015, the pace of offshore market issues seemed to have stalled, which may have been due to various factors. The Chinese central bank took significant monetary easing measures, which may have contributed to the reduction of onshore interest rates, as a result of which the yield spread which was previously in favour of the offshore market vanished, and since the second half of 2015 yields have been lower on the onshore markets. This change may have also been influenced by the fact that due to the monetary policy of the Fed and expectations about the US interest rate trajectory, emerging markets, i.e. also China, showed signs of capital flight. Capital outflows from China were mainly observed on the offshore markets, which may have contributed to the reduction in offshore issues through the increasing yields. While rising yields exerted a negative effect on the issuer side, expectations about the renminbi's exchange rate developments may have done so on the investor side of the Chinese offshore bond market. Market expectations increasingly pointed towards depreciation of the renminbi. The sudden depreciation of the onshore yuan in August 2015, which could also be seen as a step towards determining the exchange rates on the basis of market developments, may have exacerbated investors' worries about an exchange rate weakening on the offshore market as well. Furthermore, additional regulatory measures may have also influenced the drop in the volume of offshore market issues. The Chinese authorities implemented several measures in 2015 and in early 2016 to open up the onshore bond markets even more to foreign participants. The expanding opportunities offered by the onshore market may have also influenced the dynamics of offshore market issues.

2.1. Characteristics of the market

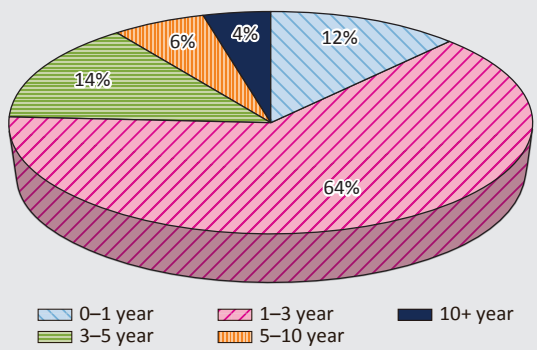
As of March 2016, the size of the offshore renminbi bond market is RMB 785 billion (approximately USD 120 billion). *Globally, this does not make it an exceptionally large market,* and it is in the same league with the Hungarian bond market. The real significance of the market is reflected by the fact that in the past 8 years more than 500 different issuers from 35 countries acquired funds on the dim sum market in the form of CDs (certificates of deposit) or traditional bonds.[2] In the early days of the market, CDs issued by financial institutions were the more frequent instruments, but the balance has increasingly shifted towards bonds. Since 2007 approximately half of all issues overall have been CDs and half have been bonds, while around 75 per cent of the products currently available on the market are bonds and 25 per cent are CDs.

[2] CDs (certificates of deposit) are debt instruments typically issued for short maturities by banks and other financial institutions. Bonds are debt instruments with maturities of over a year, issued by public sector issuers, financial and non-financial institutions and companies.

Since the establishment of the market in 2007, *more than 5,000 issues have occurred, with a total value of RMB 1.9 trillion (USD 290 billion).* The average issue size amounts to RMB 360 million, which falls short of the average on mature bond markets. Around 80 per cent of the CD and bond issuers have been rated by at least one of the three major agencies (S&P, Moody's, Fitch). *The vast majority of the issues were investment grade, although there were issuers that received a speculative grade rating* (mainly Chinese real estate development companies).

The offshore renminbi bond market is primarily concerned with shorter maturities. The maturity of the overwhelming majority of the bonds is 3 years or less at the time of issue, while CDs are typically issued with maturities of 1 year or less. In the case of bonds, the most frequent and most popular tenor, the so-called "sweet spot", is 3 years, which is mainly due to demand factors.

Figure 3
Maturities of offshore bonds at the time of issue



Source: Based on data from Bloomberg (2016)

2.2. Issuers

As the market matured, dim sum bond issuers became *increasingly heterogeneous*, both in terms of the type of issuers and their regional location. We can find everything from financial institutions through corporate issuers and government agencies to provinces, in fact, *in 2014 even sovereign issuers* entered the market (United Kingdom, Mongolia). Issuers may be motivated to enter the offshore renminbi bond market by several factors, depending on whether they are Chinese issuers or whether they are based elsewhere (*Fung et al. 2014*).

One of the important motivating factors may be considered a *political goal*: the Chinese government announced the policy of internationalising the renminbi in 2009. One of the largest issuers on the dim sum market is the Chinese state itself,

which appears on the offshore market at regular intervals to *contribute to the development of the market and satisfy the needs of investors who are looking for a safe instrument denominated in offshore renminbi.* The largest state-owned policy banks are present on the market as issuers for similar reasons. Such banks include the China Development Bank and the Agricultural Development Bank.

The multinational corporations that *operate in China can hedge against their renminbi exposure by issuing bonds.* The offshore bond market is primarily enticing for those who would have more difficulty accessing funds on the onshore market.

Foreign banks may also be motivated to issue dim sum bonds *in order to meet client needs.* The acquired funds can be lent to primarily those corporate clients that operate in China but do not issue bonds themselves.

Although an increasing number of issuers are not Chinese-based, international or supranational actors, Chinese and Hong Kong issuers still dominate the market, with a combined share of almost 80 per cent. In addition to them, German, French, South Korean and Australian issuers and supranational institutions are represented on the market with relatively higher weight. Broken down by sectors, financial institutions dominate the market with their share of 55 per cent, even if CDs are left out of the analysis.

Table 1
CNH bonds by sector (with the exception of CDs), RMB billion, March 2016

Country	Public sector	Financial sector	Non-financial companies	Sum
China	103	167	72	342
Hong Kong	0	43	15	58
South-Korean	10	9	2	21
Germany	0	17	6	23
France	3	11	6	20
Australia	0	17	0	17
Supranationals	15	0	0	15
Other	10	48	14	72
Sum	**141**	**312**	**115**	**568**

Source: Based on data from Bloomberg (2016)

2.3. Investors

The demand side of the dim sum market is somewhat harder to analyse due to the limited access to data. Similar to issuers, investors also appear on the market for several reasons (*Wang et al. 2013*). First, *there are not many alternatives* for investing in offshore renminbi. There is practically no equity market, most of the

savings are in bank deposits, and therefore investors looking for somewhat higher yields can only turn to the bond market. Second, *this is the market where foreign investors expecting the strengthening of the Chinese currency can most easily gain* renminbi exposure. Some central banks and other public institutions regard the dim sum market as the "*anteroom" to the onshore market* which offers relatively easier and more rapid access. Although they already enjoy unrestricted access to the onshore market, the operative procedures and preparing the necessary documentation may take a long time.

The investor base of short-term CDs is primarily made up of private bank and retail clients who hold the securities until maturity. Investors in longer-term, mostly fixed-rate bonds *not only include private banks but also insurance corporations, commercial banks, fund managers and foreign public institutions* (*Wang et al. 2013*). It can be stated that the so-called end-investors, i.e. institutional investors (real money) prefer bonds from issuers that have a rating from at least one international rating agency, and that are not new players on the capital market. Bonds issued by relatively new issuers without a rating are more likely to end up at private banks and commercial banks.

With respect to the geographical distribution of investors, it is perhaps not surprising that Asia and especially Hong Kong is the most dominant, with a share of about 70–80 per cent. The spread of international renminbi settlement centres or "hubs", however, is expected to bring about increased geographical diversification among investors. Yet investors were somewhat unnerved by the previously unprecedented volatility observed in 2015 (both in terms of the currency and the yields), and therefore some of them exited the market.

2.4. Liquidity

Taking into account the relatively small size of the market, the liquidity of the offshore renminbi bond market could be considered particularly favourable until mid-2015. The bid–offer yield spread of government bonds and corporate or bank bonds in the investment grade category was approximately *5–10 basis points*, while in the speculative grade category it was 20–40 basis points. The average size of the transactions was *RMB 5–10 million*, which was slightly lower than the average for other currencies. However, the rising yields and the increased volatility in 2015 undermined the liquidity of the market and widened the bid–offer yield spread.

3. Sovereign, agency, provincial and supranational issues on the dim sum and panda markets

The largest sovereign issuer in the dim sum market *is China*. The country appears at regular intervals on the offshore market too in order to promote and internationalise the renminbi, and to establish a benchmark yield curve made up of liquid bonds.

Apart from China, only three sovereign issuers have exploited the opportunities present in offshore renminbi financing since the establishment of the dim sum market in 2007. In cooperation with the Bank of China, HSBC and Standard Chartered Bank, the *United Kingdom* was the first to issue bonds in the amount of RMB 3 billion with a 3-year maturity and 2.7 per cent yield (*Tessa 2014*). The issue generated even stronger interest than expected: bids from the 85 investors, mostly private banks, amounted to RMB 5.8 billion, which enabled the issue of RMB 3 billion instead of the originally planned 2 billion and the acquisition of funds with yields approximately 20 basis points lower than anticipated. The amount received from the issue was included in the foreign exchange reserves of the United Kingdom, *thereby making a sort of gesture towards China, signalling that the country regards the renminbi as a reserve currency.*

In June 2015, *Mongolia* issued 3-year bonds denominated in offshore renminbi in the amount of RMB 1 billion with a 7.5 per cent yield (Borsuk, 2015). The high yield was warranted by the relatively low, speculative grade credit rating (B2/B+/B+) of the country, since investors expected a much higher premium in return for the higher credit risk. Although the issue was not as successful as the United Kingdom's, bids with a combined value of RMB 1.5 billion were received from 44 investors. More than 90 per cent of the bonds were bought by Asian investors, primarily fund managers and banks. Mongolia's primary objective with the issue was to *diversify its investor base*.

The IFC (International Finance Corporation), a member of the World Bank Group, is a trailblazer on the panda market: although it has had only two issues, it entered the onshore market as early as 2005 with a 10-year bond, which was followed by a 7-year bond in 2006 (*IFC 2005*). On the offshore renminbi market, however, it is a *regular issuer* offering both fixed-coupon bonds and short-term discount bonds. The corporation mainly finances the fight against climate change and investments supporting rural development. In addition, the IFC is *committed to bolstering and developing China's financial sector and the local capital market.*

South Korea was the first sovereign issuer on the onshore renminbi, i.e. *panda* market. In mid-December 2015, the country issued bonds in the amount of RMB 3 billion with a 3 per cent yield. There was huge demand for the bonds, and the transactions were concluded with a fivefold oversubscription. The issue was an

important milestone in the history of both the panda market and Korean issuers: the primary objective of the sovereign issue was to gauge the appetite of investors, and since it was a resounding success, it *paved the way for other Korean issuers as well* which had previously acquired renminbi funds on the dim sum market.

British Columbia entered the panda bond market on 21 January 2016. The western Canadian province issued 3-year bonds with a combined value of RMB 3 billion at 2.95%. Prior to the onshore issue, the Canadian province issued RMB bonds on the offshore market, first in 2013 – making British Columbia the first to issue sovereign bonds on the offshore market – and then a second time in 2014. The first offshore bonds issued by British Columbia had a maturity of 1 year, and their value amounted to RMB 2.5 billion at 2.25%. In 2014, offshore RMB funds were acquired at 2.85% with a value of RMB 3 billion and a maturity of 2 years. The province shifted from issues on the offshore market to the onshore market after China designated Canada as the first North American renminbi centre in November 2014.[3]

Hungary entered the offshore bond market on 14 April 2016 by issuing bonds with a face value of 1 billion yuan and a maturity of 3 years. Investors showed keen interest in the Hungarian issue, which was attested by the 2.5-fold oversubscription. This contributed to the fact that the bonds were subscribed to at a coupon of 6.25%, 25 basis points lower than the original yield indication. The main organiser of the bond issue was the Bank of China (*ÁKK 2016*). The volume of the bond issue can be considered symbolic, but it signals the opening up towards new, Asian investors.

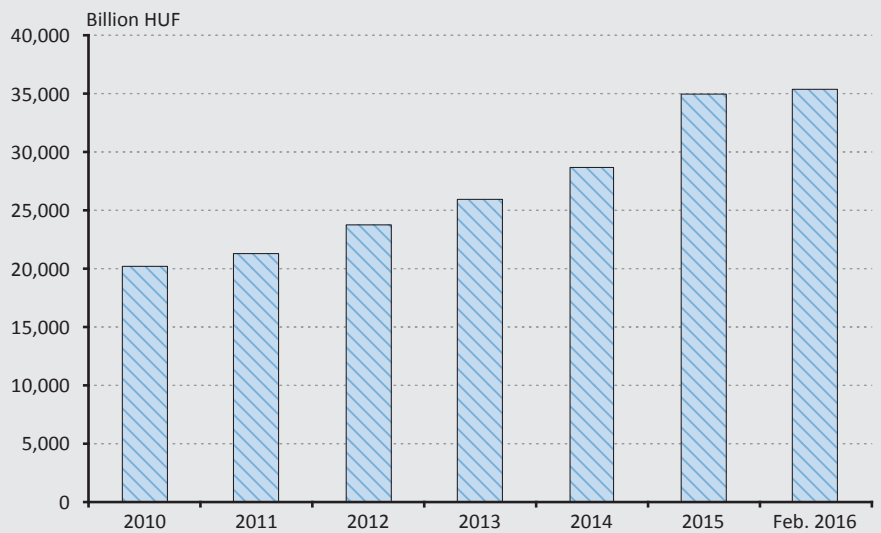
4. Onshore bond market

The onshore bond market has developed for a long time in seclusion from international investors. The first government bond was issued in 1950, and then there were no such issues between 1958 and 1981. The bond market was revitalised in 1981, and at that time only the primary market existed. Government bonds were distributed in an administrative process, and bonds were not tradable. In 1988, trading with bonds was permitted in certain cities, then in 1990 trading on the secondary market was restarted countrywide when stock exchange bond trading was authorised on the stock exchanges of Shanghai and Shenzhen. Thus, the secondary market first took off at the stock exchange, and then in 1997 the interbank bond market was established. The market maker system was introduced in 2001. The interbank bond market started to develop rapidly and took over the role of the leading bond market (*Bai et al. 2013*).

[3] Information on the bond issues by British Columbia was found on the website of British Columbia's provincial government.

Foreign players could first access stock market bond trading from 2002, after an appropriate authorisation procedure. The scope of bond market instruments started to be expanded around this time: first central bank bonds and then bonds issued by financial and non-financial corporations appeared on the market, and in 2005 the first panda bonds were issued. In 2010, in the spirit of the gradual opening up, access to the interbank bond market was granted to central banks, supranational institutions and sovereign wealth funds. The RMB clearing banks based in Hong Kong and Macau and banks engaged in offshore RMB settlements linked to trading activities were also allowed to enter the market at this time. From 2011 a predetermined group of foreign institutional investors were allowed to enter the onshore bond market using renminbi funds, in a quantitative quota system.

Figure 4
Market value of the onshore RMB bond portfolio (RMB billion), 2010–2015



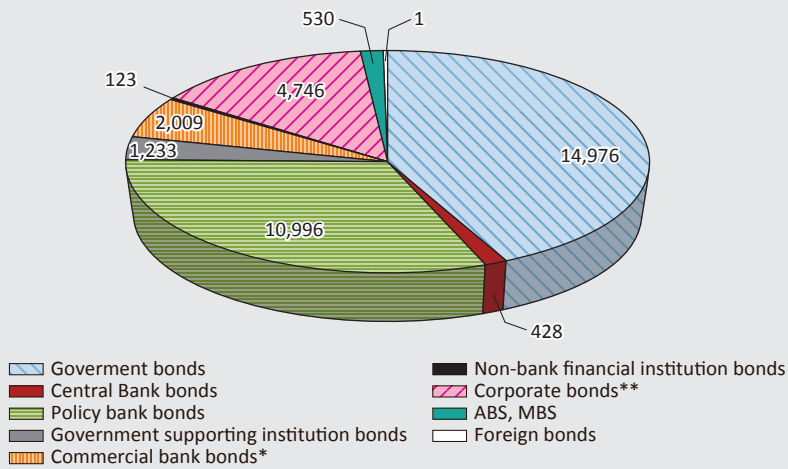
Source: Based on data from CCDC (2016)

4.1. Issuers and traded instruments

A wide range of instruments are available on the Chinese onshore market. Most of the bond portfolio is comprised of government bonds, which also include bonds issued by local governments. In addition, a substantial segment of the bond market consists of bonds issued by the three state-owned development banks (so-called policy banks). Up until 2013, the bonds issued by the Chinese central bank comprised a major portion of the existing bond portfolio and the trading on the secondary market, but they have lost their market share, possibly because there have been no issues since 2013 (*IMF 2015*). Commercial bank bonds consist

of a large variety of instruments, including hybrid bonds. In addition to the issues by the public and financial sectors, the onshore market also offers bonds from the non-financial sector. Both state-owned enterprises and private sector companies are permitted to issue bonds. Currently, asset-backed securities and the panda bonds issued by foreign institutions only comprise an infinitesimal part of the market. The modest share of panda bonds may be mostly attributable to regulatory factors. In 2015, foreign financial institutions were also permitted to issue panda bonds, which – in addition to the inclusion of the renminbi in the SDR basket – may provide new momentum to the market.

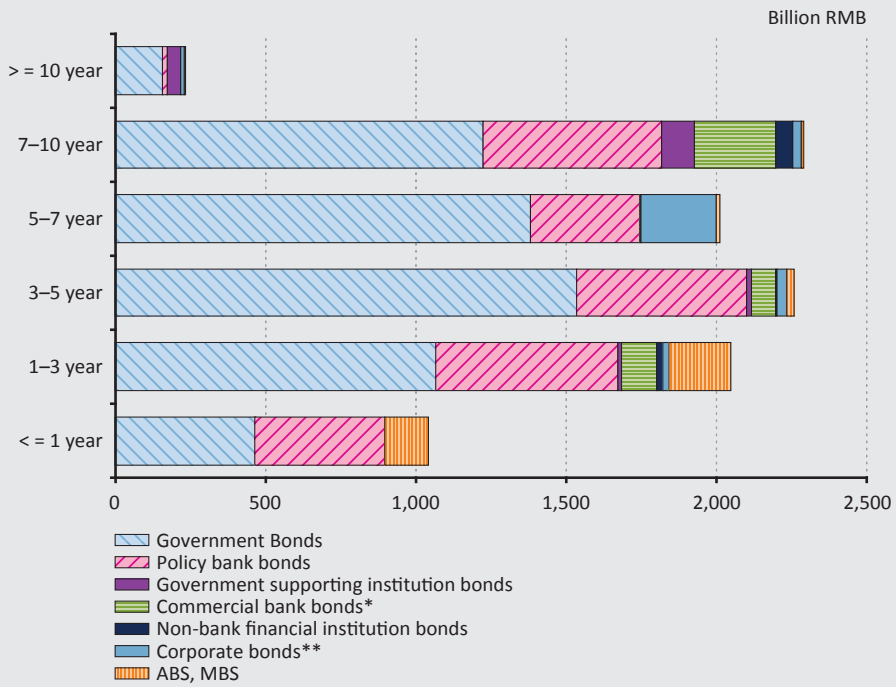
Figure 5
Portfolio of onshore bond market instruments (RMB billion), December 2015



** Also includes bonds marked as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds marked as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

From the perspective of the bond market's development, having an appropriate amount of securities at all investment horizons and having available instruments in as many maturity segments as possible are key aspects. Examining the onshore market from this angle, it can be stated that the issued amount can be typically considered even over the 1–10-year horizon, while in the segment with maturities of more than 10 years most of the issuers are sovereign players, and over the horizon shorter than 1 year the supply on the primary market is also lower.

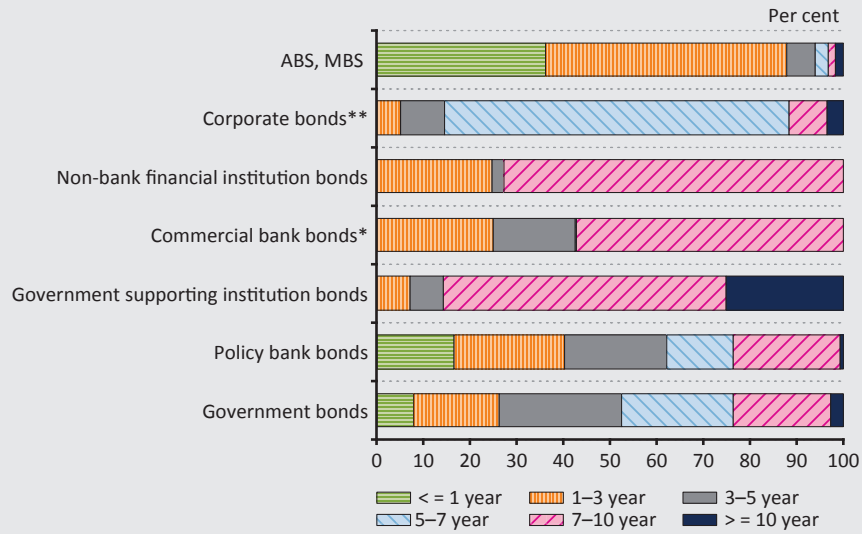
Figure 6
Onshore market bond issues by maturities (RMB billion), 2015



** Also includes bonds marked as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds marked as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

The Chinese state and the development banks play a dominant role in developing the bond market. These issuers are represented at all maturities with considerable issues. Examining the individual bond market instruments based on their typical maturities, the following can be stated. ABSs and MBSs are typically short-term bonds (mainly with maturities of up to 3 years). The majority of corporate bonds offer a medium-term investment (5–7 years), while commercial banks and other financial institutions typically issue longer-term bonds (with maturities over 7 years).

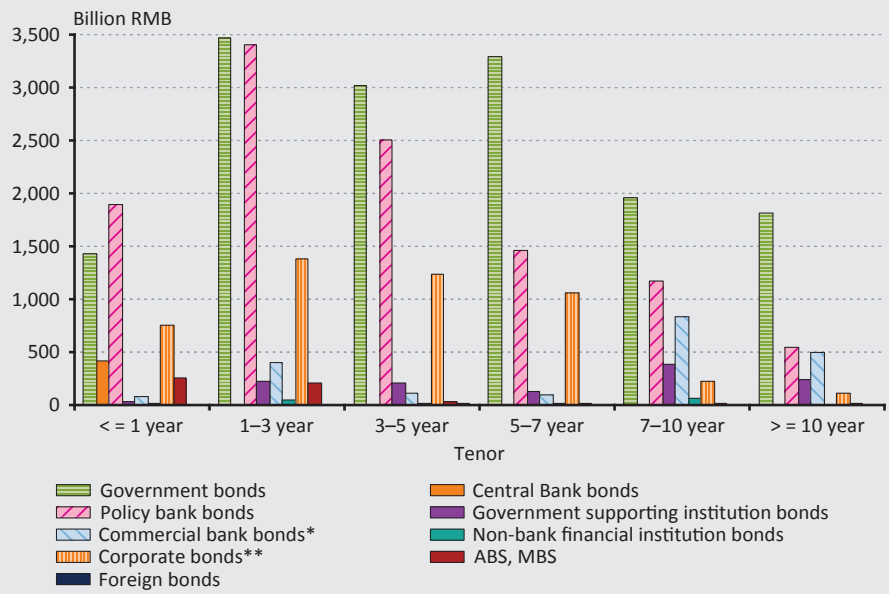
Figure 7
Typical maturities of the different bond types, onshore bond issues in 2015



** Also includes bonds marked as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds marked as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

Examining the opportunities offered by the secondary market, it can be stated that the dominant segment comprises bonds with maturities of 1–3 years, while a substantial amount of bonds is available in the 5–7-year and the 3–5-year segments as well. The largest amount of securities available at these maturities are government securities and bonds issued by state-owned development banks. In the case of the private sector, the largest supply is in the 1–3-year segment. For investors looking for a long-term investment it must be pointed out that in the segment with maturities over 7 years, bonds issued by commercial banks may offer the best investment alternative to public sector issues. For investors looking for a short-term investment (e.g. money market funds) it should be noted that in the segment of the secondary market with maturities shorter than 1 year the largest supply is in the bonds issued by state-owned development banks.

Figure 8
Portfolio of bonds available in the individual maturity segments (RMB billion), December 2015



** Also includes bonds marked as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds marked as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

4.1.1. Corporate bond market

Developing the Chinese corporate bond market is a priority for the Chinese authorities. Currently, bank financing plays a central role in corporate finance, but the acquisition of funds from the bond market may provide a sort of protection in the case of potential banking system problems (e.g. system-wide increase in lending risks, rise in the NPL ratio).

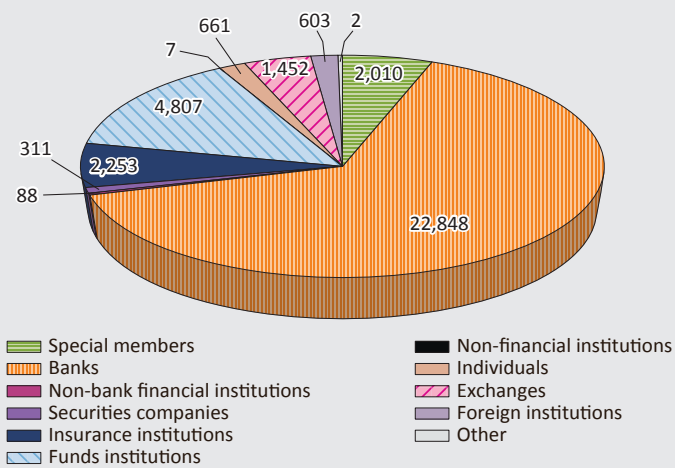
The two major segments on the corporate bond market are bonds issued by state-owned enterprises and medium-term notes (MTN) offered by non-state-owned corporations. Most of the corporate bonds were issued on the offshore market and denominated in USD (*BIS 2014*). Onshore corporate bond issues have recently gained renewed momentum, which may have been due to the decreasing onshore interest rates, and this means a cheaper source of finance for companies when compared to offshore financing. One of the notable characteristics of onshore corporate issues is that issuers must be rated by Chinese credit rating agencies. The rating practice of these agencies is peculiar insofar as it includes a grade (AAA+) above the AAA rating – which is usually the best one on other markets – awarded to a handful of larger Chinese corporations. It should be noted that the local rating

agencies gave an AAA rating to 77% of the issuers on the corporate bond market (*BNP 2015a*).

4.2. Investors

Non-Chinese residents currently have restricted access to the onshore bond market. This is also reflected by the investor side of the bond market. The proportion of foreign investors is at present negligible, hovering around 1.5–2%. Most of Chinese onshore bonds are held by commercial banks. The major holders of the existing bond portfolio include Chinese fund managers and insurance corporations as well. Of the former, the role of money market funds has increased in the past 10 years, as by 2015, 35% of all the assets managed by investment funds were in money market funds. The internationalisation of the renminbi is expected to attract the interest of international fund managers as well, and for them, similar to their Chinese peers, the bonds issued by development banks may be the most alluring (*BNP 2015*).

Figure 9
Onshore bond market investors by market share (RMB billion), December 2015

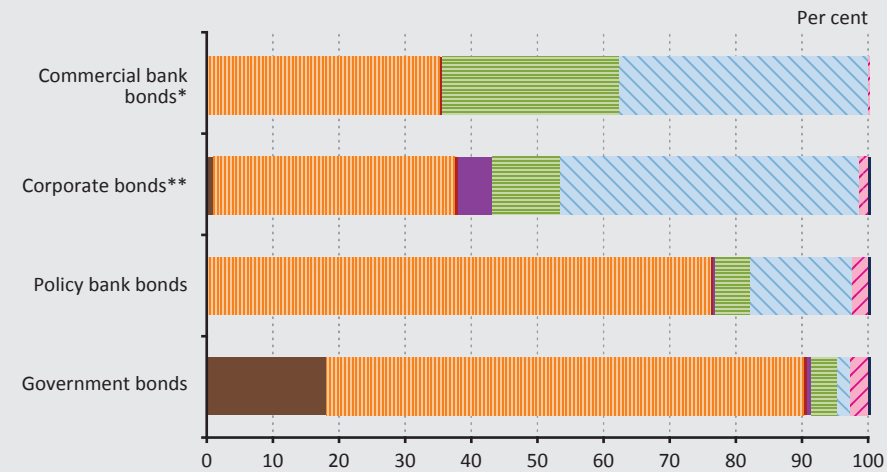


Source: Based on data from CCDC (2016)

Examining the segments of the onshore bond market it can be stated that banks, although they are among the major holders in the case of all instruments, mainly hold substantial shares of over 50% in government securities and bonds issued by state-owned development banks. The holdings of commercial banks on the market for government securities is so substantial that they almost crowd out the other participants from the world's seventh largest government bond market.

However, in the case of private sector issues, the largest investors are Chinese fund managers, as they hold the bulk of corporate bonds. In addition, they are present on the market for commercial bank bonds as investors with a weight similar to commercial banks. Brokerage firms principally appear as investors on the corporate bond market. The share of foreign investors is the largest on the market for government securities, but it is still negligible relative to the size of the market.

Figure 10
Investors of the major onshore bond types, December 2015



** Also includes bonds marked as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds marked as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

4.3. Liquidity

By virtue of being larger and offering more issues, the onshore market is more liquid than the offshore market. Nevertheless, the markets for the different types of bonds have different liquidities, and in the case of certain bond types increasing secondary market liquidity may represent the next step in market development.

Almost three quarters of the trading volume on the secondary bond market can be linked to commercial banks, and in addition to these institutions, the trading activity of fund managers and brokerage firms can be considered significant.

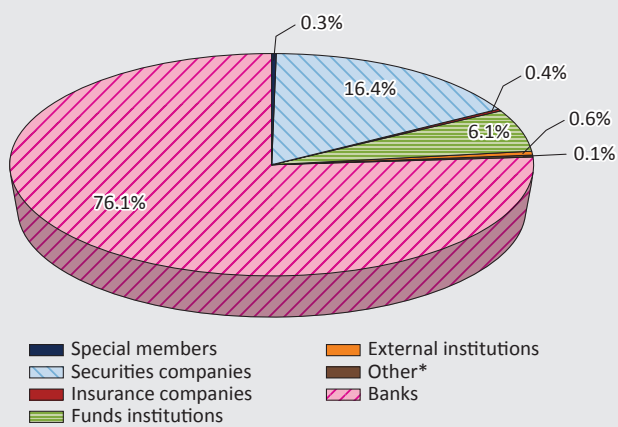
Examining the instruments traded, it can be stated that the bonds issued by development banks are the most liquid: transactions in these securities comprise more than 50% of bond market trading. In addition to these, government bonds and corporate bonds are among the most liquid instruments.

The study by *Ma and Yao* (*2016*) identifies several factors behind the higher secondary market liquidity of development bank bonds as compared to government securities. Development bank bonds are quasi-sovereign issues, and issuers also attest greater significance to capital market needs. In the case of the bonds issued by development banks, issues are more frequent, which increases the availability of so-called on-the-run issues which can be considered more liquid in general. Furthermore, a larger share of development bank issues is concentrated on the short end of the yield curve, which also points towards higher liquidity. Additionally, development bank bond issues include more bond types than government bonds. Finally, the authors also cite taxation as a factor in the lower liquidity of government bonds: the interest income from government bonds is exempt from taxation, while price appreciation gains are taxed, which encourages bondholders to hold government bonds until maturity.

In their study, the economists of the New York Fed (*Bai et al. 2013*) examine the secondary market liquidity of government securities and find that although bonds are traded on a daily basis, trading activity is not yet as intense as to enable price developments to reflect the most up-to-date information in line with the efficient market hypothesis. Examining the relationship between the individual characteristics of bonds and their secondary market liquidity, the authors find that issues with higher coupon rates, larger issue sizes, longer maturities and more recent issuance can be characterised by higher secondary market liquidity.

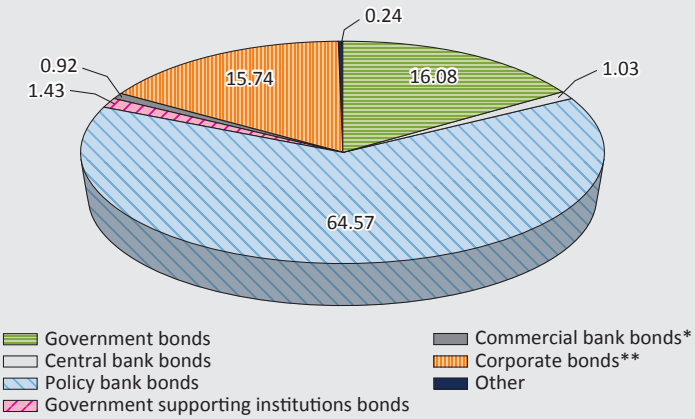
The typical transaction size on the market for government securities and development bank bonds is between RMB 10 and 100 million, while the typical bid–offer spread is between 1 and 10 basis points. The average daily volume of secondary market trading on the market for government securities with maturities

Figure 1
Key players on the onshore bond market by trading volume, December 2015



Source: Based on data from CCDC (2016)

Figure 12
Distribution of onshore bond market trading by bond types, December 2015



** Also includes bonds classified as Tier 2 instruments in the CCDC statistics*
*** Also includes bonds classified as MTN and SME bonds in the CCDC statistics*
Source: Based on data from CCDC (2016)

of less than a year is RMB 10–20 billion, while on the market for government bonds and development bank bonds it is RMB 20–30 billion (*Liu–Pihlman 2015*).

In relation to the Chinese onshore market for government securities, it should be noted that although in terms of its size it is the seventh largest market globally, it lags behind the world's leading bond markets in some respects. First, secondary market activity is substantially more subdued, which is probably due to the dominance of buy-and-hold investors (*Income Partners 2014*). Second, the proportion of international investors is low. However, the Chinese efforts aimed at the internationalisation of the renminbi are expected to bring about changes in this. The appearance of foreign institutional investors on the Chinese onshore market may also be supported by the fact that in early 2016 the Chinese authorities considerably loosened the rules regulating their entry to the market. This may offer further opportunities to Hungarian institutional investors as well.

4.4. Market infrastructure and regulation

The onshore bond market can be accessed without restrictions by Chinese residents, while among foreign investors access has only been granted to central banks, sovereign wealth funds and supranational institutions. Other participants wishing to enter the onshore bond market are faced with various quantitative restrictions. Therefore, foreign investors are relatively new on the onshore market, and in view of the administrative requirements still in place despite the gradual elimination of restrictions, it can be often easier for them to enter the market by cooperating with a domestic institution.

On the primary market, Chinese bonds are sold within the framework of an auction or book building. Government securities, central bank bonds and development bank bonds are issued at auctions, while in the case of the rest of the bonds book building is undertaken (*Liao 2011*).

The secondary market trading of Chinese bonds happens on the stock exchange and on the off-exchange market. The latter can be divided into two segments: the interbank and the OTC markets. (While the OTC market is sometimes used as a synonym for the interbank market, in Chinese bond market parlance the OTC market means the segment of the off-exchange market where non-financial institutions participate (secondary OTC market), and the interbank market is the segment of the off-exchange market that can only be accessed by banks (primary OTC market).) Trading on the onshore market is carried out on the stock exchanges of Shanghai and Shenzhen.

A major portion of the trading in Chinese bonds (more than 90%) is carried out on the interbank market, to which, for a long time, only Chinese banks had access. Thus, financial institutions with access only to stock exchange trading were at a disadvantage compared to those financial institutions that accessed the interbank market as well. The fact that access is provided to the interbank market demonstrates the relaxation of bond market regulations, and the partial opening-up of the bond market (and thus the capital account as well). This may also support the efforts aimed at the internationalisation of the RMB, as it enables access to a wider range of RMB-denominated bonds for a wider range of investors.

In addition to the Chinese investors, access to the interbank market was first granted to central banks, sovereign wealth funds and supranational institutions. For other foreign financial institutions, access to the Chinese bond market is possible by acquiring the QFII (Qualified Foreign Institutional Investor) or RQFII (Renminbi Qualified Foreign Institutional Investor) status and the relevant quotas (see Section 4.6.2 for more on QFII and RQFII status).

Bond market trading was launched on the Shanghai stock exchange in 1990, and then in 1997 the interbank bond market was established by banning commercial banks from trading bonds on the stock exchange. In a similar fashion, foreign participants with QFII status were initially allowed to trade bonds on the stock exchange, and then in 2012 they were permitted to invest on the interbank market. Investors with RQFII status gained access to the interbank bond market in 2013 (*FTSE 2015*).

On the interbank market, banks and institutional investors are allowed to trade (including central banks, the institutions holding QFII and RQFII quotas, sovereign wealth funds and supranational institutions), and in addition to bonds, repo and forward transactions are also available. On the non-interbank segment of the off-

exchange market, commercial banks act as market makers in government bonds for private individuals and non-financial institutions (companies). On the stock exchange, banks and private individuals are allowed to trade, and in addition to government securities and corporate bonds, repo and bond futures transactions are available (*Li 2015*).

The regulation and oversight of the onshore bond market's interbank segment is performed by the People's Bank of China (PBC). Bond trading is carried out through the CFETS system, while the settlement of the bond transactions is implemented by the China Central Depository and Clearing Co. (CCDC) or the Shanghai Clearing House (SCH) (*Li 2015*). Stock exchange bond trading is overseen by the China Securities Regulatory Commission (CSRC). All four regulatory bodies take part in the regulation and oversight of the panda bond market. Panda bonds are only available on the interbank market.

4.5. Role of the Chinese onshore bond market in the internationalisation of the renminbi

The internationalisation of the renminbi is fostered by its use as a settlement currency in international commercial relations as well as its inclusion in the SDR basket. The internationalisation of the Chinese currency assumes the widespread use of the renminbi. This goal can be achieved if as many international participants as possible hold renminbi instruments, including renminbi-denominated bonds. These may be either offshore or onshore instruments. Therefore, the 2007 establishment of the offshore bond market was a step towards the internationalisation of the renminbi. Opening up a larger a segment of the onshore bond market for more and more non-Chinese investors may also strengthen the global role of the renminbi. Steps to this effect have already been taken, but not all market segments are accessible for non-Chinese investors. In addition, there are quantitative restrictions that limit the bond market share of non-Chinese investors. The gradual elimination of the restrictions and gradual opening-up of the market may help the renminbi in becoming a global currency.

According to *Ma and Yao* (*2016*), in addition to the regulation, monetary policy may also foster the Chinese bond market's support for the internationalisation of the renminbi. Currently, more than 60 per cent of onshore market bonds are held by commercial banks. Banks' bond market share and demand for bonds is explained by the RRR rate. In order to meet the reserve requirements, Chinese banks create permanent, substantial demand for Chinese onshore bonds. With the reduction of the RRR[4] rate, a considerable portion of the bond market supply would become freely available, as in the context of a lower RRR rate the bond market demand of

[4] RRR = reserve requirement ratio, the reserve ratio of commercial banks required by central banks. Through the RRR rate, the central bank can influence the amount of free liquidity available in the banking system (among other things).

commercial banks would be weaker, which would allow non-Chinese investors to gain ground.

The extent to which Chinese bond markets can support the internationalisation of the renminbi depends not only on the Chinese regulations but also on other factors influencing the demand generated by international investors. Three key factors are mentioned (*Luk–Chen 2015*) which may boost the demand of foreign investors on the Chinese onshore bond market: China's credit rating has improved significantly in recent years (according to the S&P's rating, it is currently in the AA- category), Chinese bonds offer higher yields than other large, mature bond markets, and the low correlation of the renminbi instruments with the bond markets of developed countries provides a diversification advantage for international portfolio managers. According to JP Morgan's analysis, between 2005 and 2015 the correlation coefficients of the US, Japanese and German bond markets calculated on the basis of the yields offered by the 10-year government bonds were extremely high, ranging above 80%. By contrast, yields on the Chinese and US long-term bonds showed a correlation of only 12%, while Chinese and German 10-year government securities showed 8%, and the correlation with the Japanese market was negative (–9%).

The study by the Finnish central bank (*Ma–Yao 2016*) examines the conditions for the internationalisation of the Chinese bond market, especially the government securities market. The study also points out the role of the exchange rate. The authors attempt to determine the conditions that would enable the currently seventh largest government securities market in the world to become the third largest globally. The study concludes that in terms of size, convergence with the US government securities market until 2020 is not a realistic scenario. However, it may be a realistic goal to catch up with the bond markets of Japan, the United Kingdom or the European Union. Assuming a 5 per cent average annual growth rate for the 10 largest government bond markets (except for the Chinese) and a 10 per cent annual growth rate for the Chinese government securities market, and assuming that the renminbi will appreciate 1.5 per cent against the USD annually, the size of the Chinese government securities market may double by 2020 compared to its size in 2015. This would make the government securities market the third largest in the world, but according to the projections, the existing bond portfolio would amount to a third of the Japanese market and 16 per cent of the US market. Based on the claims of the study, one might ask how these figures would change if the renminbi weakened. Since the end of 2015 the renminbi's exchange rate has been volatile and it has depreciated considerably against the USD, although it remained relatively stable compared to the newly introduced CFETS index.[5] The exchange rate may be

[5] An index introduced by the Chinese authorities in December 2015. Its value reflects the exchange rate of the onshore renminbi based on the trade figures for China's 13 largest trading partners. The index is published by the China Foreign Exchange Trade System (CFETS) at intervals not previously determined.

a risk factor that could materially influence the interest of international investors in the Chinese bond market, and thus it may also impact the role of the Chinese currency in international financial transactions.

Yet the study is not pessimistic with regard to the chances of the Chinese bond market. Examining the volume of trading on the bond market in an international context, the authors find that development bank bonds, the volume of trading of which on the secondary market is double that of the government securities, may contribute to the strengthening of the renminbi's international role. Nonetheless, the authors also point out that the development of the secondary market for government bonds and increasing market liquidity should be key aspects, since a liquid secondary government securities market is necessary for the establishment of reliable bond market benchmarks that may facilitate the appropriate pricing of other instruments and thus boost the demand for them.

4.6. Opportunities for foreign investors on the onshore market

4.6.1. Central banks

Central banks enjoy a special status with Chinese authorities, and they are *considered key investors* on the onshore market. This is because one of the goals of the government to promote the Chinese currency is to make the renminbi a global reserve currency in central bank reserves.

If foreign central banks wish to invest on the onshore market, they have two options to do so. They can either enter the market *directly* after submitting a registration form to the Chinese central bank, or they can gain exposure in onshore Chinese bonds *indirectly*, through the Bank for International Settlements (BIS), which is similar to an open-end investment fund created for central banks. Until July 2015, foreign central banks were also required to hold the pre-authorised quotas if they wanted to enter the onshore market, but this was abolished by the Chinese central bank, which simplified the investment process. Central banks can choose whether they wish the Chinese central bank or a commercial bank active on the Chinese interbank bond market to act as a *trading and settlement agent* for them. The task of the trading agent is to conclude and record the transaction in the trading system (CFETS), which is then transferred to the clearing system (CCDC/SCH). The task of the settlement agent is to compare the details of the transactions concluded with the data in the trading system, to record them in the clearing system and to perform the money and securities transfers. The central banks investing in the investment fund of the BIS actually invest on the Chinese onshore market *at the expense of the quota allocated to the BIS.* The fund invests the collected capital in line with predetermined policies, and charges a fee for its services. This option is primarily used central banks which are only beginning to familiarise themselves with the Chinese bond market, but wish to gain exposure in their reserves.

4.6.2. Foreign institutional investors

Financial institutions can enter the Chinese onshore bond market under two different programmes. In both cases they can gain access to securities on the stock exchange and on the interbank market as well (and may trade shares in addition to bonds).

Access can be gained by securing QFII or RQFII status. The basic difference between the two options is that while QFII status can be requested by any foreign bank or institutional investor (insurance corporations, brokerage firms, fund managers), only offshore renminbi centres (typically countries) receive quotas from the Chinese central bank within the framework of the RQFII programme. Institutions that wish to enter the market as investors can indicate their intention to invest at the expense of this quota. Entering the onshore bond market at the expense of the RQFII quota has been possible since 2011. In view of the fact that Hungary has RQFII quotas for Hungarian financial institutions, RQFII status may present a new opportunity for entering the Chinese securities market.

The QFII quotas are set in USD, while the RQFII quotas are set in RMB. Investors with QFII status transfer USD to the onshore market, then convert it to renminbi and carry out investments with that. Investors with RQFII status gain exposure on the onshore market by utilising their offshore renminbi. The latter programme basically helps to channel back to the onshore market the renminbi accumulated on the offshore market. Meanwhile, the goal of the former scheme is also to generate capital inflows, but in foreign currency that is converted to renminbi on the onshore market. The heightened fears at the turn of 2015 and 2016 due to the capital flight from China and the efforts to enhance the likelihood of the inclusion of the Chinese bond market in the benchmark index followed by large international fund managers may have contributed to the fact that in early 2016 several measures were taken to relax the rules regulating the entry to the onshore bond market. As a first step, the maximum amount of investment permitted to investors with QFII status was raised from USD 1 billion to 5 billion, after which the PBC enabled a larger group of financial institutional investors to enter the interbank bond market through Chinese commercial banks. At this time not only the scope of investors was expanded, the administrative conditions were also relaxed (*PBC 2016*).

Investors can enter the Chinese onshore securities market through a custodian bank (which is also authorised for clearing in the case of bond market investment). The bank obtains the necessary permissions and performs the required registration at the competent Chinese authorities on behalf of the foreign institutional investors. In order to gain access to the onshore bond market, institutional investors must fulfil several conditions, for example that in the three years prior to the investment on the onshore market, the competent regulatory authority should not impose a penalty on them for infringing on the laws governing bond market activity or

other regulations (*PBC 2016*). For those applying for QFII or RQFII and quotas and fulfilling the criteria, the central bank had previously set a fixed quota, but since early 2016 fund managers can enter the Chinese market based not on a fixed quota but on a percentage of the wealth managed by them. This requires authorisation from not only the central bank but also from the State Administration of Foreign Exchange (SAFE). In addition, stock exchange trading is only permitted with an authorisation from the China Securities and Regulatory Commission (CSRC). When the necessary permits are obtained, an account is opened, then transactions can start through commercial banks authorised for trading on the bond market and through brokerage firms on the stock exchange. Although the process may seem complicated at first, investors can basically enter the market in a one-stop-shop system, through the appropriate commercial banks.

5. Summary

The article presented the onshore and offshore segments of the Chinese bond market, analysing in detail both the supply and the demand side, the scope of available instruments, the bond market regulations and the basic characteristics of the markets. Examining the bond market in the context of the Chinese policy focusing on the internationalisation of the RMB, it can be stated that this political effort may point towards a higher proportion of foreign investors on the Chinese bond market.

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Risk Management Approaches and Bank Size*

Dániel Homolya

Relying on the database of the European Banking Authority (EBA), the article analyses the relationship between firm size and the selected risk methodology (credit, market and operational risk). Based on the analysis, larger institutions are more inclined to apply more advanced approaches.[1] While this is a favourable trend from a systemic risk perspective, according to statistical tests (Wilcoxon test), there is no evidence that the shift toward more advanced approaches was more intensive in the period between 2008 and 2010 than between 2010 and 2013, even if banks' attention presumably turned to other tasks in an effort to mitigate the consequences of the economic and financial crisis and in consideration of the significant regulatory changes.

Journal of Economic Literature (JEL) Classification: G21, G32

Keywords: risk management, banking sector, capital requirement calculation methods

1. Introduction

Modern bank regulations and internal considerations have led financial institutions to increasingly focus their attention on risk management. While credit and market risks took centre stage in the 1990s, in the early/mid 2000s operational risk also came into the limelight. It is, therefore, worth exploring the common features of the institutions that apply more advanced risk measurement approaches. Under the Basel II / CRD regulation effective from 1 January 2008 (currently the Basel III / CRR regulation and directive), all financial institutions across the European

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

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[1] With regard to size, the analysis assumes that a higher share in capital requirements also means larger size. Of course, this assumption maybe limited by the fact that other considerations can also affect systemic risk relevance. This issue is discussed in more detail in the "Conclusions" part.

Union are required to hold capital to guard against various key risks they face. The primary focus of this analysis is on Pillar 1 capital requirements, i.e. the minimum capital requirements for credit risk, market risk and operational risk. Obviously, Pillar 2 capital requirements also address these key risks, but for the purposes of this analysis the term "Pillar 1" is used – in accordance with the database of the European Banking Authority (EBA) on which this paper is based (*EBA 2015*), because Pillar 1 minimum capital requirements concentrate exclusively on these three key risks (market risk, credit risk and operational risk).

Capital formation is intended to guard against losses faced by deposit holders or the creditors of banks, as all three key risks imply the possibility of incurring certain losses. The literature on risk management defines credit risk as the risk of loss stemming from a borrower's failure to repay a loan, while market risk is understood as the risk of losses arising from movements in the market prices of financial instruments. Operational risk, in turn, is defined as the risk of losses incurred for inadequate or failed internal processes, people and systems, or from external events.

With respect to all three key risks, the regulator expects the application of adequate capital allocation methods, which may range from fairly simple methods to advanced, model-based approaches. More specifically, the advanced approach is the Internal Model Approach (IMA) for market risk and the Internal Ratings Based Approach (IRB) for credit risk. As regards operational risk, simple methods imply the Basic Indicator Approach (BIA) or The Standardised Approach (TSA), while the Advanced Measurement Approach (AMA) represents the advanced approach. The method selection of credit institutions can be influenced by several factors: the expected reduction of the capital to risk-weighted assets ratio and the commensurate increase in the potential profitability of credit institutions may encourage them to select more advanced approaches. However, the costliness and time-consuming nature of the implementation of more advanced methods, the difficulties involved in obtaining supervisory approval and the possible cycle amplification effect of the chosen approach may deter institutions from the application of more advanced methods. This paper provides an overview of the methods selected at the European level[2] and examines the extent to which firm size may influence risk methods. After a review of the relevant literature, the article presents the method selection for the three key risks, before analysing the trends observed during changeovers to the advanced approaches in 2008–2010 and in 2010–2013.

[2] Based on the EBA database.

2. Review of the relevant literature

Only a few papers address the relationship between institution size and risk management practice in the relevant literature. Although there are a number of analyses (*e.g. BIS 2009a; BIS 2009b*) outlining general best practices, they do not offer an explanation of the underlying motives. In an early phase of operational risk management (1998–2001), *Helbok and Wagner* (*2006*) found that less profitable institutions chose a higher level of disclosure in their operational risk profile and operational risk management practices. According to the authors, the rationale behind this is that highly profitable institutions are less "dependent" on higher transparency, whereas lower capitalised banks expect to improve outsiders' perception of the institution by more advanced risk management practices and by a higher level of voluntary disclosure. Although *OpRisk & Compliance* (*2008 and 2009*) presents a database that includes the operational risk management practices and approaches of the largest 100 banks, these articles do not offer a detailed statistical analysis. Earlier research highlighted the positive correlation between the exposure to operational risk loss and firm size (see, for example, *Dahen and Dionne [2010] or Na et al. [2005]*). *Homolya* (*2013*) drew the same conclusion regarding operational risk loss on a Hungarian sample, also adding that institution size and the level of advancement of the applied operational risk approaches correlated positively both on the international and the Hungarian sample.

3. Data and methodology

This study relies on data included in the database of the European Banking Authority (*EBA 2015*).[3] The database includes separate spreadsheets for individual years (currently for the period of 2007–2013), for the following data types: core statistical data, credit risk, operational risk, market risk data, and supervisory actions and measures. The main descriptive data of the database are presented in *Table 1* below. Data for 2007 cannot be evaluated yet as the changeover to Basel II regulations was optional at the time. The topic could be investigated more easily with access to more detailed databases (credit institution level data), but the relevant databases (e.g. SNL, S&P Capital IQ) do not contain information which would lend itself to systematic analysis for the method selection. Consequently, future research should be based on an independently compiled database derived from annual reports. For lack of more detailed data, this study concentrates on systemic-level trends.

[3] The database covers 31 European countries (member states of the European Economic Area (EEA), which is in the scope of the CRD/CRR regulation), of which 28 are EU Member States, and the remaining three comprise: Norway, Iceland, Liechtenstein.

Table 1
Descriptive statistics of the supervisory disclosure database of EBA

Descriptive statistics	2008	2010	2013
Total assets (mn €)	45 309 818	42 444 016	42 074 134
Total GDP (mn €)	11 502 644	12 706 891	13 019 818
Number of institutions	7 134	6900	6 580
Total capital requirements (mn €)	1 428 664	1 291 324	1 159 049
Total capital (mn €)	3 836 448	3 930 917	4 038 221
Tier 1 capital (mn €)	2 943 868	3 325 189	3 597 567
Tier 2 capital (mn €)	1 122 282	750 888	442 136
CAR (%)	21.50%	24.40%	27.90%
Total asset/ GDP (%)	394%	334%	323%

Source: EBA (own calculation)

As shown in *Table 1,* banks' balance sheets contracted significantly between 2008 and 2013 as a result of the institutions' deleveraging efforts, which was accompanied by an improvement both in capital adequacy and in the quality of capital (i.e. a shift to Tier 1 capital) across the European banking sector.

Although data are also disclosed by investment firms, since they represent a lesser weight compared to financial intermediation as a whole, this analysis focuses on the data supplied by credit institutions. In the coming chapters simple descriptive statistics and visual inspections are used to analyse the methodological changeovers observed in 2008–2010 and 2010–2013. This is followed by the presentation of a number of statistical tests (sign test, Wilcoxon signed-rank test of the relevant samples). Finally, it is important to note that the quality of the EBA data falls short of expectations. The database required a great deal of data cleansing[4] before a dataset suitable for adequate analysis was produced.

4. Results

The aggregate result demonstrates that the dominant part of the total capital requirement is the portion earmarked for credit risks. This is consistent with the primary objective of the banking sector, which is to mediate between savings and borrowings (*Table 2*). At the same time, in terms of general trends, the capital allocation for market risk has increased somewhat since 2008. On the one hand, this trend may be related to active market and investment services activity, which

[4] In the context of data cleansing, firstly, discrepancies in magnitude we corrected (e.g. where 20 was shown instead of 20 per cent). Secondly, we checked outliers in the time series and thirdly, where ratios did not add up to 100 per cent when they should have, we scaled the figures up to 100 per cent to ensure consistency.

picked up once again following a trough during the 2008 crisis; on the other hand, it may also reflect increased market volatility.

Table 2
Distribution of own fund requirements under Pillar 1 – European average (unweighted)

	2008	2010	2013
Market risk part	3.00%	3.20%	3.30%
Operational risk part	7.60%	8.70%	9.50%
Credit risk part	89.50%	88.10%	87.20%

Source: EBA (own calculation)

As shown by *Table 3*, the internal model-based approach cannot be considered dominant for any of the three key risk types, neither in terms of institution number nor solvency capital requirements. However, its share based on own funds requirements is higher than its share based by number for all three risk types, which suggests that larger institutions are more inclined to apply more advanced methods. As regards market risk, the higher share of the more advanced approach can be attributed to the duration of its application, which is longer than in the case of credit risk and operational risk as the advanced method was available as early as Basel I in the case of market risk. This, however, should not be considered the primary reason in itself. The real appeal of market risk approaches may lay in the fact that in the case of this risk type, model calculations are supported by high-quality, publicly available market time series and a standardised pricing approach and hence they are associated with distributions that can be adequately estimated by Value at Risk (VaR) models. Application of the advanced Internal Model Approach (IMA) for market risk declined between 2008 and 2010, presumably in response to the crisis-related default or restructuring of certain institutions which had previously applied advanced measurement approaches (e.g. Lehman Brothers, Dexia, Fortis). Headline numbers indicate that the switch to more advanced methods was far more pronounced between 2008 and 2010 than between 2010 and 2013 (change in own funds requirement percentage share: +5.9 percentage points vs. +3.1 percentage points for credit risk; +9.5 percentage points vs. +4.2 percentage points for operational risk). At the same time, it should be noted that a more detailed, country-level analysis would be needed for testing the relationship on a more robust statistical basis. The sub-chapters below include a more detailed analysis of these relationships for each risk type, in certain cases, broken down by country. Importantly, the analysis is essentially based on the assumption that a higher own funds requirements percentage share of a given approach points to a larger size proportion as well, although this assumption might be weakened by the fact that the capital requirement share may also be distorted by special factors (e.g. the special nature of the activity or the higher exposure of special institutions to certain risk categories).

Table 3
Distribution of the selected capital requirement calculation approach by number and by level of own funds requirements (unweighted averages)

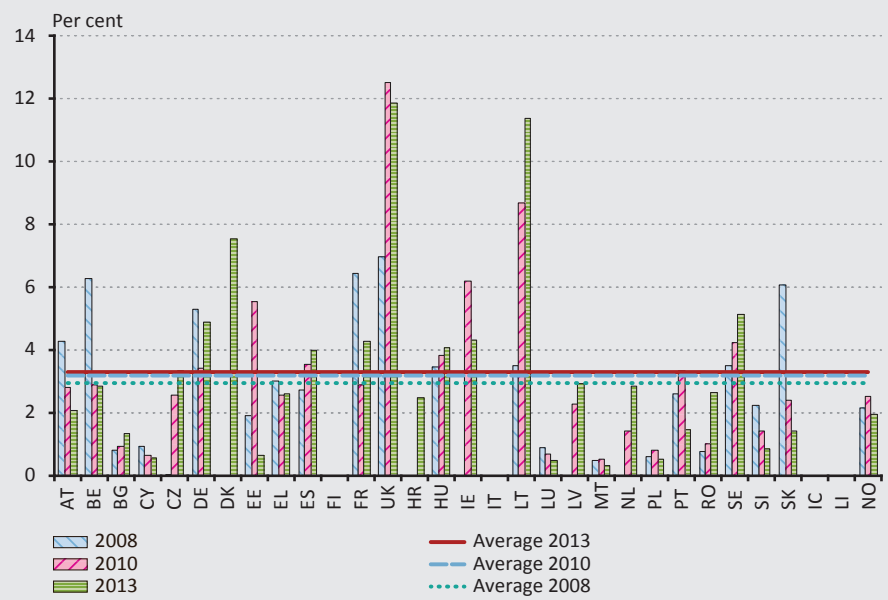
Method choice		2008	2010	2013
Market risk IMA	By number	31%	23%	19%
	By own fund req.	34%	27%	32%
Credit risk IRB	By number	13%	12%	13%
	By own fund req.	30%	35%	39%
Operational Risk AMA	By number	5%	6%	6%
	By own fund req.	8%	18%	22%

Source: EBA (own calculation)

4.1. Market risk

As mentioned above, based on unweighted average, the share of capital allocation for market risk was 3 per cent in 2008 and 3.3 per cent in 2013. Higher percentages were only observed in certain countries. In the United Kingdom, for example, the larger share can be explained by the depth of financial markets and banks' strong presence in such markets, while the relatively high share recorded in Lithuania

Figure 1
Ratio of own funds requirements for market risk to total own funds requirements
(%)

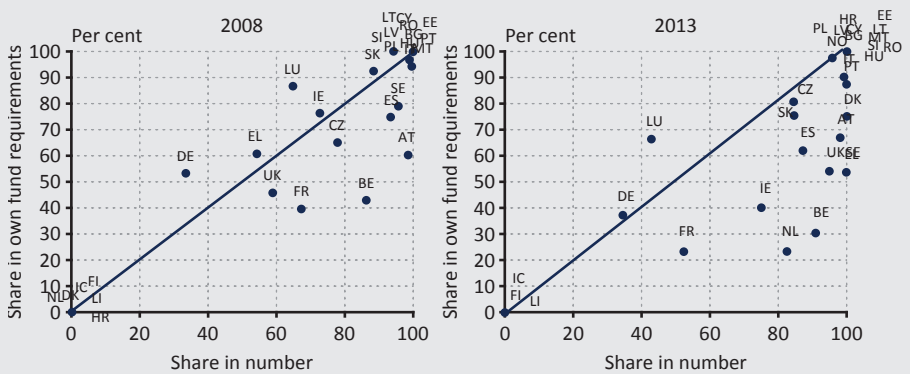


Source: EBA (own calculation)

appears to contradict our assumption and the outlier might merely stem from the data quality of the EBA database. In the Hungarian banking sector, the percentage of capital requirements for market risk exceeded the average recorded for the 31 European countries (EEA Member states, which are in the scope of CRD/CRR regulation) of the EBA database in all three years (at 4.1 per cent in 2013).

As shown in *Figure 2*, most banks applied the standardised approach in capital allocation for market risk. In many countries, the standardised approach was applied exclusively in 2013: in addition to Hungary, this was the case in Bulgaria, Cyprus, Denmark, Estonia, Latvia, Lithuania, Malta, Poland, and Slovenia, for example. Based on own funds requirements, the share of banks using the standardised approach falls short of the number-based percentage, which suggests that banks relying on the Internal Model Approach (IMA) are larger in size (with larger exposures to market risk). Starting from 2008, a diverging movement can be observed: application of the standardised approach increased in certain countries and declined in others. With respect to the exclusive use of the standardised approach in Hungary, it should be mentioned that in its recent presentation for bank risk managers, the MNB indicated, as a lesson learnt from the SREP reviews, that a more broad-based application of the Pillar 1 advanced market risk measurement approach would be desirable.[5]

Figure 2
Distribution of banks applying the standardised approach for market risk based on number and on own funds requirement



Source: EBA (own calculation)

4.2. Credit risk

As indicated above, credit risk represents a dominant share in the capital requirement. Its unweighted average share was 89.5 per cent in 2008, 88.1 per cent in 2010 and 87.2 per cent in 2013. Individual countries do not exhibit significant

[5] PRMIA presentation – Old and new supervisory instruments of the central bank – SREP findings, expected methodological changes and the new instruments of the central bank, Budapest, 23 April 2015.

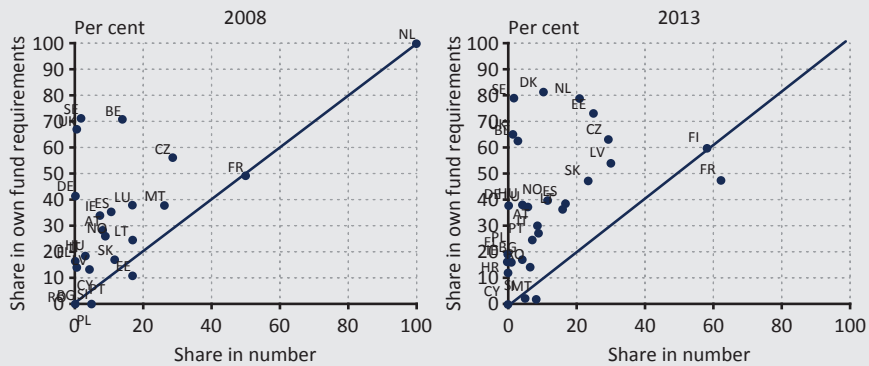
dispersion in this regard (*Figure 3*). In the Hungarian banking sector, the percentage share of own funds requirements for credit risk fell short of the European average of the EBA database in the review period.

Figure 3
Ratio of own funds requirements for credit risk to total own funds requirements
(%)

Source: EBA (own calculation)

Most banks apply the standardised STA approach for credit risk, both in terms of number and size (capital requirement). Between 2008 and 2013, application of the Internal Ratings Based Approach (IRB) increased: (percentage by number: –12.7% in 2008, –11.5% in 2010, –12.7% in 2013; percentage by own funds requirement: –30% in 2008, –35% in 2010, –39% in 2013): diverging (up and down) movements could be observed during the period, and it appears that changeover to the IRB approach decelerated somewhat between 2010 and 2013. Based on own funds requirements, the ratio of banks applying the IRB approach is higher than based on number, which points to the larger size of more advanced IRB banks. Similarly, in the Hungarian banking sector the own funds based share of banks using the IRB approach exceeds the number based share; at the same time, however, in the Hungarian banking sector the percentage of banks applying the IRB approach rose continuously in the review period of 2008–2013 (percentage by number: 1% in 2008 and 4% in 2013; percentage by own funds requirement: 2008: 14%, 2013: 38%). Obviously, these proportions can be also influenced by other factors. For instance, countries with a more extensive lending history may have a stronger background for more advanced credit risk approaches.

Figure 4
Distribution of banks applying the Internal Ratings Based Approach for credit risk based on number and on own funds requirement



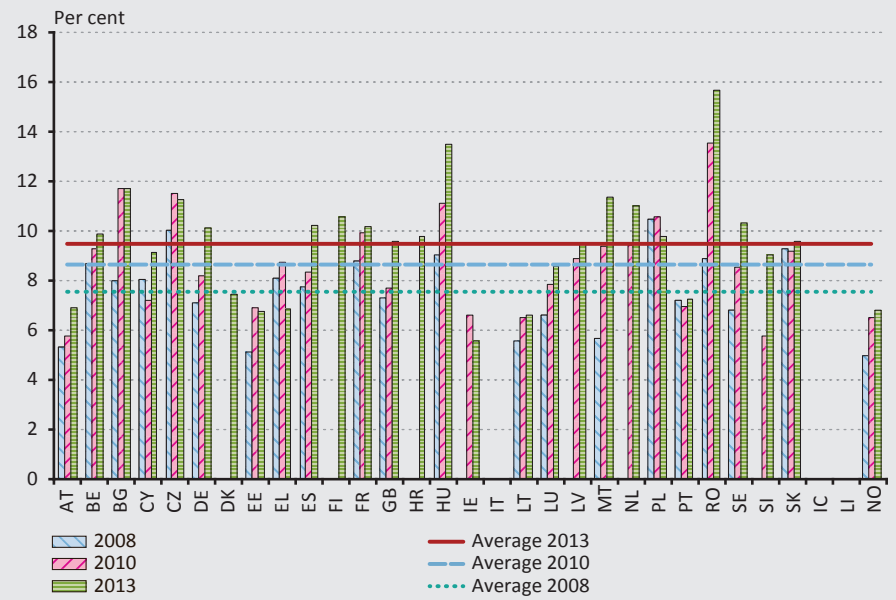
Source: EBA (own calculation)

4.3. Operational risk

Based on the unweighted average, the share of operational risk in capital requirements amounted to 7.6 per cent in 2008 and 9.5 per cent in 2013. The dispersion in the ratio of capital requirements for operational risk to total capital requirements is smaller than observed in the case of market risk. The higher ratio observed in Central European countries (including Hungary) can be attributed to the need to prepare for higher risk with higher income, which, in turn, has an impact on capital requirements as the basis of capital requirements is gross income in the case of more basic methods (which can be roughly defined as income before impairments and amortisation). Moreover, for operational risk the calculation is based on the average gross income of the last three years; therefore, any decline in gross income only materialises gradually. By contrast, in the case of credit risk, actual exposure is considered and thus changes materialise immediately.

Application of the Advanced Measurement Approach increased only gradually in the review period. The expansion, however, was more subdued in the 2010–2013 period than between 2008 and 2010. According to 2013 data, in terms of the number of institutions, the majority of banks apply BIA, i.e. the simplest approach (BIA: 72%, TSA: 23%, AMA: 7%), while in terms of capital requirements, most banks rely on the standardised approach (BIA: 28%, TSA: 50%, AMA: 23%). There was a clear shift towards the more advanced AMA approach (percentage share based on the number of institutions: 2008: 4.8%, 2010: 5.8%, 2013: 6.4%; percentage share based on capital requirements: 2008: 8.1%, 2010: 17.7%, 2013: 21.9%). Moreover, as the ratio of banks applying the advanced AMA approach is higher on the basis of capital requirements than based on number, we may conclude that banks relying

Figure 5
Ratio of own funds requirements for operational risk to total own funds requirements
(%)

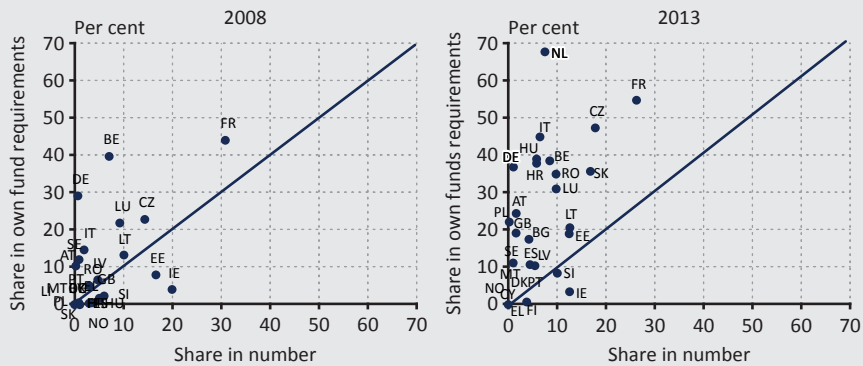


Source: EBA (own calculation)

on the advanced AMA approach are larger. Between 2010 and 2013, changeover to the AMA approach slowed. Similarly, in the Hungarian banking sector, the own funds based share of banks using the AMA approach exceeds the number based share. However, in line with the average EU trend, the percentage of banks applying the AMA approach also rose continuously in the Hungarian banking sector until it exceeded the level of the EU average (percentage by number: 2008: 1%, 2013: 6%; percentage by own funds requirement: 2008: 0%, 2013: 38%) (*Figure 6*). Obviously, these proportions can also be influenced by other factors. For instance, countries with more extensive operational risk databases may have a stronger background for more advanced operational risk approaches.

As mentioned above in Part 2, during the review of the literature, *Dahen* and *Dionne* (*2010*), *Na et al.* (*2005*) and *Homolya* (*2013*) provide an overview of the positive correlation between bank size and operational risks (larger institutions face higher operational risk loss exposures, which is essentially driven by frequency). In consideration of the potentially higher operational risk loss exposure of larger institutions, it is particularly relevant to determine whether or not larger institutions select more advanced approaches.

Figure 6
Distribution of banks applying the Advanced Measurement Approach (AMA) for operational risk based on number and on own funds requirement



Source: EBA (own calculation)

4.4. Statistical testing of the methodological changeover between 2008 and 2013 and testing of the deceleration in changeover by comparing the periods of 2008–2010 and 2010–2013

This sub-chapter tests the hypothesis according to which the higher share of institutions applying the advanced method in 2013 compared to 2008 was statistically significant. In addition, the analysis is also intended to investigate whether or not the switch to the advanced approach decelerated after 2010. For the purposes of statistical testing, in addition to the Wilcoxon signed-rank test, the sign tests of the related samples – as included in the SPSS statistical programme package – are also applied. The null hypothesis used in these tests is that the median of the differences is 0.

Nearly the entire EU sample was suitable for testing (a total of 24 countries after having discarded those with inadequate/insufficient time series: DK, FI, NL, LI, IC, NO, HR), and a separate sample was compiled from Central and Eastern European (CEE) countries (10 countries). The Pillar 1 application of the advanced market risk approach is less widespread in CEE countries compared to the European average, but the difference is only marginal in the case of credit risk and operational risk (*Table 4*).

In the case of credit risk and market risk, there was a clear difference between 2013 and 2008 with respect to the share of credit institutions using the advanced method (with a statistically significant rise observed in 2013); by contrast, there was no significant difference for market risk (*Table 5*). However, testing the change in the percentage of users of the advanced approach between 2008 and 2010 and between 2010 and 2013 reveals that the difference is statistically negligible. As demonstrated by Table 6, there was no evidence that the switchover to more advanced approaches slowed down significantly after 2010.

Table 4

Percentage of banks applying the advanced method in Central and Eastern European (CEE) countries

CEE average	by type	MarkRisk IMA average	CreRisk IRB average	OpRisk AMA average
2013	By number	2.80%	13.11%	9.10%
	By own fund req.	3.95%	33.94%	26.53%
2010	By number	3.60%	11.13%	7.73%
	By own fund req.	1.60%	25.69%	16.79%
2008	By number	4.11%	7.60%	4.92%
	By own fund req.	4.59%	12.36%	5.24%

Source: EBA (own calculation)

Table 5

Statistical test for the equivalence of the share of advanced approaches in 2008 and 2013

Shares 2008 vs. 2013 (significance)	Full sample		CEE sample	
	Related sample sign test	Related samples Wilcoxon signed rank test	Related sample sign test	Related samples Wilcoxon signed rank test
MR STA Number based 2008 vs. 2013	0.607	0.363	0.625	0.273
MR STA Own fund requirement based 2008 vs. 2013	0.143	0.022	1.000	0.686
CR IRB Number based 2008 vs. 2013	0.027	0.122	0.039	0.066
CR IRB Own fund requirement based 2008 vs. 2013	0.093	0.024	0.021	0.007
OR AMA Number based 2008 vs. 2013	0.017	0.101	0.021	0.022
OR AMA Own fund requirement based 2008 vs. 2013	0.004	0.000	0.002	0.005
OR AMA Own fund requirement based 2008 vs. 2013	24	24	10	10

Note: Grey background colour indicates a significance level above 95%.
Source: EBA (own calculation)

Table 6
Statistical test for the match between the differences in changes in the share of advanced approaches in the periods of 2008–2010 and 2010–2013 (significance)

Share difference of 2008–2010 vs. 2010–2013 (significance)	Full sample		CEE sample	
	Related sample sign test	Related samples Wilcoxon signed rank test	Related sample sign test	Related samples Wilcoxon signed rank test
MR STA Number based 2008–2010 vs. 2010–2013	1.000	0.820	0.625	0.715
MR STA Own fund requirement based 2008–2010 vs. 2010–2013	0.002	0.006	0.375	0.138
CR IRB Number based 2008–2010 vs. 2010–2013	0.832	0.592	0.754	0.721
CR IRB Own fund requirement based 2008–2010 vs. 2010–2013	1.000	0.784	0.754	0.959
OR AMA Number based 2008–2010 vs. 2010–2013	0.286	0.445	0.344	0.878
OR AMA Own fund requirement based 2008–2010 vs. 2010–2013	0.523	0.263	1.000	0.878
N = sample size	24	24	10	10

Note: Grey background colour indicates a significance level above 95%.
Source: EBA (own calculation)

5. Conclusions

The most important finding of this paper is the conclusion that institution size has a significant impact on the selection of the risk method. Indeed, larger institutions facing potentially greater loss exposure tend to be more motivated to apply more advanced approaches, presumably also in consideration of the fixed costs of risk management. From a systemic risk perspective, this is a positive conclusion, as institutions with heightened systemic risk effects should pursue a more thoughtful risk management practice.[6] The changeover to more advanced risk measurement approaches between 2008 and 2010 and between 2010 and 2013 did not exhibit a statistically significant difference in growth rate, even though a substantial deceleration could be intuited from market circumstances and other, significant regulatory changes. Interestingly, until recently regulatory authorities had made

[6] This conclusion, however, could be explored further in view of different other factors that may have an impact on the exposure to systemic risk besides firm size (e.g. in the case of diverging market concentration), such as substitutability and interconnectedness (see, for example, *FSB* [*2015*]).

great efforts to encourage the use of more sophisticated methods, but apparently, this enthusiasm was smothered by the outbreak of the financial crisis in 2008, as also expressed in a recent speech by *Stefan Ingves* (*2015*), Chairman of the Basel Committee on Banking Supervision: "When it comes to addressing the weaknesses in the RWAs framework, we can distinguish between three broad areas. The first of these is policy measures that directly limit the degree of RWA variability. This could be done by placing greater emphasis on standardised measurement approaches. Another way is by limiting the flexibility banks have in determining internal model-based estimates of RWAs". The author of this paper believes that advanced methods have both benefits and weaknesses. While thoroughly considered changes should be welcome, hopefully the advantages of advanced approaches will not be discarded during the process of rethinking the Basel regulatory framework after Basel III.[7]

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[7] Specific steps have already been taken in this process within the framework of the Basel Committee on Banking Supervision: the "fundamental review", i.e. a revision to the market risk framework (http://www.bis.org/bcbs/publ/d352.htm), was issued nearly concurrently with the finalisation of this article. Moreover, consultative document were published on Revisions to the Standardised Approach for credit risk in December 2015, and on revisions to the operational risk capital framework to introduce Standardised Measurement Approach (SMA) to replace currently existing approaches in March 2016.

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Macroeconomic effects of the increase of electronic retail payments – A general equilibrium approach using Hungarian data*

Tamás Ilyés – Lóránt Varga

In our study, we assess the possible impacts on the performance of the Hungarian economy if various proportions of retail cash payments were substituted with debit card payments. We conducted our analysis in the framework of a general equilibrium model, which also takes into account the costs of payment transactions in a detailed manner. The results indicate that substitution of cash payments with debit card transactions has a favourable impact on the performance and competitiveness of the economy, increases real income, real consumption, the level of GDP and the tax income of the state as well. The favourable effects increase exponentially with the degree of substitution, but are also manifest even in the case of a low level substitution, which is attainable in just a few years. According to our calculations, the favourable macroeconomic impact derives, to a smaller extent, from the transfer of resources released in the field of payment services to other sectors. A more significant impact derives from the fact that, on the one hand, substitution also improves the efficiency of resources already available in the real economy, and, on the other hand, the characteristics of the pricing of debit card services typically causes a smaller deadweight loss than the level we could register concerning the more complex cross-pricing of cash payment services. Based on our findings, on the whole we can formulate the conclusion that by supporting and accelerating the constant efficiency improvement of retail payments, economic policy is able to improve the performance and competitiveness of the entire economy, both directly and indirectly.

Journal of Economic Literature (JEL) Classification: C68, E27, E42

Keywords: retail payments, methods of payment, general equilibrium theory, CGE modelling, social costs

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1. Introduction

In the economic literature, it is a commonly held opinion that a higher ratio of electronic payment transactions indicates a more developed, more efficient payment system, i.e. contributes to the development of the economy and the increase in competitiveness. Two types of methodology are commonly used for assessing this matter. The first group contains the econometric analyses performed on cross-sectional macroeconomic data, which explore the relationship between the level of development of the payment systems of the countries and their level of general economic development. The other approach is from a micro aspect; it is based on the survey and aggregation of the individual costs, which makes the social cost of the methods of payment quantifiable. As a result, the amount of savings available through the replacement of methods of payment incurring higher social cost with methods incurring lower costs can be determined. Social cost is a concept based on net settlement, which screens out the flows of charges between actors of the payment supply chain and only takes into account the sum of own, private costs.

Research taking the cross-sectional, econometric approach demonstrates with compelling results that a more developed, more efficient system of retail payments has a positive impact on the performance of the economy. *Hasan et al.* (*2012*) assessed the correlation between the choice of payment method by residents and economic development in 27 European countries for the period between 1995 and 2009. In their panel model, they explained the logarithm of the per capita by macroeconomic variables and variables that measure the penetration of electronic means of payment (number of payment cards, bank transfer orders, direct debits, checks, use of cash). Their findings indicate that the penetration of electronic means of payment has a significantly favourable impact on GDP growth. The most powerful effect can be seen in relation to the use of payment cards. *Hasan et al*. (*2009*) used data in the panel of EU member states to analyse the relationship between the level of development of the system of retail payments and the profitability of the banking sector. Following this method, *Hasan et al.* (*2013*) presented a general analysis of the correlation of retail payments and the performance of the real economy. Based on panel data, they demonstrated that the ratio of electronic payments positively correlates with per capita GDP in the EU. According to their calculations, a 1.2% increase in card coverage increases the level of GDP by 0.07%. The most comprehensive international results on this topic are presented by *Zandi et al*. (*2013*) in an analysis of the panel data of 57 developed and emerging countries between 2008 and 2012. Their results show a very strong relationship between the penetration of purchases by bank cards and economic growth practically in each country under consideration. According to their calculations, in developed countries the increasing use of electronic payments in the period under review raised the GDP of these countries by 0.3%, and in the emerging countries this value is even higher, i.e. 0.8%. The aggregate average annual GDP growth rate of the 57

countries under consideration was 1.8% between 2008 and 2012, which would have been only 1.6% without a rise in the use of electronic payments. Therefore, the increasing penetration of electronic payments registered in recent years raised the global growth rate of GDP by almost 0.2 percentage points annually on average.

In the area of retail payments, the assessment of social costs started as early as the 2000s. The study of *Humphrey et al*. (*2003*) demonstrated that in the United States the decrease in the ratio of cash-based means of payment resulted in a significant saving of resources, estimated at 0.5% of GDP. This study also demonstrated that the high penetration of electronic means of payment in 12 European countries led to a significant decrease of banking costs (USD 32 billion, 0.38% of GDP).

This research was followed by several similar social cost surveys, typically performed on the basis of a harmonised methodology in Europe, which were collected and compared in the study of *Schmiedel et al.* (*2012*). It is the main conclusion of that study that in North European countries, where the ratio of electronic payments is higher, the social cost of retail payments constitutes a lower part of the gross domestic product than in countries which use cash and paper-based payments more intensively. It can also be observed based on the data that in countries characterised by a higher ratio of cash use, cash payment transactions typically incur lower unit costs than in countries which use electronic means of payment more intensively, as these methods of payment do have a cost advantage. This can be explained by pointing out that, to a significant degree, retail payments incur fixed costs – typically related to the installation and maintenance of the necessary infrastructure – and therefore the volume of the various means of payment significantly affects their average unit costs. However, owing to the different ratios of fixed and variable costs, an economy that uses electronic means of payment in a higher ratio is more efficient than one that is cash-oriented.

Based on the methodology of the European Central Bank, *Turján et al.* (*2010*) performed this assessment for Hungary as well at an outstanding level of details, and the robust results led them to conclude that in Hungary the current cost structure and consumer habits still lead to the cost advantage of cash both on the household and the merchant side. On the other hand, in the case of a powerful shift of payment habits towards electronic means of payment, significant savings can be achieved.

In summary, it is safe to say that in the literature we can find compelling results, on the one hand concerning the contention that savings can be realised in total social costs with a higher ratio of more efficient means of payment, and, on the other hand, that the penetration of more efficient means of payment has a favourable impact on the general performance of the economy. However, so far no one has explored the impact mechanism of how exactly and through what channels the decline in the social costs of the system of retail payments impacts the development

of the macroeconomy. Consequently, it cannot be specified exactly for any country what would be the type and the extent of the changes caused in the individual macroeconomic variables by substitution of different degrees in the methods of payment of various efficiency. The reason is that, although the relationships between the real economy and the system of retail payments has already been assessed by several studies from an econometric point of view, no comprehensive methodology has yet been created for the placement of retail payments into the framework of equilibrium theory. *Starr* (*2003*) presented how transactional costs can be interpreted in the Arrow-Debreu model framework. However, only a few examples can be found for its practical application. *Griffith-Jones* (*2012*) prepared a report for the European Commission based on the results of the QUEST III model on the impact of the financial transaction tax, while *Escudé* (*2007*) inserted transactional costs into his DSGE model calibrated for the economy of Argentina. However, these approaches do not involve retail payments in a detailed enough manner to enable the analysis of the impacts of structural changes.

In addition to looking for evidence in the case of the Hungarian economy as well for the favourable macro-economic impact of more efficient retail payments, in our article we also explore its impact mechanism. Therefore, in our research we integrate the individual technological and behavioural relationships based on micro data with the fundamental structure of the macroeconomy. In this manner, in our study we go one step beyond the issues assessed in the literature so far and look for the answer to the question of who are those actors of the economy that would realise the cost savings arising from choosing more efficient methods of payment in a higher ratio, what would be the type and volume of the impact on the major macroeconomic variables, and furthermore how this would affect the competitiveness of the country. On the one hand, a more efficient system of retail payments can manage payments with fewer resources; therefore these resources can be utilised in other sectors. In parallel with that, the remaining resources can generate higher added value. In our study, we intend to quantify these impacts.

In our analysis, we narrow down the subject of the research to the macroeconomic impact of substitution of retail cash payment transactions with debit card payments. We justify our choice by pointing out that in the ratio of card payments, Hungary is still significantly behind the average of the European Union, but the number and value of these payments is growing dynamically, and therefore the structure of payment habits in this area may improve significantly even in the foreseeable future. When switching between these two methods of payment, we only assess retail payments made by households (which comprise the overwhelming majority numerically anyway).

In the following part, as the first step, we present the methodology of our research. We describe the baseline scenario providing the start point of the analysis in the

third section of the article, i.e. the current usage ratios and cost structures of the payment methods applied in retail payments and our various assumptions applied to the substitution between the methods of payment. The fourth section contains the results of our calculations on the changes occurring in total social costs and the fifth section is on the macroeconomic impacts concerning the individual assumptions of substitution. We end the article by formulating our conclusions.

2. Methodology

In accordance with our research question, we assess the economic impacts of substitution between methods of payment (to be totally precise, between retail cash and debit card payments). The first step in this is the estimation of the attainable social cost savings. However, the decrease in the social costs of the payment system is not the ultimate economic impact. The calculation based on the changes in the social costs of methods of payment does not answer the question of what will happen to the released resources, how will the pricing practices of the actors in the supply chain of retail payments change, with special regard to cross-pricing between methods of payment, and furthermore to what extent the savings will ultimately improve the competitiveness of the economy and increase the ultimate consumption options.

In order to answer these questions, however, we must screen out several impacts which could influence the final result, but which are not directly related to the choice between methods of payment, the first being the impact of the increase of turnover. In recent years, both the cash stock in the economy and electronic means of payment have been growing dynamically. Even though the increasing volume reduces unit costs, to an extent that varies according to the method of payment, the cost of the entire system increases when more payment transactions need to be managed. This does not mean a deterioration in the competitiveness of the economy, a payment system expanding to a larger extent than the growth rate of the economy is a natural process in countries catching up in financial culture. To screen out this effect, in our study in each case we performed our calculations using the existing volume and value data of retail payments (observed in 2015) and only change the ratio between cash and debit card transactions within retail payments. Owing to this, the demonstrated macroeconomic and competitiveness impact can be considered entirely a result of substitution between methods of payment.

In addition, we disregard any impacts which are not directly manifest in the cost or fee structure of the actors under assessment. For example, an increase in the ratio of electronic retail payments is usually accompanied by a decrease in the ratio of the shadow economy, which could further strengthen the favourable macroeconomic impacts of substitution between methods of payment. However, quantifying this is very difficult and is not the topic of our study.

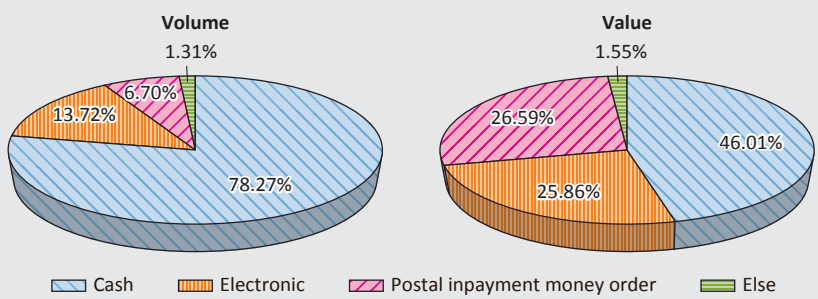
By contrast, we include in our analysis those pricing methods which are not based on prime cost, such as cross-pricing, oligopolistic pricing, and a change in the structure of the economy, i.e. a rearrangement of resources among different technologies of production, in order to provide a more accurate picture of the channels and impact mechanisms through which changes in payment habits may contribute to improving the performance and competitiveness of the economy.

Based on the above considerations, using the data on the number and value of current retail payment transactions and assuming different cash and debit card payment ratios, we first quantify the social cost savings attainable given the individual assumptions. Subsequently, using a general equilibrium model which also takes into account the costs of payment transactions, we estimate the anticipated impacts of these social cost savings on the macroeconomy and competitiveness, and furthermore, we present those channels and impact mechanisms through which these impacts are realised. For these latter assessments, we use the static general equilibrium HUPS model presented by *Ilyés–Varga* (*2015a*) and calibrated for the Hungarian system of retail payments and economy, with minor adjustments.

3. Assessment of the current situation and our assumptions applied for substitution between methods of payment

In a European comparison, the Hungarian economy is fundamentally cash-oriented. Based on *Ilyés–Varga* (*2015b*), at present the ratio of purchases with payment cards is currently relatively low in terms of volume and value (*Figure 1*), even though payment account and debit card coverage is relatively high, at 75 and 71 per cent, respectively. Owing to this, from the aspect of the entire society, there is still room for development in the use of more efficient methods of payment. However, in recent years card usage has grown strongly, in a double-digit rate, even in years when the number of accounts decreased.

Figure 1
Distribution of households' monthly payment transactions by method of payment



Source: Ilyés–Varga (2015b)

Based on the study of *Turján et al*., as a result of the intensity of use, cash has a significant average cost advantage compared to payment by debit card (*Table 1*). In fact, our estimations based on data of 2009 show that, in terms of volume, the Hungarian household sector made its payments in cash to an extent exceeding 90% in retail transactions. As a result, the average cost of payments by debit card is almost 3 times as high as that of cash transactions. Concerning purchases by credit card, this difference is more than tenfold. However, the ratio of variable costs is much lower in the case of electronic payments. For this reason, if the ratio of payments by payment cards significantly increased compared to cash transactions, substantial savings could be accomplished in the costs of the entire society.

Table 1
Cost structure in Hungary in 2009

	Cash	Debit card	Electronic transfer	Direct debit	Postal inpayment money order	Paper-based credit transfer	Credit card
Fixed (%)	33.50	62.30	52.50	63.20	17.00	8.60	73.90
Variable (%)	66.50	37.70	47.50	36.80	83.00	91.40	26.10
Total (billion HUF)	208.82	30.22	40.07	7.73	38.96	35.01	19.56
Volume (million units)	2,835	150	230	77	271	47	25
Specific cost (HUF)	73.66	201.13	174.22	100.39	143.76	744.89	796.09

Source: Turján et al. (2010)

In our article, we assess the economic impacts of substitution between methods of payment compared to the above initial situation. Therefore, as the baseline scenario, we use the cash-to-card ratio characteristic of retail payments, calculated according to the retail transaction figures for the year 2015. According to the available data and our estimations, in these categories at present and on average, in the retail sector 89% of turnover is paid for in cash and 11% by bank cards. Based on the values, the ratio of cash is somewhat lower, since in the case of transactions with higher values the customers use bank cards for payment in a ratio higher than the average. Naturally, in retail purchases and especially in other retail payments, such as the payment of invoices, we also register other methods of payment with lower turnover, such as bank transfer or direct debit. When we discuss in this article the turnover of retail payments, this excludes the turnover handled by these other methods of payment, since we include these with the same quantity and with the same value in our model in the case of every assumption of substitution. In other words, these are also included in our calculations, but we only assume substitution between transactions made in cash on the one hand and by debit cards on the other hand.

Table 2
Our assumptions on the substitution of methods of payment

	Description	Ratio of card usage within retail payments (by volume)
Baseline scenario	The ratio of payments made by debit cards within retail payments registered in 2015	11%
Low level of substitution	The ratio expected to be accomplished in Hungary according to the forecasts	25%
Medium level of substitution	Average ratio registered in the European Union in 2015	50%
Significant level of substitution	**The reverse of the existing situation, which means an outstanding level of card use**	**89%**

Compared to the baseline scenario, in our analysis we assess the macroeconomic impacts of three substitutions of different levels (*Table 2*). First, we assume a payment structure that seems attainable even in the relatively short term: we selected this as the expected ratio by 2020 of retail debit card payments, based on the projection of the current trends. As a result of the dynamic, double-digit annual growth in the number and value of purchases by payment cards, a significant shift is expected even over this short time horizon, although payments in cash also show an increasing trend. According to our estimation based on the projection of the trends, in 2020 the ratio of the number of retail card payments could reach 25 per cent. Therefore, our first assumption is that compared to the current situation we substitute cash payments, constituting 14 per cent of all retail payments, with debit card payments. In accordance with the methodological considerations, we emphasise that the projection applies to the ratios expected in 2020, with the volumes and turnover values registered in 2015.

In our second assumption, we presume the substitution of cash payments at a medium level in total. In this assumption, as a point of reference we define the accomplishment of the ratio of card payments that is currently registered on average in the retail sector in the European Union. Since we have no statistics that would enable us to determine this ratio clearly, we have made the estimation using the data of EU countries on average cash stock to GDP and the number of per capita transactions paid with payment cards. Based on these, concerning Hungarian retail turnover, retail payments reaching the EU level of efficiency would mean electronic payments reaching an extent of almost 50 per cent, and in terms of value as much as two-third of all purchases would be paid for by card.

In the third case, we expect the highest level of substitution, which could even be considered extreme, assuming that the current usage ratios of methods of retail

payments are reversed, i.e. the ratio of payments with cards would be close to 90 per cent. Currently, this ratio only exists in the most developed countries with the highest level of electronic retail payments, e.g. the Netherlands and Sweden.

4. Impacts of substitution between methods of payment on social costs

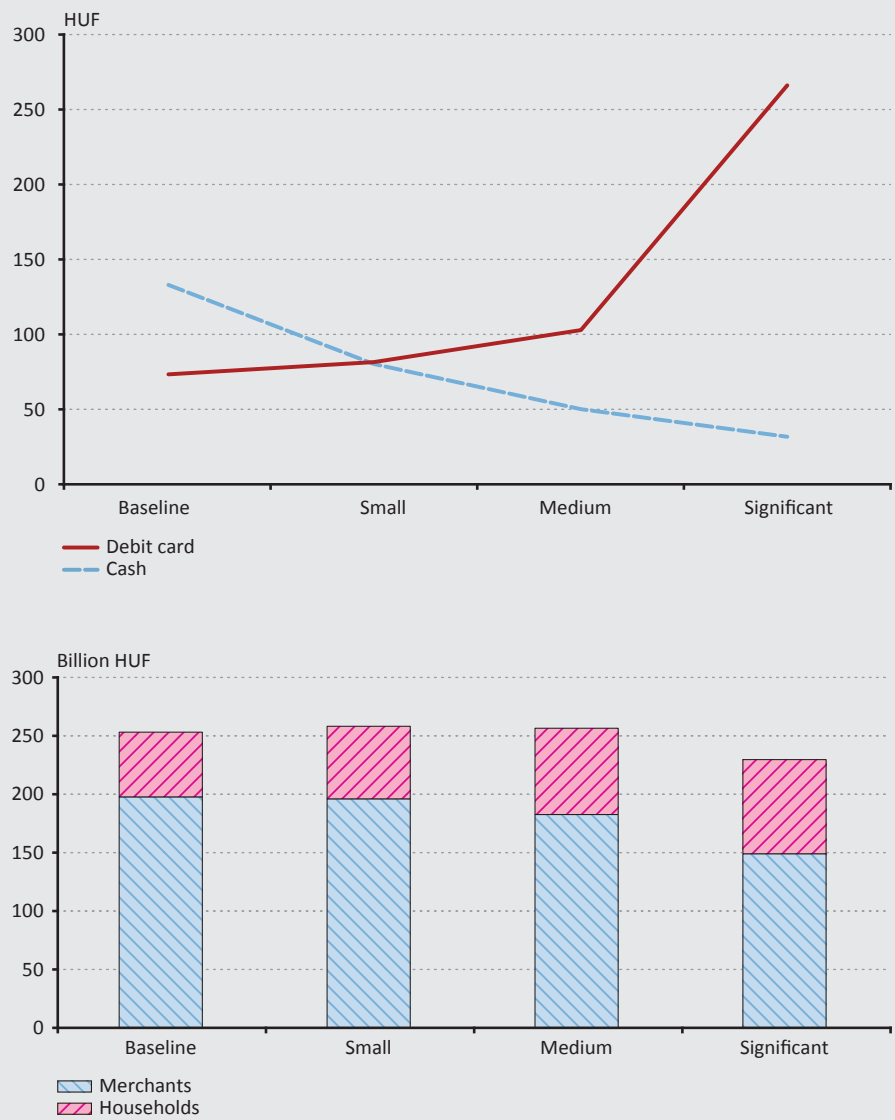
The assessment of the impacts of switches between methods of payment is based on the calculation of social costs. By social cost, we mean the entire costs of the supply chain of retail payments, excluding the fees paid by actors of the supply chain to each other. According to the calculations of *Turján et al*. (*2010*), based on data from 2009, the size of the system of retail payments can be estimated at 1.09% of GDP, based on the social costs spent on it. This method of calculation contains the costs incurred by all the actors themselves, e.g. the household sector, businesses and payment providers, and the costs of the resources necessary for operation of the system. It is important to emphasise at this point already that owing to its nature, the calculation of social costs is a partial analysis: for example, it does not further break down intermediate consumption or the part assigned to retail payments from the tax burdens of the affected actors.

As the first step, we supplemented the basic ideas of the survey underlying the cited study with the trends seen in the last five years. The data of the study, which can be considered as preliminary to our research, apply to the year 2009, and therefore they need a certain degree of adjustment to enable the analysis to be conducted. We adjusted the costs of the actors by inflation for 2015, modified the payment of fees according to the data registered in the meantime relating to the fees applied by payment providers, and thus they already reflect the situation following the introduction of the transaction tax and free cash withdrawal. By contrast, we disregarded certain cost factors surveyed in the cited study, according to the methodology of *Ilyés–Varga* (*2015a*), for example, the different time needs of the use of the various methods of payment.

Based on the partial analysis, it can be stated that the average unit cost of payment by debit card can be reduced to the level of cash even with a lower level of substitution of methods of payment (*Figure 2*). In the case of a medium level of substitution, payment by debit card already enjoys a significant cost advantage compared to payment in cash, and with a significant level of substitution this difference increases drastically.

However, the turning point in the full social average costs of methods of payment does not necessarily equal the level of substitution at which the costs perceived by the actors are reversed. If we break down the costs to merchants and residents, it can be seen that from the total social costs (which already show a decrease in the case of a significant level of substitution) the ratio of the part assigned to residents

Figure 2
Impact of substitution on unit cost and social cost

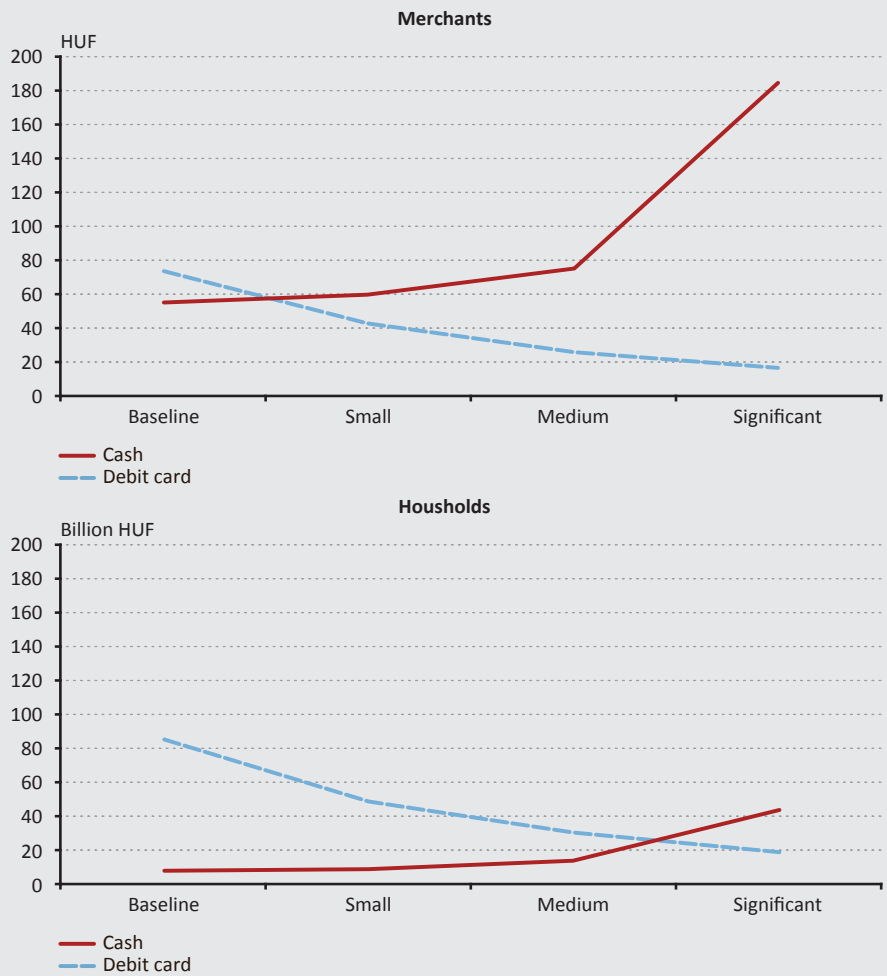


Source: authors' own calculations and the supplemented, adjusted data of Turján et al. (2010)

rises gradually (*Figure 2*). The reason is that in the case of payments by debit card residents directly bear the costs in a higher ratio. On the other hand, the costs of cash payments are incurred indirectly among the costs of merchants and payment providers.

If we consider the unit costs, a difference is registered among the actors of the economy (*Figure 3*). While on the side of merchants accepting card payments the sequence is reversed even in the case of a low level of substitution of methods of payment, the cost advantage of cash only disappears if there is a significant level of

Figure 3
Unit costs of merchants and residents in the case of card use and cash



Source: authors' own calculations and the supplemented, adjusted data of Turján et al. (2010)

substitution. The main reason for that is free cash withdrawal and the transaction tax. However, both of these are individual effects and do not appear among social costs.

In summary, it can be determined from the analysis that in the case of a major structural change in retail payment habits, compared to the current state, the costs of the supply chain of payment services can be reduced by HUF 20–25 billion annually, while among methods of payment it grows slightly simultaneously with low and medium levels of substitution (*Figure 2*). However, it can also be observed that the changes in social costs are manifest at the level of the individual actors in different measures and on different courses. In addition, as mentioned, the calculation of social cost savings is a partial analysis, which considers the external actors as static and also disregards the flow of charges between actors. By contrast, experience shows that various actors incorporate payment charges into their decisions in different ways, and intermediary service providers apply a significant degree of cross-pricing and oligopolistic pricing. External actors are not static either, and from the aspect of the central budget the tax implications of the various payment methods differ significantly, and it is not necessarily simple for the resource markets to convert the costs. The costs of tied-up capital constitute a significant portion of the costs of electronic means of payment, such as purchases by debit card, while in respect of cash payments the labour costs of manual processing are more significant. In addition, the efficiency of the resources tied up in retail payments may be different than observed in other sectors of the economy. These impacts are not independent of each other and in several cases they may even be opposing, and because of this a partial analysis based on the changes in social costs may lead to inaccurate results.

Owing to these reasons, we extended our analysis into a general equilibrium theory framework, where we were able to include all the characteristics of the system of retail payments which are significant for the purposes of the analysis, and using a logic of equilibrium theory based on the balance of the usual relations between branches, we also present the bases of the decisions of the real sector and the household sector.

5. Macroeconomic impacts of substitution between methods of payment

In this study, we apply the HUPS model presented by *Ilyés–Varga* (*2015a*), calibrated to the Hungarian system of retail payments and the economy, and slightly adjusted to the question raised by the research. HUPS is a static quantified general model of equilibrium theory, in which the various actors take into account the costs of the completion of the transactions when making their decisions concerning the real economy. The model contains two groups of the corporate sector, these are branches of the real economy and actors of the supply chain of payment services. Owing to space limitations, we only present the most important behavioural equations and relations of the HUPS model. The cited study contains a detailed description of the structure, activations and variables of the model as well as the data sources and the modes of calibration.

Of the 15 branches distinguished by the model, each is represented by a representative agent. The representative actor maximises its profit, while taking into account that the acquisition of intermediate consumption and resources also has implications in terms of retail payments. The target function of the company is the following:

$$\pi_i^p = p_i \cdot Y_i - w \cdot L_i^D - \sum_j^I p_i \cdot X_i^j - p_m \cdot M_i - \sum_m^M \varphi_m \cdot PS_{mi}^D - \sum_m^M \varphi_m \cdot PS_{mi}^{Dv} - NTX_i \qquad (1)$$

where p is the price, *Y* is the level of production, *L* is the amount of labour force, *K* is the amount of capital, *X* is interim use, *M* is import, *PSD* and *PSDv* are the volume and value of the payment services used, φ_m is the fee of payment services and *NTX* is the net tax burden.

Companies need to deal with the following constraints:

The tax burden of the company is the sum of the value added tax (*VAT*), the taxes on capital (*TXK*), on labour (*TXL*) and on production (*TXY*):

$$VAT \cdot \left(p_i \cdot Y_i - \sum_j^i p_j \cdot X_i^j - p_m \cdot M_i \right) + r \cdot K_i^D \cdot TXK + TXL \cdot w \cdot L_i^D + OTX_i + TXY \cdot p_i \cdot Y_i = NTX_i \quad (2)$$

The technology of the representative company is the composition of CES functions and the Leontief production functions:

$$Y_i = \min\left(\left(AL_i^y \cdot L_i^{Dyc^{-\sigma i}} + AK_i^y \cdot K_i^{Dyv^{-\sigma i}} \right)^{-\frac{1}{\sigma_i}}, \ldots, A_x^i \cdot X_i^y, \ldots A_m \cdot M^y \right) \qquad (3)$$

The actors use *m* different payment methods for the purpose of performing their activities in the real economy. Companies may also use several methods of payment (e.g. bank transfer, payment in cash, etc.) for their activities in the real economy (e.g. sale of goods, payment of suppliers, payment of wages, payment of taxes, etc.). The *fm* parameter shows the ratio of the individual methods of payment in the value and number of payments related to various activities in the real economy:

$$f_Y^{im} \cdot p_i \cdot Y_i + \sum_j^J f_{xj}^{im} \cdot p_j \cdot X_i^j + f_L^{im} \cdot w \cdot L_i^D + f_K^{im} \cdot r \cdot K_i^D + f_M^{im} \cdot p_m \cdot M_i + f_T^{im} \cdot NTX_i + PSFIX_v^{im} = PM_{mi}^v \quad (4)$$

$$f_Y^{im} \cdot \theta_Y^{im} \cdot Y_i + \sum_j^J f_{xj}^{im} \cdot \theta_{Xj}^{im} \cdot X_i^j + f_L^{im} \cdot \theta_L^{im} \cdot L_i^D + f_K^{im} \cdot \theta_K^{im} \cdot K_i^D + f_M^{im} \cdot \theta_M^{im} \cdot M_i + PSFIX^{im} = PM_{mi} \quad (5)$$

Where PM_m and PM_m^v are the number of items and total value necessary of the individual methods of payment for the given company, *PSFIX* is the volume of retail transaction not explained by the model, and *qm* is a parameter of projection, which shows how many payment transactions of the given method of payment belong to

the real value of the individual transactions in the real economy. The solution of the pricing problem, if λ_g^4 is the shadow price of payment services, λ_g^5 is the shadow price of the value of payment services and λ^8 is the shadow cost of taxation:

$$p_i = \sum_j^n p_j^T a_j^i + w_i^T \cdot \frac{L_i^{Dy}}{Y_i} + r_i^T \cdot \frac{K_i^{Dy}}{Y_i} + p_m^T \cdot a_{mi} + \sum_g^k \lambda_g^4 \cdot \left(f_Y^{ig} \cdot \theta_Y^{ig} + \sum_i^n f_{xi}^{ig} \cdot \theta_{Xi}^{ig} \cdot a_j^i \right) + \sum_g^k \lambda_g^5 \cdot \left(f_Y^{ig} \cdot p_i + \sum_i^n f_{xi}^{ig} \cdot a_j^i \cdot p_i \right) + \lambda^8 \cdot VAT \cdot \left(p_i - \sum_i^n p_i a_j^i \right) + \lambda^8 \cdot TXY \cdot p_i \quad (6)$$

When making an optimal decision, the actor of the branch will supplement the usual pricing formula with the marginal cost of transaction completion, by which it can translate all interim uses and primary resources into the full price. That way, the cost decrease or increase is directly incorporated in the price of the product, and the price of primary resources reflects their entire marginal profit.

The payment service providers (PSP) produce services related to retail payments using the products of the same branches, the primary resources and the services of other service providers. Their decision function is basically the oligopolistic and cross-pricing of their full prime costs received based on profit maximisation.

The profit function of payment providers is the following:

$$\pi^{psp} = \sum_{m \in psp}^M \left(\varphi_m \cdot PS_m^{St} + \varphi_m^v \cdot PS_m^{Sv} \right) - w \cdot L_{psp}^D - r \cdot K_{psp}^D - NTX_{psp} - \sum_j^J p_i \cdot X_i^{psp} - \sum_m^M \left(\varphi_m \cdot PS_m^{Dt} + \varphi_m^v \cdot PS_m^{Dv} \right) \quad (7)$$

where PS^{St} and PS^{Sv} mean the volume and value of the supply of payment services. Based on their pricing functions, payment service providers allocate their fixed costs to their direct cost (*DC*), to obtain the final price using an oligopolistic mark-up profit rate and a cross-pricing rate:

$$\varphi_m^g = \left(1 + markup^{psp} + cross_m^{pspg} \right) \cdot \frac{\left(DC_m^g + \omega_{pspm}^{fg} \cdot \left(r_{psp}^T \cdot K_{pspm}^{Dfg} + w_{psp}^T \cdot L_{pspm}^{Dfg} \right) \right)}{PS_m^{Sg}} \quad (8)$$

where *w* is the rate of distribution of indirect costs. The oligopolistic mark-up adjusts the profit expectations that are different than the full profitability of the actors by product. The cross-pricing rate has been estimated based on empirical experiences, the revenues of the bank and pricing practices. Fundamentally, it consists of three parts: increasing factors for the purpose of maintaining the entire profitability of the bank, direct reallocations between services, primarily between volume and value, or even the inclusion of the costs of purchases made with payment cards in the annual card fee, and finally, the direct passing on of the individual tax impacts.

In several cases, the calculated price differs from prime costs significantly, and therefore concerning the entire economy the rest of the actors making rational decisions will make suboptimal decisions. The resultant deterioration of efficiency can be directly measured in deadweight loss.

The state actor operates on the basis of the pay-as-you-go logic, its expenses (G_E) follow the revenues (G_R):

$$G_R = G_E \tag{9}$$

Its revenues are the profit of state-owned companies, net prices and the deficit of the budget, its expenses are community consumption, social transfers and the costs of the payment services used:

$$G_R = NTX_G + D_G + \pi^G \tag{10}$$

$$G_E = C_G^D + TR_G + DP_G \tag{11}$$

For the state operator, the completion of payments is exogenous for the decision.

The household representative actor is an entity that maximises its profit, in which it takes into account the costs of the completion of payments.

$$U(C_i) = \left(A_1 \cdot C_1^{-\beta_h} + \cdots + A_j \cdot C_J^{-\beta_h}\right)^{-\frac{1}{\beta_h}} \tag{12}$$

Its budgetary constraint is the identical amount of consumption, costs of payment services, and net taxes, along with capital income, labour income and transfers.

$$\sum_i^J p_i \cdot C_i + \sum_m^M \left(\varphi_m \cdot PS_{mh}^D + \varphi_m^v \cdot PS_{mh}^{Dv}\right) + NTX_h = r \cdot K^S + w \cdot L^S + \pi^h + OTX_h \tag{13}$$

$$C = \sum_i^J p_i \cdot C_i \tag{14}$$

The supply of resources of the various sectors is fixed. The model distinguishes three primary resources, capital, labour and import:

$$C = \sum_i^J p_i \cdot C_i \tag{15}$$

$$L^S = L_0^S - \sum_m^M L_{mh}^D \tag{16}$$

$$M^S = M_0^S \tag{17}$$

In order to present the impacts accurately, HUPS also has an income distribution module based on the system of integrated national accounts and following the logic of the social settlement matrices. Accordingly, some of the capital incomes go abroad, the state actor creates social transfers from taxes, and we also take into account the income transferred home from abroad. Social settlement is static, it operates calibrated to the ratios of the year 2014.

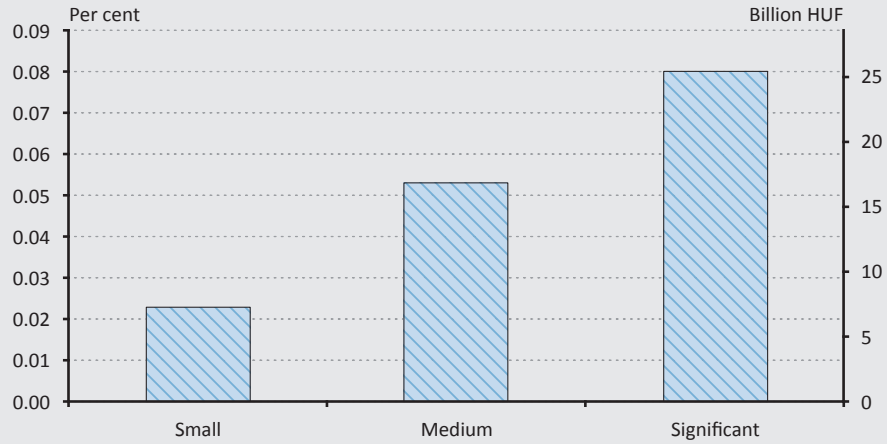
In our research, we calibrated the model applied to the macroeconomic data for the year 2014. The reason is that the detailed national account data for 2015 were not yet fully available at the time the article was written, and therefore estimations would have been necessary in many respects. The retail transaction data used for calibration are taken from 2015. The model slightly differs from the one presented by *Ilyés–Varga* (*2015a*), in that we primarily changed the structure of methods of payment. We detached the credit card function costs from the costs of transactions with payment cards taken into account in the study. The reason is that in accordance with the question raised in our article we considered the debit card as the primary electronic substitute of cash use in retail turnover. For this reason, the payment cards included in the model only mean cards with debit function, the costs of the credit function are represented among other methods of payment in the model in this article.

In the model calculations, we modified the ratio between cash and card transactions by the household sector according to the assumptions presented in Section 3 of the article, leaving everything else unchanged in the model. The results thus obtained were more accurate than the partial analysis in Section 4 of the article, since the level of detail of the applied model makes it possible to distinguish the transactions performed by the individual sectors on the one hand, and, on the other hand, we can also assess the indirect economic impacts of changes in retail payments, thanks to the general equilibrium approach.

Figure 4 contains the aggregate results of the calculations. Since the HUPS model is quasi-price-homogeneous, the price level is fixed. The selected benchmark is the implicit GDP deflator; therefore, each change in GDP corresponds to a volume change in the statistical sense. The available resources are fixed, which means that GDP is an aggregate unit of measurement of the entire productivity of the system. It is clear from the chart that the impact predicted by the model is positive even at a low level ratio of substitution, even though based on the partial results of Section 4 the social costs of retail payments still increase slightly in this case.

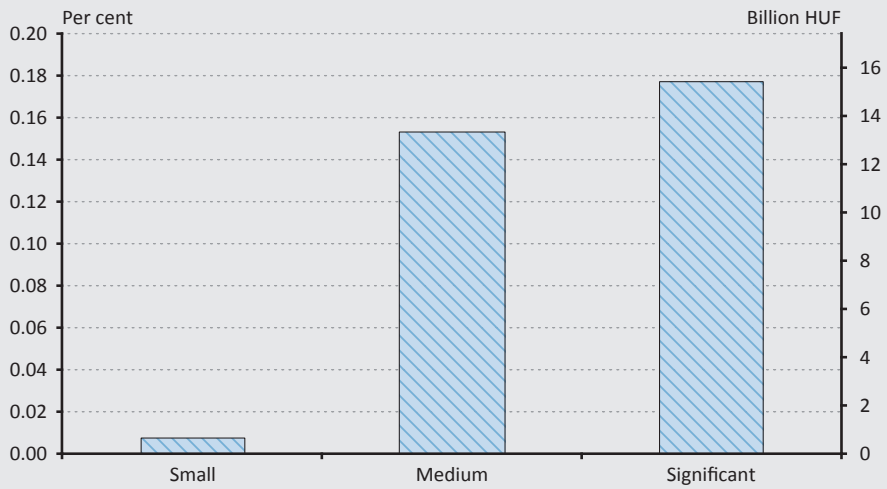
The cause of the difference is that the HUPS model framework is capable of quantifying significantly more impacts than the calculation of social cost savings. As a general efficiency indicator, the incremental real GDP summarises every such element. The U form still exists, but the incremental turning point is shifted forwards. In order to accurately understand the macroeconomic impacts, we can trace back the effects step by step to the original assumptions.

Figure 4
Impact of the various scenarios on real GDP
(departure from the baseline scenario of the model)



Source: calculations using the adjusted HUPS model

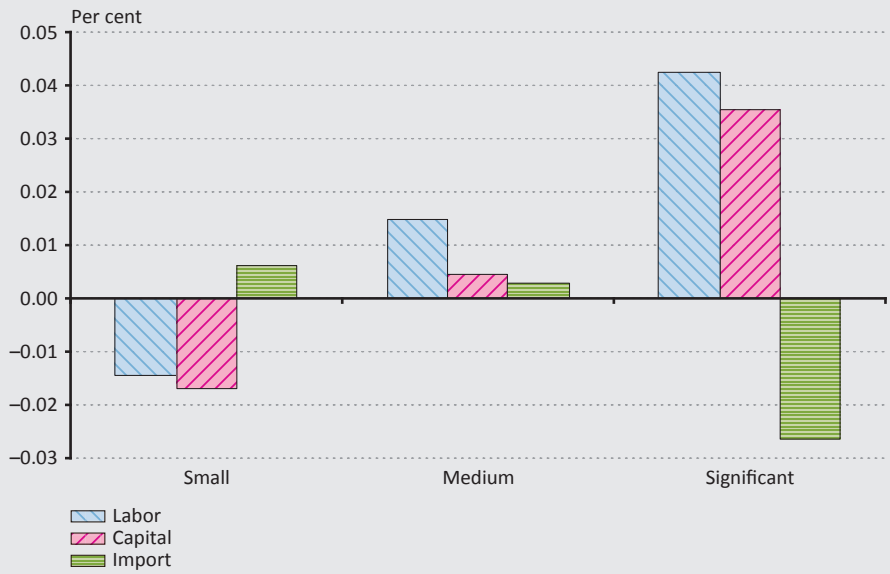
Figure 5
Development of household real consumption in the various scenarios
(departure from the baseline scenario of the model, a volume index weighted by base)



Source: calculations using the adjusted HUPS model

The surplus production deriving from substitution between methods of payment is registered in two places; first, in the increase in consumption of the household sector (*Figure 5*). Since the system adjusts the price level, the incremental consumption derives from incremental income. The increment is nominally lower than the entire GDP increment, since other sectors also receive their share of the increased efficiency.

Figure 6
Development of real incomes in the various areas
(departure from the baseline scenario of the model)



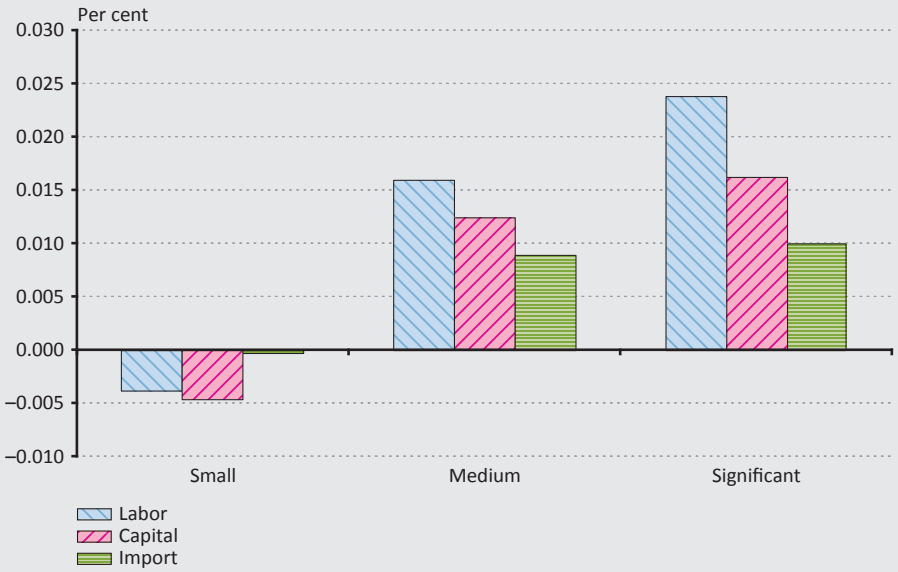
Source: calculations using the adjusted HUPS model

The scenario of real income is significantly different than the scenario of the consumption of the household sector (*Figure 6*). There are two reasons for this. On the one hand, the model analyses the relationships between the various income categories and social transfers following the practice of the Social Accounting Matrices (SAM). Accordingly, a significant portion of capital incomes go abroad, while the income of the household sector is increased by benefits paid by the state. The other cause is the different scenarios of the three different primary resources. The course of labour and capital is led by the usual U form, while imports are significantly affected by the fact that the ratio of activities involving different import ratios changes in the various scenarios.

The increase in real income is caused, on the one hand, by the indirect efficiency improvement of the resources. Businesses are able to pay higher wages and dividends, because production becomes more efficient in general. Since after the substitution payments can be managed at lower per-unit costs, businesses achieve higher resource efficiency, for the most part through the mediation of the commercial branch that sells the produced goods to the household sector. On the other hand, it increases real income as a direct impact that resources that are removed from retail payments are added to the real sector and expand production.

However, the re-allocated resources only expand the activities of the real sector to an extent lower than their previous efficiency (*Figure 7*). The efficiency of the primary resources applied in the model is typically higher in the sector of financial

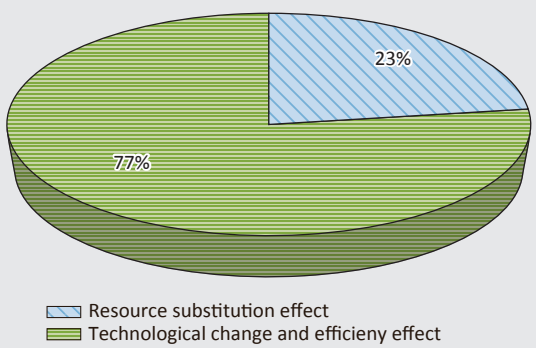
Figure 7
Resources in the production of the real sector
(departure from the baseline scenario of the model)



Source: calculations using the adjusted HUPS model

activities, to which retail payments belong, as compared to the remaining part of the economy. This difference is quite significant in the case of capital efficiency. We can partially break down the impact of substitution on economic growth, based on the usual growth accounting. By allocating the GDP growth according to the CES functions generally applied in the model we can make the statement that for the

Figure 8
Breakdown of GDP growth as a result of efficiency improvement and expansion of resources



Source: calculations using the adjusted HUPS model

larger part growth may be associated with the increase in the efficiency of resources already existing in the real sector, and not with the reallocation of the resources released in the field of payment services (*Figure 8*).

Based on the results of our model calculations, substitution between methods of payment ultimately improves the competitiveness of the economy through three channels. The classic, direct channel is the utilisation of resources drawn from payment transactions in the real sector. This channel can be partially analysed through savings on social costs. However, the model-based analysis shows that in our case this channel is less significant, since the efficiency of several sectors typically falls behind that of payment services; therefore the impact is lower than the full nominal volume of savings. The second channel is the general efficiency improvement of the resources, accomplished by more efficient payment services, manifested for the most part through the mediation of the commercial sector. Therefore, substitution between methods of payment also improves the efficiency of resources already existing in the real sector. Since HUPS is a disaggregated model, the impact is manifest in a way typical of the input-output models.

The third channel is a structural change in the economy that does not directly affect production technologies. In the modelled economy, deadweight loss may occur as a result of a pricing system that is not entirely prime cost-based and based on the system of taxation. The HUPS model follows the pricing practice and the regulations applying to the activity, and therefore the market of various methods of payment is detached from their actual costs. The cross-pricing of the methods of payment was already demonstrated by the study of *Turján et al.* (*2010*), as was the fact that the extent of cross-pricing is quite significant in cash transactions and paper-based bank transfers. In recent years, in addition to this several regulatory changes have been implemented that further increased the difference. By contrast, in payments by card on the retail side the typical arrangement is costs charged on the annual card fee, which have been partly incorporated into the decisions of the consumers, and on the corporate side cross-pricing decreased as a result of the regulation of interbank commissions. Based on the detailed results of the model, the impact can be led all the way, the prime cost – shadow price – of payment services is significantly different than the market price in several cases, which runs all the way through the supply chain. Since the corporate actors apply the full price in their decisions on resource demands, and it is not characteristic of the actual cost, they make suboptimal decisions concerning the entire economy. They consume more than the optimal level of resources that utilise more intensively the method of payment with a reduced price through cross-pricing. For this reason, in accordance with the theoretical models, a deadweight loss occurs in the economy. Concerning the impact on the taxation system, following a similar logic, the structural change of substitution between the products with different tax burdens on the one hand and

the resources on the other hand modifies the deadweight loss. The results of the model also lead to the conclusion that the pricing of cash payments and the related tax burden is more distorted than in the case of transactions with debit cards, and therefore the substitution presumptions examined by us have a favourable impact on the performance of the economy through this channel as well.

In summary, it is safe to say that the savings calculated in the social cost calculation are realised directly to a lower extent as incremental production, since payment transactions typically have more added value per one resource unit than the rest of the sectors. However, indirect effects cannot be neglected, and in the case of changes in payment habits a switch between various, non-prime-cost-based methods of pricing (a shift towards pricing with less distorting effect) and other channels of economic effects also contribute to a significant extent to the improvement of the entire competitiveness of the economy.

6. Conclusions

In our study we analysed the question of how and to what extent substitution between methods of payment contributes to the performance and competitiveness of the economy. To this end, we assessed the substitution impacts between retail cash and debit card payment transactions in the case of the Hungarian economy. In our research, we first assessed the cost situation of the methods of payment under examination and demonstrated that, despite the constant increase in electronic payments, concerning average costs cash transactions still have an advantage. This advantage can be observed at every economic agent (payee, merchant) individually as well. As the first step for surveying the economic impact of substitution, we analysed the structure of the social costs of the two payment methods.

Using the social cost data of retail payments for 2010, adjusted and calibrated to the situation in 2015, we assessed the impacts of three different levels of substitution compared to the baseline scenario, i.e. in comparison to the ratio of card payments of 11 per cent currently registered in retail payments. We defined our assumptions on the extent of the substitution in such a manner that, with the small level of substitution, according to the projection of the current trends, we should recah the ratio of payment by card which is attainable within a few years in the retail sector (25%), in the case of medium-level substitution we should accomplish the current average rate of payment by cards in the European Union (50%), while in the case of a significant level of substitution we should get the reverse of the ratio of the baseline scenario (almost 90%). This latter figure can be considered an extremely high level of card use, which currently only a few European countries with the most developed payment system approach at best.

Based on our partial analysis, we demonstrated that by increasing the ratio of card use actual cost savings are attainable both at the level of society and at the individual level of actors in the economy. The process, however, is not linear. Owing to the different structures of cash and debit card transactions, at a small level of substitution the total cost for society rises temporarily; however, after the turning point it is possible to accomplish exponentially increasing actual savings with an increase in the level of substitution. Since social cost calculation in itself is not capable of quantifying the impact on the macroeconomy and on competitiveness, we were unable to gauge the utilisation of savings by this method. In addition, we were also not able to assess the impacts of complicated cross-pricing, changes in taxes, oligopolistic pricing and changes in the structure of technology. For this reason we extended our analysis and estimated the anticipated macroeconomic impacts of the previously identified social cost savings using a static general equilibrium model which takes into account the costs of payment transactions in detail as well and is calibrated to the Hungarian payment system and economy.

The applied model is capable of quantifying all of the impacts listed above and directly estimating their combined effect. Our results showed that the substitution of cash payments with transactions by debit cards has a favourable impact on the performance and competitiveness of the economy, increases real income, real consumption and the level of GDP, and also has a favourable impact on the tax income of the state. We also demonstrated that in contrast to the turning point in the average unit costs of the methods of payment under examination, the impact on total productivity can be registered even in the short term, including the case when we assume a low level of substitution of methods of payment. The reason is that the general equilibrium theory approach summarises impacts realised through multiple channels. On the one hand, the resources released in the field of payment services are utilised in the real economy, but only at a lower level of productivity than earlier, since the resource efficiency of the real economy is typically lower than that of the financial sector. However, the indirect effects of substitution between methods of payment also improve the performance of the economy. Owing to the increase in the ratio of electronic means of payment, the handling of payments becomes more efficient for every economic actor, and thus the companies' own technology improves, which also improves the efficiency of their existing resources as a multiplier effect. In addition, the substitution of the methods of payment presented in our article also has a favourable impact on the economy owing to the different level of cross-pricing of cash and debit card transactions. The reason is that according to our model calculations the pricing of debit card transactions causes a lower level of deadweight loss than more significant and more complex cross-pricing related to payments in cash.

Therefore, the savings identified in social cost calculation are realised directly to a lower extent as incremental production, since payment transactions typically have more added value per one resource unit than the rest of the sectors. However, indirect effects cannot be neglected, in the case of a change in payment habits a shift towards a less distorting manner of pricing and other indirect channels of the economy also substantially strengthen the favourable macroeconomic impacts. Based on our findings, in total we can formulate the conclusion that by promoting and accelerating the constant efficiency improvement of retail payments, economic policy is able to improve the performance and competitiveness of the entire economic system both directly and indirectly.

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Financial personality types in Hungary – research methods and results*

Erzsébet Németh – Dániel Béres – Katalin Huzdik – Boglárka Zsótér

The objective of our study is to determine the characteristic features according to which an individual can be evaluated from the aspect of his/her financial culture. People filling in the questionnaire consisting of 36 questions may determine how much they can be characterised by individual features or behaviours. We worked with two types of personality profiles. One of them was compiled by the author of the test (preliminarily defined personality profile). In this case, respondents get feedback on the results they achieved in each pre-defined dimension (Price-sensitive, Economizing, Moderate, Saver, Diligent, Controls his finances). Among these dimensions, awareness and diligence are positive preliminary indications of the level of the person's financial culture. The high level of saving and price-sensitivity did not correlate with good results achieved in other personality dimensions. In addition, we elaborated another personality profile obtained in empirical way. In order to establish the dimensions, we performed factor analysis. The established dimensions are: Short of cash, Economizing; Money-devouring; Order creates value; Price-sensitive; Collector; Planner; Ups and downs; Diligent and Cannot control his finances.

Journal of Economic Literature (JEL) Classification: A13, D03, D12, I22

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1. Introduction

Individuals' financial behaviours and habits may be extremely varied in both space and time, as the formulation and modification of these are influenced by a number of factors.

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With the present research (*Béres et al. 2015*), our objective is to explore what dimensions can be determined from the aspect of the financial personality, and how they can be evaluated from the aspect of financial awareness.

This research qualifies as basic research,[1] i.e. the primary objective is to offer a starting point for further research. However, we would like to point out that with a little bit of further thinking, the results may be directly suitable for "objectivising" the subjective risk analysis considerations in the field of retail lending, i.e. it is possible to use the results directly in the industry.

2. Financial personality

Since the 1970s, a number of researchers have been examining financial attitudes and personality types, trying to find out the factors according to which people's financial behaviour patterns evolve. This study examines the financial personality and the individual's relation to money from economic and psychological points of view. In processing the professional literature, from the studies completed in this area we review those which we found relevant to this research and which served as a basis for our own evaluations.

The first such study is related to the names of *Goldberg and Lewis* (*1978*). They distinguished three types of individuals in their study: collectors, individuals striving for independence and power players. They came to the conclusion that individuals striving for independence accumulate money to reduce their feeling of discomfort, while collectors accumulate money to avoid damages originating from economic and environmental changes. As opposed to the first two groups, the main objective of power players is not to ensure security, but to use their money to attract the attention and earn the admiration of other people.

A decade later, *Forman* (*1987*) supplemented the system of Goldberg and Lewis with another category, the gamblers. The members of this new group connect the acquisition of money to an intensive status of excitement and emotions – poker or roulette may be similar – and sometimes the stock exchange itself can be interpreted as a kind of gamble.

Similarly to *Mellan* (*1997*), *Yamauchi and Templer* (*1982*) defined the attitude to money as a multi-dimensional term.[2] According to their research, the *first dimension* is the power-prestige, in which money is the symbol of success and

[1] The report on the research can be found on the website of the Pénziránytű Foundation *http://www.penziranytu.hu/helyes-diagnozis-nelkul-nincs-hatekony-terapia*

[2] Later, a number of researchers, including *Furnham (1984)* and *Tang (1992)* also used dimensions to define individuals by financial personality.

power in the individuals' attitudes. In this sense, money helps the individual acquire power, security and freedom, and become special compared to others. This is identical with *Goldberg and Lewis'* earlier (*1978*) research results and *Zsótér and Nagy's* later (*2012*) research results. This is supplemented with the research by *Bell* (*1998*) and *Durvasula and Lysonski* (*2010*) in a way that the continuously increasing consumption by individuals belonging to the power-prestige dimension also increases the materialism-centred nature of people, and its climax may be compulsive shopping activity. The *second dimension* is retention-time. In the case of individuals in this group, the main focus is on preparation for the future and keeping the financial situation under continuous control. For these people, saving and amassing are of primary importance, and they regularly record the situation of their finances. They are able to give up present consumption in the hopes of later, probably bigger consumption. Giving up may be explained over the short term by strengthening their sense of security.

The *third financial personality dimension* of *Yamamuchi and Templer* (*1982*) is distrust. The common feature of individuals in this category is that they look at money with suspicion, almost with fear. For them, money is practically the source of distrust. In general, we can say that individuals that have no trust in money and finances, usually do not trust themselves either to the necessary extent. For instance, this may be the case when someone does not have enough experience or knowledge in a given area, in this case, in finances.

The *fourth* and last *dimension* of the authors contains anxious individuals, who tend to be nervous (anxiety dimension). For this type of personality, money is a controversial phenomenon, as it means both anxiety and protection for them. In other words, we could simply say that they are the "what will happen, when we do not have it" personalities. A characteristic feature of the paradox personality is that they ease their anxiety by shopping, and it may become a compulsive activity (*Valence et al. 1988*).

The above described typology of *Yamamuchi and Templer* (*1982*) was used by *Bauer and Mitev* (*2011*) in Hungary as well. In their study, they used the so-called *"Money Attitude Scale"* retention-time dimension to examine relations with compulsive shopping. Based on their results, the retention of money and prudent spending may not form one dimension. In their opinion, retention and compulsive shopping may exist side by side, as there may be consumers who can afford compulsive shopping. This is in line with the results of the study published earlier by *Ridgway et al.* (*2008*).

Furnham's work in 1984 focused on beliefs and behaviour patterns related to money. The scale he used is called the *"Money Beliefs and Behaviors Scale"*. The sixty statements on the scale are reduced to only six factors. These are (*1*) obsession,

(*2*) power/spending, (*3*) retention, (*4*) security/conservative, (*5*) inadequate, (*6*) effort/ability.

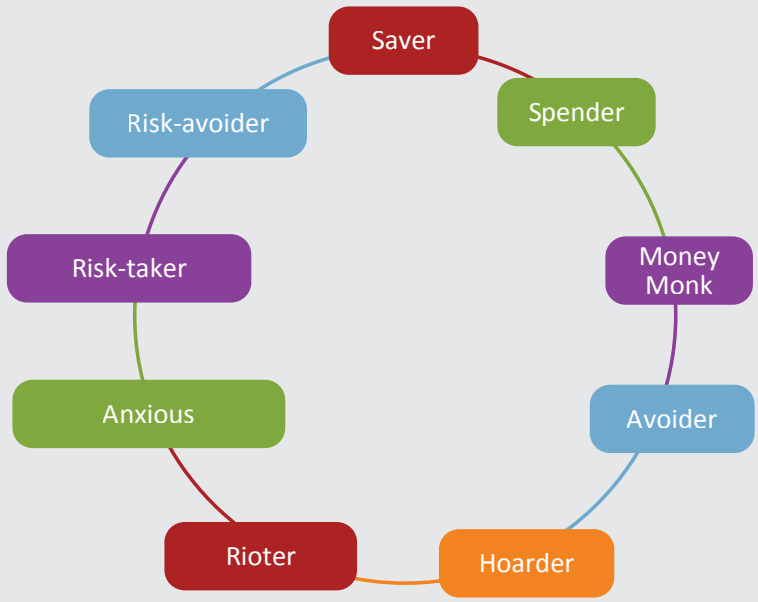
In the studies of *Furnham* (*1984*), obsession means that individuals use money as a basis of comparison with others. These persons associate the possession of money with superiority, from which the second category, i.e. power is separated to a small extent only. In the case of people in the power category – similarly to the results of earlier research – possession of money is the primary (with a little exaggeration, the exclusive) basis of power. The third dimension is retention, which – in Furnham's opinion – focuses on financial conservativism and placing security at the forefront. A common feature of people belonging to the dimension of dissatisfied persons is that they never feel that they have enough money, i.e. they are characterised by the attitude of "more is better than much", which is a kind of driving force for them as well. Last, but not least, according to Furnham, the effort dimension includes all people for whom the motive of work appears in connection with money and their attitude to money, and that reflects certain values as well. It can be seen that Furnham's results are not significantly different from the results of earlier studies.

Furnham's scale of 60 statements (*1984*) was used by *Christopher et al.* (*2004*) in a shortened version for their study. In the case of Christopher et al., the received dimensions compared to the original six factors are: dissatisfaction (which is identical with one of the factors of the original research), self-praising, conservative approach, and negative feelings about money. It is obvious that the meanings of the factors have also changed in their contents. All of this is even more obvious in the study by Masuo and partners. The three factors they specified are: power, security and financial modesty.

Based on the attitudes to money, *Tang* (*1992*) identified six factors, which also contain affective, cognitive and conative factors. Within the affective component, the good and the evil side of money is presented, i.e. the feelings triggered by money. Within the cognitive component, performance, respect and power emerge, i.e. kind of evaluating thoughts related to money. The budget emerges within the conative component, i.e. this is what primarily determines actual behaviour. The questionnaire that originally contained 30 statements (metering scale) was later used by Tang in a shortened version, first with 12 statements (*Tang 1995*), and finally with 6 statements (*Tang and Kim 1999*). The six statements determine three factors. The first factor is budget ("I control my budget with care", "I use my money carefully"), the second factor is negative feelings about money ("money is bad", "money is the source of all bad things"), while the third factor is that money is the token of success ("money is the symbol of success", "money reflects performance").

Compared to previous researchers, *Mellan* (*1997*) identified more, altogether nine personality types on the basis of their attitude to money.

Figure 1
Mellan's financial personality types



Source: Mellan (1997)

In Mellan's typology, the saver is person who sticks to his money, finds it hard to buy things that would cause momentary pleasure to himself or its beloved ones. Money represents a kind of security to him, so hedonist behaviour is far from him.

For the spender type of personality, the pleasure is in spending his money when and on what he feels necessary – this status is usually related to an external stimulus. In other words, they could also be called impulsive. Saving money and making budgets are not the characteristic features of this personality type.

It makes Money Monks feel bad when they have a lot of money. This makes them feel guilty in a way, especially when they get a large amount of money suddenly. They are convinced that money spoils everything.

People who try to avoid daily tasks about money are called avoiders by *Mellan* (*1997*). Individuals belonging to this group do not like to deal with their finances, so they usually also do not produce budgets. In fact, this characteristic feature can be compared to *Yamamuchi and Templer's* (*1982*) uncertainty category, i.e. it is possible that they evaluate their financial skills in an unrealistic way and are convinced that they have no proper knowledge about finances.

The next category is the hoarder personality. The main feature of people in this category is that the amount of money available to them – or rather the increase of it – is one of their main objectives, as that is the way they can also prove their power.

The combination of the saver and the spender personality types are called rioters by *Mellan* (*1997*). This person tends to economise for a while (say, for the achievement of a major objective), but if he is affected by an external stimulus (impulse), he is able to buy something without consideration.

The anxious personality type is also present here. The common characteristic feature of people in this group is that they lack self-confidence, they are afraid to lose control, and therefore they control their finances. Typically, they continuously monitor their financial situation.

For people in the group of risk-takers, money means adventure, excitement and freedom. They like to risk their money, as they enjoy the shivering and adrenaline, which come with it.

And last but not least, the last category of *Mellan* (*1997*) is the group of risk-avoiders. For them, money equals security, therefore, they prefer keeping their money at home, if they can.

Based on the above points, we can say that research on financial personalities has significant roots, but, at the same time, we can also say that certain personality types cannot be clearly distinguished from each other: there are some overlaps between them (*Béres et al. 2015*).

Considering the time that has elapsed between the individual studies (and the different metering scales), we can draw the conclusion that the individual group-creating features also change with time (the emphasis is shifted).

3. Methods

3.1. Questionnaire

In order to identify the financial personality types of respondents, and to find out what behaviour patterns, habits and attitudes characterise them, we compiled a personality test containing 36 statements (*Annex 1*). For each item of the questionnaire, the responding persons had to decide to what extent the given statement was true for them. They were able to do so by using a Likert scale of five degrees, in which 1 means not agreeing at all, and 5 means full agreement.

The questionnaire was inquired on-line from the www.penziranytu.hu website, from 3 June 2015 to 17 August 2015. In the specified period, a total of 3,139 respondents filled in the questionnaire, and following data cleaning, 3,088 persons remained. It

can be seen that not a lot of respondents had to be excluded in the course of data cleaning. Those who started to fill in the questionnaire, usually completed it. In the case of on-line questionnaires, it may often happen that respondents interrupt the completion of the form for some reason (they find the questions boring, they think that the questions are not relevant for them or may find them disturbing, or do not understand the statements, etc.), therefore they cannot be included in the final analysis. In this study, this problem did not occur. Another similar problem with the on-line self-completion methodology may be that respondents do not take the answers seriously, and tick the same answer to each question (e.g. one), or tick the answers erratically, without any thought. In order to mitigate this problem, we incorporated reversed statements, i.e. when statements of similar contents are included in both assertive and negative forms. All of this allowed us to exclude respondents who entered contradictory answers.

In the present research, the high rate of respondents and the honest replies were facilitated by the following factors.

Way of phrasing: We tried to phrase the statements in a way that respondents would not feel the subject too scientific or remote, and be more motivated to give honest answers to the questions. At the same time, the simple and respondent-friendly phrasing also allowed us to minimise the risks of misunderstanding.

Omission of sensitive issues, ensuring anonymity: We requested no demographic data in the questionnaire, so that respondents would not feel that they could be identified at the end of the study. The lack of demographic variables can also be interpreted as a limitation of the research, but it significantly increased the willingness to reply, and thus we were able to analyse the contents of the scale with a sample of large number of items.

Inclusion of motivation element: Following the completion of the form, respondents immediately received the evaluation of their profile suggested by their replies. The inclusion of this feedback into the research also resulted in higher willingness to participate, and facilitated honest replies as well.

3.2 Personality profile

In the course of this research, we worked with two types of personality profiles. One of them was compiled by Erzsébet Németh, the developer of the test, and that is referenced in this article as a pre-defined personality profile. In this case, following the completion of the test, respondents immediately get a so-called personality profile and an evaluation of their scores achieved in the pre-defined dimensions (Price-sensitive, Economizing, Moderate, etc.).

In addition, we worked out another personality profile obtained in an empirical manner. These personality dimensions were obtained with mathematical-statistical methods on the basis of the answers to the individual statements.

3.2.1. Pre-defined personality profile

The questionnaire is a so-called Likert-scale of 36 questions. The respondents may use a scale from one to five to evaluate the extent a specific characteristic feature characterises them. They have to answer questions such as: "It happens that on a bigger shopping trip, I spend more than I planned"; "I will make a snack so that we do not have to buy anything in the buffet"; "The yellow cheques are killing me", or "I know exactly what costs what", etc.[3]

Considering the fact that the research put the emphasis on features that are related to financial culture and that are considered positive, in the development of the individual personality profile patterns and the statements representing them, the pre-defined personality types also reflect these elements. In other words, the individual statements belonged to six categories: (*1*) Price-sensitive, (*2*) Economizing, (*3*) Moderate, disciplined, (*4)* Saver, (*5*) Diligent, (*6*) Aware.

In the questionnaire, six statements belonged to each dimension.

The pre-defined personality profile was immediately evaluated, so the respondents received prompt feedback. The basis of the evaluation was the value of the answer given to individual questions on the Likert scale, i.e. if they fully agreed, it was 5 points, if they did not agree, it was 1 point. If somebody achieved more in a given dimension than 17 points,[4] then they received a positive evaluation along that dimension, and if they received 17 or less, it was a negative evaluation.

Pre-defined personality profiles are evaluated in two ways. On the one hand, we select those who received the most or the least points in a given dimension, and compare their averages with each other, and, on the other hand, we check how they perform compared to the average of the total.

3.2.2. Personality profile obtained in an empirical manner

According to our hypothesis, the pre-defined personality profile – especially because of the overlaps between individual financial personality dimensions – will differ from the personality profile obtained in an empirical manner. In order to determine the latter, we apply mathematical-statistical methods with multiple variables (e.g. factor analysis).

[3] *For details, see: http://www.penziranytu.hu/penzugyi-szemelyisegteszt*

[4] If the respondent enters the value of 1 to each question, the minimum number of points is six, so we did not take half of the possible maximum, i.e. 30, which would have been 15, but lifted the dividing line, so the dividing value was 17 points.

4. Results

4.1. Characteristics of the basic dataset

The number of items in the sample mentioned in the methodology description is 3,088. Socio-demographical data are not related to the database, so we are unable to check the representative nature of the dataset (we treat it as a non-representative sample), but the large number of respondents allow us to consider our results valid.

4.2. Answers to the statements in the questionnaire

In connection with the 36 statements in the questionnaire, respondents had to decide whether or not that statement was true about them. The number one indicates that something is not typical at all for the respondent, while number 5 means that it is totally typical of him.

The largest number of fives were given to the statement that people know exactly how much money they have. Although we must not forget the fact that the less resources are available to us, the more attention we pay to that, we take it as a positive feature for the financial personality, because when we do not know what we control, we will probably not achieve a good result.

Approximately 45% of respondents indicated that economizing was totally true for them when they had little money, and also, that they did not like to throw out still usable things, which we also evaluated in a positive way, as the former reflects an economizing character, while the latter reflects the proper assessment of values (being aware of the real value of a given thing).

In addition, more than 30 per cent of respondents thought it was completely true for them that they controlled their spending, always had enough savings, compared the prices in shops where they took shopping lists compiled with proper consideration. From the aspect of the financial personality, we evaluated these features as positive aspects in each case. There was only one exception in the category over 30%, which we evaluated a bit more negatively, namely the situation when someone wants to provide his child with everything. The reason for the more negative qualification is that in our opinion – considering pedagogical aspects, too – it is not necessarily a positive process over the long term when a child receives everything and does not have to work for it. However, the reason why we do not consider it as a clearly negative feature is that respondents may have interpreted this statement in a more moderate sense.

Reversing the scale, a little more than three quarters of respondents said that they had no financial problems at the end of the month, i.e. they did not have to borrow money. This is completely true for 4.37 per cent only. From the aspect of judging the

financial personality, we also considered this as a positive feature, because when someone needs no loan at the end of the month, it means he is able to economize, and it implicitly means that he has enough income to maintain his standard of living.

A little higher ratio is represented by people who think it is completely true for them that they have an enormous amount of debt (7.8 per cent), but for the vast majority it was still not true at all – almost 64% of the respondents.

In addition, more than 40% of respondents think that they are always able to pay their bills in time (people who always pay late represent a ratio of 8.55 per cent). If we look at the ratio of people for whom this is not really the case (who selected 1 or 2), their total ratio is close to 70 per cent (if we add those who selected 3, they represent 80 per cent), and looking at the whole dataset, it is also a positive feature.

The most dividing statements (where each category was selected by at least 14 per cent of respondents) are as follows: (*1*) When I need more money, I take on extra work. (*2*) I make a sandwich, so that we do not have to buy one in the buffet. (*3*) I always have enough savings for unexpected expenses.

The more they feel the above three statements are true about them, the more positive their assessment will be from the aspect of financial personalities. Considering the fact that all three mean a kind of willingness to perform extra activity (work), we think that – also considering the features of the work supply curve – the statements looking at the approach to work belong to the key factors of financial personality. The reason is that individuals can be best distinguished from each other by these features.

Last but not least, we should mention statements that resulted in the most neutrality, i.e. where the number of 3 responses given to the statements was highest in the replies. In our case, these statements were “we like it, when our home is nice and warm”, or “we spend a lot on healthy food and mineral water”. Almost 35% of respondents gave a value of 3 to these statements. In our views, from the aspect of judging the financial personality, these are negative statements, but in these cases, together with the 1-s and 2-s, the total picture is positive, i.e. these statements are not typical of more than 73 and 64 per cent of respondents.

4.3 Pre-defined financial personality profile

In each category we defined, we examined if respondents belong to the positive or negative range within the given financial personality dimension (to what extent the given dimension is true for them), and on the other hand, we compared them with people who were least characterised by the given feature (who received the least points to the six questions in the given dimension). In the evaluation of the above results, a dimension was considered positive if the people with above-average

results in that dimension also had similar results in other dimensions, because the pre-defined dimensions were defined by using the positive financial personality features.

4.3.1. The price-sensitive

Within the total dataset, altogether 327 people (10.6%) received the highest points on categories defined for price-sensitivity. On the other hand, for 554 people (14.3%) price-sensitivity was the weakest feature.

With the exception of being moderate, price-sensitive people always have a positive assessment, so they are in the positive domain on the pre-defined scale (their average value is higher than 17), but looking at the total dataset, they do not exceed the average. At the same time, it is interesting to note that the least price-sensitive people have the best performance in all other dimensions. Therefore, our conclusion is that *price-sensitivity is not necessarily a positive category when we talk about financial personalities*.

4.3.2. The economizing

More than one fifth of the total dataset (20.95 per cent) reached the highest points in the economizing dimension. It can be said about them that their financial personality image is positive in terms of all characteristic features according to pre-defined categories, but even despite its size, the group is below the average of the whole dataset. Based on that , we can say that *economizing in itself does not mean a positive personality image* – all the more because in other categories, people who can manage their money in a less efficient way, usually perform better. At the same time, it must be noted that the differences between individual dimensions are by far not as large as they were in the case of price-sensitive people.

4.3.3. The moderate (disciplined)

Regarding the group of moderate people, the most interesting point is that almost 22% of those asked belong to people for whom this is their least typical characteristic feature, and it is most typical for only 5.76 per cent of them. The moderate are closest to the average of the whole dataset in the respect of saving and diligence. Therefore, we can draw the conclusion that *being moderate does not necessarily influence whether or not someone is a saver or hard-working*. The difference between the most and least economizing people is smaller than in the case of price-sensitive and economizing people, i.e. the sample is better-balanced along this dimension.

4.3.4. The savers

Only 12.4 per cent of those asked belong to the group of people for whom saving is the most important thing, and those, for whom saving is the least important feature, represent only 8.1 per cent.

It is important to note that the members of both groups are above the expected value of 17, i.e. saving characterises all respondents independently of the fact whether they found it important or less important.

To make it even more interesting, the least thrifty people are the ones who performed above the average of the whole group in each dimension. Therefore, our conclusion is that *saving is important for individuals, and it is a good indicator to judge one slice of the financial personality, but it may be misleading in itself.*

4.3.5. The diligent

The most important conclusion regarding the dimension of diligent people is that most of the respondents (approx. 23.67 per cent of all respondents) received the least points in this category, i.e. the number of people who are not really diligent is the highest within all categories. The most and least diligent people are above the pre-defined dividing line of 17 in every other category.

4.3.6. The aware

Aware respondents are people who are able to control their finances. We find it a very positive feature that 25.4 per cent of respondents, i.e. more than one fourth of them received the highest points on awareness. Individuals putting financial awareness in the focus received more points in each category than those who rated another feature higher. Based on that, it is obvious that *financial awareness, i.e. when someone is able to control his finances is clearly the best indicator for judging the financial personality.* It happens only in the case of people preferring awareness that they always perform above the average of the overall dataset, but it is also due to the fact that they represent the highest ratio, so no more conclusions are drawn from this.

4.3.7. Lessons from pre-defined dimensions

Having examined the individual dimensions one by one, we collected useful pieces of information. The first and most important thing is that for the description of a financial personality – to decide what can be considered a positive direction – in most cases it is not enough to make decisions on the basis of a special indicator, but in individual cases, it may serve as an extremely good guidance.

It turned out from the results that the price-sensitive do not necessarily have proper financial personality profiles. We accept that as a result, as on a second thought, when price is a primary consideration for someone, then quality (be it a product or a service) is only of secondary or lower priority, so it may happen that at the end we have to spend more times and higher amounts on something. This may refer to the lack of long-term thinking and investment-centred thinking, which is not positive from the aspect of the financial personality profile. In summary, if we

look at price-sensitivity only, in our opinion, people who are less price-sensitive are judged in a more positive way.

It is usually judged in a positive way when someone is able to economize with the sources available to him. In our case, it has not been clearly proved about the economizing personality whether it is positive or negative from the aspect of the financial personality; this requires more examination.

As far as being moderate is concerned, this was the characteristic feature for which the majority of respondents received the least number of points. Based on the values of the respondents, we were able to draw the conclusion that *being moderate does not influence the fact whether someone is able to economize or not*.

The number of people who thought saving was the most or least important thing is low. That leads us to the conclusion that saving is a feature that is considered important by most people participating in the survey, but it is not important enough to play a role for them. This is why we think that *saving in itself cannot be an indicator for the assessment of the financial personality*. This is important because in the credit rating systems of banks, savings (or, in other words, saving up money) are included as evaluation considerations regarding saving. From macro-economical approach, it is important because saving is not of primary importance in the views of respondents, but investments realised from savings are important at the national economy level. What this means to us is that both the competitive sphere and the public sphere should continuously stimulate savings with their own measures, in order to take the economy in a positive direction.

We found it an important positive feature that the ratio of the least diligent people was the lowest within the whole dataset. It also means to us that respondents attribute real value to income obtained through work, so it is less likely that they will spend it carelessly – in other words, it is more likely that they will maximize their usefulness with a choice on the basis of proper value for money, when it comes to spending their income.

Last but not least, it can be considered as a significant positive feature that *most respondents control their finances, so they received the most points on awareness*. This is all the more positive because individuals classified as aware pay more attention to their environment, and it happened only once in their case that they performed better in each dimension (received a higher average value) than respondents who attributed the least importance to awareness. Therefore, we think that *the best way of assessing the financial personality is to put awareness in the centre of future examinations and research*.

4.4. Personality profile obtained in an empirical manner

We have already seen the results that could be achieved by evaluating the financial personality profile through the pre-defined financial personality dimension. However, when designing this study, we were aware that an individual's financial personality profile may be determined according to different dimensions as well, because there are sometimes only slight differences between individual dimensions. In the following, we examine other dimensions according to which respondents could be evaluated.

In establishing the dimensions, we ran factor analysis for the statements in the questionnaire, or rather, for the answers. Based on the factor analysis, a total of nine groups emerged. On the basis of the results of people who statistically received similar number of points to the same questions, we have created our own dimensions: (*1*) Economizers with little money, (*2*) Money-devouring (opposite of moderate), (*3*) Order creates value, (*4*) Price-sensitive, (*5*) Collector, (*6*) Planner, (*7*) Ups and downs, (*8*) Diligent, (*9*) Cannot control finances

It is obvious from the categories that there are overlaps with pre-defined categories, but the factor analysis allowed us to set up more sophisticated dimensions.

4.4.1. Economizers with little money

The dimension of economizers with little money includes people who have trouble managing their finances, most of them struggle with debts, but at the same time and as opposed to it, it may happen that they also have some savings. Economizers with little money, while struggling with their financial problems, are convinced that they are able to control their finances well. *We found it a positive feedback for the conclusion drawn for the pre-defined categories that economizing does not necessarily mean a positive financial personality image.*

4.4.2. Money-devourers

Among the characteristic features of money-devourers, it is primarily the short-term features that dominate – they love to have fun, they immediately buy what they like, they love shopping and often reward themselves. It is important to point out that risk-taking is also present here. All in all, we could call this category "dolce vita", i.e. sweet life, but this cannot be maintained over the long term, so the assessment of respondents belonging here is not positive from the aspect of financial personality.

4.4.3. Order creates value

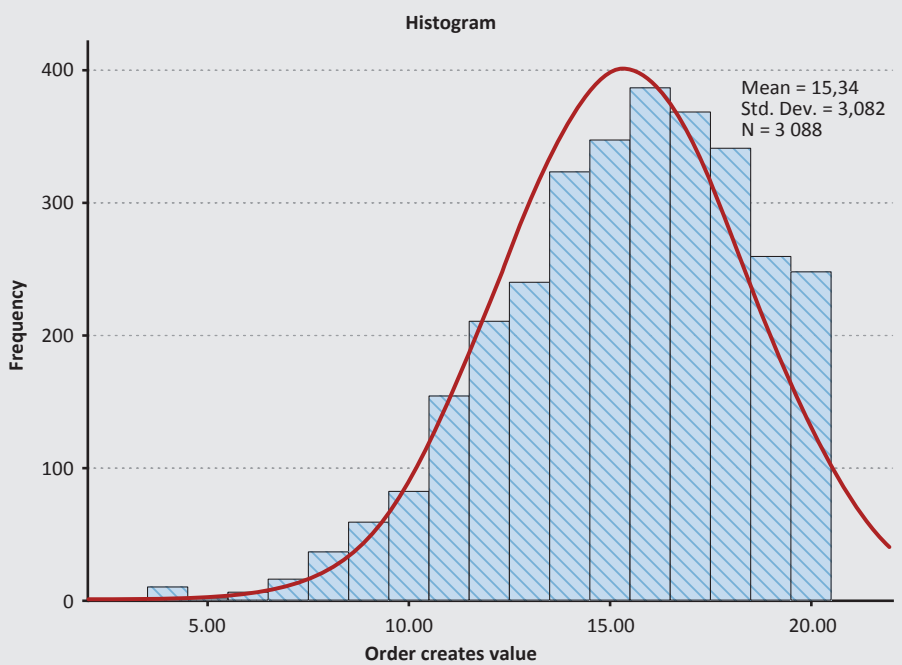
From the aspect of the financial personality, it is worth focusing on this dimension. If someone performs well here, he keeps track of his expenses, knows exactly when and how much money he has, and from this, it partly comes that he keeps his home and household tidy, and before shopping, always thinks over what he needs. If we

had to find one indicator for high-level financial culture, this would be it, on the basis of the profile gained in an empirical manner.

As the factor consists of four statements, respondents were able to give altogether 20 points. Based on *Figure 2*, we found it a positive feature that a significant portion of respondents gave an average mark of at least 4 to the four questions (both the modus and the median values are 16), and, in addition to that, more than half of the respondents gave a value of 16 or higher.

From the pre-defined categories, the dimension of the aware is closest to the order creates value dimension.

Figure 2
Order creates value factor (distribution)



Source: authors' work

4.4.4. The price-sensitive

The dimension obtained in an empirical manner contains people for whom it is most typical that they compare prices before shopping, and as a result, are able to take their time in selecting the articles. They know the exact price of everything, and because of the time and energy invested in the process, they find it hard dispose of their belongings.

This dimension is different from the price-sensitive group defined by us in advance, as in this case, the focus is rather on good value for money and on long-term interests, while in the pre-defined group, price-sensitivity meant that individuals could have additional expenses in the future, because low prices may be coupled with poor quality – thinking about the Veblen-effect – and may generate additional expenses in the future.

The above points also indicate the general weak points of financial personality profile definitions – which were partly known during the processing of the technical literature – which means that the definition of the financial personality dimensions of people always involves certain challenges without the firm definitions of terms.

4.4.5. Collectors

In this dimension, those people reached higher scores who take advantage of sales and try to amass everything. They do not necessarily keep their environment tidy, but when they do, they realise how many unnecessary things they have. When they go shopping, they usually buy more items than they planned. We can say that they are capable of long-term thinking, but momentary impacts and impulses divert their behaviour in the wrong direction. In other words, we could call them the victims of marketing.

4.4.6. Planners

The name of the dimension refers to the fact that people reaching higher scores in the category usually compile a list before shopping (they plan what they want to buy). We can feel that they have awareness, but based on their features, they are different from the order creates value dimension. Therefore, we think that *in addition to the order creates value dimension, it is the planners dimension that clearly indicates a positive financial personality.*

4.4.7. Ups and downs

In this dimension, savers and spenders are together, so we thought that *Mellan's* (*1997*) rioter category would fit them best. However, rioters clearly refer to a negative category, and therefore we felt it important to ease the description. In fact, from the aspect of financial personality, their assessment depends on which feature is stronger in the given respondent.

4.4.8. Diligent

This dimension corresponds to the diligent category pre-defined by us. The central organising principle is work, in connection with which individuals assess the acquired income, and as a consequence, they are able to appreciate it. The assessment of individuals reaching highs scores in this category is clearly positive in respect of their financial personality.

4.4.9. Cannot control finances

When giving a name to this dimension, we could have selected the use of the money-devouring category, because even people with high scores here spend money like water, and are unable to fully control that. The difference from the previous money-devouring category is motivation. While in the previous category the motivation (e.g. shopping) was to maximise the advantages over the short term (pleasure), here the individuals are not able to appreciate the real value of the goods they wish to consume, and over the short term it means that they are surprised at the amount they have to pay at the cash-desk, and over the long term, it may take the development of their children in a negative direction, as they give everything that their children desire. From the aspect of the financial personality, we do not classify it as a positive dimension.

4.4.10. Lessons learned from dimensions obtained in an empirical manner

It is obvious from the established dimensions that in the creation of the individual financial personality profiles, it is not possible to draw sharp dividing lines, which is a weakness – and a strength – of all financial personality profile studies.

We found it a positive feature that several of the pre-defined financial personality dimensions could partially or fully be matched with the new personality dimensions created on the basis of empirical data, for instance price-sensitivity, diligence, planning and being moderate. Personality dimensions obtained in the empirical way were also interpreted as the validation of pre-defined dimensions.

The order creates value dimension and the planner dimension obviously contain characteristic features which are the most likely bases of having a positive financial personality that can be considered good. This is all the more important as in loan assessments by banks, the weight of subjective elements is high, but the set of tools available to assess it is rather limited – it is primarily based on personal impressions. Consequently, what this research can offer as a contribution to the development of such systems is the implicit questions, based on which we can draw some conclusions about the debtor's personality and behaviour pattern, and the key point for the bank is whether or not the person will be able to repay the loan.

5. Summary

This research served two purposes. On the one hand, with proper foundations from the technical literature, to determine and test financial personality dimensions which lead us to believe at the beginning of the research that it would be possible to define the financial personality profile of an individual. On the other hand, we were aware that, because of the overlaps between individual dimensions, real life will not fully confirm our ideas. Therefore, our secondary objective was to determine new

dimensions typical of the given dataset, using mathematical-statistical methods, on the basis of the answers received. We also used the latter to validate our originally established model.

Our sample used in the research was not representative, but it contained a high number of elements (almost 3,100), and therefore we believe that the conclusions from the sample are suitable for drawing effective conclusions. It must be noted though that respondents' points in individual dimensions may depict a better picture of domestic financial awareness, than measuring the same in a representative sample. It can be supposed that if someone devotes the time to fill in a test (and finds it), he will be interested in the subject more than the average.

Our most important conclusion is that it is very difficult to evaluate the financial personality of individuals along one specific dimension: it may present a number of challenges and false directions. However, it is important to note that both the pre-defined and the empirical dimensions contain dimensions that may be suitable for this purpose.

Among the pre-defined dimensions, awareness and diligence are such categories, while among the dimensions obtained in an empirical manner, these were diligence and planning. As the names are not separated significantly, the contents of these dimensions are not significantly separated from each other. Planning, a long-term approach, the assessment of money through the work done for it are all positive features for the financial personality.

As to the usability of the results of the research, we think that they can be used best as a starting point for further financial personality research, but they could also be well utilised for business purposes. One option is loan assessment in banks, as the answers given to the statements may offer some objective information on the borrower, which used to be part of subjective loan assessment before.

Finally, we can also draw macro-economic conclusions, based on individuals' preferences. Saving seems to be an objective that is considered important by the majority of the participants of the surveys, but it does not play a central role in their financial personality profiles. In other words, we can say that retail savings are able to grow and will grow as a result of incentives only, whether these are induced by the private sector or the public sector, it is irrelevant from the aspect of the financial personality.

The most important lesson to be learned from the research is that individuals can do a lot to be better off. Both the pre-defined and empirical dimensions indicate that the most efficient strategies are financial awareness (planning and recording expenses) and the improvement of diligence. Economizing and price-sensitivity

alone are not enough, especially if the person tends to do impulsive shopping. It is worth building subsequent examinations on the results of the research, and carefully examining these personality types and relations.

The results of the research may be a useful source of information in the development of domestic programmes aimed at improving financial culture, and may offer some support to the formulation of the national strategy of financial culture development and to the development of operating plans.

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About ageing – for economists*

György Németh

In Issue 2/2015 of the Financial and Economic Review, Emese Kreiszné Hudák, Péter Varga and Viktor Várpalotai published their study entitled "The macroeconomic impacts of demographic changes in Hungary in the context of the European Union".[1] While I have no reason to dispute the essential statements presented therein, the notion of ageing – just as in the entire specialist literature – was not elaborated in their study, perhaps because the authors believe that it is self-explanatory, evident, trivial, etc. But it is not. Ageing in the context of the economy has a much narrower meaning than ageing in the demographic and social sense. Moreover, the measures of ageing combine two demographic processes of fundamentally opposite judgement, i.e. the increasing average life expectancy, which is judged positively and the fertility rate below the level of simple reproduction, which is judged negatively. The author of this paper is convinced that a correct (macro) economic policy programme can only be drawn up, if the impacts of ageing are analysed separately by its components.

The attention of economics turned to the population[2] *as a whole* two centuries ago, since the appearance of Malthus. It is the population that creates and operates the economy, and a part thereof is the beneficiary, while another part of it is the loser of the happenings of the economy – i.e. of all that is examined by economics. Malthus worried that food production, increasing along an arithmetical progression would not be able to satisfy the population's needs increasing along a geometrical progression.[3] Shortage of food results in overpopulation, while overpopulation generates conflicts that escalate to (civil) wars, where the soldiers dying with weapon in their hands and the unarmed civilians killed by the weapons literally give their life for the reinstatement of the balance between the population and food production. Since war is a moral evil, and moral evil should be prevented, Malthus recommended birth control, and – as the means thereof – abstinence and late marriage.

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[1] http://hitelintezetiszemle.hu/letoltes/4-kreiszne-varga-varpalotai.pdf

[2] Thomas Malthus published – anonymously – his book entitled "An Essay on the Principle of Population" in 1898, which he republished – already with name and fully revised – in 1903, essentially as a new book.

[3] Mathematical progression (1, 2, 3, 4, 5, ...) and geometrical progression (1, 2, 4, 8, 16, …).

Malthus is usually received with resignation: he did not foresee the crop-increasing impact of the scientific and technical development, and that people will be inclined to restrain their reproduction even without abstinence and late marriage (and for this they will undertake abortion and contraception, also regarded by him as moral evil). Nevertheless, historians can provide numerous examples of the truth of Malthus. It is often a basic formula for war that the party short of resources attack the holders of resources to acquire such resources, of course usually trying to justify it by retaliation for an injury it has suffered or some other noble-looking objective. Just one example: the nomadic tribes living to the north of China usually found an excuse to attack China (the Great Wall was built against them) when cereal prices soared in China due to poor harvests.[4] Malthus – still regarded by many as an amateur Anglican country vicar who meddled with demography only to kill time – was professor in political economics, one of the greatest figures of classic English economics, and in several respects he was ahead of Keynes, and he was right – contrary to his famous contemporary and rival Ricardo – in several questions. (As Keynes noted, Ricardo prevailed over him, because he expressed his thoughts more precisely and he was able to capture the imagination of the London gentlemen better...). It was Malthus who introduced into economics the awareness of the finiteness of resources, and the weight of this topic only became a practical issue for mankind towards the end of the 20th century, when the viability of the planet Earth turned out to be at risk.

Malthus' attention focused on the most important characteristics of population: its size, i.e. the number of individuals. Another important attribute of population is the age of the individuals, that is the age structure of the population and the change thereof. One possible direction of the change is ageing. The focus on ageing is a substantially more recent phenomenon, with a history of merely twenty-five years. Most generally, ageing means that the ratio of the old increases and that of the young decreases. It is a question to be answered when and why this may be interesting for economists. It is not self-explanatory.

[4] In the language of economics: the intention was to fill the current account deficit generated in bilateral trade relations by booty or reparations. (Under reparations also meaning the annual tax paid by the Chinese state in lieu of peace (non-aggression), which in the language of economy means that the Chinese assumed the current account deficit, or – to some extent – accepted the unequal exchange). If the attack failed, the consequence was a decline in population resulting from famine. The nomadic stockbreeders needed settled agriculturalists, but this was not true, or not to the same degree, in the other way round. Agriculturalists had a large variety of options to improve crops without damaging the soil, while the nomadic stockbreeders spoil their pastures if they increase the number of animals. Ways to break out of this trap could have included the changeover to agriculture, engagement in long-distance intermediary trading (as international service activity) or the creation of strongly export-oriented industry (including the mining of raw materials, if any can be found on their territory). The first two was not possible due to the geographic conditions, while the principle conditions of the third one were established only after two thousand years. The result, on the one hand, is the populous and rich China, while the nomads – which were once feared by the Chinese, and under the reign of Genghis created the empire with the largest area of world history, also occupying China – became insignificant and poor.

Notion of ageing

Ageing (or aging), as a technical term, is the attribute of two disciplines. These are (medical) biology and demography. These are two separate worlds, albeit the first one does have something to do with the latter, and in the future it will be increasingly so.

It is a biological fact that all creatures, and thus humans as well, age. The earlier we learn and understand the biological processes leading to ageing, the more probable it is that we find the way to decelerate such, prolonging life and – hopefully to an even larger degree – the years spent in health. There are two distinct positions as to how long ageing can be decelerated and where the uncrossable limit of human life is. According to the first one the uncrossable limit is 120–130 years, the human organism is "configured" for that much; this makes average lifetime over 100 years imaginable, and perhaps in the middle of the second half of the 21st century, and almost surely by the beginning of the 22nd century it will be reality. According to the second position, we do not yet know and see where the uncrossable limit is, but it is surely higher than 120–130 years. Irrespective of this, it is a fact that in the past decades there was a considerable rise in average life expectancy, however – and this may appear to be paradox – this was not primarily due to the fact that people *generally* lived longer, but because there was a fall in the number of those that died before they reached adulthood. This trend is about to run out: the source of a further rise in average life expectancy will increasingly be the fact that people live longer *generally* as well.[5]

The other discipline is demography. Demography is a science of descriptive nature (as the second part of the *'graphia'* Latin compound words, originating from Greek, means description, drawing), which presents the size and age structure of the population, as well as the birth and mortality rate, and external migration impacting it *directly*, and marriages, divorces and internal migration, affecting it *indirectly*. In demography the smallest unit of population is the "individual person", with two attributes: sex and age. In addition, we know that the creation of the "individual person" requires two "individual persons" of the opposite sex, of which the biological age of the woman is (more) limited[6] than that of men.

[5] This may also be helped by the invention of anti-ageing molecules that with time may as well be applied as medicine. Researchers at the US Salk Institute were surprised to find during their research for anti-Alzheimer drugs that it "rejuvenated elderly mice", which was supported by a number of physiological parameters: their memory and cognitive capacities improved, their brains' vascular system became healthier and their physiological functions developed.
See: https://sg.hu/cikkek/115835/lassitja-az-oregedest-egy-molekula.
The referenced study is available at *www.impactaging.com.*

[6] Demography considers women between the age of 15 and 49 being in the fertile age.

Demographic descriptions call for explanations (what made the size and age structure of the population exactly like that), which is also addressed by population science of sociological nature, which is also referred to – albeit inaccurately – as demography. Demography describes specific populations, and compares them with other specific populations, while population science tries to find sociological explanations for the demographic features of individual societies and the cause of the differences. Population science is built on demography; demography serves as the starting point, the dataset to be interpreted and which it interprets. In demography it is the population, while in population science it is the society that ages. A population does not necessarily constitutes a society, while a society can always also be described by its population. Population and society are not synonyms.

As mentioned before, ageing in the most general sense means that within a given population the ratio of the old increases, while that of the young decreases between two dates. Since this may also happen the other way round, youthing also exists, but this technical term did not become part of the demographic thinking, probably because in the history of mankind ageing is a basic trend, which has been interrupted rarely and only for a short time by periods of youthing. This can be claimed with high certainty even without the possibility of proving it (we have rather limited data to support this from the periods other than the last one-one and a half century), and perhaps it can be made more accurate by saying that the constant age structure may be the most general (with shifts within the margin of error), but when there was a perceivable change that usually meant ageing.

Measuring ageing

Before moving on, it is worth briefly touching on the established methods of measuring ageing, mostly to make their unsatisfactory nature clear later on.

The direction of the change in the age structure (ageing or youthing) and the magnitude of the change can be determined, if the age structures existing at different points of time can be condensed into a single statistical index. Of course, statistical indices disguise a large part of the compound, complex reality that they are meant to describe, but in lieu of the lost information at least we obtain a tool that is perfect for comparison: numbers. There are three solutions in use for the generation of numbers for the purpose of comparison.

Solution I – calculation of the average age: at a given point of time we add the age of all members of the population and divide it by the number of constituents. This is regarded to be useless to such a degree that neither the international organisations, nor the national statistical authorities calculate it.

Solution II – finding the median age: that is the age where half of the population is younger and the other half is older than that. This is regarded to be an essentially better index than the average age,[7] and it is calculated both by the international organisations and the national statistical authorities. The world's median age in 1980 was 22.5 years, the estimate for 2015 is 29.6 years; according to the UN's advance calculations it will be 33.1 and 36.1 years in 2030 and 2050,[8] respectively. It will fall short of Hungary's 2010 figure – i.e. 39.9 years[9] – even in 2050.

It is obvious that of two populations compared at a given point of time that one whose respective age is higher is the older one, and a given population ages between two dates if that age increases.

Solution III– creating some kind of quotient. An essential condition for this is to determine the age when we regard elderly people to be old. The old are included in the numerator and the total population – or perhaps only the population without the old (total population *minus* the old) – in the denominator. On the other hand, if we take the approach that "old age" should be interpreted not relative to the total population or to part of the population without them, but relative to "the young", the age over which one is no longer regarded to be young must be determined. Then we measure "old age" with the quotient of the old to the young. For example, the *ageing index* used by the UN is the quotient of the 60-year old and older (60–) and those younger than 15 years (–14); however, the quotient of the 65-year old and older (65–) and those younger than 20 years (–19) is used more often. If the reason for the enquiry about ageing is more directly the issue of providing for the old, then the denominator contains the "middle-aged" population – who, as follows from their age, already and still operate the economy – rather than the old and the young. The *dependency ratio* also measures "agedness", but – being a slightly more practical indicator – in the ageing index it tries to determine "middle age" in accordance with the hypothetical age of entering the labour market and retiring.

The drawback of "quotients" is the coercion to determine age: where old age starts (and where youth ends), which inevitable contains some arbitrary approach. In the case of average age and median ages, this is not a concern.

[7] The main reason for this is that, compared to the average (arithmetical) age, it includes some extra information related to the variance around the average.

[8] *http://esa.un.org/unpd/popdev/Profilesofageing2015/index.html*

[9] For the median ages of the individual countries between 1950 and 2010, by intervals of ten years, see: http://ourworldindata.org/data/population-growth-vital-statistics/age-structure-and-mortality-by-age/. You will find the median age by countries and in male-female breakdown, as an estimate for the given year (when writing this paper for 2015) on the website of the United States' Central Intelligence Agency (CIA). According to that Hungary's estimated median age in 2015 is 41.4 years, 39.5 years for men and 43.8 years for women. The same in the world is 29.9 years, 29.1 years for men and 30.6 years for women. So, it is clear that the CIA perceives the world to be younger by 0.3 year than the UN. *(https://www.cia.gov/library/publications/the-world-factbook/fields/2177.html)*

Ageing – why should economists care about it?

Ageing in the most general sense – that is in the context of demography – means that within a given population the ratio of the old increases, while that of the young decreases between two dates. This alone is not sufficient to raise the interest of the economists, but it is not known by the economists either when it is sufficient. This is why they talk about ageing in general, while in fact they mean only a special segment thereof. This needs a bit more elaboration.

Let us assume a population with a constant mortality rate where women give birth on average to eight children during their life. In one year, a female age-group reaches the childbearing age that changes the established fertility attitude and from then on the average becomes four children. As a result of this, the population is ageing quickly, and although its number of inhabitants increases, the rate thereof decelerates. (Provided that the mortality rate assumed to be steady is not so high that the four born children is not sufficient to ensure simple reproduction.) The ageing resulting from this decrease in fertility in the last one and a half century – considering its social and economic consequence in the age of modernity – is a positive development to be welcomed. Namely, the fast growth of population is the source of huge problems, as it is unlikely that the number of jobs can keep up with it and it is impossible to build so many more flats, or expand public institutions (schools, hospitals, etc.) and infrastructure at the same rate. Before the age of modernity, when subsistence farming provided for the living of the vast majority of the population and there were abundant resources, the fast growth of the population was a lesser problem, or could even have socio-economic advantages: people cut down forests, reclaimed land and ploughed uncultivated land, thereby the fast growing population created a living for itself; moreover, the higher density of population could create more intense and efficient trade relations. Due to the finiteness of resources and the economic-technical development, this is no longer a viable option. The society, economy and politics have become much more "population-sensitive".

In the example above, we assumed constant mortality rate. If it is assumed to improve – on a historical scale this is the only option – it may have bi-directional impacts. On the one hand, the improvement in mortality before the end of the childbearing age – and we can be sure that almost the entire improvement will be in that age bracket – slows down the ageing determined by the drop in fertility, since a larger ratio of the women born live until childbearing age and give birth to children. Contrary to the youthing effect of the lower mortality rate, the mere "longer living" has an ageing effect. The question is the outcome of these two opposite effects; it is certain that an improved mortality rate after childbearing age solely has an ageing effect. The main reason for demographic booms is that at a relatively high fertility rate, as a result of the improved infant and child mortality

rates, more women live until childbearing age; it is very rarely attributable to an increase in fertility (this may mostly happen if a very high mother mortality rate is reduced drastically).

Ageing is a demographic-social basic trend of mankind, and hence there is nothing special in it; nevertheless we talk about it more and more often and only in the negative context. Ageing is a negative demographic phenomenon and it would be best to turn it around, but there is little chance for the youthing of the population, hence – for lack of something better – we have to submit to it. In fact, it is youthing that should be talked about only in negative context, while we do not even mention it. How would we take the situation when under constant fertility the population became younger due to higher mortality rate among the middle-aged and the old, or under constant mortality rate due to an increase in fertility, for example in the overpopulated black African or Arab countries? It is easy to see that the attention of economists is turned to the demographic phenomenon called "ageing" by the nearness of a distinguished demographic point. This point is the level of fertility around simple reproduction. This level in the developed countries is 2.1 (=TFR, Total Fertility Rate). Ten women during their live have to give birth on average to twenty-one children to reproduce themselves and a man. The reason why more than twenty is because on average one does not reach her fertile age.

From this, we may conclude that the notion of ageing used by us is not accurate and not sophisticated enough. Below I attempt to differentiate three notions of ageing:

ageing in the demographic sense: in a specific population, the ratio of the old increases and that of the young decreases. The opposite thereof is youthing. The basic trend is ageing.

ageing in the social sense: ageing in the demographic sense has a social impact that is not necessarily negative, but requires attention and political responses in terms of social and welfare policy. (Increase in the number/ratio of the elderly requiring care and support.)

ageing in the economic sense: the decline in fertility below the level of simple reproduction (independently of the mortality rate). This situation raises economic problems not yet known and clarified in full (which is not the case with ageing in the social sense; moreover, it may often contribute to the resolution of economic problems). We also talk about ageing in the economic sense, when fertility increases, but does not go beyond the level necessary for simple reproduction (while in the demographic sense this is youthing, unless offset by an improved mortality rate).

I propose that economists should talk about *ageing in the economic sense* since after all they use the notion of ageing in this sense.

And finally one more proposal. There is no such thing as ageing *in general*, as it is the result of two opposite processes: a falling fertility and an improving mortality rate. It is wrong to treat these alike as is the case with all established ageing indices. While an improved mortality rate and the lengthening of human life are clearly positive developments to be welcomed, the fall in fertility below the level of simple reproduction is negative, which deserves the government's attention and becomes the justification for taking pro-natalist demographic policy measures.

We need a twin index of ageing that shows to what extent the ageing of the population can be attributed to the increase in average life expectancy and to what extent to the decrease in fertility. Such a twin index has yet to be developed.

Core-Periphery Relations in the European Union – Power and Conflict in a Dualist Political Economy*

Stefan A. Musto

J. M. Magone – B. Laffan – C. Schweiger (Eds.):
Core-Periphery Relations in the European Union –
Power and Conflict in a Dualist Political Economy
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The core-periphery paradigm was conceived in the 1960s and early 1970s as one of the various theoretical explanations of the phenomenon of socio-economic development and especially underdevelopment. These theories were generally related to the Third World, designed mainly in Latin America and generalised by I. Wallerstein in his book *The Capitalist World Economy* (*1979*); they did not say too much about the future of "developed" societies. They grew out of the theories of economic growth and societal modernisation derived from Western thinking and experience. At that time, there was consequently little concern about the question of whether or not development theories or paradigms should or can at all be applied to the case of Europe. The advanced countries of the West, it was assumed, had arrived.

This has changed since the value system of Western modernity has been biased by developments like the oil crisis, the decline of some key industrial sectors, the emergence of uncontrollable financial markets and, most particularly, the successive enlargements of the European Community, originally designed for highly industrialised countries, to include less advanced new member states with differing economic, political and cultural structures. Increasing heterogeneity and inequality led to the emergence of differing political and economic development patterns and respective national interests.

One of the first attempts to apply this paradigm to the case of Europe was the project of the European Association of Development Training and Research

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

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Institutes (EADI) to analyse the implications of the accession of Greece, Portugal and Spain for the future of the European integration process (cf. Seers-Schaffer-Kiljunen: *Underdeveloped Europe* (*1979*), Seers-Vaitsos: *Integration and Unequal Development* (*1980*), Seers-Vaitsos: *The Second Enlargement of the EEC - Integration of Unequal Partners* (*1982*). Since that time, further successive enlargements particularly involving Eastern European countries, and political, economic and financial crises, have significantly increased the divergence of responses to common challenges by individual member states and have therefore revealed possible and actual conflict potentials.

As stated in the introductory note, this volume of contributions by 17 authors takes a comparative and theoretical approach using a variety of case studies. It examines how mounting economic, political and cultural divergences have transformed the European Union and how these crises have both exacerbated tensions in centre-periphery relations within and outside the Eurozone. Accordingly, a rather pessimistic conclusion is drawn: the EU as a supranational organisation may have reached its limits in terms of multilevel governance.

Most of the contributions focus particularly on the asymmetrical relations between the economically stronger core countries (e.g. Germany, Austria, Netherlands, and Finland) and those of the periphery (e.g. Greece, Portugal, Spain, Italy) within the context of the Eurozone crisis. Brigid Laffan emphasises that, especially in the case of Greece, the manner in which this problem has been managed was modelled on a German paradigm, since the crisis was never just about sovereign debt, but rather about a mismatch between the banking sectors of the creditors from the core and the lenders from the periphery. The article concludes that the asymmetry of power between the core and periphery has made it very difficult for the peripheral states to obtain sufficient political capacity to secure an alternative policy mix. Angelos Sepos outlines the theoretical foundations of the core-periphery paradigm and their applicability to the economic and political power relations in the European Union, concluding that the creation of a full-fledged symmetrical, cooperative EU federal model, rather than more differentiated integration, could help the Union to bridge the divide. Taking account of the actual state of the Union, such an argument seems to be, most regrettably, wishful thinking rather than a pragmatic way towards a feasible solution. The article of Christian Schweiger takes a more realistic position in analysing the national interests and differential integration patterns of the three strongest member states: Germany, France and the United Kingdom. It points out the fundamentally different strategic approaches of these countries to the financial crisis and the subsequent divergence that even under profound crisis conditions they display tendencies to defend their national interests and the perceived competitive advantages of their domestic political economies. All of this seems to

be true even in the case of the current refugee crisis, which, of course, could not have been anticipated when this article was written.

The following chapter by Stefan Auer stresses the interesting aspect of the different political cultures in the way how the crisis is supposed to be managed. He states that there were no value-neutral solutions to the euro crisis, and the myriad of measures adopted appear to have largely reflected the preferences and interests of Germany. In fact, the euro was intended to be a German-type currency. The author quotes Mario Monti as saying that for Germany "economics is a branch of moral philosophy". According to protestant ethics, fiscal sinners are to be punished and the righteous have nothing to apologise for, whereas in the countries influenced by Catholicism sins can always be forgiven if the sinner repents. In countries of orthodox faith such as Greece there is not even a need for forgiveness.

The thesis of the chapter by José M. Magone is that Southern European countries had an idealised image of the European Union and there was a general belief that the very fact of being members would resolve their political and economic problems. Accordingly, there was a tendency to be the passive receivers of democratisation and modernisation packages instead of being pro-active in solving their own problems. This certainly may be true for Greece and most of the Eastern European candidate countries, but as this reviewer recalls, Spain and Portugal negotiated thoroughly on accession for more than eight years, while at the same time making serious efforts to restructure their domestic economies to become able to satisfy the conditions of international competitiveness. On the whole, however, European integration has contributed to greater stability and democratic accountability in these countries. The EU turned out to be a *vincolo esterno* in order to modernise and democratise society.

Three Hungarian authors contributed to this volume. The chapter by Attila Ágh deals with the special case of the Eastern European new member states. The author rightly points to the fact that the whole debate on differentiated integration has so far been restricted to "technical" aspects, side-lining the politics and policy dimensions, whereas democracy backsliding has become a widespread phenomenon in some member states resulting in an increasing democracy gap within the EU. Some of the new member states have produced reduced, formal-legal, low-performing democracies with poor governance and non-sustainable social progress. Accordingly, the expectation that the collapse of communism and the victory of Western liberalism would make for swift convergence between the eastern and western parts of Europe has turned out to be an illusion. The author concludes that it should be the task of the EU institutions to push the new member countries more energetically towards convergence with mainstream European values and developments. It may of course be questioned whether such efforts by

the EU could prove to be even counterproductive by strengthening nationalistic tendencies in the countries affected.

A similar approach is taken by Oliver Kovács in his contribution on Hungary's agony over Eurozone accession, as he emphasises that mere fulfilment of the accession criteria in mathematical terms does not guarantee successful integration afterwards. It is equally essential to refocus on the role of the state and its institutional settings. Based on a series of comparative statistical indicators, the article shows that Hungary's seemingly dynamic growth trajectory in the period 2000–2006 was mainly driven by rising indebtedness while the period 2009–2012 was characterised by expenditure-based fiscal consolidation combined with unconventional economic policies leading to mounting uncertainties. Poor performance in innovation, autocratic nationalism and macroeconomic populism do not enhance the good governance required for sound socio-economic development. Beyond pure numerical economic targets, important qualitative aspects such as trust, credibility, and responsible public management should be better integrated into economic analyses and policies.

The central thesis of the chapter by Bela Galgoczi is that the problem of competitiveness of the Southern and Eastern countries in the periphery of Europe cannot be adequately analysed and solved by reference to factors such as diverging labour costs. Non-price aspects such as export structure, productivity and quality, which are largely ignored by adjustment policies, play a crucial role in overall economic performance. Given the lack of effective adjustment mechanisms in the Eurozone, the surplus-deficit gap evolved into a more complicated creditor-debtor relationship. The distortions in terms of basic economic structure were not addressed. But if convergence is exclusively driven by purely economic processes, the result will not be durable and balanced.

A series of case studies highlights the specific problems, challenges and responses in the individual countries of the European periphery. In her paper, Anna Visvizi presents a thorough and concise analysis of the Greek crisis and the role of the so-called Troika. She emphasizes that the effective implementation of economic adjustment programmes requires a broad political consensus and programme ownership cannot be limited to the ruling government itself but needs to stretch across the entire political spectrum. The chapter by Bernadette Connaughton deals with the special case of Ireland which was once regarded as the most successful peripheral country, but due to the financial crisis had to adopt rigorous austerity measures. Although the crisis was unleashed by the global credit crunch, it was strongly aggravated by "home-grown" governance and policy failures. The structural adjustment programme yielded fairly successful results, but Ireland remains vulnerable and the government must be ready to take measures to address potential future risks. Two further case studies by José M. Magone are included in

this volume: the case of Spain and that of Portugal. Both papers present a thorough, informative analysis of the respective problems and the measures taken to address them. As for Spain, this country was able to escape the intervention of the Troika, but despite major reforms some structural problems in the Spanish economy still remain unresolved. One important difference compared to the cases of Greece and Portugal is that Spain is a much larger economy and its banking sector is more robust and more embedded into international networks. With regard to Portugal, this country, once a "good pupil of the EU", is hit by major social and political crisis. The debt problem was merely a symptom of an economy and society that has proved to be basically weak. In an interesting analysis of the Italian case, Marco Brunazzo and Vincent della Sala conclude that the traditional perception of Italy as a central state of the EU has eroded in recent decades, the country now has the ambiguous position of being at the same time part of the centre and part of the periphery. In his paper on the balance of Poland's ten years of membership in the EU, Maciej Duszczyk reports on the dynamic economic growth and significant investments over the last decade thus narrowing the development gap between Poland and the core countries of the Union. Nevertheless, if Poland wants to play the role of a core country, it should reaffirm its willingness to accede to the Eurozone. Finally, in the case of Cyprus, the paper of Thorsten Kruse shows in detail that the causes of the financial crisis were manifold and the approach employed by international creditors to resolve this crisis were quite different from the measures implemented in other affected European countries. After the Greek "haircut" and on the way towards insolvency a so-called bail-in was designed as a mechanism to recapitalise the banking sector and thus prevent final bankruptcy. Nonetheless, the island's economy has to be restructured and diversified, and the enormous debt must be carefully reduced.

The last three chapters of the volume deal with the global impact of the European crisis. In an interesting paper focusing on the Union's changing role in the world, Carolin Rüger quotes the former Belgian minister Mark Eyskens in saying that the EU is an economic giant, a political dwarf and a military worm. However, when the economic giant tumbled, it also lost its newly gained political ambitions. The financial, economic and sovereign debt crisis has affected not only the core-periphery relations within the EU, but also the Union's global role in the world. Centrifugal tendencies additionally hinder common external action. The dilemma of EU foreign policy remains: "all member states, both core and periphery, would like the Union to wield the joint weight of the 28 states, however, the willingness of each member state to cooperate with the other 27 is much more limited." As a consequence, Europe is on the road from the global core towards the global periphery.

A similar question is raised by Edward Yencken in his article on the impact of the Eurozone crisis on third-country perceptions of the EU, although his conclusion seems to be less pessimistic. He admits that the crisis has had a significant impact in negatively influencing external perceptions of the EU as an international actor. Certainly, the crisis may bring tensions into the Union's relations with third countries, the crisis is unlikely to substantially alter the extent to which the EU is perceived to be an important global player. The EU-Australia relationship is an example that the Eurozone crisis has failed to disrupt bilateral cooperation.

In the last chapter, the three editors of the volume try to summarise the findings and to draw, within the realm of the possibilities, overall conclusions. Successive enlargements led to a Union of highly developed economies and a Southern and Eastern periphery of economically significantly weaker member states. Since the EU is not to become a "Transfer Union", cohesion policy is serving as a means for Europeanisation and modernisation which proved to be unable to bridge the gap. The core countries profited the most from the integrated market, and the global financial crisis hit more severely the weaker member states thus exacerbating the core-periphery rift within the Union. Paradoxically, the experience of the crisis makes it even more difficult to enhance solidarity. Enhanced transfers require trust, and trust is a scarce commodity in the EU. The chapter concludes with the assertion that only the future will tell if a new compromise between stability and flexibility will emerge and bear fruit over the long run.

This volume is certainly a useful and well-edited book, although it does not contain radically new arguments. Nevertheless, it reinforces earlier findings and, partially, old wisdom. The European Community once designed for six member states at a comparable level of both economic development and political interests has, through a long series of enlargements, become a quasi-imperial supranational entity with all the advantages and disadvantages of an overcharged empire which is now challenged by the particular problems and conflicts among its individual members. There is no doubt about the fact that economic strength and political power are, to a significant extent, unevenly distributed in the European Union but is too late to blame the European institutions (not so much the Commission rather the Council) for the decisions to enlarge the scope of integration and to extend their sphere of influence.

The British-American historian Paul Kennedy has, in his monumental work *The Rise and Fall of the Great Powers*, demonstrated that boundless overstretching and subsequent significant economic and political divergences within an empire can become the main causes of increasing vulnerability and possible final decay. In case of the European Union, such a development would be more than a historical tragedy that should, by any means, be avoided.

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The future is spontaneous, yet predictable*

Zsigmond Pálvölgyi

Albert László Barabási:
Bursts – The Hidden Patterns Behind Everything We Do,
from Your E-mail to Bloody Crusades
(Translated by János Kepes)
Libri Kiadó, Budapest, 2016, p. 336
ISBN: 978-963-310-513-9

As a result of the development of natural science, we now can model the movement of atoms with a high degree of accuracy, understand the repetitive nature of animals' eating habits or easily find out from the weather forecast whether it will rain the day after tomorrow. Although the world around us exhibits numerous regularities, we tend to believe that in the fast-paced world of the new millennium this does not apply to human actions at all. In most cases, we do not know in advance where we will spend next Saturday night, and perhaps we would find it offensive and even scary if someone stated that they knew with a certainty of 80 per cent what we would do exactly this minute a month later. Albert László Barabási, a Transylvanian-born Hungarian physicist and network researcher, points out in his book that most of us are far from being as spontaneous as we would like to believe: it is more difficult to predict the whereabouts of a bumble bee than that of any human being.

Barabási's book analyses the role of chance in human behaviour through the history of the peasants' war led by György Dózsa, while trying to find out whether the uprising was indeed predictable. The book closely follows the development of the uprising in 1514, mainly due to the prophecy of István Telegdi, the treasurer of King Ulászló II, who – according to the chronicle – forewarned the king and archbishop Tamás Bakócz of the bloody outcome of the crusade. Although the story, which runs for almost half of the book, relates to the work's narrower topic only tangentially, the alternation of the natural science and history chapters makes the book truly interdisciplinary.

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

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As in his book *The New Science of Networks*, Barabási provides an insight into the development of his research results in *Bursts* as well, while at the same time illustrating through several examples how much luck one also needs for scientific inventions. We would know much less about the speed of virus propagation had the craze of tracking banknotes over the internet not spread, or the German Theodor Klauza would be known by everyone if Albert Einstein had been more quick to accept his five-dimensional space theory unifying gravity and electromagnetism in a single scheme. The book not only reveals the patterns of human behaviour, but also presents the results of key studies bringing us closer to it, along with the history of the creation of these patterns, which makes the book really interesting.

Based on the stories included in the book, we can assume that most natural science research is commenced by an idea occurring during friendly talks – or, in keeping with the title, a burst – as occurred with the research of the velocity of cash or the migration of albatrosses. Dirk Brockmann, a German physicist, learnt about the *wheres-george.com* site, registering the location of banknotes, from his friend in Vermont. Using this database, Brockmann found that, similarly to cash, the propagation of viruses also follow a Lévy flight, which may help to prevent the spread of epidemics in the future. Similarly, with the help of a database received from his cousin, Sergey Buldyrev found that the migration of albatrosses, which covers several thousands of kilometres without landing, may also be described by a Lévy flight, which could be concluded from the wet and dry signals of the detectors fastened to their legs. The question as to what degree the human behaviour can be described by the distributions observed in nature, and – if there are patterns in our actions similar to the propagation of cash or the migration of albatrosses – then to what extent they can be used for forecasting our future decisions, gradually unfolds in the book.

According to Barabási, human behaviour follows a number of patterns, due to which – in contrast to albatrosses or bumble bees – our future whereabouts can be estimated relatively well. Although we are affected by a number of new impulses every week, the actions of most people follow a similar pattern: on weekdays we get up at the usual time, we are at work from early morning to late afternoon, usually returning home thereafter. Although our weekend programmes can be very diverse, our behaviour can still be predicted relatively easily due to our daily routines. According to Barabási, due to our repetitive behaviour, the whereabouts of most of us follow a Gaussian distribution, as a result of which at any moment it can be estimated with an average certainty of 80 per cent where we are and what we are doing.

According to the book, although our actions can be forecast by normal distribution, power distribution is more suitable for the characterisation of the frequency of our activities. In contrast to migratory birds and cash, the average daily travel distance

covered by humans – due to our repetitive activity and permanent home – can be better described by the power distribution than by the Lévy distribution. Most of us stay in a district of a few kilometres on a daily basis, while others commute several hundreds of kilometres daily due to their work; but, contrary to the Lévy distribution, it is not typical of us to change our relatively narrow whereabouts on a monthly basis. Similarly to the travel distance of humans, the number of emails sent by us or the calls initiated from our phones also follow power distribution; however, what is much more interesting than that is the distribution of these over time.

Barabási points out that our repetitive actions are far from being accidental: they show bursts, hence they can be forecast similarly to our whereabouts. Our phone calls follow an abnormal distribution, as usually we make several subsequent calls followed by a pause of several hours – i.e. we may expect that if somebody initiates a call, very soon he will make several additional calls. Moreover, based on our actions in the past and our habits, the time elapsed between the bursts can be also predicted, thus it can be estimated with relatively high accuracy when we will make the next phone call.

On the whole, although we believe that it is spontaneous when we reach out for the phone, in fact – according to Barabási – in addition to our telephoning habits, a number of our repetitive actions also follow power distribution, and hence can be forecast with high accuracy. Our life is made more exciting by numerous bursts, but it appears from the book that these are far from being accidental: by obtaining deeper knowledge of the bursts the future may also become predictable some day.

India – The contradictions of economic growth*

Antal Mester

Jean Drèze – Amartya Sen:
An Uncertain Glory – India and its Contradictions
Princeton University Press, Princeton, 2015, p. 448
ISBN: 978-0-69-116552-3

Jean Drèze and Amartya Sen are both economists and co-authors of numerous publications. These two acknowledged researchers of India are also excellent social scientists, and the analysis of economic development and social justice, as well as the social consequences of growth bear utmost importance in their publications. Additionally, Amartya Sen was awarded the Nobel Memorial Prize in 1998 for his activity in the reform of welfare economics.

This work describes India's economic changes and the influence of such on the society and on the welfare of its people since the country's independence. As also suggested by the title, the balance of the past period of almost seventy years is rather contradictory. In ten chapters, the book details the impact of the GDP growth seen in past decades, including the effects in the area of education and healthcare, and also analyses the freedom of press, corruption, poverty and the situation of women within the population. The work openly takes a critical tone, and social inequality occupies a central place. At the same time, it is a good read, written in a free and easy style, with a rich bibliography. This review focuses on the chapters examining India's economic performance.

After the end of an era as a British colony, India won its independence in 1947, becoming the world's most populous democratic state. Economic growth accelerated: as opposed to the first half of the 20th century (when annual average GDP growth was 0.9 per cent), the annual average growth between 1950 and 1980 was 3.5 per cent, rising to 5.2 per cent, 5.9 per cent and 7.6 per cent in the 1980s, 1990s and 2000s, respectively. This makes India the second fastest growing economy among the developing large economies. Regarding the growth rate, the country

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

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is catching up with its regional competitor, China. In the period under review, life expectancy at birth increased more than twofold (from 32 to 66), the infant mortality rate fell to one quarter of its previous level, and the illiteracy rate among women decreased from 91 to 35 per cent. However, the benefits of economic growth were not distributed evenly among the various social strata, thereby further increasing inequalities in terms of income. Furthermore, the authors highlight the difference that while in China a large portion of the growth results was reinvested in infrastructure developments and the establishment of the social care system, this was not typical in India. Basic services, such as clean potable water, electricity and primary healthcare, are still not available for hundreds of millions of people.

In the first decade of independence, India's leadership set the goal of implementing two five-year plans. The initial growth of the economy (4.1 percent average annual GDP growth) lasted until the mid-1960s. This was followed by severe droughts in several subsequent years, which substantially retarded the performance of the primary sector which had a dominant weight; in addition, between 1965 and 1973 India was at war with Pakistan, which generated major expenditures for the budget. As a result of these factors, the GDP growth rate decelerated in that decade, and due to poor average harvest results in agriculture, masses of people had to live in need. The growth of gross domestic product accelerated once again in the 1980s, initially induced primarily by the development of the agricultural sector. This was a collateral social benefit of the period during which higher harvest yields made a strong contribution to the reduction of general poverty, since in that social class agriculture was the only source of living for many households. The increase in the trade deficit and external indebtedness was also a phenomenon of the 1980s, which – coupled with soaring oil prices – finally led to a financial crisis in 1990. However, this crisis did not last long, and as a result of structural changes and the increase in foreign investments, growth accelerated from the 1900s. Meanwhile, several economists noted that the actual income of workers increased to a much lesser degree than the GDP growth would have justified. Drèze and Sen present China as an example: between 1981 and 2005 the income of industrial workers in China rose by 600 per cent, while the increase was only 70 per cent in India during the same period.

Probably the most thought-provoking chapter of the book is the comparative analysis of India and the poorest countries of the world. Based on extensive research, the authors analysed a huge volume of parameters and compared the economy's general indicators with the numbers measuring the wealth of the population. The results highlight the Janus face of the boom in India: the Indian state is at the end of the row in several general society indicators even among the poorest countries; these include the ratio of undernourished children (2010: over 40 per cent), infant mortality (2011: 47 per 1,000 live births), existence of basic

hygiene conditions (when the book was written, half of all households lacked water systems), number of years spent in school among the population over 25 years of age (2011: 4.4 years) or illiteracy among women.

In the next chapter, the authors compare the performance of the Indian state with the countries of the region (Bangladesh, Bhutan, Pakistan, Sri Lanka and China) based on the data from 1990 and 2011. The figures show that per capita GDP measured using purchasing power parity increased here to the largest degree after China. Nevertheless, in terms of the improvement in indicators reflecting the social situation (life expectancy at birth, vaccination coverage of children, etc.), India underperformed severely compared to its neighbours. This resulted in the unusual situation where in terms of many indicators India performed relatively better in 1990 than in 2011, despite the substantial GDP growth. According to 12 such indicators, compared to the aforementioned countries, India advanced only in terms of per capita GDP as mentioned above. This can be regarded as a failure and clearly highlights the improper use of the achievements of the prospering economy. The authors cite Bangladesh as an example: there the per capita income is less than half of that of India, but the infant mortality rate is lower, children's vaccination coverage rate is higher, and general hygiene conditions are also much better. Comparing the data with the indicators of other BRICS countries, the shortfalls are even more spectacular. However, the two authors emphasise that there are major differences between the individual federal states of India: in the more advanced southern region (such as Kerala, Karnataka, Tamil Nadu, Maharastra) the indicators are much closer to the figures of the BRICS states, in contrast to the circumstances in the northern territories. In the north, the ratio of those living below the poverty line is extremely high, coupled with almost no access to healthcare and education services.

On the whole, it may be stated about the book that the authors always support their arguments with figures; on the other hand, it should be noted that they do not investigate examples where the country made major achievements. These include, for example, the highly qualified labour force easily communicating in English, or the strength and growth potential of the industries representing high added value (information technology, pharmaceutical industry).

China's secret strategy to replace the USA*

Viktor Eszterhai

Michael Pillsbury:
The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower
Henry Holt and Co., USA, 2015, p. 336
ISBN: 978-1627790109

In his book, Michael Pillsbury has created a special genre: the book is simultaneously a memoir (based on his career of over 40 years with the CIA, RAND and the Pentagon) and an analysis of China's present situation, embedded in a kind of historical framework. One central thesis of his book is that the hawks in China have successfully persuaded the Chinese leadership to view the United States as a dangerous hegemony which it must replace. The title of this plan is "The Hundred-Year Marathon", the goal of which is that by 2049, i.e. the 100th anniversary of proclaiming the People's Republic of China, China should ultimately end the age of Western humiliation and create a world order with China as the Number One power. Pillsbury is firmly convinced that implementation of the goals of "The Hundred-Year Marathon" is progressing successfully, essentially due to two factors: one of them is that the Western countries, particularly the USA, make erroneous assumptions in respect of their perception of China, and the other is that China is following a successful strategy derived from its own historical experience.

According to the author, there are basically five false assumptions in the USA. The first is that the engagement shown by the Western countries in China increases China's willingness to cooperate. Pillsbury believes that the policy followed by China in Afghanistan, Sudan, Iran and North Korea demonstrates that China is not willing to cooperate in global interests and has no intention of taking part in the international order as a responsible participant. The second false assumption in the view of the author is that China is on the road to democracy. He believes that there is no evidence of this; moreover, the Chinese Communist Party has demonstrated spectacular flexibility in the recent decades, which presages the long-term autocracy of the party. The third typical misconception is that the situation of China and the

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Chinese economy is unstable, and thus – in order to avoid chaos – no pressure should be exerted on China. According to Pillsbury, this is not true. Indeed, quite the contrary: while the West is worried about China's woes, the Chinese economy is increasingly catching up with the USA. The fourth false conclusion of the American general public and leadership is that China wants to be just like the USA, which – according to the author – merely comes from America's hubris. And finally, the last misconception is that China's hawks are weak and play no major role in the governance of the country, in the army and among intellectuals. Pillsbury states that the hawks have been advising Chinese leaders since Mao Zedong, but were invisible to the outside world.

According to the author, the Chinese hawks derive their strategy from the Warring States Period, which contains nine key elements: *(i)* Induce complacency in your opponent, who thus becomes careless: you must not openly provoke the controlling power, unless it is no longer possible to interrupt its rise. *(ii)* Be patient – for decades or even longer – and continue developing your skills. *(iii)* Manipulate your opponent's advisers. For this purpose, China gives money to US think tanks and scientific institutions, it lobbies companies and individuals, pursues direct advertising and occasionally threatens (e.g. cyberattacks). *(iv)* Steal your opponent's ideas and technology for strategic purposes: For this purpose, China conducts continuous scientific espionage and does not recognise patent rights. *(v)* Military might is not the critical factor in winning a long-term competition. This partly explains why China has not devoted more resources to developing larger, more powerful military forces. *(vi)* Recognise that the hegemony will take extreme, even reckless action to retain its dominant position; thus, China must be prepared for such situations as well. *(vii)* Never lose sight of 'shi' (the flow of power). China is waiting for the point of maximum opportunity to erode the role of the USA. *(viii)* Employ metrics for measuring your status relative to other potential challengers accurately. *(ix)* Always be vigilant to avoid China being encircled and make others believe that China cannot be encircled.

Pillsbury comes to the conclusion that the USA must dispel the false assumptions stemming from its own strategy and China's strategy and cope with the new situation. Pillsbury proposes that a new Cold War be announced, since with this method the USA already managed to overcome a similarly threatening situation in the past. As part of this, the USA's strategy should comprise of the following elements: give nothing to China that may further strengthen its capacities; formulate a uniform US position in terms of goals; build a coalition with other nations against China; and finally the USA should support the Chinese opposition and the pro-democracy powers within China, to undermine the power of the Communist Party.

Pillsbury enriches his story with a large volume of (primarily intelligence agency) information, which easily captivates readers due to its personal style. The

information presented in the book, however, is often known already, and provides a convincing, albeit distorted picture. From the Hungarian reader's point of view, Pillsbury's prophecy and warnings do not achieve their objective, since the author's concern about China's intentions originates from his desire to preserve the global status which America obtained after World War II. The methods criticised by the author are often not foreign to US leaders either, and hence condemnation of such methods on a moral basis cannot be expected outside the USA. Despite its intentions, the book is also suitable for gaining insight into the thinking of not only the Chinese, but also of the American hawks.

European Spring: Why Our Economies and Politics are in a Mess – and How to Put Them Right?*

Palicz Alexandr Maxim

Philippe Legrain:
European Spring: Why Our Economies and Politics are in a Mess –
and How to Put Them Right?
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As an economic advisor to former president of the European Commission José Manuel Barroso, Philippe Legrain obtained direct insight into the practices of European crisis management, the political deals emerging, and all the concerns and political interests that shaped European crisis management. The author earned his degree in economics and international political economics from the London School of Economics. Since graduation, he has worked as a journalist and written several books.

The first structural unit of the book describes the events leading up to the emergence and escalation of the European debt crisis following the financial crisis arising in the aftermath of the Lehman Brothers bankruptcy. Along with a description of European crisis management, it specifically addresses the crisis management practice of the UK, discussing similarities and differences. The escalation and prolongation of the financial crisis in Europe is attributed to a series of errors in decision making. European leaders failed to recognise that the problems were not fiscal in origin. Rather than through restrictions, they ought to have been addressed through a renewal of the European institutional system, by breaking the relationship between banks and sovereigns. The author argues that crisis management and the future of the euro area cannot follow the German example, and the European institutional system cannot be redesigned in a German approach, which is unsustainable both economically and politically.

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

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The European crisis was not caused by imbalances in fiscal policy. Turbulences in the bond markets did not increase because a set threshold of public debt was breached, but as a result of incorrect policy decisions. Following the financial disruptions in the aftermath of the American subprime crisis, after emergency liquidity injections by the ECB, concerns over the survival of the euro area had not yet surfaced. However, instead of providing fiscal stimulus, decision makers in the euro area tried to stabilise European economies through a wide range of restrictions. The author argues that the European crisis started to escalate when the possibility of Greek insolvency emerged. Due to the inadequate institutional structure of the euro area, and primarily to errors in policy decisions, the crisis reached a systemic level.

Banks should have only been rescued subject to orderly reorganisation and a review of their business policies. The author highlights the bank rescue packages following the onset of the American subprime crisis. As part of those packages, governments provided assistance on a large scale to financial institutions in distress, without the orderly resolution or reorganisation of such. In the euro area there were no common resolution requirements in place, as a result of which, despite the fact that banks' operations allowed them to grow large on a real European scale, when they were wound up their solvency had to be restored within national powers, which imposed a great burden on governments.

Greek debt should have been restructured immediately. Right from the start, it was obvious that Greek sovereign debt was unsustainable and that the country was insolvent. However, arguing that a Greek bankruptcy would lead to Lehman-style panic, European decision makers opted against restructuring the country's debt. Even after the first Greek rescue package, it was apparent that Greece remained insolvent and would need further assistance shortly. Decision makers also refused to write off part of the debt on grounds of the 'no bail out' clause of the Treaty. The refusal carried the message that other European countries could also become insolvent in the event of their inability to refinance their debt.

Forced crisis management aimed at fiscal balance was harmful and failed. Following the Greek rescue package, European decision makers opted to implement a wide range of rebalancing measures. With subdued demand from the private and financial sectors, government restrictions resulted in a deep recession, while at times of turmoil it was only governments that could have generated additional demand in the economies.

Confusing the problems of illiquid countries with Greek insolvency only exacerbated the crisis. When Greece was bailed out, it was proposed that going forward, countries in distress would be aided using community funds, with the involvement of the private sector. Under that proposal, member states that were forced to seek assistance due to turbulences caused by market disruptions rather than insufficient

economic fundamentals (such as Spain and Italy) would be allowed to shift losses on the private sector. As a result, the crisis spilled over to other countries, and European government bond yields continued to soar.

Raising the possibility of Grexit was a bad decision. Liquidity had been provided to Greek banks by the ECB, discontinuing which would have forced the country to exit the euro area. As a result, the euro was no longer trusted as an irreversible single currency.

The consequences of the above policy decisions caused the government bond yields of each country to increase. Given that government securities account for a significant portion of European banks' balance sheets, the impairment of such caused financial institutions to incur major losses, requiring them to seek assistance from the state, which in turn increased government bond yields further. That is, the negative feedback process between banks and sovereigns destabilised countries.

Crisis management based on the German model was founded on erroneous assumptions and failed to resolve the problems of the euro area. Over the past 15 years, the German economy made considerable progress, primarily by means of an artificial brake on wage growth. Wages did not grow at the same rate as the productivity of the German economy, which gradually improved Germany's competitiveness and generated a huge current account surplus. The author considers that surplus to be harmful, arguing that except for Greece, southern countries were not destabilised as a result of their excessive indebtedness, but rather by Germany's excessive savings. Due to insufficient domestic demand for credit, German capital created asset price bubbles in southern countries. The author finds fundamental flaws with the German position that southern countries should recover their competitiveness and increase their exports through internal devaluations, i.e. by cutting labour costs. The German model cannot provide a solution for the European Union as a whole. The EU is the largest market in the world, and as such it must not generate an excessive current account surplus, since those surplus exports should also be consumed by some countries, for which there is no real chance.

The crisis of the euro area was finally put to an end by ECB President Mario Draghi's speech on his commitment to preserve the euro. Soaring European government bonds collapsed immediately. The main problem was therefore caused by the fact that as opposed to other countries, the central bank of the euro area was not mandated to act as a lender of last resort. This in turn meant that countries in distress had to be rescued through fiscal policies, which resulted in unsustainable social and political tensions.

For the sake of the euro area's future, the shocks caused by the debt crisis must be prevented, its consequences must be mitigated, and losses must be distributed in a transparent manner and as decently as possible. For the preservation of euro area, the author considers four institutional arrangements to be viable: the prevalence of the German approach, a technocratic future, a federal euro area, and a flexible euro area. The German approach foresees increased German dominance, a stronger coordination of fiscal policies, and German-style measures to rebalance and improve competitiveness (wage cap), accompanied by a minimum level of shared risk and solidarity. The technocratic arrangement involves an operational banking union, centrally supervised fiscal rules, the introduction of Eurobonds, and a stronger dominance from Brussels in setting economic policies. In the federal approach, a European Central Treasury would be set up, which would collect tax revenues in its own right, allowing it to issue debt of its own, which would be a safe asset in times of crisis. Additionally, the Treasury could provide fiscal incentives, and the ECB, in its role as lender of last resort, could support the sustenance of trust in central debt. The fourth option is the creation of a flexible euro area, which involves a comprehensive banking union, and stronger coordination accompanied by the preservation of autonomous fiscal policies. In this case, in its role as lender of last resort, the ECB could support illiquid member states, while the debt of insolvent member states would be restructured under IMF supervision.

Of the possible visions, the author considers the federal approach to be the most ideal one, which, however, is not a realistic outcome in the current political climate. The second best approach would be a flexible fiscal union, but that also raises the question of how much autonomy each institution should enjoy. To what extent would the single supervisory mechanism give equal weight to addressing the problems identified in various member states? Would insolvent member states subject themselves to IMF schemes? How long would the ECB grant assistance to illiquid member states in the event of Germany's possible protest? The author argues that we are heading in the German direction, with technocratic additions. That is, the community institutions are being set up, but are used by Germany to promote and enforce its own will and policy. That means to improve competitiveness and to establish export-oriented economies, primarily by cutting wage costs. However, the German technocratic arrangement is politically unsustainable, as it undermines democratic support for the single European project and will ultimately lead to a new crisis across the region.

The economies of the euro area and the UK are facing similar difficulties. The author compares the crisis of the UK to that of the euro area, and finds that their problems are shared in several aspects. In both economies, subdued corporate lending and moderate growth pose a severe problem. The problems in both economies are attributable to insufficient crisis management. In the UK, growth failed to recover

despite the absence of a bond market crisis. In most cases, the UK approaches problems from a Washington perspective, but its response to the economic crisis was definitely European in the form of severe rebalancing measures. As a result of the restrictions, demand in the UK plunged, while the fiscal balance failed to improve. The government ultimately abandoned fiscal adjustments. Attempts to generate additional demand were made through the support of the Bank of England's large asset purchase programme. However, this failed to bring about a meaningful improvement in growth prospects. Consequently, the UK is facing difficulties that are similar to those of the euro area. The author highlights moderate growth, high unemployment and subdued corporate lending.

In the second structural unit of the book, the author discusses the challenges that the EU and the UK must meet in order to lay the foundations for economic success. Europe's problems result from the poor adaptability of the economy, low growth potential, the consequences of aging society, the culture of risk aversion, and the fact that the interests of the political elites contradict changes. Following the discussion of the problems, the author proposes the implementation of so-called ADD (adaptive, dynamic and decent) reforms. In order follow up on past successes, the European continent needs economic and political change; a European spring.

The economy suffers periodic shocks, both internal and external. As the market economy and the financial system are essentially stable, it is the adaptability of the economy that needs improvement. The risks stemming from the financial system need to be mitigated by increasing the quantity and quality of capital. The mobility of the factors of production and of labour in particular need to be improved so that they are utilised where they are needed the most. The standardisation of markets and the abolition of unnecessary regulations enable competition to become more intensive, giving companies incentives for efficient operations. Therefore, the adaptability of the economy to various shocks must be improved.

Economic growth must be facilitated, and the dynamism of the economy increased. Growth requires more innovation, more start-ups, and more initiatives. To that end, entrepreneurship in society must be strengthened from early childhood. Education plays a key role in shaping creative thinking and an enterprising spirit. In public and higher education, efforts must be made to foster creativity and develop entrepreneurship. Innovation emerges in proportion with the density of social connections as part of social interactions. This is why innovations occur primarily in cities. As a result, the number of human interactions and the density of human connections must be increased. Apart from all this, the required funding also needs to be provided. The conditions for access to funding by start-ups must be provided. The government must develop government services and must spend more on research and development. The ability of the economy to grow can be improved with the support of new ideas and innovations.

European social values must be centred around equal opportunities. Society works the most efficiently when every individual has equal opportunities to accomplish the objectives set. The state must therefore reduce the differences between individuals by supporting those in distress. Excessive differences in income must be eliminated. Incomes should be determined on the basis of social utility. Efforts are needed against undeserved revenues; therefore, taxes must be levied on land, and agricultural subsidies must be reviewed and discontinued. With a view to the most efficient use of resources, granting equal opportunities must be given priority in society.

The author argues that rather than through German-style restrictions and the UK's asset purchase programmes, European competitiveness should be restored by means of measures facilitating the adaptability, growth potential and decency of the economy. And that requires radical economic and political changes, i.e. a European spring.

Stock Exchange Development and Growth – Report on the lessons from the capital market conference of the Budapest Stock Exchange (BSE) and the Association of Hungarian Economists (AHE)*

Márton Teremi

The stock exchange conference, organised jointly by the Budapest Stock Exchange and the Association of Hungarian Economists, took place on 26 May 2016 in the ballroom of the Váci street headquarters of Magyar Külkereskedelmi Bank. In the morning session of the conference, the presentation of the representative of the Ministry for National Economy was followed by a discussion by the heads of the Zagreb, Belgrade and Bucharest stock exchanges on the development trends, successes and challenges of the regional stock exchanges. In the second part of the conference, the various dimensions of boosting the Budapest floor were discussed by *Márton Nagy*, Chairman of BSE and the Financial Section of AHE, and a panel comprising of the Chief Executive Officer of BSE and actors in the industry.

The participants were welcomed by *Richárd Végh*, Chief Executive Officer of BSE and *Benedek Sándor*, Deputy Chief Executive Officer of MKB, designating the discussion of the regional and domestic stock exchange development trends as the key objective of the event. *Ágnes Hornung*, State Secretary at the Ministry for National Economy in charge of finances, highlighted the stock exchange's significant role in the national economy and the latest supporting measures of the Government. The upgrade of Hungary by Fitch on 20 May 2016, the administrative easing implemented within the framework of the recently adopted modification of the Capital Market Act, as well as the regulations facilitating the development of new capital market structures all clearly reflected the Government's commitment to developing the stock exchange. *Hornung* also assured the audience that there were ongoing consultations with stakeholders to ensure further measures in the 2016 autumn legislative session.

Ivana Gažić, CEO of the Zagreb Stock Exchange, provided a very thorough summary of the factors influencing the path of the Zagreb stock exchange so far and the future

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

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prospects, with special regard to the initiative related to the regional stock exchange association. As she noted, the development of the Croatian markets was hindered by several internal and external factors: the poor macroeconomic environment and high external vulnerability, the low willingness to privatise, the financing model with the banks in focus, the low free float, and the underdeveloped institutional investors all contributed to the stagnation of the Zagreb stock exchange. This was further exacerbated by an economies of scale problem, as the international regulation and the increasing requirements for technological investments gave preference to larger stock exchange operators. *Gažić* was of the opinion that other stock exchanges in the region struggled with similar problems, which gave rise to the initiative known as SEE Link. The SEE Link association was established by the stock exchanges of Bulgaria, Croatia and Macedonia, and was soon joined by another five national stock exchanges in the region. The products of the other stock exchanges became visible and accessible for the member stock exchanges participating in the association and for their partners free of charge, which facilitated the realisation of the orders between the various stock exchange systems and intermediaries by setting up a shared protocol. In the medium run, the integration of new stock exchanges may support strengthening of the SEE Link initiative, while in the longer run the trend of the development may be represented by deeper harmonisation of the trading, post-trading and other stock exchange rules and systems.

Siniša Krneta, CEO of the Belgrade Stock Exchange, started his presentation by drawing a distinction between the European and Asian processes. Over the last ten years, the liquidity of the European stock exchanges, with the exception of the Warsaw Stock Exchange, had declined significantly, while turnover on the Asian stock exchanges had multiplied in the same period. *Krneta* highlighted that this development was only partially linked to the different impacts of the financial and economic crisis in the two continents; the differences between the approach to the role of the stock exchange may have been equally important. The European model was more focused on trading, and the regulation was very favourable for the emergence of the alternative markets, while the Asian model gave preference to the financing function and paid special attention to the regulated markets. *Krneta* encouraged the strengthening of the financing channel in Europe as well, which may be realised by new issuances generated by the strengthening of the connection between the stock exchange and the real economy. The Belgrade stock exchange will also be joining the SEE Link initiative, in addition to listing state-owned companies and developing an adequate regulatory environment, in order to lay the foundation for higher liquidity, which was essential for the development of the stock exchange.

Ludwik Sobolewski, CEO of the Bucharest Stock Exchange, highlighted the fact that not much time was left to boost the development of the capital markets. In his view, the transformation phase of the economic and social systems in the

countries of the region was approaching its end, and hence the maximum time left for defining the role of the national stock exchanges at a new, higher level may be 3–5 years. According to his regional experiences, the presence of foreign investors had had a positive impact both on pricing and financial literacy; on the other hand, their participation had also depended on the broadness of the issuer base, as well as on the flexibility of the capital market infrastructure and regulatory environment. In addition to encouraging stock exchange privatisation, the Bucharest Stock Exchange had also established the Aero market for SME-sized enterprises. He believed that there were no supply problems in Romania, while on the demand side it was necessary to enhance the financial awareness of private investors and to manage the liquidity risk. As regards the future, *Sobolewski* hoped that the latest regulatory initiative would not undermine the functioning of the capital market and believed that the arguments for the stock exchange consolidation clearly pointed to integration in the longer run.

Márton Nagy, Chairman of BSE and the Financial Section of AHE, reported on recent research that dealt with the features of the companies eligible for listing and may serve as a basis for BSE's issuer acquisition activity. As a starting point, he stated that the financing opportunities of companies were substantially influenced by the fact that the inflow of the EU funds would decelerate significantly in the coming years and the central bank loan programmes would also run out in the foreseeable future. Thus, the companies would change over to "normal" market-based financing by 2020, whereby BSE must play an important role. However, for this it was necessary to define the criteria that determined the range of companies eligible for listing and along with this to identify those companies with which BSE should initiate further cooperation. The specialist literature measured companies' eligibility for listing on a quantitative scale, based on which the most important factors for being successful on the stock exchange included age, export capacity, size, growth and capital structure. The backbone of the qualitative scale was comprised of the market share, other industry features, the ownership structure and the corporate governance system. SME-sized companies best satisfying these criteria typically had higher ROIC-based return and export activity, and lower leverage, and usually paid higher wages to their employee than the entire SME universe. 44 per cent of the headquarters of the SMEs eligible for listing were located in the Central Hungary region and they mostly operated in the manufacturing sector.

As regards the BSE's objectives, it was an important aspect that if the 50 most eligible SMEs entered the stock exchange, it would increase market capitalisation only by 5 per cent. Hence, BSE also deemed important to involve the large corporate sectors, but this worked through a different channel. Nevertheless, it was still worth making efforts to support the capital market entry of the SME sector, which the BSE intended to facilitate by providing support and consultation services

during companies' preparation process. The framework of this would be the BSE Anteroom, which would help eligible companies that were just about to enter the stock exchange with training and consulting programmes focused on corporate finance. Another anticipated initiative was the designated consultant system based on foreign best practices, which in part supported the preparatory process and in part also fulfilled an investor protection role. In addition, it was important to note that the actors in charge of regulation also recognised the need for this, which was reflected in the modification of the Capital Market Act. Hopefully a capital fund, supported by EU resources, would also be established, which would support both the supply and demand sides of SME transactions by capital market exit and the subscription of capital market issuances.

The panel discussion was attended by *Róbert Cselovszki*, CEO of ERSTE Befektetési Zrt., *Ádám Hegyi*, Director of KBC Securities, *Róbert Barlai*, Executive Director of OTP Treasury, *György Jaksity*, Chairman of Concorde Értékpapír Zrt., and *Benedek Sándor*, Deputy CEO of MKB Bank, with *Richárd Végh*, CEO of BSE, acting as moderator.

The participants first commented on the analysis presented by *Márton Nagy*, the purpose, approach and methodology of which was essentially welcomed and regarded as suitable for identifying and approaching potential issuers. On the other hand, *György Jaksity* and *Róbert Cselovszki* expressed their doubts about the way to access a substantial range of investors and achieve liquidity for the shares of SME-sized companies, which may have a fundamental influence on acquisition activity. In recent years, the stock exchange performance of smaller companies had been marked by unfavourable experiences and due to this at present there was no investor interest in the smaller shares. On the other hand, the participants agreed that in the present low yield environment and by introducing additional incentives it could be possible to find a way to boost investor interest again and resolve the credibility problems of stock exchange investments.

Richárd Végh mentioned some methods to reach the SME-sized issuers and encourage their presence on the stock exchange. *Benedek Sándor* was of the opinion that successful enterprises had increasing reserves and may be able to implement their investments even without external finance. *György Jaksity* proposed to capitalise on the succession problem – he believed that the stock exchange may be a real alternative for owners which had already fostered somewhat independent management in the governance of their company, and hence the governance structure of their enterprise may be more suitable for the stock exchange. On the other hand, strategic investors may be competitors in this case as well. *Ádám Hegyi* mentioned in general that their SME clients typically searched for other alternatives after having fully utilised the solutions of credit nature, but this connection was not inevitable. He believed that substantial demand for stock exchange financing may arise only when it provided a solution not only for the financing problem, but was

also advantageous in other respects as well, such as – for example – the absence of the requested tangible collaterals. *Róbert Cselovszki* mentioned the unfavourable nature of the present regulation in respect of the issuance transactions as an obstacle, while *Richárd Végh* believed – as was noted in the presentation by *Ágnes Hornung* – some progress had already been made in this respect.

Richárd Végh raised the question to what extent the designated consultant structure may be viable at BSE. The participants essentially found the model, which has already applied in a number of markets in the EU, to be viable in Hungary as well, but at the same time they repeatedly called attention to the importance of fiscal incentives in this area as well. In addition, *Ádám Hegyi* also mentioned that in the issuances of recent years institutional investors were not present in the range of investors, which would have been reassuring for small investors as well in terms of pricing and the safety of their investment.

Reacting to the presentations during the morning session, *Végh* asked the participants about the opportunities they saw in the SEE Link initiative and to what extent it might be advisable for the BSE to join the association. *Róbert Barlai* stated that the Xetra integration of BSE had not achieved the expected positive impacts, and thus the disadvantages of the integration should also be clear. *Róbert Cselovszki* and *György Jaksity* also mentioned that the integration would result in the equalisation of the participants' trading and other costs, which may be definitely advantageous for investors and the actors of the industry.

Finally, the focus was on the future of the national stock exchanges. *Róbert Cselovszki* and *György Jaksity* called attention to the process of turning the stock exchange and investment services activity into a "public utility", accompanied by increasing competition and disruptive structure (MTF markets); thus the prospects were negative at present. On the other hand, national stock exchanges play a unique role, and hence the participants did not see the need for and the sustainability of these exchanges as being in question.

Richárd Végh thanked the lecturers and attendees of the conference for their participation. In his summary, he mentioned that *Ágnes Hornung* had informed the participants about the latest regulatory developments and based on this the participants may hopefully expect measures supporting the further development of the stock exchange. The managers of the regional stock exchanges discussed a number of topics containing significant lessons for BSE and the participants thereof, and the stock exchange association also provided an important view on the cooperation opportunities. The presentation of *Márton Nagy* and the panel discussions mainly focused on national considerations, but these related to the key challenges faced by BSE and hopefully strengthened the belief in the development of the stock exchange.

Conference on financial market liquidity – Report on the 6th Annual Financial Market Liquidity Conference (AFML 2015)*

Péter Csóka – Dániel Havran – Kata Váradi

The Financial Research Centre, established in 2014 by the Department of Finance of the Corvinus Business School, Corvinus University of Budapest, held the international conference at the Corvinus University of Budapest on 19–20 November 2015. This was a joint project with the "Momentum" Game Theory Research Group at the Hungarian Academy of Sciences, Centre for Economic and Regional Studies.

The conference was held for the sixth year in a row, focusing on the following topics: Market Liquidity and Funding Liquidity; Liquidity Aspects of Systemic Risk; Game Theoretic Aspects of Liquidity and Financial Risk; Global Liquidity (both Public and Private) and Regulations; Leverage and Macroeconomic Determinants; Market Microstructure with Emphasis on Liquidity; Asset Pricing and Management with Illiquid Assets; and Illiquid Alternative Investments and Asset Innovations.

The 2015 conference was attended by about 150 registered participants from the international and Hungarian academic sector and from the industry, and 30 motivated students were also selected. The language of the conference was English. The following speakers were invited. Keynote speaker: Lasse H. Pedersen (Copenhagen Business School and NYU Stern School of Business). Other invited speakers: Jonathan A. Batten (Monash University), P. Jean-Jacques Herings (Maastricht University), Sviatoslav Rosov (CFA Institute), Michael Sternberg (Morgan Stanley), Vera Száz (Mol Group), Balázs Székely (MSCI), Niklas Wagner (Passau University), Adam Zawadowski (Boston University and Central European University).

In addition to the 9 invited speakers listed above, there were also another 35 speakers who registered for the conference after the scientific committee of the conference accepted their applications. 10 of them participated with a poster.

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

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The conference was opened by Zita Zoltayné Paprika, dean of the Corvinus Business School. She highlighted that this was the first year with parallel sessions in the conference, and the participants also had the opportunity to publish their research work in the special issue of the international journal Studies in Economics and Finance (chief editor: Niklas Wagner). Jonathan A. Batten, editor of Finance Research Letters, was also interested in the research papers of the participants.

We can proudly say that the 2015 conference once again achieved its goals of connecting theoretical and empirical academia and industry experts, and discussing the latest results in the field of market liquidity in a friendly, interactive environment. We are thankful for the support of our sponsors: Foundation of the Department of Finance, the Pallas Athéné Domus Scientiae Foundation, CFA Society Hungary, MSCI, Morgan Stanley, Foundation ISC, the Hungarian Academy of Sciences "Momentum" Program, Keler CCP, EFFAS, and the Institute for Training and Consulting in Banking. The conference was organised in the framework of the event series "Celebration of Hungarian Science 2015".

The next conference will take place on 17–18 November 2016; the keynote speaker will be Anthony Saunders (NYU Stern School of Business). We recommend this event to practitioners and leaders who would like to know and understand the answers given by researchers to the latest questions generated by market needs, and achieve a competitive advantage based on this knowledge at the operative and strategic level as well.

Further useful information is available on the conference homepage:
http://liquidityconference.uni-corvinus.hu/

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Manuscripts should be submitted in accordance with the following rules.

- The length of the manuscripts should be limited to 40 000 characters (including spaces) but a ± 50 per cent deviation is accepted. Manuscripts should be written in Hungarian and/or English.
- Papers always begin with an abstract which should not exceed 800–1000 characters. In the abstract a brief summary is to be given in which the main hypotheses and points are highlighted.
- At the bottom of the title page a footnote is to be given. The footnote contains every necessary information related to the paper (acknowledgement, relevant information etc.). This is followed by the name of the institution and position the author works at, e-mail address in Hungarian and English.
- Journal of Economic Literature (JEL) classification numbers should be given (three at least).
- Manuscripts should be written in clear, concise and grammatically correct Hungarian and/or English. Chapters and subchapters should be bold.
- Manuscripts should contain the list of references with the first and surname of the authors (in case of non-Hungarians the initials of the first name is required), the year of publication, the exact title of the book, the publisher, the place of publication. In case of papers, the exact title of the journal, the year, the volume, and the pages should be indicated. References in the text should contain the surname and the year separated by comma. When citing, the exact page be indicated.
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- Equations should be aligned to the right and should be numbered continuously in parenthesis. (Chapters and subchapters should not contain restarted numbering.)
- Manuscripts are to be sent to the Editorial Office of the FER only. Papers are peer-reviewed by two independent and anonymous reviewers.
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