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Hungary Is on the Path to Convergence*

György Matolcsy – Dániel Palotai

After 2010, Hungary achieved exceptional economic results both by Hungarian and international standards, and thus the Hungarian economy has become one of the growth engines of the European Union. Hungary's economic policy measures successfully placed the country on the path to convergence, bringing the country to the forefront of the European Union in areas such as raising the employment rate, decreasing unemployment, improving the budget balance and government debt, and restoring external equilibrium. As a result of this, the Hungarian economy has sufficient stability and reserves to implement a turnaround in competitiveness, which may be achieved by targeted measures. This paper reviews Hungary's macroeconomic achievements that are outstanding also by international standards and based on which sustainable convergence of the national economy can be ensured.

Journal of Economic Literature (JEL) codes: E52, E61, E62, O10, O23, O47

Keywords: convergence, sustainability, economic policy, competitiveness

1. Introduction

Hungary is undergoing a period of convergence that is unique in the economic history. Thanks to the successful economic policy reforms, the growth period has lasted since 2013, while simultaneously maintaining macro financial equilibrium and a gradual decline in the vulnerability of the economy. In addition to these achievements, it has once again become a realistic opportunity for Hungary to converge to Europe's more economically advanced countries in the foreseeable future.

However, convergence is not a done deal. It requires a steady commitment to continuing the policy of competitiveness reforms (*Palotai – Virág 2016*). The significance of focused economic policy is also confirmed by international experiences, since in international economic history successful convergence is rather

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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the exception. Most convergence attempts lost momentum, and convergence often reversed. In fact, this is not surprising since during the convergence process newer and newer growth opportunities that may serve as the next step in convergence must be identified on a continuous basis. This is feasible only on the basis of a committed, creative and innovative economy policy which enjoys wide-ranging support of the society.

Starting from 2010, the Hungarian government established the conditions for convergence with measures built on each other and mutually strengthening each other's effects. It pursued a drastically new crisis management approach and restored equilibrium by supporting growth. It reformed the tax regime to foster employment and stabilised the budget. Harmonisation of fiscal and monetary policy from 2013 onwards was another step forward. The central bank supported economic growth and helped restart lending by way of new, innovative programmes, while at the same time also reducing the vulnerability of the economy.

As the post-2010 reforms started bearing fruits, Hungary embarked on an equilibrium growth path in 2013. Hungarian GDP has been growing dynamically for many years, rising faster than the average of the developed countries. Meanwhile, the low budget deficit, the downward trend in government debt, the trade surplus and moderate inflation were also maintained. Low unemployment and dynamic wage increases make the results of growth tangible for wide layers of Hungarian society. The period of growth and equilibrium seen since 2013 is unprecedented in the history of the modern Hungarian economy. However, economic convergence to the developed countries requires even more. Convergence is conditional on maintaining the growth period for more than a decade, during which time additional growth reserves must be activated, i.e. a turnaround in competitiveness must be achieved.

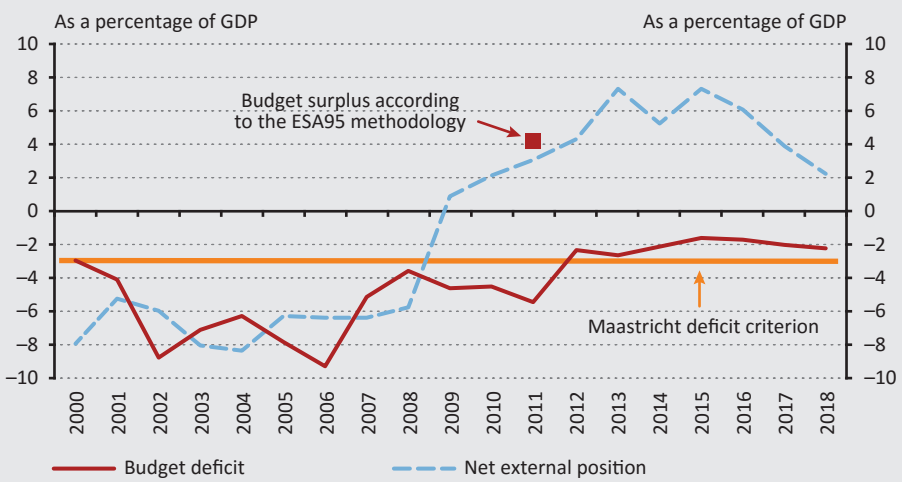
The primary objective of this paper is to present the main achievements of the current convergence process. The measures supporting the realisation of results have already been presented in detail in previous papers (*see, for example, MNB 2017a and Matolcsy – Palotai 2018*), and thus we describe those here only to the degree necessary for evaluating the results. The paper is structured as follows: First we depict the baseline, i.e. the situation of the Hungarian economy right before the outbreak and after the global financial crisis. We then shortly present the reforms that the government used to manage the crisis after 2010 and that created the basis for economic growth and financial equilibrium. Following this, we move on to the analysis of the results already achieved during the convergence period, which we also assess compared to the performance of the European countries.

2. Economic policy errors before and during the crisis

The global financial crisis ruthlessly highlighted the fact that permanent convergence is possible only if macro financial stability is maintained. In the 2000s, the erroneous Hungarian economic policy fostered growth at the sacrifice of equilibrium. As a result of this, Hungary was hit particularly hard by the global financial crisis.

Prior to the crisis, fiscal policy was irresponsibly loose, and the indebtedness of the private sector also rose continuously. The government deficit of 8 per cent on average between 2002 and 2006, and the net external borrowing requirement of 8 per cent on average, were not sustainable in the long run (*Figure 1*). The degree of labour taxes was extremely high by international standards, as a result of which – in conjunction with the looser-than-justified social benefits, which did not foster employment – by 2007 Hungary's rates of employment and labour force participation were among the lowest in Europe. It was not possible to finance the high government debt with domestic funds (*Matolcsy 2008*). The increasing share of non-residents in the financing of the government debt increased Hungary's vulnerability and raised the funding costs of the state, and indirectly of the private sector.

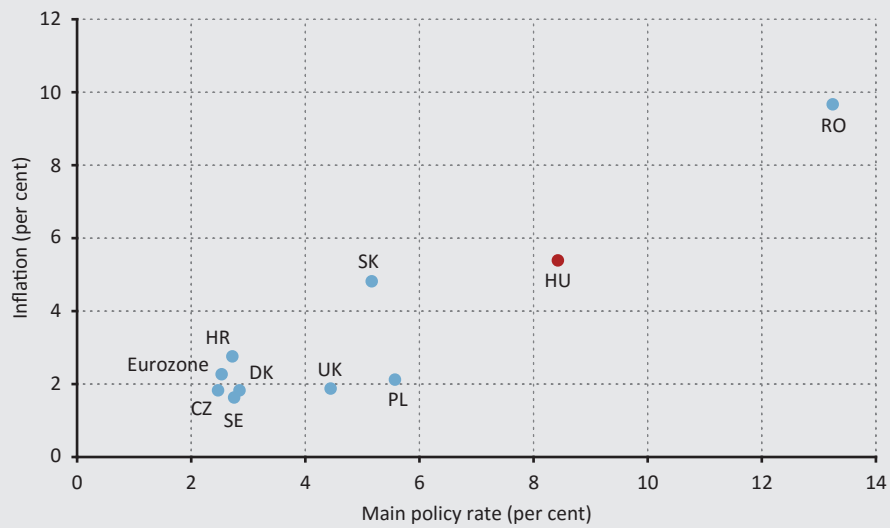
Figure 1
Government deficit and net borrowing of the national economy



Source: MNB, Eurostat

Government overspending and private sector indebtedness led to inflation exceeding the central bank's target. Monetary policy attempted to contain inflation by maintaining a high nominal interest rate (*Figure 2*). However, with the permanently expansionary fiscal policy this yielded no success; moreover, the high nominal interest rates led to further deterioration in the general government balance via the rise in interest expenses (*Matolcsy – Palotai 2016*). In addition, high interest rates led to the spread of foreign currency loans. As a result of inaction by the financial regulatory authorities, there was a surge in foreign currency lending to households, which had commenced in 2003, and at the time of the outbreak of the financial crisis, the majority of outstanding housing loans were already denominated in foreign currency (*Lentner 2015*). The increase in foreign currency exposure rendered the economy extremely vulnerable to changes in the international financial market environment. By 2006, growth financed by indebtedness became unsustainable. The government tried to reduce the government deficit by fiscal austerity measures. However, authority measures curbed growth, and thus the convergence of the Hungarian economy came to a halt and, in the absence of growth, the anticipated balance improvement also failed to materialise.

Figure 2
Average central bank base rate and inflation in the 2002–2007 period



Source: BIS, Eurostat

On the whole, the vulnerability that built up before the financial crisis and crisis management based on authority measures caused the Hungarian economy to suffer one of the largest declines in Europe in the years that followed the outbreak of the financial crisis. As a result of the high government debt and the continued substantial government deficit, there was no room for fiscal easing, which could have mitigated the economic downturn. Upon the outbreak of the crisis, the global decline in investors' risk appetite and the shaken confidence resulted in liquidity constraints on the international financial markets. Investors turned to safe assets, which made the financing of the Hungarian budget extremely complicated. In parallel with the problems of financing the government debt, the stability of the financial intermediary system also wavered. The gradually realised and expected lending losses made commercial banks to curb their lending activities, which further deepened the crisis. Naturally, the deteriorating mortgage loan portfolios caused problems not only for the financial sector. The increasing risk of the loss of homes raised the threat of a severe social crisis. Due to the inability to finance government debt from the market, the government at that time turned to the EU and IMF for a financial rescue package. However, the rescue package was conditional on the implementation of additional austerity measures, which further deepened the crisis.

3. Successful crisis management after 2010

After 2010, the new government broke with the previous crisis management practice and placed the emphasis on the stimulation of the economy, instead of authority measures. One of the main growth-friendly ways to contain the budget deficit was to stimulate employment. As a result of the tax reform, the structure of tax revenues changed in a growth-friendly way: the weight of labour taxes decreased (*Svraka et al. 2014*), while that of consumption taxes rose. The flat rate personal income tax regime was introduced, as a result of which the marginal tax rate on labour substantially decreased (*Giday – Mádi 2018*). In addition to the tax cuts, a significant contribution to boosting employment also came from the reduction of social benefits that were not conducive to employment, and public employment supplemented with education programmes and the substantial increase in family support elements (conditional on employment) also needed. Growth in labour demand was additionally supported by the reduction and simplification of the taxes payable by small enterprises. The purpose of the Job Protection Action Plan was to support those in the most disadvantaged labour market position. In addition to stimulating employment, the introduction of sector specific taxes and the reform of the pension system also materially improved the budget balance. The measures

aimed at fiscal stabilisation proved to be successful, and thus the excessive deficit procedure (EDP) conducted by the EU against Hungary was lifted in 2013. This is all the more a major achievement, because after 9 years of EDP the suspension of EU funds was a real risk.

Harmonisation of fiscal and monetary policies was essential to set the economy on a growth path (Matolcsy – Palotai 2016). From 2013, monetary policy played a much more active role than previously in fostering economic growth, in addition to its primary objective, i.e. ensuring price stability. Owing to the gradual cuts in the base rate, the private sector's cost of finance decreased, while investment and consumption picked up. The decreasing base rate and the central bank programmes reduced government securities market yields and also substantially lowered the interest expenses of the budget (*Kicsák 2019*). The expansion of the central bank's set of monetary policy instruments with new, innovative elements was instrumental in the transformation of Hungarian monetary policy.

The Magyar Nemzeti Bank (the central bank of Hungary, MNB) launched a number of new, targeted programmes to strengthen financial stability and stimulate economic growth. *In the first three phases of the Funding for Growth Scheme (FGS), the MNB provided the SME sector with financing in the amount of HUF 2,800 billion via the banking sector.* The purpose of the scheme was to restart corporate lending, which had declined to an extreme degree as a result of deleveraging by commercial banks after the crisis (*Bokor et al. 2014*). Commercial banks, utilising the interest-free central bank funding, could grant loans at a maximum interest rate of 2.5 per cent to the SME sector for new investments, current assets, pre-financing of EU funds and refinancing of foreign currency loans. By easing lending constraints and boosting investments, the scheme raised GDP by 2–2.5 percentage points between 2013 and 2017 (*Fábián – Pulai 2018*).

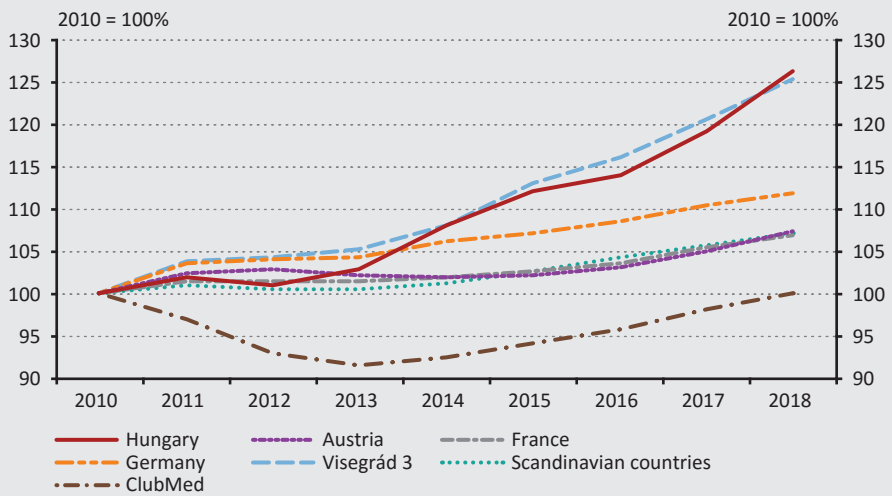
The phasing-out of foreign currency loans was of outstanding importance to strengthen financial stability. In the period 2011–2012, the government reduced the burdens of households by the early repayment scheme. After the adoption of the Curia's uniformity decision, underlying the conversion of foreign currency loans, the MNB provided banks with funding of EUR 9.7 billion in total, for the implementation of the forint conversion (*Kolozsi 2018*). In addition to relieving Hungary of a severe financial stability risk, the forint conversion, which was implemented in an orderly manner in a single step, also increased the efficiency of monetary transmission. The timing of the measure was extremely favourable, since soon afterwards the Swiss central bank abandoned its minimum exchange rate for Swiss franc, which resulted in significant depreciation of the forint exchange rate to the Swiss franc (*for more details, see Fábián – Zágonyi 2015; Nagy 2015*).

Owing to the fiscal and monetary turnaround, the period of active crisis management ended and balance was restored, and thereafter the focus of economic policy shifted to the support of sustainable convergence.

4. Achievements of the convergence of the Hungarian economy (2013–)

Since the growth turnaround in 2013, the economy has been on a convergence path. The condition for successful economic convergence is that economic growth should markedly exceed that of the benchmark countries. Between 2013 and 2018, Hungary's GDP rose by 23 per cent in total, i.e. considerably faster than the output of the more advanced Western European countries. For example, in four of these six years, growth in the Hungarian economy exceeded the annual growth of Austria by more than 2 per cent. Hungary's economic convergence is reflected more directly by the change in the GDP per capita ratio, as the most common index of economic development. Between 2013 and 2018, GDP per capita in Hungary rose by almost 20 per cent, i.e. at a faster rate than in the large economies of the EU, in the Mediterranean countries or in Scandinavia, and at a similar rate as in the Visegrád countries[1], regarded as the growth engine of the EU (*Figure 3*).

Figure 3
GDP per capita (in constant prices)



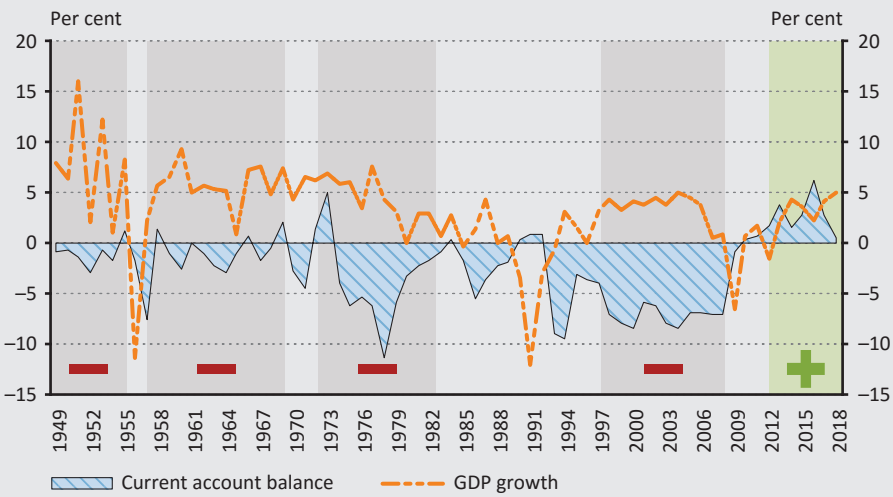
Note: The members of the Visegrád 3 (V3 Group) are the Czech Republic, Poland and Slovakia, the Scandinavian countries include Denmark, Finland and Sweden, while the ClubMed group includes Greece, Italy, Portugal and Spain.

Source: Eurostat

[1] Visegrád Group includes the Czech Republic, Hungary, Poland and Slovakia.

Also considering the financing structure of the Hungarian economy, the growth period lasting since 2013 is unprecedented in the history of the Hungarian economy. Previous growth periods for the Hungarian economy were characterised by external indebtedness, constituting a striking contrast to the current dynamic economic growth, realised in conjunction with a steady current account surplus and a low budget deficit (*Figure 4*).

Figure 4
Growth cycles of the Hungarian economy and changes in the current account balance between 1949 and 2018



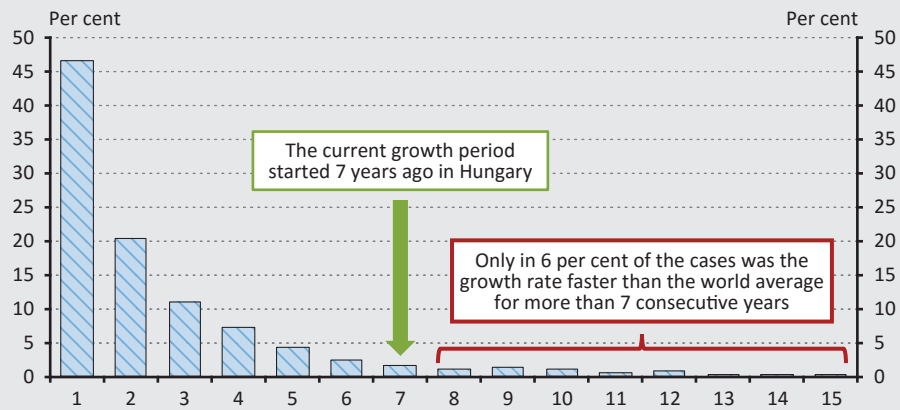
Note: The coloured stripes indicate the longer periods of boom, while the signs in the figure show the current account balance in the respective period.

Source: Lehmann (2019)

It is worth assessing Hungary's growth performance since 2013 from a broader perspective as well. Based on the data from the period 1920–2016, *Figure 5* shows how many years growth in any country was able to outstrip the growth of the global economy. Past experiences show that individual states were usually able to maintain a growth rate higher than that of the global economy only for 1–2 years. The ratio of growth periods that steadily exceeded global economic growth and were longer than that of the current growth period of the Hungarian economy, which has already lasted for 7 years is merely 6 per cent.

The successful convergence experiences of the 20th century indicate that convergence takes at least one decade. Accordingly, Hungary – if it wants to break out of the middle income trap – also needs to prolong the current growth period for much longer than a decade. In the past fifty years, only a few economies were able to achieve this: e.g. South Korea (*Yoo 2008*) and Singapore (*Kaushik 2012*) among the Southeast Asian countries (*Krugman 1994; Felipe 2006*), while among the Western European countries, among others, Austria (*Prammer 2004*) and Ireland (*Powell 2003*).

Figure 5
Distribution of the length of growth periods steadily exceeding the average growth of the global economy (between 1920 and 2016)



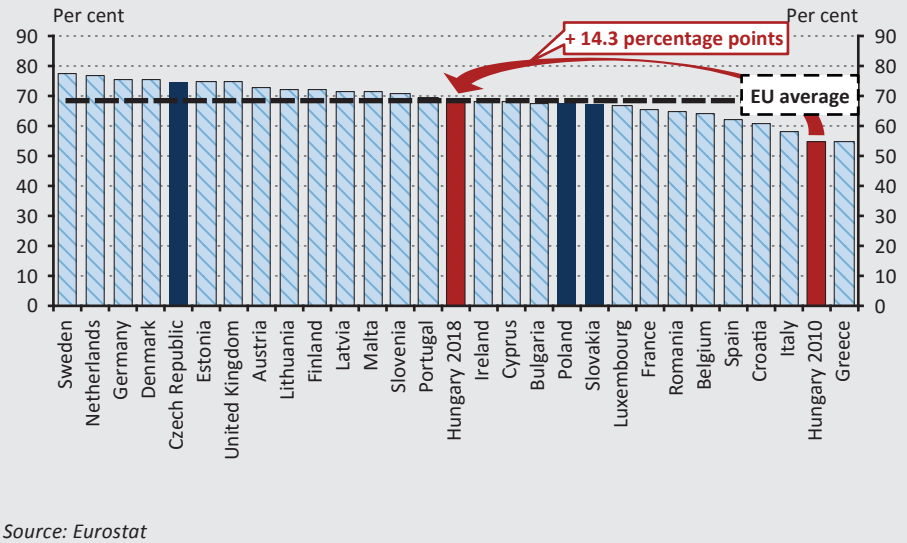
Source: Calculated based on the Maddison Database

In the following, we examine several aspects of the convergence process, reflected both in economic growth and stability, where the causes and consequences are often intertwined. Presumably, none of the factors on its own would have been capable of achieving material and sustainable progress without development in other areas. Hence, it is difficult to determine the sequence of effects, but in our opinion growth in employment is the most important factor, and thus we start the chain of thoughts with that.

In recent years, the most important basis of economic growth was the rise in employment. In 2010, the new government believed that it was simultaneously possible to achieve economic growth and equilibrium by raising employment, and thus reforms were launched both of the tax regime (primarily by introducing the flat rate personal income tax) and the social benefit system in a way to stimulate

employment to the greatest possible degree. The results are clearly visible. Between 2011 and 2018, the number of employees in Hungary rose by 750,000 and reached 4.5 million in 2019. As a result, the Hungarian employment rate – which was the lowest in the EU in 2010 – already reached the average of the EU and exceeds the level recorded in France and Ireland (*Figure 6*).

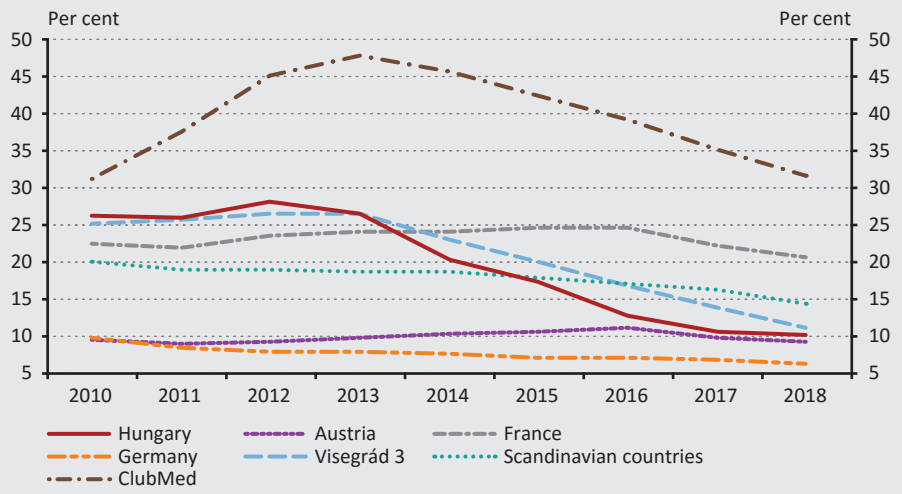
Figure 6
Employment rate in 2018 (15–64 years)



Source: Eurostat

In parallel with the rise in employment, the number of unemployed persons also fell substantially, and thus Hungary made an important step towards achieving full employment. In 2018, the ratio of unemployed persons was 3.7 per cent, which was the third lowest figure in the European Union. The unemployment rate was lower only in Germany and in the Czech Republic, while in all other more advanced EU Member States the unemployment rate exceeds that of Hungary. There was a particularly large decrease in Hungary in the unemployment of young people. Their unemployment ratio fell from the pre-crisis level of 25 per cent to 10 per cent (*Figure 7*), which was strongly attributable to the measures of the Job Protection Action Plan fostering the employment of people below the age of 25.

Figure 7
Changes in the unemployment rate of young people (15–24 years)

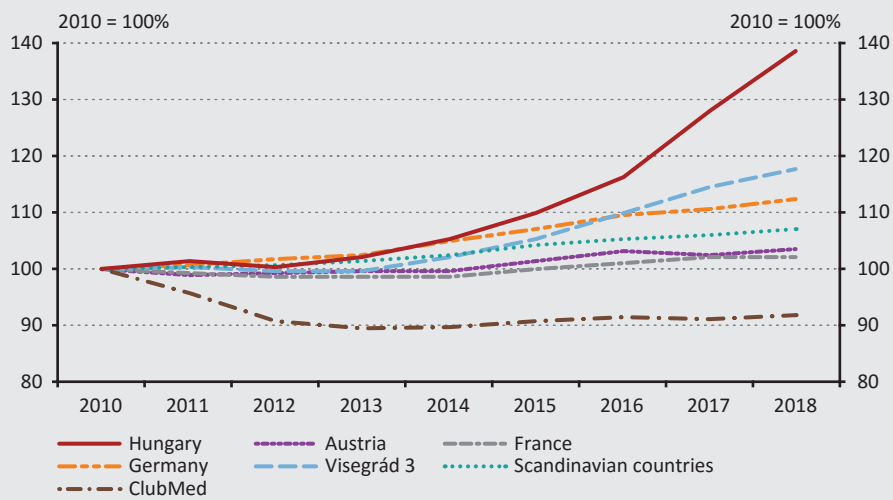


Note: See Figure 3 note.
Source: Eurostat

Rising employment rate is key to successful economic convergence, but it also means that there are constraints of further growth in employment. There are still labour reserves in certain social groups of the Hungarian economy, but they are significant smaller than before. Accordingly, economic growth may still primarily stem from the increase in labour productivity, as well as the flow of labour force to jobs of higher productivity. All of this requires investments, technological development and continuously adjusting the economic structure.

As regards employees, the rise in real wages is also a sign of the convergence process, in addition to the growth in employment. The rise in wages affected a broad range of employees under a tightening labour market. The raising of minimum wages made a substantial contribution to the wage increase of those with low earned income: the amount of the lowest wage payable to full-time employees doubled between 2010 and 2019. The growth in the purchasing power of wages was also supported by inflation anchored for years. The growth rate of real wages was dynamic not only compared to that of the Western European countries, but it also outperformed the average growth rate registered by the other Visegrád countries (*Figure 8*). However, the dynamic rise in wages did not jeopardise the competitiveness of the economy, since the wage share reached its historic average only in recent years (*Balatoni – Erdélyi 2018*).

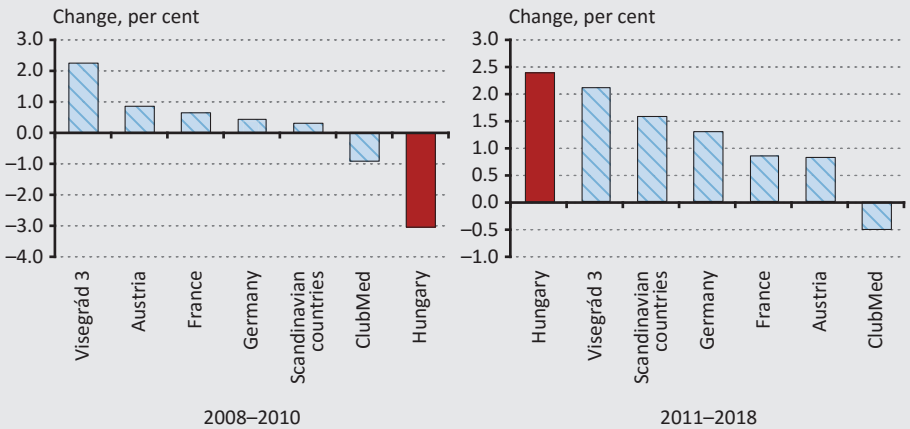
Figure 8
Changes in real gross average wage



Note: See Figure 3 note.
Source: Eurostat, HCSO

The growth in earnings also generated a turnaround in household consumption. During the crisis, the consumption of Hungarian households declined to an extremely large degree (*Figure 9*) even in an international comparison, due to the increased instalments and the fiscal austerity measures: by 2010 consumption had fallen to the level of the early 2000s in real terms. However, starting with the growth turnaround in 2013, owing to the rising employment and real wages, the consumption expenditure of households increased at an accelerating rate, expanding by more than 5 per cent in 2018. Thus, Hungary is in the vanguard of the European Union in this respect as well. The rise in consumption exceeded not only that registered in the most developed Member States, but also rose compared to the average of the Visegrád countries, which exhibit similarly dynamic GDP growth. Thus, the shift in the tax regime's focus to consumption and sales taxes did not curb consumption, but increased budget revenues to an even larger degree.

Figure 9
Changes in consumption in the European Union and in Hungary (annual average changes)



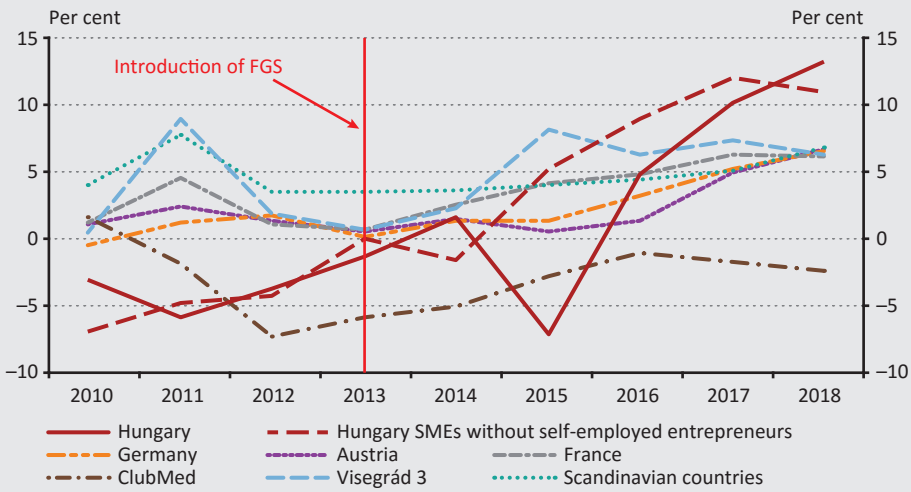
Note: See Figure 3 note.
Source: Eurostat

In addition to the turnaround in employment, another driver of growth was the recovery in lending. During the crisis, a credit crunch developed in Hungary, the protraction of which jeopardised the success of recovery from the crisis. The MNB launched the Funding for Growth Scheme with a view to preventing the credit crunch, which ensured lending to the SME sector that was unfavoured on the lending market, at favourable price. Meanwhile, the cuts to the base rate supported the decrease in loan prices in all sectors. Following the end of FGS, the MNB launched new schemes as well, to support SMEs' access to funding. Within the framework of the Market-based Lending Scheme, launched in autumn 2015, the MNB supports banks' willingness to lend by an instrument facilitating risk management and liquidity management. The schemes launched by the MNB in 2019 – i.e. the FGS Fix and the Bond Funding for Growth Scheme – intend to exert an effect primarily on the corporate funding structure, with the goal of increasing the share of long-term and fixed-rate forms of funding.

The central bank schemes and the improved economic prospects resulted in a successful lending turnaround (*Figure 10*). The growth of over 10 per cent in corporate lending in 2017 and 2018 was extremely dynamic in a European comparison, while some of the Mediterranean countries, where crisis management failed, are still characterised by declining lending. The growth in lending also indicates that corporations have confidence in sustained growth and convergence. Whereas during the crisis the investment ratio fell below 20 per cent of GDP,

owing to the lending turnaround, the financing facilities provided by the European Structural Funds and the growth-supporting government measures, by 2014 this value exceeded 22 per cent of GDP and rose to 25 per cent of GDP by 2018. The MNB's June 2019 Inflation report projects an investment ratio of around 28 per cent by 2019–2020, which ensures the growth and rollover of corporate assets, and thereby rising productivity.

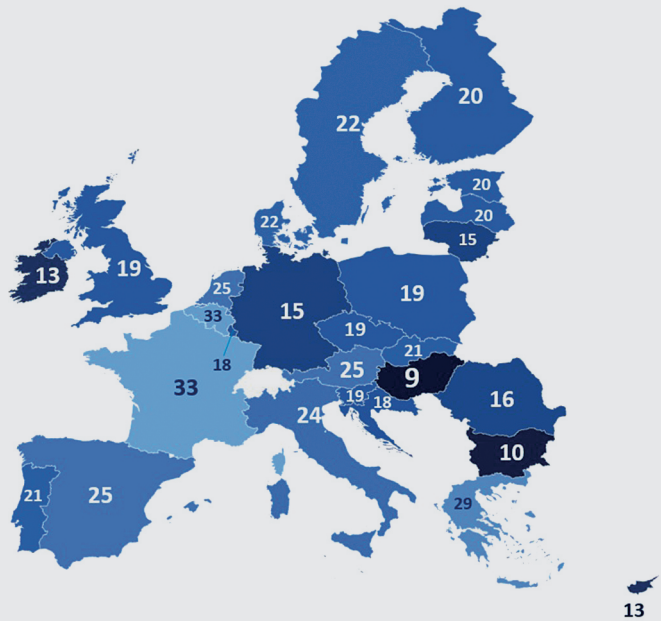
Figure 10
Annual change in the outstanding borrowing of corporations



Note: The annual growth rate is the average of the quarterly growth rates. See Figure 3 note.
Source: ECB

The substantial reduction in the corporate income tax rate also contributed to the rise in investment activity. In addition to the labour tax cuts, the decrease in the income taxes directly burdening corporations also stimulated economic activity. The decrease in the tax burdens imposed on smaller enterprises already commenced in 2010 by extending the range of enterprises eligible for the preferential corporate income tax and later on by creating new forms of taxation targeting small enterprises (small taxpayers' itemised lump sum tax and small business tax). Since the fiscal situation permitted this, from 2017 the corporate income tax rate was uniformly reduced to 9 per cent in Hungary, which is the lowest value in the European Union (*Figure 11*). The reduction of the corporate income tax and labour tax rates together substantially improved Hungary's capital attraction capability, as well as the corporations' willingness to invest, their profitability and capital accumulation capacity. The more investor-friendly environment is also reflected in the employment and investment data. The international companies, including the car industry companies which is of outstanding importance for Hungarian industry, implemented several large investments in Hungary in recent years.

Figure 11
Upper rate of the corporate income tax in 2018 (per cent)

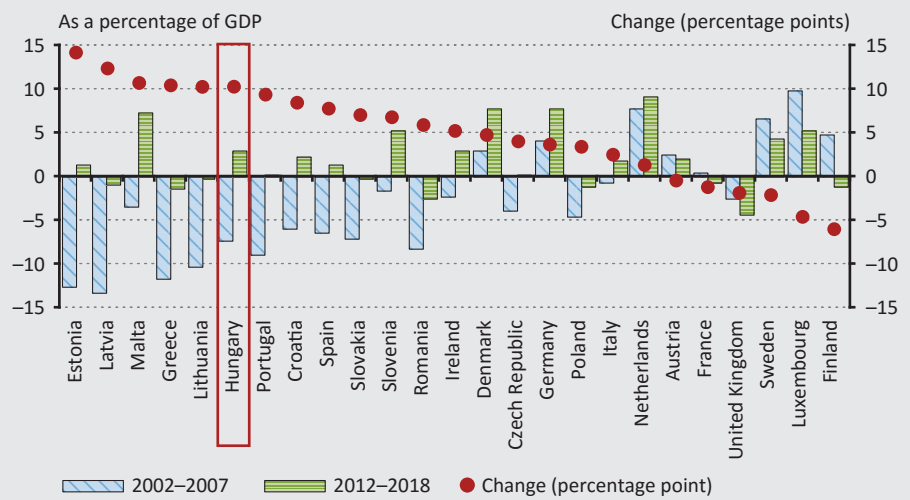


Source: European Commission

In the past years, Hungarian economic growth was also supported by the international financial environment and the expansion of Hungary's key trading partners. However, convergence may only succeed if it lasts for a sufficiently long period, and thus it also spans over periods where the external environment does not support growth. As regards the convergence of economies, recessions in the global economy and the relative performance in periods of crisis are as important as those observed in a favourable environment. International experiences show that countries lagging behind or stuck in the middle income trap are often unable to catch up due to major downturn suffered during the crises (*Cerra – Saxena 2017*). As a result of the underdeveloped institutional system, the absence of crisis management mechanisms, the build-up of financial risks and the weaknesses of the private sector's adaptability, the crisis hits converging countries harder than the advanced economies, and thus convergence may be quickly abolished by a crisis.

Due to the foregoing, maintaining financial equilibrium in all sectors of the economy is an essential condition for economic convergence and long-term growth (Matolcsy 2015). This is why it was also essential for Hungary to reduce the vulnerability of the economy after the post-crisis stabilisation. Since 2010, Hungary's net lending regularly recorded a surplus. While the pre-crisis current account balance showed a substantial deficit, in the period 2012–2018 Hungary already recorded a substantial surplus (*Figure 12*).

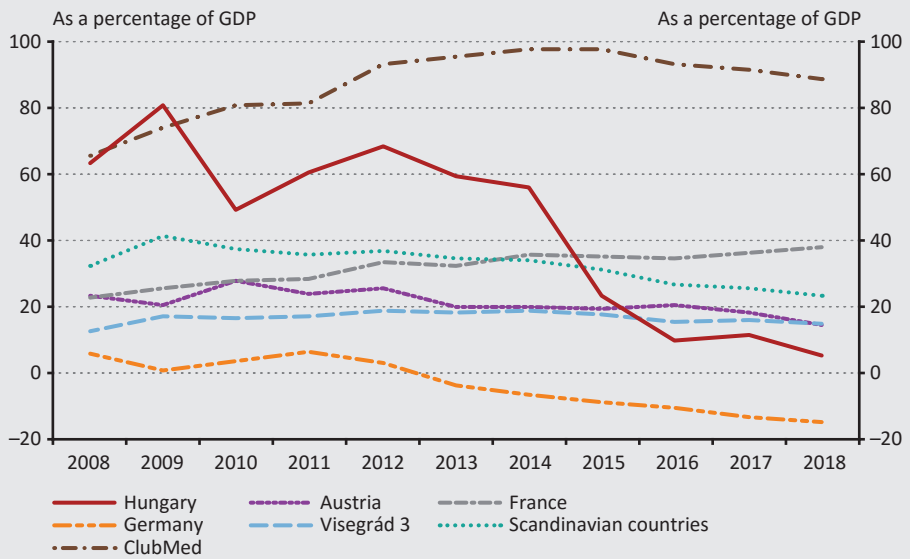
Figure 12
Average current account balance in the periods 2002–2007 and 2012–2018



Source: AMECO

The current account surplus continually lowered Hungary's external debt, thereby reducing the country's vulnerability. Hungary's net external debt fell from 49 per cent of GDP to 5.3 per cent between 2010 and 2018 (*Figure 13*) and thus Hungary was on the verge of becoming a net lender.

Figure 13
Changes in net external debt

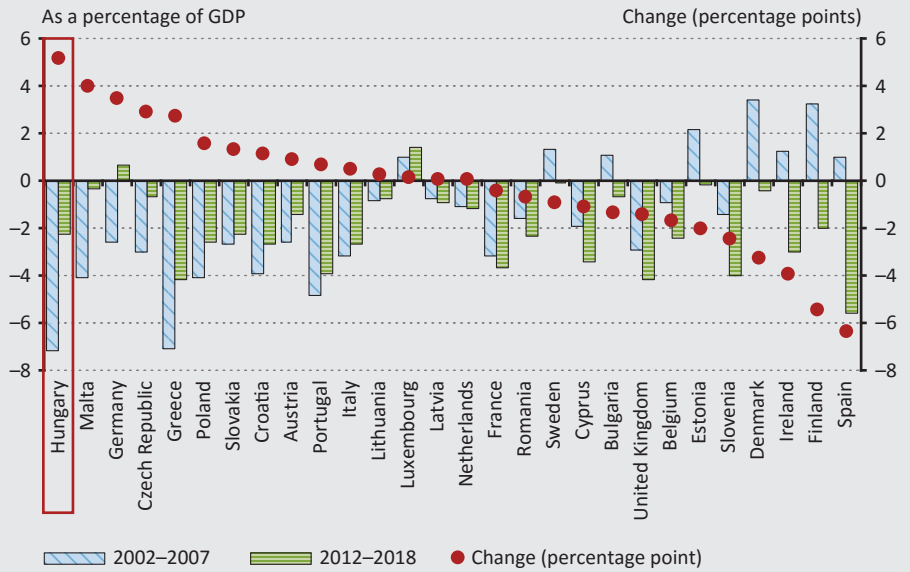


Note: See Figure 3 note.

Source: Eurostat

The post-2010 disciplined fiscal policy was also successful. As a result of the successful fiscal turnaround, since 2012 the budget deficit has steadily remained below the 3 per cent Maastricht threshold, at around 2 per cent. The budget balance improved to a larger degree in Hungary compared to the pre-crisis periods than anywhere else in the European Union (*Figure 14*). The post-2010 tax reform exerted its effect gradually, partly by boosting growth. According to the calculation of *Szoboszlai et al.* (*2018*), the tax reform, together with the transformation of transfers, improved the general government balance by roughly HUF 200 billion in the longer run. The success of the reforms is also evidenced by the fact that between 2014 and 2016 tax revenues as a percentage of GDP rose by 2 percentage points without implementing any tax increase (*Palotai 2017*). In addition to the tax reform, expenditure side reforms were also implemented through the Széll Kálmán Plans. The decrease in the budget deficit was also supported by the MNB's monetary policy, partly through the base rate cut, and partly through other, targeted schemes. It is also due to this that yields on government securities declined substantially, and thus the interest expenses of the budget fell from 4.3 per cent of GDP, recorded in 2012, to 2.3 per cent by 2018, representing a total saving of HUF 2,400 billion for the budget in this period.

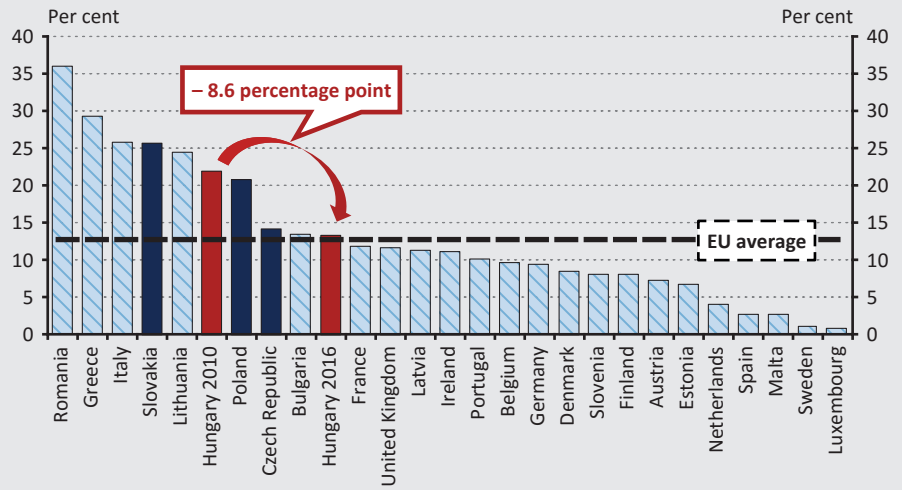
Figure 14
Change in the average general government balance in the periods 2002–2007 and 2012–2018



Source: Eurostat

The reduction of the budget deficit was also assisted by the large-scale suppression of the shadow economy and tax evasion. Previously, tax evasion not only reduced budget revenues, but also hindered fair competition and increased uncertainty for stakeholders (e.g. unregistered employees). With a view to enhancing the efficiency of tax collection, in 2012 the government decided on the introduction of online cash registers, which was completed by 2014. The introduction of the Electronic Trade and Transport Control System (EKÁER) and the reverse VAT rates also supported more efficient tax collection. As a result of the targeted efforts, the VAT gap, i.e. the difference between the expected VAT revenue and the amount actually collected, fell from 22 per cent to 13 per cent between 2012 and 2016. The achieved level is the best among the four Visegrád countries, and Hungary moved substantially closer to the EU average in this respect as well (*Figure 15*). The introduction of real-time invoice reporting obligation, which came into force as of 1 July 2018, could bring another step towards reducing the hidden economy.

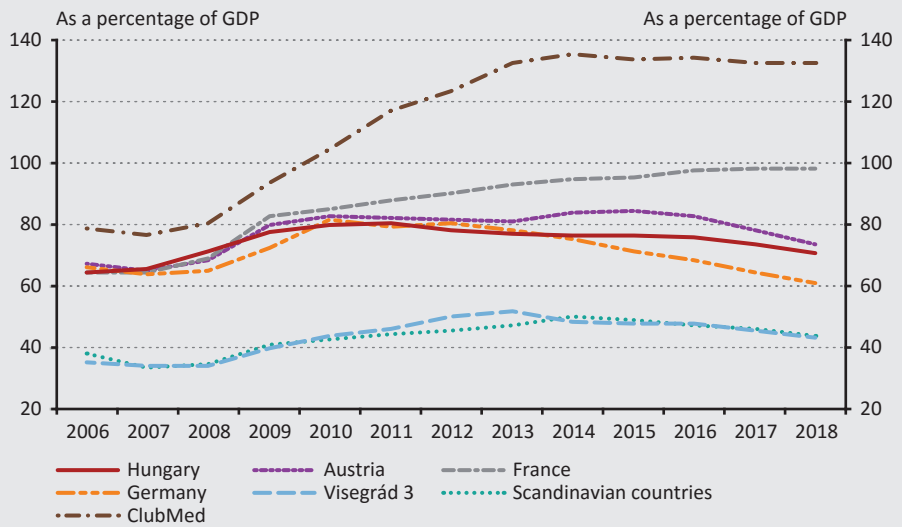
Figure 15
VAT gap in 2016



Source: European Commission

One of the most important signs of the improvement in macro financial stability is the decrease in government debt ratio, which declined substantially below the EU average. The government's commitment to this is evidenced by the fact that it elevated the objective and requirement of reducing the government debt to the constitutional level, by including it the Fundamental Law. As a result of the successful fiscal policy, the debt ratio started to decline from 2011 (*Figure 16*) and Hungary is the only state in the European Union, where the government debt ratio has been decreasing year by year ever since. In 2010, the Hungarian debt ratio of 80 per cent still exceeded the EU average, but by the end of 2018 it had fallen to 71 per cent (the EU average is still around 80 per cent). In parallel with the decline in government debt, the debt structure and the range of investors also changed. The MNB launched the Self-financing Programme in the spring of 2014. The primary goal of this was to increase the ratio of Hungarian funds within the financing of government debt with a view to reducing external vulnerability. Within the framework of the Self-financing Programme, the MNB diverted banks' liquid funds to the securities market, including the government securities market. The central bank's programme was instrumental in reducing the foreign currency ratio within the debt of the central budget from above 50 per cent at the end of 2011, close to 20 per cent by the end of 2018. The larger part of the government debt was also obtained by Hungarian holders: in 2011 only one-third of the debt was held by Hungarian investors, while this ratio increased to two-thirds by the end of 2018. The stable financing structure greatly contributed to the decrease in Hungary's external vulnerability, which is also reflected by the gradually improving rating of the government debt.

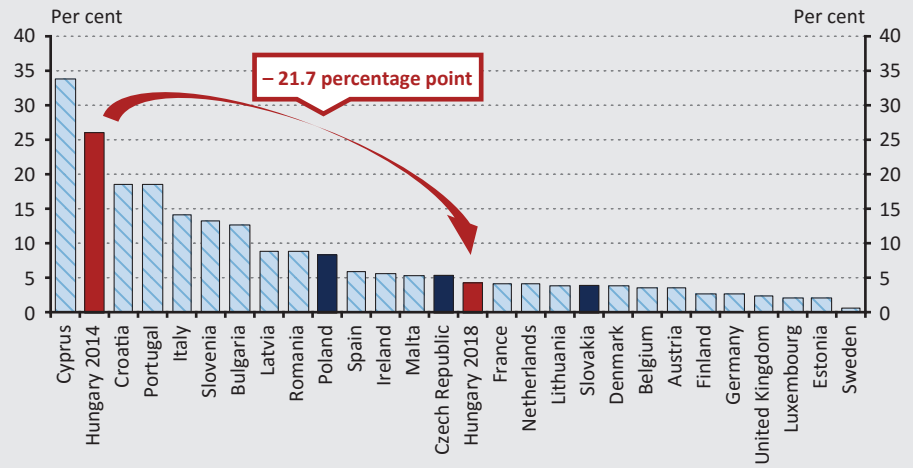
Figure 16
Changes in gross government debt as a percentage of GDP



Note: See Figure 3 note.
Source: MNB

Strengthening the stability of the financial system was essential to reduce economic vulnerability. No sustainable growth exists without financial stability, and economic convergence is also unfeasible. Following the integration of the central bank and the financial supervisory authority, the MNB placed great emphasis on improving the quality of financial institutions' loan portfolios. The conversion of foreign currency loans into forint, portfolio cleaning by the credit institutions and the rise in the share of new loans disbursed under more prudent credit assessment criteria, jointly led to a gradual decrease in the ratio of non-performing loans. While in 2012 the ratio of non-performing loans was almost 20 per cent both in the household and the corporate sectors, by 2018 this ratio had fallen to below 5 per cent. This decline was outstanding in a European comparison. By 2018, of the V4 countries the ratio of the non-performing corporate loans was lower only in Slovakia (*Figure 17*). The strengthened balance sheets of financial institutions enable the financial intermediary system to support economic growth in the long run.

Figure 17
Ratio of non-performing corporate loans (2018)



Source: ECB

The MNB's macroprudential policy improves the stability of the financial intermediary system over the long run as well. Following the integration of financial market supervision in the central bank, the MNB has a wide-ranging set of instruments to prevent the build-up of major systemic risks. The wide set of instruments allows the MNB to respond to risks in a targeted and efficient manner.

5. Summary and outlook

The present period of convergence in Hungary is uniquely favourable in the history of economics. Owing to the successful crisis management implemented after 2010 and the monetary policy turnaround observed from 2013 onward, the Hungarian economy is on a growth path that maintains equilibrium. The economic growth rate exceeds the average of the European Union's advanced economies, as necessary for convergence, by at least 2 per cent (on average since 2013), and thus it is not only growth, but also convergence, which is measurable from a number of aspects. The basis of the simultaneous maintenance of equilibrium and growth is that the employment rate has already reached the EU average. As a result of the high labour demand, in recent years there was also convergence in the level of wages. Higher incomes were able to raise households' consumption and savings simultaneously, while positive economic outlook and the central bank's schemes once again raised lending to a sound level. Growth took place while maintaining, and even improving,

equilibrium. As a result of the low budget deficit and positive current account, the government debt ratio and the external indebtedness have declined, while the structure of outstanding debt has also changed for the better.

However, the persistence and accomplishment of the convergence process is conditional on a competitiveness turnaround. The convergence period since 2013 is a major result in economic history, but continuation of this convergence should not be taken for granted. Quite on the contrary, additional efforts are needed. To date, economic growth has mostly stemmed from the rise in employment, but sustainable convergence is conditional on the activation of new growth reserves (*MNB 2017b*). This necessitates additional structural reforms.

The MNB supports the convergence of the Hungarian economy by analyses and proposals, in addition to other instruments. The Competitiveness Programme, published in February 2019, formulated 330 recommendations in 12 areas to ensure the development of the growth potential of the economy. The objective to see Hungary in the forefront of Europe and the world in as many areas as possible can only be achieved by brave, innovative measures. In parallel with the development of the Competitiveness Programme, the MNB strengthened its competitiveness analysis and measurement system. From autumn 2019, the central bank will examine the changes in the competitiveness of the Hungarian economy from two aspects: through the continuous monitoring of the structural measures affecting competitiveness, and through the objective measurement of the factors determining competitiveness. The MNB will present the result of such analyses in its reports, thereby also supporting the accomplishment of Hungary's competitiveness turnaround.

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Lifting the Veil on Interest*

István Ábel – Máté Lóga – Gyula Nagy – Árpád Vadkerti

The central bank practice which emerged in the period following the financial crisis called into question numerous elements of interest rate considerations. In this paper we present a new theoretical framework that dispenses with the concept of real interest altogether, as a vague and unnecessary category both in policy judgements and business decisions. This approach breaks with the traditional theory of economics. Traditional macroeconomics places its argumentation in the context of real analysis, which hinders the understanding of economic processes. Schumpeter and subsequently, Keynes took a stand against this approach and, rebuffing the real approach, turned to monetary analysis as early as a century ago. In the framework of the classical theory of economics, they describe monetary policy as an adjustment to the natural rate of interest. In this article we propose a different approach. Describing the role of fiat money, the endogenous money theory puts the lending activity of commercial banks into the focus of money creation. This concept also put central bank monetary policy in a new framework. According to this approach, central banks assume an exclusive role in determining the interest rates, but the central significance of the interest rate policy weakens. Once we recognise the crucial role of commercial banks in money creation, the role and function of the central bank changes. The central bank no longer controls money creation solely by shaping the interest rate policy, but also by way of the micro and macroprudential regulation of lending.

Journal of Economic Literature (JEL) codes: E43, E52, E31

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1. Joseph Schumpeter's theory of economic development and monetary analysis

In the debates following the escalation of the 2008 global financial crisis, there was a sharp increase in the criticism of mainstream economics, the dominant school of economic thought rooted in classical and subsequently, neoclassical theories. Nearly all stakeholders – including policymakers, users and subjects of economic policy – as well as the general public, voiced their dissatisfaction with the approach of mainstream economics and the paradigm it designates. The fundamental problem that crystallised during these debates had already been recognised, but this had not led to any changes in economics textbooks. As early as 1911, Joseph Schumpeter's theory of economic development and innovation had already objected to the principal shortcoming of the traditional (classical) approach which has dominated economic thinking to date, namely, the fact that the theory was built on the principles of *real analysis*, whereas economic agents make their decisions by weighing the performance reflected in the nominal processes measured by money (*Schumpeter 1980*). Schumpeter sharply criticised and broke with what we now call the mainstream – the dominant classical theory of economics at the time. In a later work, Schumpeter summed up the essence of real analysis as follows:

"Real Analysis proceeds from the principle that all the essential phenomena of economic life are capable of being described in terms of goods and services, of decisions about them, and of relations between them. Money enters the picture only in the modest role of a technical device. (...) But so long as it functions normally, it does not affect the economic process, which behaves in the same way as it would in a barter economy: this is essentially what the concept of Neutral Money implies. Thus, money has been called a 'garb' or 'veil' of the things that really matter, both to households or firms in their everyday practice and to the analyst who observes them. Not only can it be discarded whenever we are analysing the fundamental features of the economic process, but it must be discarded just as a veil must be drawn aside if we are to see the face behind it" (*Schumpeter 1954:264*).

Schumpeter was not an advocate of this "classical" theory and took a stand for monetary analysis in the arguments presented later in the same work.

"Monetary Analysis introduces the element of money on the very ground floor of our analytic structure and abandons the idea that all essential features of economic life can be represented by a barter-economy model. Money prices, money incomes, and saving and investment decisions bearing upon these money incomes, no longer appear as [nonessential] expressions (…) of quantities of commodities and services and of exchange ratios between them: they acquire a life and an importance of their own, and it has to be recognized that essential features of the capitalist process may depend upon the 'veil' and that the 'face behind it' is incomplete without it" (*Schumpeter 1954:265*).

The theories falling in the scope of real analysis are all based on the acceptance of the hypothesis – as a "critical assumption", to use the term applied by *Rodrik* (*2015*) – that the operation of the economy can be adequately captured by the relationship between real variables. In this view, money only "intermediates" – or shrouds as a veil – these real relationships. Since the only role of money is to facilitate smooth exchange, this also means that such a description captures the economy practically as one that is based on a direct exchange of commodities (barter). Thanks to the intermediary role of money, in this system the barter is smooth, cost-free and coordinated. This implies the assumption of a *perfectly competitive market.* By contrast, monetary analysis focuses on financial flows that materialise as the *actual* financial reflection of the exchange processes. It addresses the effects of money incomes, nominal prices and investment decisions where monetary flows acquire an independent and peculiar significance and determine the circular flow of economic life. The term *"actual"* emphasises that the effects also include the consequences arising from the power structure between the players, i.e. power itself, as opposed to the idea of perfect competition where the infiltration of power would rip a gash in the belief of absolute perfection. The concept that economic development cannot be captured by mainstream real analysis is a key element in Schumpeter's theory of economic development. The author's rejection of the philosophy and thinking of mainstream economics is demonstrated particularly clearly by his explanation of the key role of credit in economic changes. It is credit that provides the means for the reallocation of resources necessary for innovation and for the appearance of new combinations (*Schumpeter 1980:116–117*).

In this paper, we wish to shed light on the drawbacks of mainstream interest rate theories. This is related to the fact that classical economics, and in several regards the contemporary mainstream neoclassical theory, depends on the real approach even in relation to interest rates.

One of the difficulties in discussing the shortcomings of mainstream economics is the fact that the mainstream, as such, is non-existent. There are various trends and lumping them together is only possible on an overly generalised level. For the purposes of this paper, besides classical macroeconomics, we also consider later versions of the mainstream. We often refer to the objections voiced by Schumpeter and Keynes. Obviously, their critical remarks mainly targeted the classical version. Consequently, they may have had a different choice of words with respect to the neo-Keynesian version. The statements quoted in this paper are applied with the accents and connotations implied by the post-Keynesian approach.

In the next section, we make a brief diversion to mark the place of our article on the map of these trends. For this purpose, we highlight the main assertions of various theoretical concepts on monetary policy. The mainstream is represented by the neo-Keynesian synthesis of the neoclassical school. Since currently this trend can

be regarded as the macroeconomic framework of monetary policy, in this section we refer to it as the "new consensus".

2. Main differences between the mainstream and the post-Keynesian approach

After the global economic crisis of 1929–1933 and even more so after World War II, Keynesian ideas played a dominant role in shaping economic policy. Keynes radically broke with the classical approach. An important element of this departure was the fact that in the face of the supremacy of free competition and the market, the state increasingly intervened in economic processes in order to maintain efficient demand. By the 1970s, this economic policy reached an impasse. Despite high level of public spending, growth decelerated while inflation increased (stagflation). The neoclassical synthesis and the monetarist approach tackled this challenge with tight budgetary control. Emphasising the primacy of monetary policy, the government introduced strict restrictions and successfully restrained inflation. During this period, Milton Friedman's principles served as the theoretical framework of monetary policy. Based on this theory, the central bank could control the quantity of money fairly well by the allocation of central bank liquidity (central bank reserves) via money multipliers that were assumed to be stable.

However, the applicability of the theory suffered a severe blow when it became clear that the value of money multipliers is not constant, but rather variable. Due to new products and payment options emerging with the development of money markets and bank services, the definition of the quantity of money also became problematic. Previous concepts about the categories of broad money were no longer capable of describing the true role of money in the economy. With a view to addressing the practical problems of monetary policy, a new neoclassical consensus emerged, inspired primarily by the studies of neo-Keynesian economists (*Lavoie 2004:15–16*). The new consensus integrated the practical changes: thus, it accepted that central banks dispensed with the regulation of the quantity of money and turned their attention to setting interest rates. In the context of the neoclassical theory this meant that they abandoned the IS–LM framework (*Blinder 1997, McCallum 2001, Romer 2000*). Another consequence of the neo-Keynesian modifications was that the mainstream integrated two key elements from the post-Keynesian (Modern Monetary Theory) principles: the principles of the endogenous money supply and the exogenous rate of interest. This means that the assumption of the central bank's (exogenous) control over the quantity of money was abandoned, and instead, the focus of monetary policy shifted to the central bank's (exogenous) interest rate setting. By contrast, the IS–LM theory had assumed that the quantity of money is determined exogenously by the central bank, whereas the interest rate evolves endogenously in the market as the supply of saving and the demand of investment reach an equilibrium in the market.

As regards the mainstream, i.e. monetary policy, the neo-Keynesian correction of the neoclassical synthesis – which is referred to in *Table 1* as the new consensus – is extremely close to what is proposed by the post-Keynesian renewal in respect of the contemporary policy framework.

Table 1
Post-Keynesian principles versus mainstream theory (new consensus) on monetary policy

	Mainstream (new consensus)	Post-Keynesian
Schumpeter principle	Real analysis	Monetary analysis
Equilibrium interest rate, natural interest rate	At equilibrium, it is defined by productivity and saving (Wicksell).	It has no economic policy significance. Equilibrium may emerge under any interest rate and it does not necessarily mean full employment.
Key policy rate	Classical mainstream: it is determined by the market (endogenous). New consensus: it is determined by the central bank (exogenous).	It is determined by the central bank (exogenous).
Money supply	Classical mainstream: it is determined by the central bank (exogenous). New consensus: it is not a central bank target variable (from a central bank perspective, it is endogenous, money multiplication through changes in the central bank reserves).	It is determined by the credit demand of the economy (shaped endogenously by the banking sector; money multiplication is irrelevant).
Inflation	Inflation is caused by excessive money supply.	By changes in the credit supply, money supply adjusts to rising prices and economic growth. The increase in the liquidity need of trade and the expansion in loans outstanding are interrelated.
Financial stability	Price stability maintains financial stability (one objective – one instrument).	In addition to price stability, the central bank facilitates the maintenance of price stability by regulating the balance sheet structure of banks (more than one objective – more than one instrument).

In this paper, we take account of the traditional theories on interest rates (as proposed by the mainstream) and set them against the post-Keynesian, modern interpretation. The main focus of the new consensus is Wicksell's assertion that central banks align their interest rate decisions with the natural equilibrium rate of interest. The post-Keynesian approach disputes this. *Lavoie* points out that the biggest difference between the post-Keynesian approach and the new consensus – which also accepts the endogeneity of money supply – is the post-Keynesian rejection of the natural rate of interest (*Lavoie 2014:190*).

3. On Irving Fisher's interest rate theory

Views on the determination of the interest rate are extremely diverse among the dominant trends of economics, but they have a common feature. Most approaches fall in the scope of real analysis. The theory focuses on the *equilibrium* interest rate, which is essentially determined by real factors in a state of equilibrium; monetary components can only influence the exceptions, i.e. the market rates. Monetary policy refers to the equilibrium interest rate as the *neutral* interest rate, because it corresponds to an interest level where output resides precisely at its potential level, and the interest level does not give rise to either inflationary or deflationary pressures.

In simplified terms, the school of economics built on the exclusivity of real analysis assumes an economy where financial flows merely facilitate a simpler and more flexible exchange, but money has no effect on the emergence of equilibrium proportions. Financial instruments only play a role in executing, intermediating or facilitating the exchange. It was in this conceptual framework that American economist Irving Fisher formulated one of the most thoroughly developed forms of classical interest rate theory, which has continued to be influential up to today.

Fisher's interest rate theory proceeds from the notion that each economic unit can maximise its welfare intertemporally (across different periods) by adjusting its preferred consumption to its intertemporal real income (*Fisher 1907, 1930*). If it consumes less in one period than what could have been permitted by its income, it will purchase financial instruments (or grant credit) from its saving. In the reverse case, if it is to consume more than its present income, it needs to sell assets from its portfolio (or borrow). The purchase and sale of portfolio elements are aimed at return maximisation. The institutional unit can achieve this by managing its yield-producing financial portfolio, for instance, by holding cash or bonds. It purchases high-return elements and sells low-return items. As a result of this process, the yields ultimately equalise in the market as demand for high-return instruments increases their price, which in turn lowers the return on investments in the given instruments.[1]

[1] Consider an instrument purchased at the cost of 100 unit yields 10 units each year (10 per cent). An increase in the price of this instrument (say, now it cost 200) secures a significant return for the seller, but the investor's (new owner's) return still remains 10, which translates to a mere 5 per cent for his 200 units of investment.

The equilibrium real return emerging in the market is called the *natural rate of interest*[2] in the theory. This is commonly denoted by *r**. The market interest rate of the financial instruments is denoted by *i*. In Fisher's interpretation, *i* represents the impatience of individuals, i.e. the time preference, while *r* denotes the investment's rate of return over the costs of the investment (*Fisher 1930:280*). In the case of intertemporal welfare maximisation, in a state of equilibrium the correlation between the nominal yield of the financial instrument (the interest on the loan) *i* and the natural (real) rate of interest *r** will be:

$$i_t = r_t^* + E_t(\pi) \tag{1}$$

where $E_t(\pi)$ denotes future inflation expectation at time *t*.

According to Fisher's theory, if – out of the variables in equation (1) – *i* was smaller than $r_t^* + E_t(\pi)$, this would signal that the cost of borrowing is lower than the nominal return on the investment in the real asset. In that case the investment should be financed from borrowing. In parallel with the growth in investment, however, inflation accelerates as rising demand raises the price of capital goods. Based on equation (1), at this point the rise in inflation will continue to push up the nominal interest rates until the equilibrium is restored. In the reverse case, however, when the nominal interest rate (*i*) is higher than the return on investment, credit demand drops and with the downturn in purchases from credit, inflation keeps decelerating until the equilibrium is attained. In Fisher's above-mentioned interest theory, the *nominal interest rate (i) adjusts to term* $r_t^* + E_t(\pi)$ *on the right-hand side of equation (1).* Nominal interest, therefore, depends on factors appearing on the right-hand side of the equation, which essentially depend on real variables; this is why this theory is referred to as the *real theory of interest*.

In Fisher's work, a prominent role is assigned to real categories related to such human behaviour as impatience, self-control, responsibility for future generations or fashion, all of which are factors with a bearing on consumption behaviour (*Fisher 1930:284*). Foresight is yet another such trait, which helps to rein in expected inflation, whereby the monetary category of inflation can be incorporated into the real analysis of the economy.

[2] Over the past 100 years, the concept of the natural rate of interest evolved in line with the changes in capital, money, credit and value theories. The interest rate theory based on the intertemporal maximisation of consumption is traced back to *Fisher* (*1930*). This has remained the mainstream to date. The first order maximum condition of intertemporal consumption maximisation is defined by the Euler equation: , where present consumption (*c*) is the decreasing function of the real rate of interest (*r*), and the rate of the decrease depends on the elasticity of the intertemporal substitution (σ) and the discount rate of the population (ρ). Numerous aspects of consumer decision are still subject to intensive research. *Cohen et al.* (*2016*) provide a broad overview on the topic in the context of the interest rate, focusing on the issues of discounting and time preference.

4. A critique on Irving Fisher's interest rate theory

It is a long-standing view in economics that Fisher's real interest rate category, which leads to the equilibrium or neutral interest rate, is the basis of central bank operation and captures the very essence of inflation targeting. It suggests that central banks should solely and exclusively focus on inflation, which can be best achieved if the central bank adjusts the key policy rates to the equilibrium interest rate, which in turn is determined by the equilibrium of saving and investment. Milton Friedman exacerbated this misconception by proposing a rule on money growth with a view to achieving this goal, one that may further it even without any interference from central banks. We will return to the central bank's role and key responsibility in shaping the interest rate later. We now intend to analyse Fisher's theoretical ideas in the context of their own internal logic rather than from the conclusions that can be drawn from them in relation to monetary policy.

Tymoigne (*2006*) analyses in detail the criticism and arguments against Fisher's interest rate theory, among them those voiced by *Keynes* (*1965*)*, Harrod* (*1971*) and *Davidson* (*1986*). It proceeds from the Fisher equation in equation (1) that, since the size of the equilibrium real interest rate (*r**) is assumed given – and determined by the structure of the economy) – the evolution of the nominal interest rate (*i*) is determined by the developments in inflation. Based on Fisher, the dynamics of the process are guided by the following arbitrage mechanism: suppose we are in a state of equilibrium where the nominal interest rate coincides with the equilibrium rate, but the central bank is expected to generate inflation by expanding the money supply. In such a scenario, equation (1) dictates an immediate rise in the nominal interest rate in the market in response to the increase in inflation expectations. Keynes rejected this mechanism for three reasons (*Tymoigne 2006:3*). The first criticism pointed out that it is only the nominal interest rate that is known to decision-makers as this is the only observable variable in equation (1). A rise in this rate results in a capital loss on bond investments, which was not taken into account in equation (1) whatsoever. Keynes's second objection was related to the fact that changes in capital assets (investment) and consumption (savings) were inversely related to what had been assumed by Fisher. Keynes stressed that resigning from consumption due to the high level of interest rates (higher saving) *does not translate into* investment growth. If anything, it gives rise to the exact opposite as a decline in demand has a negative impact on investment. Keynes's third criticism of Fisher's explanation was that the present/future consumption arbitrage studied by Fisher does not support a direct relationship between changes in inflation and the interest rate. A hike in the interest rate reflects the increase in *uncertainty* in response to rising inflation, and not the yield sacrifice. Increased

uncertainty prompts individuals to adjust the proportion of liquid and illiquid instruments in their portfolio. Uncertainty raises the importance of liquid assets in itself, and balance between the two asset groups can only be restored in a higher interest rate environment.

The global economic crisis of 1929–1933 and the phenomenon of over-indebtedness were assigned great significance in Fisher's work, and the author's clear understanding of the issue is evident even by contemporary standards (*Fisher 1933, Shiller 2011*). It is all the more ironic that what made Fisher infamous was an ill-conceived statement published in the 22 October 1929 edition of the New York Times, in which he encouraged investors to buy stocks as the prices were extremely low. Two days later the stock market crashed. Analysing the fundamental value of corporate equity, *McGrattan – Prescott* (*2001*) found that Fisher had been right after all, in that stocks were undervalued at the time, as even at the peak equity prices were low relative to their fundamental (real) value. This, however, also means the failure of the theory based on real analysis, pointing out the inadequacy of real analysis in relation to such money market phenomena as a financial crisis.

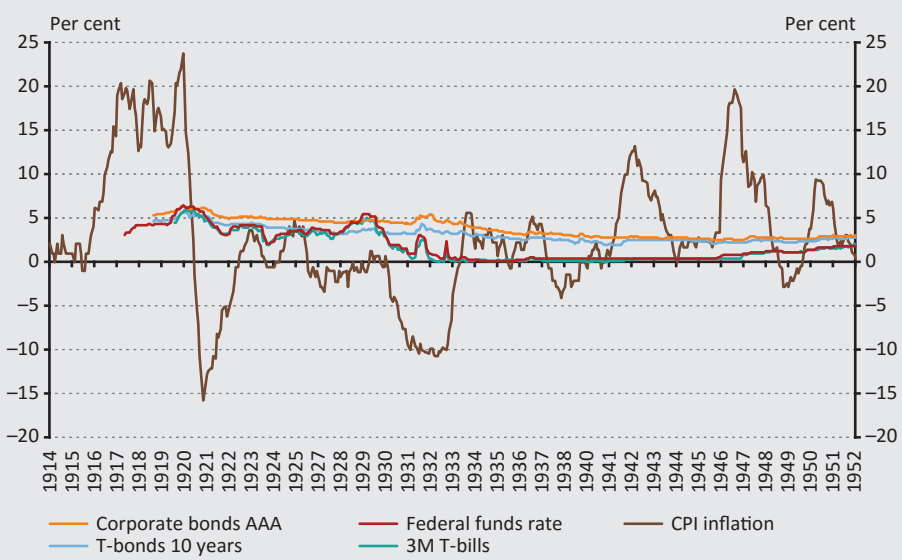
Real analysis promotes the equilibrium attained by way of outputs derived from a perfectly competitive market and the rational calculation of policymakers. It proposes that government interventions or regulatory constraints only hamper the emergence of the equilibrium, generating instability. As is the case with market price signals, the central bank should not interfere with the evolution of the interest rate either. It is a widely held idea that one of the causes of the global crisis was the fact that the US Federal Reserve kept the interest rates unnecessarily low for too long, giving rise to rampant speculative investments. This notion was ridiculed by *Tymoigne* (*2017*) when, following the steps of real analysis he argued that interest rates should be left to be determined by market forces. However, economic participants should be left alone to make a rational calculation to decide whether it is worth investing in a business, education or healthcare; in any area where the marginal benefit outweighs the marginal cost. If the high interest level signals that the return on the investment underlying the individual's financial welfare is insufficient, a rational individual would be content not to own a house or not to go to university because it is not beneficial in the current interest rate environment.

5. The empirical explanatory power of Fisher's interest rate theory is dubious

Based on equation (1), which describes the correlation between the market rate, the equilibrium interest rate and inflation expectations, one would think that a close correlation can be observed between inflation and the interest rate. We do not assume that the equilibrium interest rate fluctuates much, while the observable interest rate and observable inflation are less stable. *As Figure 1* demonstrates, there is no evidence of this correlation in the data of the US economy pertaining to Fisher's era, i.e. the years preceding World War II.

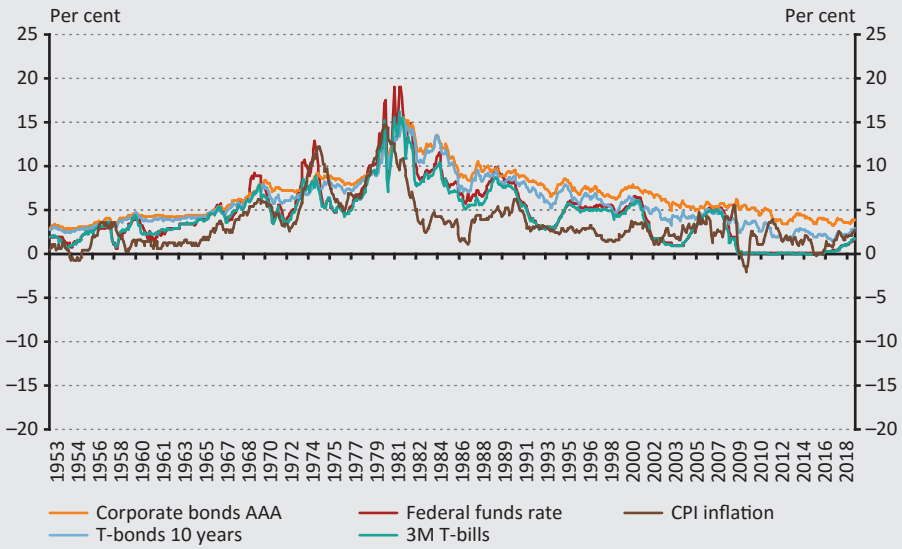
Tymoigne (*2006*) analysed the correlation between the interest rates and inflation using several methods and found evidence of an extremely weak relationship between these variables in the US economy in the period preceding 1953. After 1953 the Fed's monetary policy changed noticeably, and it often used the federal funds rate to influence inflation and employment. As a result, a close correlation started to develop between interest rates and inflation (*Figure 2*). This correlation, however, cannot be viewed as evidence in support of Fisher's theory. Driven by market mechanisms, interest rates do not tend to be affected by inflation unless the central bank moves its interest rates as a function of inflation (*Tymoigne 2006:31*).

Figure 1
Yields on corporate bonds and government securities of various maturities vs. federal funds rates and inflation in the USA (1914–1952)



Source: Federal Reserve of St. Louis, National Bureau of Economic Research, Bureau of Labor Statistics

Figure 2
Yields on corporate bonds and government securities of various maturities vs. federal funds rates and inflation in the USA (1953–2018)



Source: Federal Reserve of St. Louis, National Bureau of Economic Research, Bureau of Labor Statistics

6. Keynes's theory of interest and money: liquidity preference and financial conditions

Maintaining liquidity and solvency is crucial for the finances of businesses. Businesses interpret economic effectiveness in nominal, rather than real terms. This affects a number of variables, such as the interest rate. In this approach, the rate of interest is a reward for realigning the portfolio towards illiquid assets rather than for saving. Businesses base their investment decisions on their expected future cash flows, in which the interest rate is not the only – and not even the most important – factor. The classical theory of interest – as represented by Fisher's previously discussed real-theory – is not applied by practitioners as it does not reflect the financial interrelationships that have key importance in their everyday decisions.[3]

Keynes's liquidity-preference theory of interest shows a great deal of similarity to Fisher's interest rate theory. Both Keynes and Fisher argue that economic units rearrange their portfolios in such a way that they strive to hoard high-return assets and try to shed low-return ones. This realignment (arbitrage) will continue until the returns equalise in the market. However, there is a significant difference of

[3] *Szalai* (*2015*) provided a valuable assistance in the assessment of Keynes's theory of interest.

opinion between them. Keynes, as opposed to Fisher, based his arguments on the nominal return on financial instruments instead of the real return on real assets (*Kollarik – Szalai 2017*). In Keynes's theory the nominal interest rate "anchors" the system. This is a very important difference from the approach of the mainstream.

Another important difference is that, while there is no need for a money theory for the determination of the interest rate in a theory placed in a real analysis framework, Keynes's arguments presuppose the theory of money. In his works, Keynes's views on money changed over time, and his theory of money took several approaches. For the purposes of this paper, we rely on the *General Theory* and on the interpretation presented in *Hicks* (*1937*) to demonstrate that interpreting Keynes' thoughts in the IS–LM framework leads to a misleading view.

According to the IS–LM approach, the IS curve represents the equilibrium between saving and investment. In the understanding of classical economics (and also of the contemporary mainstream), this means that the equilibrium interest rate is determined by the attainment of an equilibrium between saving and investment. An increase in the inducement to invest relative to saving will tend to raise the rate of interest, which in turn will reduce the inducement to invest and increase savings. It is important to see that in this approach, both saving, and investment are *flow* variables. This interpretation is entirely alien to Keynes. Reinterpreting Keynes's key concepts, the mainstream inserted them into real analysis, with utter disregard for the fact that Keynes had been engaged in monetary analysis and, like Schumpeter, rejected the procedure of the mainstream. In order to illustrate how incongruous this textbook interpretation is with the Keynesian interest rate theory, we need only to point out that it refers to *flow* linkages, whereas Keynes's theory of interest is built on *stock* categories. One of his key categories, liquidity – as monetary stock – is a stock *variable.* The discrepancy arising from the use of *stock* and *flow* variables is only one of many significant differences between the two theories. In the following, we address the interpretation differences between saving and investment in more detail.

Another important deviation from mainstream ideas is the fact that Keynes's model rests on the idea of effective *demand* (*Taylor 2010*). By contrast, the currently dominating neoclassical, traditional interpretation of economics postulated that domestic income is determined by the *supply* side, by full employment of all inputs into production. Households freely decide how much of their incomes to save or consume and according to mainstream economics, investment must adjust to meet this available saving. In other words, investment fills the gap created in demand by saving. The theory resting on this assumption cannot tackle situations where the banking sector is unable to extend loans and households are forced to hoard their savings, causing a sharp jump in their propensity to save, while businesses see no investment opportunities amid collapsing demand and seek to reduce their debts instead. In other words, investment is unable to fill the gap created by increased

saving between supply and demand (*Taylor 2010*:*5*). Nonetheless, such situations may occur from time to time, as is the case in times of most financial crises.

Keynes's ideas crystallised while he was seeking to solve practical problems, and the change can be traced across the publications of his findings. Undoubtedly, the way he formulated his ideas was misleading at times, which led to numerous misinterpretations of his theory of interest down the road. He nevertheless clarified his thoughts in debates, and his theory of interest can be grasped more clearly in the series of debates published in several 1937 issues of *The Economic Journal* under the title "*Alternative Theories of the Rate of Interest"* (*Keynes 1937a, 1937b; Ohlin et al. 1937*). The theory is also discussed in detail in Chapter 17, "The essential properties of interest and money" of the *General Theory* (*Keynes 1965*).

Keynes's theory of interest rests on the concept of liquidity preference, and he deduces the interest rate from the evolution of asset prices. In the case of all assets, the expected return depends on several factors. These factors are captured by the formula presented in Chapter 17 of the *General Theory*, according to which the total return expected from the ownership of an asset consists of four main components: $q - c + l + a$, where q is the asset's expected yield, c is its carrying cost, l is its liquidity premium and a stands for its expected appreciation/depreciation. Keynes maintains that in the case of the most liquid assets (money) the yield derives from l while all other components are negligible by comparison (*Keynes 1965:251*).

Asset prices may change in line with changes in the liquidity preference. A fall in liquidity preference affects the demand for liquid assets (cash) the most, as their valuation suffers the sharpest decline. After providing an overview of this theory, *Wray* (*2004*) emphasises that Keynes did not mean to imply that liquidity preference is the only factor determining asset prices or that the above formula covers all factors. It is still clear, however, that he presented assets as *stock*, rather than flow, *variables*.[4]

Liquidity preference may change for various reasons, and this also affects the market interest rate. However, we have no reason to assume that an interest rate which reflects liquidity preference coincides with the equilibrium interest rate between the demand for investment and the supply of savings, as claimed by real analysis.

[4] *Foley* (*1975*) analysed the two specifications proposed by macroeconomic models: the stock and flow specifications, where stock formulations mean "beginning-of-period", while flow formulations mean "end-of-period". Under certain conditions, the two approaches are equivalent. This is the case when perfect foresight is assumed in the flow specification. According to the intuitive approach, we reach the end of the period from the stock specification describing the beginning of the period by adding flow values to the latter. Here, however changes in stock values are also a part of the flow. Accordingly, assuming perfect foresight of the prices/rates, the stock and flow specifications become equivalent. Notwithstanding this equivalence, *Foley* (*1975*) also calls attention to the significant differences in interpretation. *Foley* (*1975:320–321*) demonstrates that in the debate between *Keynes* (*1937a*) and Ohlin (*Ohlin et al. 1937*) with respect to the interest rate, Ohlin argues in accordance with the flow approach, whereas Keynes presents his thoughts in the context of the stock specification. This is the reason behind the clash in their views, even though in reality they propose equivalent assertions.

7. On Keynes's views on real variables

Presenting Keynes's views on real variables, *John Weeks* emphasised that, owing to the dichotomy between real and monetary variables, classical economics failed to integrate relative prices – thus the interest rate – with the theory of money (*Weeks 1998*:*270*). Keynes's own words help shed light on this statement: "So long as economists are concerned with what is called the theory of value, they have been accustomed to teach that prices are governed by the conditions of supply and demand; and, in particular, changes in marginal cost and the elasticity of short-period supply have played a prominent part. But when they pass in volume II, or more often in a separate treatise, to the theory of money and prices, we hear no more of these homely but intelligible concepts and move into a world where prices are governed by the quantity of money, by its income-velocity, by the velocity of circulation relatively to the volume of transactions, by hoarding, by forced saving, by inflation and deflation *et hoc genus omne*; and little or no attempt is made to relate these vaguer phrases to our former notions of the elasticities of supply and demand. If we reflect on what we are being taught and try to rationalise it, in the simpler discussions it seems that the elasticity of supply must have become zero and demand proportional to the quantity of money; whilst in the more sophisticated we are lost in a haze where nothing is clear and everything is possible." (*Keynes 1965*:*317*)[5]

8. Different interpretations of saving and investment in real analysis and monetary analysis

The neoclassical mainstream applies the interest rate to bring saving in line with investment; in other words, if saving is low compared to investment preference, credit demand will raise the interest rates. The interest hikes, in turn, will increase saving and reduce investment preference and hence, credit demand. As a result, an interest rate will emerge in the market that results in a level of saving that coincides with the investment preference of the economy. This argument does not seem flawed; indeed, both investment and saving are flow type variables. In this interpretation, the theory addresses real variables rather than financial variables, given that both the total output invested and savings as non-consumption are real variables. *In the real theory, the amount of saving determines the amount of investment.*

Keynes, however, does not determine the interest rate on this basis; he uses the *liquidity preference* between money and bonds for this purpose. While cash bears no interest, when invested in bonds, it will yield a higher return. It depends on the level of the interest rate what part of its liquidity the private sector is willing to part with for the sake of interest income. Notably, Keynes makes no mention

[5] Keynes's text is available on page 185 at https://cas2.umkc.edu/economics/people/facultypages/kregel/courses/econ645/winter2011/generaltheory.pdf

of investment in his theory of interest. In this argument we work with financial variables. Liquidity and money are active participants. The interest rate is influenced by the demand for liquidity as a *stock* variable. The *stock-flow* distinction acts as a watershed here: as a flow variable, investment cannot mix with this interest rate definition. The same applies to saving, which is also understood as a flow variable.[6]

The interest rate evolves irrespective of investment; investment preferences adjust to the interest rate emerging in the market. However, once investment is determined through the interest rate, it also means that saving has also been determined. Investment is the excess saving from the total output (income) over consumption. *In monetary analysis, the investment determines the ultimate size of the saving.*

It should be stressed that the difference between real and monetary analysis does not stem from different interpretations of the concepts. Under the monetary approach, the concept of saving – as a flow variable – indicates total output, just as in real analysis: the total output over consumption. Measuring and aggregating total output is equivalent to the determination of aggregate income under both approaches. Both real analysis and monetary analysis use income categories with the same content and definition, but the correlations between them can differ significantly. In real analysis an increase in saving reduces the interest rate and leads to an increase in investment. Under the monetary approach, an increase in saving reduces demand, but it has no effect on investment finance or the interest rate, as investment is not financed from current year savings, while the interest rate is determined by liquidity preference, a stock rather than a flow variable of the annual saving.

9. On the problems of the IS–LM illustration

The theory assumes the saving (S) and investment (I) curves – which play a key role in the real approach of mainstream economics – are independent, and that the equilibrium materialises at their point of intersection. In reality, saving and investment are not independent. More investment also contributes to GDP growth through the increase in investment demand. Increased income, in turn, raises savings. Higher aggregate investment yields higher savings.

It is by no accident, then, that Keynes's analysis is founded on the rejection of real analysis; in formulating his theory, he seeks to avoid all real variables and focuses his attention on the concepts of money and employment.

Keynes's theory of interest has been widely criticised for, among other things, its inconsistency, and even the mainstream ignored it. *Appelt* (*2016*) provided a broad

[6] In classical economics, saving is understood as the difference between annual current income and current consumption, i.e. as a flow variable. By contrast, as used in everyday language as well as in business vernacular, saving means a previously accumulated stock kept in the bank or held in financial assets.

overview of the critiques and in summary, he found that Keynes's theory of the rate of interest is far-reaching as regards its implied consequences. For instance, a "free market does not ensure an efficient allocation of resources. The intervention of the state is necessary to prevent excessive savings that could lead to unemployment. The rate of interest is the chief tool of such an intervention" (*Appelt 2016:7*). The approach focusing on a perfect free market discards this thought entirely, and understandably so. In his summary of Keynes's professional career, *Szakolczai* (*2016*) attributes Keynes's neglect following his death to the mainstream's propensity to disregard the facts. As the author put it: "What Keynes had hoped for did not come to fruition; indeed, the facts of the world today are contrary to Keynes's vision. The principles proposed in *General Theory* (...) are rejected by current mainstream economics. (...) As a result, unemployment has not been eliminated; it continues to increase (...); income and wealth disparities have not lessened but escalated, and the state's economic policy not only failed to restrain this process but in fact facilitated it. Public control over investment not only has not been extended but it weakened, and current mainstream economics clearly condones this trend" (*Szakolczai 2016:853–854*).

Keynes's career was practice-oriented; he participated in the daily work of governmental bodies continuously, and his theoretical ambitions were all aimed at analysing the problems arising in this environment. This approach is also reflected in his attitude to classical economics, which he summed up as follows: "Our criticism of the accepted classical theory of economics has consisted not so much in finding logical flaws in its analysis as in pointing out that its tacit assumptions are seldom or never satisfied, with the result that it cannot solve the economic problems of the actual world." (*Keynes 1965:402*). The classical and subsequently, the neoclassical school's response to this was an attempt to prove, through a number of theoretical refinements, that the implementation of the programme envisioned by Keynes was not even necessary. The framework of this reconciliation was outlined by *Hicks* (*1937*), and the subsequent unfolding of the IS–LM approach made it appear as if it were the integration of Keynesian economics into the classical framework, even though it retained numerous elements that were clearly defied by Keynes. It was in an overview of these developments that *Tily* (*2007*) and *Chick – Tily* (*2014*) called the evolution of the theory a betrayal of Keynes's thought.

We have already voiced a number of objections in regard to the IS side of the IS–LM approach. The LM side is also not devoid of problems. The main trouble in this regard is that broad money is deemed to be an exogenous variable that can be controlled by the central bank. In reality, it is determined endogenously, and the central bank can control only a small part of it at most. In the LM approach, money supply dominates while money demand plays no role at all, even though it is precisely credit demand that gives rise to changes in the quantity of money in the *endogenous theory of money*.

10. Endogenous money – exogenous interest rate

To put it simply, the debate between Keynes and classical economists is rooted in the fact that while classical economists examine the way in which the nominal interest rate can be derived from the equilibrium real interest rate, Keynes recognised that the equilibrium real interest rate is merely a theoretical creation of real analysis, which has no practical relevance in reality; consequently, it should not be a starting point for arguments regarding the nominal interest rate. In Keynes's liquidity-preference theory of interest, the equilibrium real interest rate does not appear at all. In his *Treatise on Money* (1930), Keynes's view was still close to *Wicksell's* natural interest rate concept, which was defined as the equilibrium between saving and investment. In *General Theory,* however, he firmly rejected this view after having recognised that this equilibrium may emerge at numerous income (employment) levels, and he was only concerned with full employment equilibrium. He wrote: "In my Treatise on Money I defined what purported to be a unique rate of interest, which I called the natural rate of interest – namely, the rate of interest which, in the terminology of my Treatise, preserved equality between the rate of saving (...) and the rate of investment. I believed this to be a development and clarification of Wicksell's 'natural rate of interest', which was, according to him, the rate which would preserve the stability of some, not quite clearly specified, price-level. (...) I am now no longer of the opinion that the concept of a 'natural' rate of interest, which previously seemed to me a most promising idea, has anything very useful or significant to contribute to our analysis. It is merely the rate of interest which will preserve the status quo; and, in general, we have no predominant interest in the status quo as such." (*Keynes 1965:266*).

What sets Keynes's theory apart from the classical school is the essential difference between real analysis and monetary analysis: his views on money with regard to its impact on economic processes. A direct consequence of this is the difference between the interpretation of equilibrium and the interpretation of equilibrium in the context of full employment. Another difference concerns the theory of money, in particular, the key role of liquidity preference in the determination of the interest rate and, in relation to money creation, the key role of credit; in other words, the recognition of the commercial banks' role in endogenous money creation. *Ábel et al.* (*2016*) provide an overview of the contradictory treatment of banks and money in traditional macroeconomics and demonstrate the practical significance of the theory of endogenous money in the face of mainstream economics. However, the authors do not address the Keynesian roots of the theory of endogenous money or the determination of the interest rate. *Pilkington* (*2014*) refers to the theory of endogenous money as the crowning jewel of post-Keynesian theory. The revival of the theory of endogenous money in the wake of *Basil Moore's (1988)* influential work emphasised that the money supply curve

is horizontal as opposed to being vertical as assumed by the classical approach (*horizontalism* versus *verticalism*). By now, however, even the mainstream view has integrated horizontalist considerations.[7] The essential difference, therefore, is not that by embracing the theory of endogenous money central banks gave up their fruitless attempts at determining the money supply and allowed it to be shaped by externalities independent of them. As *Palley* (*2006*) pointed out, endogeneity – which the author refers to as "central bank endogeneity" – is fundamentally different from the theoretical foundation of the theory of endogenous money, which believes in endogenous money creation through credit. *Palley* (*2006:80*) terms this as the "endogeneity of finance". We refer to the theory of endogenous money in this sense.

Bindseil – König (*2013*) re-evaluated the work of Basil Moore 25 years later, and found that his book had impressively stood the test of time.[8] Simplifying the difference between Moore and the mainstream to the horizontalist–verticalist conflict, we can state that in the traditional verticalist view money supply is exogenous, independent of money demand (business considerations), and is controlled by the central bank within reasonable limits. By contrast, in our view Moore's horizontalist theory offers a realistic description of money creation where it is linked to bank credit. Bank credit, in turn, depends on credit demand. The central bank may influence the "price" – i.e. the lending rates – at most, but money supply (the credit volume) is not determined by the central bank: it is determined by credit demand, which depends on business considerations. The verticalist paradigm may apply in a world of commodity or pure fiat money. But to provide a correct description of a credit economy, the horizontalist view should be adopted (*Bindseil – König 2013:384*).

The endogeneity of money supply means that, in addition to the money created by the central bank (state), the market creates fiat money endogenously as well, for example, when a commercial bank extends a loan. Money created by the state is outside money, while endogenously created money is inside money. In the modern market economy, the weight of inside money in payment transactions is overwhelming – in excess of 90 per cent – compared to cash (outside money).

In *Wray's* (*2004*) simplistic wording, the exogeneity of the interest rate means that the central bank can shape the interest rate using administrative means

[7] "We are all Horizontalists now!", declares the title of an interview conducted with Basil Moore (*Moore 2010*).
[8] As the work of Basil Moore had been largely ignored, it took years for central banks to move, learning from their own experience, in the direction that had already been analysed by Moore with impressive precision. Although *Bindseil* (*2004*) cites *Moore's* (*1988*) book in his seminal work discussing the frameworks of monetary policy instruments, it took 25 years for him to recognise that Moore had correctly identified the development trend and main features of contemporary central bank instruments (*Bindseil – König 2013:387, Footnote 1*).

(unilaterally).[9] The set of instruments and institutional structure of monetary policy exert a profound impact on the interest rate – including the rates they affect directly – and on monetary policy transmission, i.e. the way in which this passes through to the rest of the money market interest rates and to the other features of the market (such as inflation).

However, the discretionary power of central banks in regard to the determination of the interest rate is limited: it does not cover all types of interest and it is not equally valid at all times. The central bank exerts the most direct impact on the short-term interest rate, i.e. the key policy rate. Depending on the structure of the set of monetary policy instruments, the "key" qualifier may mean various interest rates. For most central banks, this is the overnight instrument, which directly affects developments in the overnight interbank lending rates.

11. What determines the nominal interest rate?

The post-Keynesian practice explains the operation of monetary policy by describing the daily operational procedures and processes of central banks. A consequence of this pragmatic approach is the fact that the post-Keynesian theory approximates current practices better. In describing the daily practice of the central bank, many authors have adopted the distinction used by *Alfred S. Eichner* (*1987*) regarding the central bank's "protective" and "accommodative" functions. The day-to-day – indeed, minute-by-minute – management of market liquidity is the protective function. The central bank monitors – and facilitates the smooth management of – the liquidity shocks emerging in foreign exchange markets and internal money markets and the volatile swings in the financial flows and payment transactions of various economic participants, the government and the private sector. Another, longer-term element of the central bank's interest rate shaping activity is the enforcement of monetary policy objectives and principles and long-term changes in economic processes. This is the responsibility covered by Eichner's reference to the accommodative function of central banks. However, the central bank not only accommodates to changes in the business cycle, it also intervenes proactively therein by way of its monetary policy and in the interest of furthering its own goals. This fits fairly well within the post-Keynesian theoretical framework of monetary policy.

[9] *Wray* (*2004*) quotes the three most commonly used interpretations of the exogenous variable: (1) In the control sense, an exogenous variable is one whose value is set by government policy. (2) In the theoretical sense, the exogenous variable in a model is assumed to cause changes in the endogenous variables, but not the other way around: exogenous variables are independent of the endogenous variables. (3) In the statistical sense, an exogenous variable is one which is independent of the explanatory variables of a tested model. For the purposes of this paper, we apply the first interpretation. It is worth quoting Basil Moore's words voiced in an interview on the subject: "Nothing is really exogenous, even interest rates, because central banks will always react to economic conditions. (...) In that sense interest rates always have an endogenous component." (*Moore 2010:9*). Accordingly, the first interpretation is not about when and why the central bank adjusts the interest rate; it merely states that the interest rate is determined by the central bank.

In general, central banks can influence nominal interest rate developments most efficiently across short-term maturities. Central banks play a dominant role in shaping the interest rate; in fact, they define the interest rate and have a wide array of instruments at their disposal to enforce the chosen interest rate in the market. By selecting and applying their regulatory tools, central banks have a significant impact on developments in market rates as well.

Obviously, a change in short-term interest rates also affects longer-term interest rates, but this impact is only indirect. Other than the application of non-conventional quantitative measures mostly in crisis periods, central banks can exert an influence on long-term interest rates through macroprudential, resolution or credit market regulations. The minimum requirement pertaining to regulatory capital and to liabilities eligible for write-down or conversion (MREL) and the macroprudential regulation on liquidity indicators affect commercial banks' lending activity – and hence, money creation – fundamentally. *Li et al.* (*2017*) present an interesting model calculation in regard to the latter.

12. Summary and conclusions

The interest rate is one of the key variables of economics. In traditional economics, the argument founded on intertemporal optimisation asserts that sooner or later, all material processes in the operation of the economy are bound to converge to the natural rate of interest. The core part of this theory is rooted in Fisher's theory of interest. In this paper, we demonstrated that this interest rate theory is one of the key elements of the real analysis framework of traditional economics. The theory that was built on this foundation, however, is not supported by data, and the traditional theory with this in its focus is not suitable to analyse the processes of the contemporary economy. Comparing it against real analysis, we present monetary analysis, which was first formulated in Schumpeter and Keynes's work and progressed – through the theory of fiat money – to the theory of endogenous money. In this framework the interest rate is determined by the central bank as opposed to the market. The theory of endogenous money underpinned the process of money creation, commercial banks shape the money supply through their lending activity in accordance with market demand, and the weight and significance of the central bank's creation of outside money had become secondary. The interest rate lost its primary role in the monetary policy of modern central banks. Although the interest rate is defined by the central bank, the central bank no longer controls money creation through this channel. For the purposes of endogenous money creation (lending), the design and operation of liquidity regulating central bank instruments and micro- and macroprudential regulations fulfil the exact same role as the measures used by traditional-minded central banks with a view to shaping the interest rates.

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Portfolio Cleaning of Problem Project Loans in Hungary – Experiences Related to the Systemic Risk Buffer, as a Targeted Macroprudential Instrument*

Péter Fáykiss – Erzsébet-Judit Rariga – Márton Zsigó

After the crisis, more than 50 per cent of project exposures related to real estate financing became problem exposures at the largest Hungarian banking groups. With a view to managing macroprudential risks, the Magyar Nemzeti Bank introduced a systemic risk buffer, the rate of which has been calibrated in proportion to the individual contribution to systemic risk. In this paper, based on the data available in the project exposure database at contractual granularity, we analyse certain characteristics of these transactions in the third quarter of 2015, immediately prior the announcement of the capital buffer requirement, as well as the adjustment by the institutions until the end of the first quarter of 2017, i.e. the start date of the mandatory recognition of the capital buffer. We found that banks typically cleaned the larger problem exposures, and there is no indication that institutions gave preference in the cleaning process to problem exposures that defaulted more recently. In fact, when examining the institutions preliminarily affected by the announcement about the intended capital buffer quite the opposite was seen. The analysis also revealed that cleaning was stronger at those institutions which, based on the 2015 Q3 data, would have been preliminarily affected by the systemic risk buffer.

Journal of Economic Literature (JEL) codes: G21, G28, G32, G33

Keywords: real estate financing, non-performing loans, macroprudential policy, financial stability, portfolio cleaning, systemic risk

1. Introduction

After the outbreak of the financial crisis, a large portfolio of non-performing loans built up in certain countries' banking sectors. In Hungary, this was primarily observed in relation to households' foreign currency loans; however, the portfolio

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of non-performing project loans – particularly of loans secured by commercial real estate[1] – also started to rise steeply. At the largest banking groups in Hungary, more than 50 per cent of project exposures, most of which were related to real estate financing, became non-performing (*Szenes et al. 2017*).

In addition to the large size of the non-performing portfolios, the slow cleaning of these portfolios caused problems throughout Europe. While in the United States the ratio of non-performing loans already started to decrease gradually from 2010,[2] in the EU a moderate decline in such loans was only observed starting from mid-2014. Moreover, the outstanding level is still relatively high, at around 7–8 per cent across the EU, and the related risks have been assessed as being substantial by several EU institutions and authorities of the Member States (e.g. *ESRB 2017, EP 2017, EC 2017,* or for the measures taken by the Member States see *ECB 2017*).

The Magyar Nemzeti Bank (MNB) also deemed the persistently large portfolio and institutional concentration of the problem project loans observed in the Hungarian banking sector to be a key macroprudential risk. In order to manage this risk, the MNB opted to introduce the systemic risk buffer (SRB) (see e.g. *MNB 2015*), with buffer rates determined in proportion to the individual contribution to the systemic risk.[3] The systemic risk buffers applicable to the individual institutions were prescribed in the form of individual MNB decisions, and banks had to comply with the new macroprudential capital buffer requirements starting from 1 July 2017. Thus, the respective market participants had a relatively long adjustment period to clean the problem project exposures or – if portfolio cleaning failed – to build up their capital buffer. In this paper, we analyse the effects of this macroprudential intervention based on micro data originating from the regulator, the MNB, with special attention to the time profile and composition of the portfolio cleaning which occurred.

This paper is structured as follows: After the introduction, we review the potential unfavourable effects of the large non-performing portfolio on the banking sector and the real economy, also touching on the potentially insufficient motivation of the

[1] Commercial real estate loans/project loans include the exposures where the primary source of repayment of the loan is represented by the cash flow generated by the utilisation of the real estate (sales, lease, facility management).

[2] The faster decline observed in the United States was attributable to a number of factors (for an overview of this see e.g. *Baudino – Yun 2017*), including, among other things, the commonly applied securitisation of loans, the size, activity and development level of the loan exposures' secondary markets and investors, the more prepared legislative and regulatory environment (e.g. extremely efficient out-of-court debt settlement procedures, stricter loss recognition rules, stipulating a shorter timeframe than the European regulation), and the special government programmes (e.g. the well-known Troubled Asset Relief Programme, or the Public-Private Investment Program built on a combination of public and private capital). In the period under review, these credit and capital market conditions, and the legislative and regulatory tools that were available in the United States during the financial crisis, as well as the government programmes (which may require substantial room for fiscal manoeuvre), were typically not available or were much more limited in the European markets and regulatory environment to support the cleaning the problem loan portfolios.

[3] For more details, see *Section 4.2*.

banking sector to clean the portfolio in timely manner. Then we briefly present the characteristics of the non-performing project loan portfolio secured by commercial real estate which is regarded as systemically risky, both in terms of the type of the collateral real estate, denomination of the loans and the cash flow generation capacity of the scheme. Section 4 describes the details of the introduction of the macroprudential measure, i.e. the systemic risk buffer, applied for the management of the systemic risk related to project loans secured by commercial real estate, and then Section 5 presents the adjustment by credit institutions, observed following announcement of the measure. Finally, we summarise the key conclusions of the paper.

2. Theoretical overview: Unfavourable effects of the large non-performing portfolio on the banking sector and the real economy

2.1. Consequences of the excessive build-up and persistent presence of the problem loan portfolio

The extensive accumulation and long-term presence of non-performing exposures in the balance sheet of the banking sector can have an unfavourable effect on financial stability and healthy lending. In the wake of financial crises that typically occur after assuming excessive credit risk, the volume of non-performing or problem credit exposures can inflate in the balance sheets of credit institutions to an extraordinary degree. If this affects a large range of institutions in the banking sector, it can jeopardise financial stability and be detrimental to the respective banks' lending activity, credit allocation decisions and efficient operation. The negative consequences of this may appear in macroeconomic performance (*Aiyar et al. 2015, Balgova et al. 2016, Berti et al. 2017, EC 2017, Suárez – Serrano 2018*). Construction and real estate development may prove to be particularly vulnerable to a sharp rise in the banking sector's non-performing ratio (as implied by the analysis of *Ghosh 2017*), while borrowers may also experience it directly, e.g. through higher interest rate spreads.

Due to the limited information, market valuation of portfolio quality and the non-performing loans may be difficult, and consequently a high ratio of such loans weakens investor confidence in the institutions in question. The typically low transparency renders the assessment of the fair value and the risk associated with the non-performing loans problematic, and this market imperfection may also be compounded by the possible intention of the bank's management to temporarily conceal the problems.[4] A large problem portfolio can significantly undermine

[4] For the information problems with the valuation of problem loans and the hypotheses related to the motivations aimed at the maintenance of this, see *Fell et al.* (*2017*) and *Baudino – Yun* (*2017*), while for the problem of the bank's private information, learnt upon lending but difficult to share, and for the relation between the generation of the narrowing credit risk information and the (over)valuation of the real estate collateral, see *Asriyan et al.* (*2018*).

investors' and depositors' perception of the bank's risk. As a result, the affected institutions' access to capital and money markets becomes more expensive and they may operate only with higher cost of finance (*Aiyar et al. 2015, Balgova et al. 2016, Berti et al. 2017 and Suárez – Serrano 2018*). At the same time, the deterioration in financing conditions may be unequal; it may have stronger effect on institutions that became financially weaker during the stress period or operate with low profitability, while the deterioration may be moderate at institutions which remain more stable and profitable, even if they operate with relatively higher non-performing exposure ratio (*Angelini 2018*).

A large non-performing loan portfolio can also erode the profitability of the affected bank. Since no income is typically realised on problem loan exposures or is only realised at substantially lower rate, while the costs of finance are higher due to the higher regulatory capital and provisioning requirements and higher risk spreads, large non-performing portfolios can result in a significant deterioration in profitability. For example, according to the simulation performed by the European Central Bank, replacement of the non-performing loans over a period of three years after 2016 would have improved the return on equity by 1 percentage point on average, and by 2.5–5 percentage points in certain Member States involved in the analysis (*Constâncio 2017*).

The deteriorating portfolio quality and the substantially weakened profitability and capitalisation level may have unfavourable effect on the banks' willingness to take risks. The deteriorating portfolio quality may limit risk-taking capacity and prompt banks to act cautiously. By contrast, willingness to take risks may be influenced in the opposite direction (which may also lead to systemic risks), if – due to the bank's losses leverage increases – the owners' skin in the game decreases and moral hazard mechanisms[5] begin to take effect. This may push the affected banks to follow a higher risk strategy based on the uncertain recovery of non-performing loans. This is because compared to the outcome of recovery – which has a low probability, but offers high payment – a large part of the potential costs must be borne by the external financing entities, and thus the owners and/or management may be more willing to risk the bank's profitable operation or even take a gamble on a resurrection strategy. Empirical analysis should be performed in order to decide which of the two effects in the opposite directions dominates risk-taking (for more details on this, see e.g. *Kirti 2017, Dinger – Vallascas 2016*).

For banks operating with lower profitability and a more unstable financial position, it may be difficult to expand their lending via the financing of productive real economy investment opportunities. Earlier empirical research[6] concludes that – both in the

[5] The theoretical mechanisms are described in the summary note of *Stolz* (*2002*), while for the empirical analysis, see e.g. the paper of *Gropp and Vesala* (*2004*).
[6] See *Bending et al.* (*2014*), and the studies mentioned in the first paragraph of this sub-section.

euro area and in the countries of the Central-Eastern European (CEE) region – with regard to banks operating with higher non-performing portfolios the large portfolio and rapid rise in problem exposures typically correlates with more moderate growth in the outstanding lending, which may be particularly unfavourable for industries that generally rely on bank financing or for small and medium-sized enterprises (*Aiyar et al. 2015*). One issue which still awaits further underpinning of empirical research is the question of through which theoretical channels the effect between the high non-performing portfolios and the lending activity, as well as the interest rate spread on loans materialises, where the latter, in theory, may also influence the operation of monetary policy transmission. Even when controlling for the banks' regulatory capital position, certain analyses indicate that a rise in the ratio of problem portfolios may have unfavourable effect on credit supply (see e.g. *Bredl 2017*). At the same time, *Accornero et al.* (*2017*), when examining the Italian economy under deteriorated capitalisation and losses resulting from problem exposure, estimated a negative impact of corporate credit demand decline in the weakening of lending activity, presumably due to e.g. the worsening risk characteristics and investment opportunities of borrowers.

The long-term maintenance of problem loans may distort optimal credit allocation, while cleaning may reduce borrowers' debt overhang. The long-term maintenance of a high non-performing ratio in the banking sector entails the risk that "zombie" lending may appear between banks and their corporate clients. This usually characterises vulnerable banks operating with low capitalisation, the major part of the lending capacity of which may be absorbed by financing the less productive activity of corporate clients struggling with financial difficulties, which offers low return (*Gandrud – Hallerberg 2017*). Among the corporations financed in this way, the availability of zombie loans enforces neither the cleaning of the market nor deleveraging by corporations, and excessive debt financing is expensive, while no tangible restructuring takes place. Excessive indebtedness of corporations – but also of households – may reduce the capital invested in productive investments; e.g. the outstanding, long-term debt servicing may represent excessive burden on investors' anticipated return and makes additional fund raising more difficult (see e.g. *Philippon 2009* or *Occhino 2010*). *Storz et al.* (*2017*) attributed the appearance of "zombification" in the periphery economies of the euro area to the more vulnerable corporate clients who were able to increase their indebtedness further between 2010 and 2014, typically thorough their ailing banks.

The efficiency of the banking sector's operation and the accumulation of extraordinarily large non-performing portfolio may be interrelated. On the one hand, the management of problem portfolios may absorb major organisational resources. In normal periods, the development of activities dedicated to the management of extraordinary volumes of non-performing loans is not part of banks'

operation. An example of this may be when the banking staff is engaged in workout activity rather than in lending, or the management is occupied with the sales of collateral. The organisational development of this may also significantly undermine a bank's profitability and efficient operation (as implied e.g. by the analysis of *Berger – Young 1995*, where examining the banks of the United States they found that there is Granger causality between the high level of non-performing loans and the deterioration in cost efficiency, which – according to their hypothesis – may be caused by the rise in administrative and operational costs). On the other hand, investors may interpret the high non-performing ratio as lack of efficient operation, risk management and management.[7]

The permanent presence of non-performing debtors in the financial system may erode the willingness of more and more clients to pay and trigger additional non-performance. The preparedness of the credit institutions with a large volume of non-performing loans for the workload and the special capacities and resources necessary to carry this out may be limited. Based on the large number of former non-performers, customers may get the impression that the probability of the lender's sanctioning non-performance is low, and thus they may be more inclined to opt for strategic non-performance (i.e. they perform below their repayment capacity, if this is a more profitable option for them compared to duly performing and maintaining the customer relationship developed with the bank). Having examined the Italian banking system, *Schiantarelli et al.* (*2016*) found that debtors – convinced of their stronger bargaining position and seeing the steep rise in past non-performances – run on banks of less stable financial situation (borrowers run), i.e. they opt for strategic non-performance in large numbers.

Excessively fast scheduling of portfolio cleaning may also lead to substantial, systemic problems. The abrupt or almost simultaneous derecognition of problem exposures among the credit institutions involved and the excessively strong incentives included in the related regulations may also divert the cleaning process from optimal scheduling. Wide-scale, abrupt cleaning may confront institutions which are already struggling with a weakened financial position with major losses, as a result of assets sales or the realisation of collateral in large quantities. The losses thus generated may also give rise to an involuntary contraction of lending activity and to a change in the bank's risk appetite. Furthermore, pressing too much for cleaning may entail the termination of valuable customer relations and interrupt the financing of corporations which are struggling with temporary financial difficulties, but operate with favourable productivity in the long run (*Angelini 2018*).

[7] The hypotheses relate to the interactions of efficiency and non-performing ratio are examined by *Louzis et al.* (*2012*); *Tarchouna et al.* (*2017*) deals with the impact of corporate governance on the development of non-performing portfolios, while all of this is brought into connection with market and investor expectations by *Bredl* (*2017*).

2.2. Potentially insufficient motivation of the banking sector to clean the portfolio

The financial incentives of banks for the adequate – i.e. optimal for the functioning of the economy as a whole – reduction of the high ratio of problem exposures may prove to be insufficient. Banks may not take into consideration the costs presented in the previous subsection when making their business decisions, such as postponing balance sheet cleaning and the deterioration in efficient operation. When examining the life cycle of non-performing loans (see *Suárez – Serrano 2018*), we found that the bank's management may be interested in delaying the timely recognition of non-performance (*Szenes et al. 2017*), fearing that the assessment of the management's performance may be more strongly prejudiced if the bank recognises the individual loan repayment problems and the deterioration in loan portfolio quality before those become obvious across the sector and at the competitors as well. As a result of this, during an economic recession and in financial stress periods, the materialisation of credit risk problems may occur en masse, with a delay and simultaneously at several institutions, which may further deepen the crisis processes, e.g. the contraction in lending.[8]

Typically, more vulnerable banks may try to conceal their customers' debt repayment problems over the long run by renewing the loans granted to customers with poor solvency or by restructuring them ("evergreening"), which offers no real solution. In parallel with the deterioration in customers' solvency, certain lenders may permanently settle on the financing of problem corporations, and thus roll over the loans under preferential conditions which are tailored to decreased debt servicing capacity. One reason for this could be the permanent postponement of the recognition of major losses, e.g. due to the banks' remuneration systems, while maintaining the bank's own solvency may also depend on keeping its customers financially alive (*Peek – Rosengren 2005*, *Homar et al. 2015*).

The information problems of secondary markets, the special features of the demand side and simultaneous sales of large volumes may reduce the return realisable on the sales of problem exposures. Selling the portfolio to secondary market participants specialised in the management of those is an essential tool of portfolio cleaning. However, on these markets it may be typical that buyers purchase the respective loans with a major information deficit (*Navaretti et al. 2017*). As a result of this, credit institutions are able to sell the problem assets only at a price that does not fully reflect the real, more favourable quality of the assets. Moreover, the limited size and trading flow of secondary markets, the heterogeneity of the sold exposures, the institutional structure of the demand side (e.g. quasi-monopsonistic, or just the opposite operating with fragmented capacities) may create additional

[8] For details on the systemic effects see *Bushman – Williams* (*2015*); the hypotheses related to the underlying mechanisms are summarised by *Li* (*2017*).

obstacles to price discovery or improvement in supply side return. All of these factors reduce the opportunity cost of keeping the problem exposures in the balance sheet and hits those who take action first ("first mover disadvantage"). Almost simultaneous, mass sales may entail a major decrease in prices, similarly to the situation after the mass realisation of collaterals, which may also discourage certain institutions.

Banks may also be hindered in the cleaning by their weakened financial position. The financial stress characterising periods when problem exposures accumulate in large volumes may erode credit institutions' profitability and capital position. Moreover, undertaking excessive credit risk may strengthen cyclically in the banking sector and procyclical underprovisioning may arise.[9] As a result of the foregoing, the increase in defaults in the recessionary phase of the credit cycle may take them by surprise, and they may take efforts to postpone the losses and write-offs accompanying cleaning while they have weakened capitalisation (this may be encouraged by avoiding the breach of regulatory requirements, and also by the intention to avoid the development of negative market perception of the bank or the incentives for income smoothing *[Bethlendi 2007]*).

The accounting, taxation and prudential framework and other institutional factors may also have major impact on the banking sector's decision related to portfolio cleaning. The banks' decisions related to the management of non-performing loans may be distorted by accounting rules, which for example permit the recognition of interest income in respect of such exposures. Under the IFRS 9 international financial reporting standard, in the European banking systems accrued interest receivable may be recognised for the net amount of the problem exposures, contrary to the FASB approach used in the United States. The IFRS 9, and the preceding IAS 39 rules may distort net interest income, the solvency capital and impairment rate as well, and encourage banks to postpone the recognition of losses (*IMF 2015*, *Jassaud – Kang 2015, Cohen – Edwards 2017*, *Baudino et al. 2018*). By contrast, in the period under review, the special Hungarian regulation prescribed the suspension of interest-type incomes in the event of delinquency of 30 days or more, where – although it did not mean the requirement to classify the loan as non-performing automatically – the suspended interest and commission could not be recognised as receivable and income, and no provision and impairment could be recognised in respect of them either.[10] Further examples include the accounting and prudential rules prescribing loan loss provisioning and solvency capital accumulation, which – since selling the non-performing loans reveals the realised losses – confronts bank with stricter requirements and additional provisioning or capital requirements (*Fell*

[9] See e.g. *Olszak et al.* (*2017*), and the findings of *Szenes et al.* (*2017*) on the problem of cyclicity in risk management and regulation.
[10] See Section 17 of Government Decree 250/2000 (XII. 24) on the annual reporting and bookkeeping obligations of credit institutions and financial enterprises.

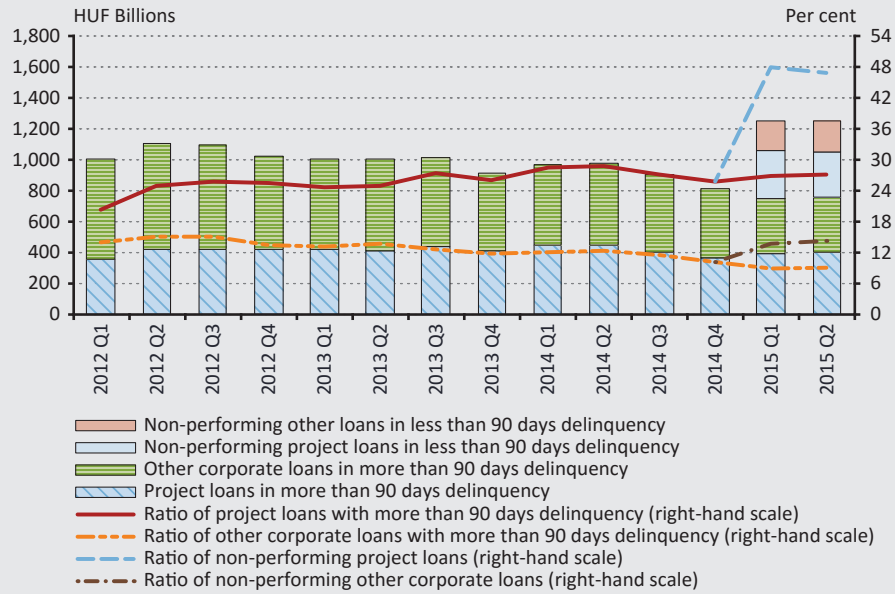
et al. 2016, *Gangeri et al. 2017*). The tax regulations may permit that – prior to the derecognition of the non-performing exposure – even partial loan loss provisions can be recognised as deductible expenses. The financial expenses, the time required and the uncertainty of the legal institutions and legal procedures, as well as certain limitations of the status of European harmonisation and transparency – e.g. the elaboration of bankruptcy laws and efficiency of foreclosure – may also influence banks' strategy in the management of non-performing portfolios (for more details on these issues, see *Aiyar et al. 2015*, *Suárez – Serrano 2018*).

3. The large non-performing portfolio of project loans secured by commercial real estate as a systemic risk

In the pre-crisis period, project loans – particularly those secured by commercial real estate (CRE) – expanded dynamically. In 2008 alone, disbursement amounted to roughly HUF 600 billion annually, while the portfolio outstanding in the initial period of the crisis was close to HUF 2,800 billion. Moreover, this portfolio was concentrated to a great degree: the vast majority of the project loans secured by commercial real estate were in the books of a few Hungarian complex banking groups (*MNB 2015, Szenes et al. 2017*).

Following the dynamic increase, after the outbreak of the crisis disbursements of project loans secured by CRE declined substantially. While during 2008, the volume of loans placed quarterly in this segment typically amounted to HUF 120–160 billion, from 2010/2011 this declined to an amount of roughly HUF 20–60 billion (*Figure 1*). In parallel with this, the non-performing portfolio also started to rise steeply, as the ratio of loans non-performing for more than 90 days rose to above 18 per cent by 2012 from around 4 per cent registered in 2008. This ratio was even higher for project loans: roughly 50 per cent of the project loans secured by commercial real estate became non-performing later on, based on which it can be stated that after the retail foreign currency loans the banking sector realised the largest losses on this portfolio (*Szenes et al. 2017*).

Figure 1
Ratio and volume of non-performing corporate loans in the credit institution sector



Source: MNB

The ratio of problem loans was much higher within the project loans, and typically within those secured by commercial real estate, than within other corporate loans. It is worth briefly reviewing the reasons that gave rise to such a high ratio of non-performing loans in this segment:

- Typically, the most important factor for project loans is the earnings potential of the respective project, since this is the primary source of loan repayment. However, for project loans secured by CRE the earnings potential is extremely vulnerable to economic cycles, since in the case of offices, shopping malls, hotels, etc. a drastic deterioration in macroeconomic variables substantially lowers the profitability of these sectors via the decline in aggregate demand, and thus cyclical effects strengthen (*ESRB 2015*).

- Beyond the significant sensitivity of the segment to cycles, the practice of excessive leverage also increased risks. Low own contribution was typical for project loans secured by commercial property and in the case of building site financing practically only the minimum own contribution was available (*Szenes et al. 2017*). This did not improve the shock absorbing capacity of the project, nor did it strengthen borrowers' willingness to cooperate (the "moral hazard" problem).

- Project loans secured by commercial real estate were typically denominated in foreign currency, and thus – in addition to changes in the business cycles – unfavourable trends in foreign exchange rates also had a negative impact on the portfolio. Although in several cases in these transactions not only the financing, but also the rents were often denominated in foreign currency, this often represented only a virtual hedge for changes in foreign exchange rates, since the real income of lessees, e.g. a shopping mall, was realised in local currency, i.e. in forint (*Szenes et al. 2017*).

In its publication dated 18 November 2015,[11] the MNB assessed the persistently large portfolio and the institutional concentration of problem project loans observed in the Hungarian banking sector as a key macroprudential risk. Although in a lower proportion the presence of non-performing loan portfolios can be regarded as a natural attribute of banking operations, their excessively fast growth and the persistence of problem portfolios – as seen in the previous section – carry severe financial stability and macroprudential risks.

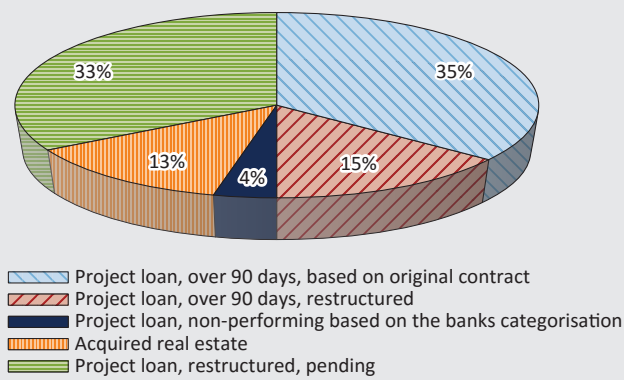
At the same time, with a view to managing the risk, the MNB opted for the introduction of the system risk buffer, the rate of which is determined as a proportion of the individual contribution to the systemic risk. The MNB prescribed the systemic risk buffer at the institutional level at a rate between 0 and 2 per cent of the domestic risk weighted total exposure amount, and at consolidated level, it must be met with CET1 capital elements in addition to the other capital buffers. The systemic risk buffers related to the individual institutions were prescribed in the form of individual MNB decisions, and based on the MNB's communication, banks had to comply with the new macroprudential capital buffer requirement initially from 1 January 2017, which later was changed 1 July 2017. Thus, the respective market participants had a relatively long adjustment period to clean the problem project exposures or, if the portfolio cleaning failed, to recognise the capital buffer. In the following section we briefly present the features of the affected problem project loan portfolio directly prior to the announcement. The analysis was performed on the basis of the portfolios outstanding at the end of 2015 Q3.

Based on the utilised micro-level, fairly detailed MNB database (data supply L70), containing more than 720 individual problem transactions of the banking sector, we found that half of the problem project loans – i.e. restructured or already non-performing – secured by commercial real estate, outstanding on 30 September 2015, were non-performing for more than 90 days (*Figure 2*). The portfolio not yet overdue but based on the respective bank's assessment likely to become non-performing, amounted to 4 per cent, while further 13 per cent included repossessed

[11] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2015-evi-sajtokozlemenyek/a-problemas-projekthitelekbol-eredo-kockazatok-kezelesere-az-mnb-rendszerkockazati-tokepuffert-vezet-be

real estate stated in the banks' balance sheet. The latter case means that certain banks tried to manage part of the long-time non-performing loans by taking the commercial real estate offered as collateral for the project loan on their balance sheet, thereby reducing the problem project loan exposure. After this, the real estate project was managed by the bank – either directly, or through a facility management company (according to the Hungarian regulations, such real estate may burden the banks' balance sheet only for a relatively short time, and thus these institutions must sell them within a few years). The restructured, but not yet problem-free project loans accounting for the remaining part, i.e. roughly one-third, of the problem portfolio. These included transactions that have already been restructured, but the period after which they can be reported as problem-free has not yet elapsed. Here the transactions restructured into bullet or balloon loans (or were such loans from the outset but were once again restructured) – i.e. the principal debt must be paid in lump sum only at the end of the repayment period, and until then the project makes only interest instalments – deserve special attention. Within these schemes it is a major problem that by repeatedly prolonging the end of the repayment period, evergreen transactions are essentially created in such cases when the project in fact is no longer able to generate the cash flow of the respective loan.

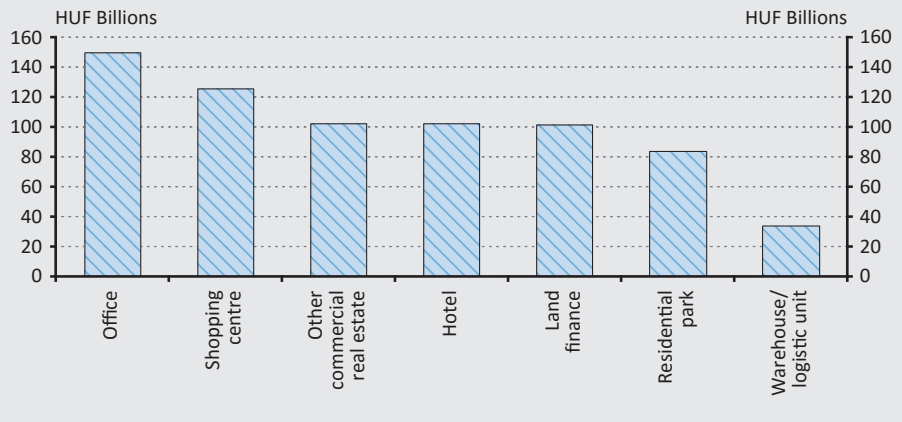
Figure 2
Distribution of restructured, non-performing project loans secured by commercial real estate and real estate exposures within the problem portfolio (30 September 2015)



Source: MNB

In addition to the delinquency and restructured nature of the transactions, it is also worth examining the type of real estate securing the problem project loans and repossessed collaterals. Based on the database, in this respect it is the office and shopping mall collaterals that should be flagged: of the total problem project exposures amounting to roughly HUF 700 billion, almost HUF 280 billion was linked to these types of real estate at the end of 2015 Q3 (*Figure 3*), i.e. roughly 40 per cent of the problem exposures. In addition, it is also worth mentioning the relatively high ratio of building site financing, as almost 15 per cent of the problem project loan portfolio was secured by such real estate.

Figure 3
Problem project loans secured by commercial real estate and repossessed collateral by real estate type (30 September 2015)



Source: MNB

As mentioned earlier, the cash flow generating capacity of project loans is of key importance for the probability of default. Roughly 75 per cent of the problem portfolio outstanding at the end of 2015 Q3 had any kind of cash flow generating capacity, and a bit more than half of this portfolio was able to pay interest in accordance with the contract, which may have been amended several times due to restructuring. As regards the principal instalment, the situation was much worse: roughly one third of the problem portfolio was not able to pay any principal instalment stipulated in the contract. Finally, we also examined the problem project exposure by denomination. In accordance with the pre-crisis practice, the vast majority, i.e. roughly two-thirds, of the problem portfolio was denominated in foreign currency at the end of 2015 Q3. Of that, the ratio of euro was two thirds, while most of the remaining part was denominated in Swiss franc.

4. Prescribing the systemic risk buffer

As mentioned earlier, according to the MNB's assessment, the large portfolio of non-performing project loans entailed a special financial stability risk, not only due to the size and concentration of the portfolio, but also due to the extremely poor demand for the purchase of real estate and project receivables, since due to this it is more complicated for banks to clean their portfolio. Moreover, multiple restructuring ("evergreening") of these loans is particularly typical, since banks use this to try to conceal the real risks of the problem portfolio. Accordingly, with a view to strengthening the stability of the Hungarian banking system and reducing systemic risks, the MNB – in its capacity as macroprudential authority – opted for the introduction of the systemic risk buffer. The prescription of this buffer, as a potential macroprudential instrument encouraging the reduction of non-performing project loans, may stimulate the cleaning process.

Both demand and supply incentives may arise with a view to accelerating the portfolio cleaning process. Of the demand incentives, one of the most important could be the establishment of an asset management company for corporate loans, and particularly for project loans, which is able to take over the problem exposures relatively quickly and, in addition, may also stimulate the workout market. A good example of this could be the role of MARK Zrt, the appearance of which may have acted as an important catalyst both on the commercial real estate market and the project workout market on the demand side. It may also be regarded as a demand stimulating factor that, within the framework of Funding for Growth Scheme (FGS), the central bank permitted the purchase – for the purpose of lease – of commercial real estate securing non-performing or already cancelled loans, since in this way a financing constraint may be partially eased and it may generate additional demand for these assets. Thus, these two initiatives essentially impacted the demand side: MARK Zrt. appeared directly, as a buyer, on the market of problem project loans, thereby supporting portfolio cleaning by the banks, while at FGS the financing, at low cost, of the purchase of collaterals underlying problem loans may have assisted buyers and thereby the cleaning process.

In addition to the demand stimulating factors, incentives strengthening supply may also arise. The authorities of certain countries, and the ECB – operating as the banking supervision of the euro area – tightened, also for this purpose, the requirements pertaining to impairment provisioning, and the various capital requirement rules may also act as incentives to the supply of problem exposures. In this paper we essentially deal with the circumstances and impacts of the application of systemic risk buffer, focusing primarily on the cleaning of non-performing project loans.

4.1. Regulation of the systemic risk buffer

Based on the European regulation effective from 2014,[12] the competent authorities of all Member States may prescribe a systemic risk buffer for the credit institution sector, or for one or several sub-segments of the sector, in addition to the minimum capital requirement as part of the combined buffer requirement.[13] This is possible where there is a need to prevent or reduce non-cyclical systemic risks or increase the resilience of the financial intermediary system.[14] In Hungary, based on the rules stipulated in the Credit Institutions Act for prescribing the SRB, this is the competence of the MNB, supported by macroprudential instruments, in accordance with the following principles:[15]

- The rate may be set between 1 and 3 per cent, in steps of 0.5 per cent, but a higher rate may also be prescribed in particularly justified cases.
- When the buffer rate exceeds 3 per cent, the approval of the European Commission – formulated on the basis of the opinion of European Banking Authority (EBA) and European Systemic Risk Board (ESRB) – is needed, while below that Member States only have notification obligation (ESRB notification).[16]
- The capital buffer must be met with CET1 capital, for exposures to counterparties in Hungary, in European Economic Area (EEA) states and in third countries.
- The credit institution must recognise it on an individual, sub-consolidated or consolidated basis, but for institutions subject to consolidated supervision compliance on both an individual and consolidated basis may be prescribed.
- The buffer rate must be defined in such a way that it may not entail a disproportionate negative impact at the national or EU level (it must not jeopardise the functioning of internal market).
- Buffer rates must be reviewed at least every two years.

4.2. Application of the systemic risk buffer to address the systemic risk arising in connection with project loans secured by commercial real estate

Initially, banks had to comply with the new macroprudential capital buffer requirements from 1 January 2017,[17] with this date later postponed by an amendment to 1 July 2017.[18] Thus, the respective market participants had a relatively long adjustment

[12] Article 133 (1) of Directive 2013/36/EU (CRDIV).
[13] The combined buffer requirement comprises, in addition to SRB, the capital conservation buffer, the countercyclical capital buffer, the G-SII buffer and the O-SII buffer.
[14] Article 35/A (1) of Act CXXXIX of 2013 on the Magyar Nemzeti Bank, 16 September 2013.
[15] Act CXXXIX of 2013 on the Magyar Nemzeti Bank, 16 September 2013.
[16] http://www.esrb.europa.eu/pub/pdf/2014-01-27-Decision_ESRB_2014-2_SRB.pdf?91f4fd3697b23924ebd-9da0c3e923ae4
[17] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2015-evi-sajtokozlemenyek/a-problemas-projekthitelekbol-eredo-kockazatok-kezelesere-az-mnb-rendszerkockazati-tokepuffert-vezet-be
[18] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2016-evi-sajtokozlemenyek/az-mnb-a-hitelezes-tamogatasa-erdekeben-tobb-idot-biztosit-a-banki-tokepufferek-megkepzesere

period to clean the problem project exposures or, if portfolio cleaning failed, to comply with the capital buffer requirements. The systemic risk buffer could be suitably applied to encourage the institutions to clean the stuck, non-performing project loan portfolio from the balance sheet (by writing off or selling the non-performing portfolios). This was because this macroprudential instrument – in contrast to the tightening of impairment rules – acts as an incentive through the increased capital requirement due to the higher cost of capital. Practically this means that although upon tightening the impairment rules the institutions must recognise higher impairment loss, later on they may reverse it or part of it, if they sell the exposure at a higher price even years later. Accordingly, there is less motivation for portfolio cleaning to be implemented within a shorter time, since the cost of keeping the problem exposure in the balance sheet is relatively low. By contrast, upon prescribing the systemic risk buffer, keeping the problem exposure in the balance sheet for a longer period is already more expensive due to the cost of capital arising from the additional capital requirement. Prior to its implementation in Hungary, the application and calibration of the systemic risk buffer to encourage portfolio cleaning was unprecedented at the international level, while there were examples of other regulatory interventions to stimulate portfolio cleaning: for example, in the early 2000s in Japan it was mandatory to clean the balance sheet within three years from the default of the non-performing loans (a grace period of 2 years was specified for the outstanding portfolio), while in Brazil the worst quality loans must be written off within 6 months (*IMF 2013*).

The systemic risk buffers applicable to individual institutions or banking groups were prescribed in the form of individual MNB decisions on a consolidated basis. The rate of the capital buffer was determined on the basis of the credit institutions' individual contribution to the systemic risk, i.e. it was imposed in proportion to the domestic problem project loans and repossessed collaterals. The rate depended on the ratio of the gross amount of the problem exposures (i.e. loans non-performing for more than 90 days, the non-problem-free restructured project loans and other transactions, classified by the credit institution as non-performing not reduced by impairment) at a respective institution or banking group, to the domestic Pillar I capital requirement. If this balance exceeded 30 per cent of the capital requirement and HUF 5 billion, the systemic risk buffer was prescribed at least at 1 per cent, but could not exceed 2 per cent[19] (*Table 1*). The application of gross exposure is important because in this way the respective institutions cannot decrease their calibration ratio by impairment provisioning, i.e. the indicator, which determined the rate of the capital buffer, may only be reduced by true sales of the exposures which remove them from the balance sheet.

The MNB passed the individual decisions determining the rate of the systemic risk buffer for the first time in 2017 Q2, based on the data for 2017 Q1. Based on

[19] https://www.mnb.hu/letoltes/srb-altalanos-hatarozat-hu-20161024.pdf

such, the systemic risk buffer had to be recognised from 1 July 2017. The individual regulatory decisions, which determined the rate of the systemic risk buffer to be recognised by credit institutions and credit institution groups, were reviewed annually on the basis of the dedicated reporting introduced, in accordance with the general decision (up to now, there were two reviews, in 2018 and 2019).

Table 1
Calibration of the systemic risk buffer

Problem project loan portfolio as a proportion of the domestic Pillar I capital requirement	Systemic risk buffer
0.00–29.99%	+0.0%
30.00–59.99%	+1.0%
60.00–89.99%	+1.5%
above 90.00%	+2.0%

Source: MNB

5. Adjustment by credit institutions after announcement of the systemic risk buffer requirement

As mentioned earlier, by raising the capital requirement, the systemic risk buffer may be essentially suitable to encourage institutions to clean the non-performing project loans portfolios from the balance sheet. The capital buffer affects not only the distribution of costs over time, but – via the raised capital requirement – also the higher cost of capital, thereby encouraging institutions to perform cleaning. However, prior to its implementation in Hungary, application of the systemic risk buffer for the stimulation of portfolio cleaning was unprecedented, and thus it is worth examining the effect of this macroprudential instrument on the cleaning practice of the respective institutions.

In the first part of this section, within the framework of a descriptive analysis, we present the changes in the problem project loans and the portfolio cleaning process. Unfortunately, the database available to us and the special features of the market do not facilitate the application of econometrics – in an ideal case, the difference-in-differences – methods to establish whether the cleaning process was stronger in the institutions theoretically affected by the macroprudential instrument. The main reason for this is that project loans were concentrated at relatively few banks, and thus our estimates may be distorted due to the low number of institutions (this does not permit the formation of convincing treatment control groups). In spite of this, we believe that a sufficiently comprehensive view of the cleaning process across the banking sector can be obtained by applying the descriptive analysis as well. In the second part of the section, we focus only on the affected banks: we examine in more detail the cleaning practice of the institutions affected by the capital buffer. Using the probit and linear probability model (LPM) estimates, we try to identify

how certain factors of the problem project exposures (size, time elapsed since default, etc.) affected the probability of cleaning.[20]

5.1. Portfolio cleaning process after announcement of the application of the systemic risk buffer

Based on the data reviewed, following announcement of the systemic risk buffer requirement substantial portfolio cleaning was implemented for the problem project loans secured by commercial real estate. Compared to the situation in 2015 Q3, immediately before publication of the general decision stipulating the framework for the new capital requirement and the calibration process in November 2015, the balance of problem exposures fell from roughly HUF 700 billion to HUF 241 billion by 2017 Q1, i.e. the reference date for determining the systemic risk buffer. If the systemic risk buffer had been introduced immediately in 2015 Q3, it would have affected 6 institutions of the larger banking actors in total, while in the end it was effectively prescribed only for two institutions,[21] but even those performed significant portfolio cleaning.

Heterogeneity among the banks related to portfolio cleaning was rather strong, although it affected at least half of the problem exposures even at the least active banks. The cleaning typically took place in the form of market sales, gross receivable write-offs and enforcement of receivables, while at one institution portfolio transfer was also realised during resolution.[22] Sales of problem exposures were also supported by the recovery of the commercial real estate market and the revival of the workout market, where MARK Zrt. may have acted as a catalyst. At a systemic level, the strongest portfolio cleaning was observed for loans denominated in Swiss franc and for the transactions secured by gated community and shopping malls, and it primarily affected non-performing project exposures and to a lesser degree the repossessed real estate stated in the balance sheet (*MNB 2017*).

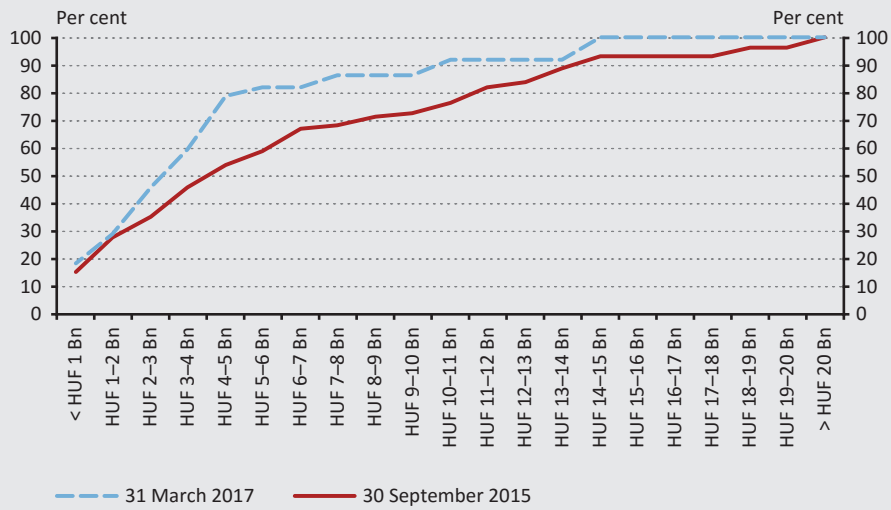
In addition to the denomination and the type of the underlying real estate collateral of the project exposure, it is also worth examining whether institutions gave preference to smaller or larger project exposures in the course of cleaning. One argument for the former may be that it could be easier to sell packages of smaller exposures and demand may also be higher, while the argument for the sales of larger exposures may be the more significant decrease in the nominal problem portfolio when concluding one unit of transaction. As illustrated by *Figure 4*, the full sample was characterised by the latter: institutions typically sold larger transactions, since the cumulated distribution of the problem portfolios calculated on the basis of the exposure amount shifted to the left.

[20] For the descriptive statistics of the variable included in the samples of the probit and LPM-model, see the annex.

[21] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2017-evi-sajtokozlemenyek/a-problemas-projekthitelekbol-eredo-kockazatok-kezelese-erdekeben-az-mnb-ket-bankra-rendszerkockazati-tokepuffert-irt-elo

[22] https://www.mnb.hu/sajtoszoba/sajtokozlemenyek/2015-evi-sajtokozlemenyek/rendben-zajlik-az-mkb-bank-szanalasa

Figure 4
Cumulated distribution of problem portfolios based on exposure value

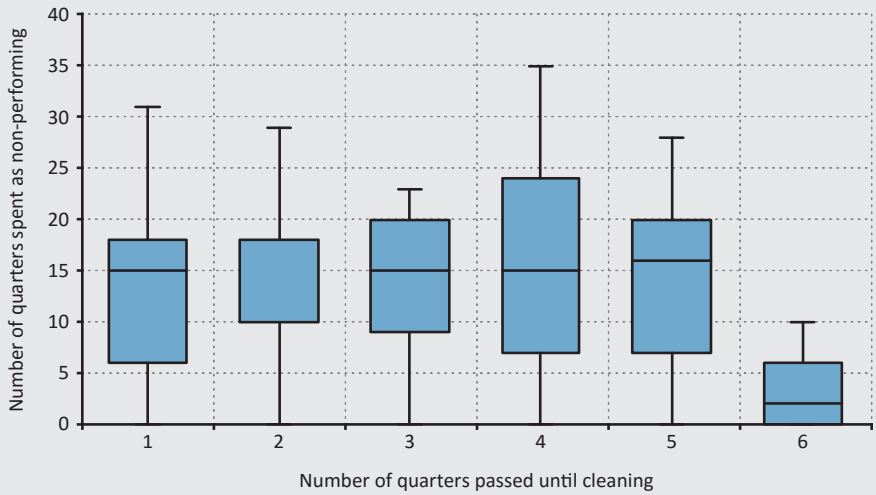


Source: MNB

Relying on the available data, we also examined whether credit institutions are able to more quickly clean the exposures that are in default for a shorter time, and thus, in some sense, are of better quality. Presumably in parallel with the rise in the number of quarters elapsed since the default, the expected repayment ratio declines. As also illustrated by *Figure 5*, based on number of transactions in the 18 months after 30 September 2015, i.e. in the most intensive period of portfolio cleaning, institutions sold long overdue loans and loans overdue only for a few quarters in roughly the same proportion. Accepting the assumptions related to the expected ratio of repayment, according to a descriptive analyses we see no indication of institutions selecting problem loans that recently became delinquent, which presumably can be sold at better price, while keeping the worst problem assets in the balances sheet (the "cherry picking" hypothesis is also examined, among others, by *Ciocchetta et al. 2017* in the cleaning practice of Italian banks).

Finally, we also examined whether portfolio cleaning was stronger at those institutions where – based on the 2015 Q3 data, i.e. immediately preceding the announcement of the application of the capital buffer – the systemic risk buffer would have been prescribed with a rate of at least 1 per cent. In these cases, more intensive cleaning was expected based on the motivating mechanism of the capital buffer, since maintaining the problem portfolio at the same level would have required these institutions to set aside a significant amount of additional capital.

Figure 5
Number of quarters elapsed since the default of the problem project loans secured by real estate collateral and number of quarters elapsed after 30 September 2015 at the time of their cleaning

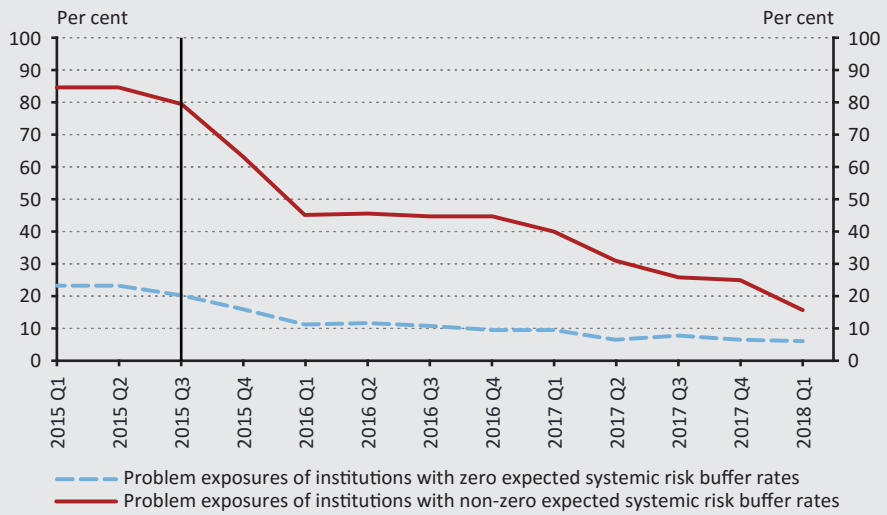


Note: We considered the period between 2015 Q3 and 2017 Q1, and thus banks had six quarters to clean their portfolios compared to 2015 Q3. Data points exceeding the upper or falling short of the lower quartiles by a value higher than one and a half times the interquartile interval value were eliminated as outliers.

Source: MNB

Our results indicate that stronger cleaning was observed at those institutions that would have been preliminarily affected by the systemic risk buffer (*Figure 6*). In the case of these institutions, based on the 2015 Q3 data, the gross balance of the problem exposures exceeded 30 per cent of the respective institution's domestic Pillar 1 capital requirement, and thus in the absence of additional balance sheet cleaning of adequate volume the individual systemic risk buffer requirement, at least at 1 per cent, would have been applicable to them as well (for the capital buffer level see the previous section). Following the preparation period, a systemic risk buffer rate other than zero applied to two credit institutions of the covered institutions, but even these institutions performed substantial balance sheet cleaning. It should be noted that the observed dynamics can also be recognised after the elimination of the portfolios affected by resolution; and at the institutions preliminarily affected by the capital buffer somewhat stronger portfolio cleaning was observed not only in nominal terms, but also in terms of ratios.

Figure 6
Distribution of the problem exposures of credit institutions preliminarily affected and not affected by the systemic risk capital buffer as a percentage of the total problem exposures outstanding on 30 September 2015



Note: Ignoring the portfolios affected by resolution. Portfolio outstanding on 30 September 2015 = 100 per cent.

Source: MNB

5.2. Cleaning practices of institutions initially affected by the capital buffer

In order to examine our hypotheses for describing the adjustment by credit institutions preliminarily affected by the capital buffer, we performed probit and linear probability model estimations using the following specifications (D stands for the dummy variables). We run cross-sectional regression estimations on the problem exposure observations outstanding in 2015 Q3, which – based on the systemic risk buffer calibration rules and the problem exposure portfolios at that time – were included in the balance sheets of banks facing capital buffer requirement other than zero. Thus, we examined the problem exposures of only those institutions, where – based on the 2015 Q3 data, i.e. immediately preceding the announcement of the application of the capital buffer – the systemic risk buffer would have been prescribed with a rate of at least 1 per cent. The binary dependent variable's value of 1 represents observations which the respective banks have already cleaned from their balance sheet by the end of 2017 Q1 (which is the real reference date for prescribing the capital buffer). Independent variables include the size of the problem exposures, expressed in their logarithmised gross value converted into forint. In our database, the value of the number of quarters elapsed since the default until 2015 Q3 is missing for a considerable amount of the observations, which reduces the number of observations that may be involved in the estimates compared to the number of elements in the population of all problem exposures reported by the banks affected by

the systemic risk buffer requirement (*Table 2*). Dummy variables were specified for the fulfilment of the interest instalment and principal instalment (they represent partial and full performance in accordance with the contract, the reference observations pay no interest and/or principal debt due in the contract even partially), and for the type of the real estate (the reference type is the hotel, dummies represent the shopping mall, office, warehouses/logistics facilities, residential park, building site financing and other project real estate financing types). Finally, we also included the dummies, estimating the fixed effects, representing the identity of the banks included in the sample with a view to eliminating potential bank-specific, one-off effects.

Probit model specification:

$$\Pr(Cleaned = 1 \mid \boldsymbol{X}) = \phi(constant + \beta_1 \log(exposure\ size) + \beta_2\ Number\ of\ quarters\ in\ default + \beta_3 D(Partial\ principal\ instalment) + \beta_4 D(Principal\ instalment\ in\ accordance\ with\ the\ contract) + \beta_5 D(Partial\ interest\ payment) + \beta_6 D(Interest\ payment\ in\ accordance\ with\ the\ contract) + [\beta_7 \ldots \beta_{12}] D(Type\ of\ the\ real\ estate\ dummies) + [\beta_{13} \ldots \beta_{17}] D(Individual\ bank\ dummies) + \varepsilon_i)$$

Linear model specification (LPM):

$$D(Cleaned) = constant + \beta_1 \log(exposure\ size) + \beta_2\ Number\ of\ quarters\ in\ default + \beta_3 D(Partial\ principal\ instalment) + \beta_4 D(Principal\ instalment\ in\ accordance\ with\ the\ contract) + \beta_5 D(Partial\ interest\ payment) + \beta_6 D(Interest\ payment\ in\ accordance\ with\ the\ contract) + [\beta_7 \ldots \beta_{12}] D(Type\ of\ the\ real\ estate\ dummies) + [\beta_{13} \ldots \beta_{17}] D(Individual\ bank\ dummies) + \varepsilon_i$$

The results of the estimates are summarised in *Table 2*. When examining the size of exposures, we see that there is positive correlation between the size of the problem project exposures and the probability of their cleaning, at a significance level of 5 or 10 per cent, depending on the specification. Based on model specifications 2 and 4 which include control variables, we found that the size variable is less significant if the variables representing the type of collateral real estate is included. The coefficients of the variable of the number of months elapsed since the default are significantly positive under all specifications, i.e. they do not confirm the formerly mentioned empirical test hypotheses and outcomes, i.e. banks did not clean earlier the exposures that more recently became non-performing, but rather those exposures were removed from the balance sheet that became delinquent long ago. Similarly, a significant effect was observed in relation to principal instalment in accordance with the contract: the respective institutions were less likely to clean those problem project loans that were able to pay the principal instalments in accordance with the contract (also including principal instalments in accordance with the contract modified during restructuring). In relation to the probit estimation we also prepared the classification tables. Based on this, it can be stated that the model estimates in roughly 85 per cent correctly the cleaned status (cleaned vs. non-cleaned) of the

problem exposures included in the sample at the institutions theoretically impacted by the systemic risk buffer (*Table 3*).

Table 2
Probit and LPM-model estimates with regard to the portfolio cleaning of problem project loans at the affected credit institutions

Independent variables	Dependent variable Problem exposure cleaned by 2017 Q1= 1, Non-cleaned problem exposure = 0			
	Probit		LPM	
	Model 1	Model 2	Model 3	Model 4
log (exposure size)	0.0360*** (0.0126)	0.0187* (0.0102)	0.0360*** (0.0132)	0.0234** (0.0117)
Number of quarters in default	0.0189*** (0.00238)	0.0104*** (0.0025)	0.0188*** (0.0027)	0.0113*** (0.0027)
Principal instalment				
partial		–0.029 (0.101)		–0.070 (0.098)
in accordance with the contract		–0.334*** (0.106)		–0.329*** (0.100)
Interest payment				
partial		–0.0034 (0,0875)		0.0312 (0.0915)
in accordance with the contract		0.0442 (0.0603)		0.0343 (0.0714)
Type of collateral real estate securing the problem exposure				
shopping mall		–0.0796 (0.086)		-0.0504 (0.0932)
office		0.0722 (0.0606)		0.0793 (0.0678)
warehouses/logistics facilities		–0.1802* (0.0956)		–0.1885* (0.1043)
residential park		–0.0204 (0.0725)		0.000 (0.0753)
building site financing		–0.1201 (0.0869)		–0.101 (0.0781)
other project real estate financing		–0.583*** (0.0632)		–0.549*** (0.0623)
All specifications contain individual bank dummy variables				
Constant (coefficient)	–2.309** (0.906)	–0.12 (1.168)	–0.164 (0.275)	0.427 (0.262)
Number of observations	414	414	414	414
Pseudo R (1–2) or R-square (3–4)	0.21	0.46	0.26	0.5

*Note: The cross-sectional models are estimated on data from 2015 Q3, involving those banks for which the systemic risk buffer regulation would have prescribed a capital buffer higher than zero, calibrated on the basis of their problem exposure outstanding on that date. Below a zero value for the dummy variables representing the fulfilment of principal and interest instalment the observation is non-payer. Below a zero value for the dummy variables representing the type of the real estate, the real estate type is hotel. In the probit models, we present the average marginal effects, except for the constant. Standard errors in brackets. *** p<0.01; ** p<0.05; * p<0.1.*

Table 3
Classification table of the probit estimation

Classification table of Model 2		
Did the bank clean the problem exposure based on the model's estimate?	**Did the bank clean the problem exposure according to the observations?**	
	Cleaned	**Did not clean**
Estimated cleaning	87.65% (213)	18.13% (31)
No cleaning according to the estimate	12.35% (30)	81.87% (140)

Note: Based on the backcasting, the model correctly estimates the cleaned status (cleaned vs. non-cleaned) of the problem exposures included in the model at roughly 85 per cent. During the classification, we considered an estimate given for the cleaning of a specific observation as estimated cleaning over a probability margin of 0.6, since roughly 60 per cent of the observations are indeed cleaned. The numbers of observations in the different classification categories are shown in brackets.

6. Conclusions

In our paper we examined how banks adjusted to the systemic risk buffer requirement, a macroprudential measure applied to manage the systemic risk arising in connection with non-performing project loans secured by commercial real estate. The MNB deemed the persistently large portfolio and institutional concentration of the problem project loans observed in the Hungarian banking sector to be a key macroprudential risk. With a view to managing the risk, the MNB introduced a systemic risk buffer, the rate of which has been specified as a proportion of the individual contribution to systemic risk. Banks had to comply with the new macroprudential capital buffer requirements starting from 1 July 2017, and thus the market participants in question had a relatively long adjustment period to clean the problem project exposures or, if portfolio cleaning failed, to comply with the capital buffer requirement. In this paper we essentially analysed the effects of this macroprudential intervention, relying on a micro-level database of the banking sector.

We reviewed the potential unfavourable effects of the large non-performing portfolio on the banking sector and the real economy and then presented the features of the non-performing project loan portfolio secured by commercial real estate, regarded as a systemic risk, both in terms of the type of the collateral real estate, the denomination of the loans and the cash flow generation capacity of the scheme. In respect of credit institutions' adjustment following announcement of the macroprudential measure, we found that cleaning typically took the form of market sales, write-offs of gross receivables and the enforcement of receivables. Examining the entire sample, we found that institutions typically sold the larger transactions, and based on the examined data there is no indication that the institutions selected problem loans that recently became delinquent and thus presumably can be sold

at a better price, while they kept the worst-quality problem assets on the balance sheet. We also examined whether portfolio cleaning was stronger at institutions where – based on the 2015 Q3 data, i.e. immediately preceding the announcement of the application of the capital buffer – the systemic risk buffer would have been prescribed. Based on our results, it can be stated that a different cleaning trend was observed at the institutions which would have been preliminarily affected by the systemic risk buffer. The observed dynamics remain even after eliminating the portfolios affected by resolution. In the final part of our paper, we perform a more thorough examination of the cleaning practice of the institutions preliminarily affected by the capital buffer. Relying on the probit and linear probability model estimates, we tried to identify how certain factors of the problem project exposures (size, time elapsed since default, etc.) affected the probability of their cleaning. When examining the size of exposures, we find that there is positive correlation between the size of the problem project exposures and the probability of their cleaning, although when involving the variable of the collateral real estate types the size variable is less significant. The coefficients of the variable for the number of months elapsed since default are significantly positive under all specifications, i.e. they do not confirm the formerly mentioned empirical test hypotheses and outcomes, and thus banks did not clean earlier the exposures that more recently defaulted, but rather those exposures were removed from the balance sheet that defaulted long ago. Similarly, a significant effect is observed in relation to the principal instalment in accordance with the contract: the institutions were less likely to clean those problem project loans that were able to perform principal instalment in accordance with the contract.

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Annex

Descriptive statistics of the variables included in the samples of the probit and LPM model				
	Average	**Standard deviation**	**Lower quartile**	**Upper quartile**
Gross exposure value (HUF), logarithmised	19.55	1.86	18.75	20.7
Number of quarters in default	11.12	8.76	3	18
Dummy variables				
Description				**Observations belonging to the respective category (per cent)**
Cleaned: Takes the value of 1, if the exposure that was a problem exposure in 2015 Q3 is removed from the bank's balance sheet or becomes performing by 2017 Q1				59
Principal instalment				
Non-payer: benchmark observations in the estimates, no principal instalment is made				56
Partial: only partial payment of the principal instalment specified in the original contract for the exposure				34
Full: full payment of the principal instalment specified in the original contract for the exposure				10
Interest payment				
Non-payer: benchmark observations in the estimates, no interest payment is made				47
Partial: only partial payment of the interest burden specified in the original contract for the exposure				20
Full: full payment of the interest burden specified in the original contract for the exposure				33
Type of collateral real estate securing the problem exposure				
Hotel: benchmark observations in the estimates				12
Shopping mall				6
Office				19
Warehouses/logistics facilities				4
Residential park				18
Building site financing				11
Other commercial real estate financing, property financing, project financing				30
Note: We applied fixed effects to the banks included in the sample.				

Novel Modelling of the Operation of the Financial Intermediary System – Agent-based Macro Models*

Bence Mérő

The study describes three agent-based macro models – expanded with the banking sector – that may later, following adequate further development, serve as bases for regulatory decisions. By presenting and explaining these models, the author attempts to make the readers understand the nature, essence and framework of agent-based modelling, also highlighting the difficulties that arise during modelling.

Journal of Economic Literature (JEL) codes: B52, E44, Y2

Keywords: agent-based modelling, banking sector, money creation

1. Introduction

As a result of the financial crisis, the need increased to develop models that allow for the examination of the role of lending in terms of real economy feedbacks and with which it is possible to model the operation of the financial intermediary system taking account of various regulatory requirements, with particular regard to macroprudential regulation, which serves financial stability.

In the light of experiences, more and more mainstream models include financial frictions (e.g. *Gertler and Kiyotaki 2010, Gertler and Karádi 2011, Christiano et al. 2010, 2014, Cúrdia and Woodford 2016, Lindé et al. 2016*). The vast majority of dynamic stochastic general equilibrium (DSGE) models model banks as financial intermediaries, which disburse savings as loans. However, in the actual functioning of the economy, the banking sector creates the deposits in parallel with the disbursement of loans (*McLeay et al. 2014*). This approach is introduced into the DSGE models by *Benes et al.* (*2014*) as well as *Jakab and Kumhof* (*2015*). The latter also generates credit cycles, which are important in terms of macroprudential policy, although this requires several consecutive, independent exogenous shocks that are

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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not foreseen by the actors at all, i.e. even when the individual shocks occur, they do not expect another one for the coming period.

The nature of lending and in particular the ensuing systemic risks are based on households' and corporations' considerable heterogeneity. While in previous DSGE models in many cases lending was constituted by the interaction of only two types of households, a patient one and an impatient one, for the modelling of lending risks it is necessary to increase the heterogeneity of the actors. The HANK (Heterogeneous Agent New Keynesian) models expand heterogeneity further, introducing a continuum of households (e.g. *Kaplan et al. 2018*).

It is partly the actors' bounded rationality that may result in the evolution of imbalances, which are determinants in terms of the riskiness of the banking sector as well. Bounded rationality changes the expectations in the mainstream macro models. *De Grauwe's* (*2012*) model, which rests on new Keynesian foundations, contains a behavioural economics approach as well, and by the inclusion of simple heuristics it is able to generate cycles in output in an endogenous manner. In the model of *Békési et al.* (*2016*), households' expectations concerning real income and the real interest rate are not model consistent, but they assume that they reach their steady state values in a specific quarter.

DSGE models are also able to model regulatory issues concerning the banking sector: *Chadha and Corrado* (*2012*) examine the liquidity aspects of macroprudential policy in their mainstream model, while *Alpanda et al.* (*2018*) developed a DSGE model in which monetary and macroprudential policies are analysed together.

The aforementioned examples suggest that by using various techniques it is possible to make DSGE models much more realistic, and researchers are working to create models in which both monetary and macroprudential policies can be analysed. Nevertheless, despite the significant achievements in individual areas, many leading economists are of the opinion that it is necessary to model the macroeconomy using other approaches as well (cf. *Farmer and Foley 2009, Krugman 2011, Stiglitz 2011, Romer 2016*). In parallel with this, so-called agent-based modelling has appeared as another approach in macroeconomics (cf. *Tesfatsion and Judd 2006*). Instead of solving the systems of equations of mainstream models, agent-based macro models consist of the simulation of the behaviour of economic agents: in their behaviour (e.g. in their consumption or production decisions), agents follow relatively simple rules of thumb one after the other.

Agent-based models model the economy setting out from heterogeneous actors. Of the different types of actors (such as households and companies), there may be several agents in the economy, and each agent has its own parameters and current state of its variables. The individual agents have bounded rationality, and they make

their economic decisions on the basis of simple rules rather than by optimisation (and knowing the whole system). The aggregate variables evolve as a result of these decisions (bottom-up approach).

Upon determining the behavioural rules of individual actors, various behavioural economics results can be used, and accordingly, the economy can be modelled along increasingly realistic assumptions. Moreover, these assumptions are not limited by mathematical constraints: almost any rule can be introduced, and there is no need to keep the model manageable analytically or with the help of the current solving algorithms.

In view of the properties of agent-based modelling, at the level of assumptions everything is in place for an adequate treatment of the banking sector, correlation between lending and the real economy, lending risks stemming from the heterogeneity, the various micro- and macroprudential rules, etc. Agent-based models are bound by fewer constraints than mainstream models, and therefore they are able to provide a better mapping of reality. Accordingly, they allow for more reliable examination of the various monetary and macroprudential measures. Nevertheless, it would be too early to state that agent-based macro models will ever offer a better alternative, as they still need to develop significantly, and for the time being this direction of development also has to overcome many obstacles. In any case, it is worth reviewing what agent-based macro models are mentioned in the literature, as their further developed versions may (also) later be used to prepare various forecasts or to create regulations for the banking sector. Comprehensive descriptions of agent-based macro modelling are provided, for example, by *Haldane and Turrell* (*2018*), as well as *Dawid and Delli Gatti* (*2018*). *Fagiolo and Roventini* (*2017*) as well as *Dilaver et al.* (*2018*) compare agent-based macro models with mainstream models. The objective of this study is to exhibit during operation – by presenting three specific agent-based macro models – the possibilities inherent in this approach, with special regard to the functioning of the banking sector, because following further developments these types of models may also later serve as bases for regulatory decisions.

The next chapter provides a brief overview of the most important features of agent-based macro modelling, and the scope of agent-based macro models to be presented is also determined therein. In the subsequent chapters, the characteristics of the selected models are described. In light of own experiences obtained in the development of agent-based macro models, we comment on the models presented and on agent-based macro models in general, with a closing summary at the end.

2. About agent-based macro modelling in general

According to *Pyka and Fagiolo* (*2007*), the construction of agent-based macro models is typically based on the following features:

1. Bottom-up approach: the model is based on economic agents' individual (micro level) decisions; macro level dynamics are the result of these decisions.

2. Heterogeneity: agents of the same type (e.g. companies or households) may be different from one another in various respects, which can be some simple variables (e.g. wealth or income) or even behavioural rules. Accordingly, the heterogeneous actors of the real economy are not substituted by a representative consumer (or company), but the individual actors make decisions separately, taking account of their peculiarities.

3. Bounded rationality: even if we disregard chance, the individual actors are not perfectly aware of the functioning of the economy, and thus their expectations are not necessarily model consistent. The decisions of individual actors are influenced by their expectations, but they can be formulated on the basis of very different rules. Learning may also be introduced into the models, e.g. the actors may change their expectation rules on the basis of experience. However, most often the agents apply some kind of adaptive expectation rule.

4. Direct (endogenous) interactions: agents' decisions may depend on the decisions of other agents (e.g. on neighbouring agents' decisions in the case of a spatial model), also including what other agents the individual agents establish contact with. Agents' relationship structure may also change over time.

5. Selection-based market mechanisms: in many cases agents may choose on the basis of market mechanisms who they establish contact with (e.g. what company a consumer purchases from), which may result in the closing-down of less profitable companies and the emergence of new firms.

The following characteristics follow from the above listed conditions:

6. Path-dependent dynamics: it follows from the adaptive expectations that the economy evolves in a path-dependent manner.

7. An evolving complex system approach: the actors of the model live in a complex system, which may change as time goes by.

8. Endogenous and persistent innovation: structural changes may evolve in an endogenous manner during the agents' decisions.

Agent-based macro models consist of successive discrete periods, which are usually quarters or months. While in new Keynesian models everything is determined in a simultaneous manner in the individual periods, in agent-based models the events follow one another in a pre-determined order in every period, and previous events may affect later decisions. Accordingly, an agent-based model is a sequence of events. The logic of the model does not exclude the parallel occurrence of some events (for example, companies may make decisions in parallel with one another concerning the quantities to be produced).

Agent-based modelling is practically a computer simulation where the successive algorithms are programmed rather than deducing the equations of the model. Typically, an object-oriented programming language is used, as it is easy to match the agents to the objects. Each agent (object) has its own parameters and variables, which may change depending upon the developments in the model. And each agent has its own methods (which often depend on parameters or other variables), for example how a company decides on production in a given period or how a consumer decides on its consumption in a given period.

It is possible to create a wide range of modelling structures in agent-based macro models, but for the time being there are not many established rules as opposed to DSGE models. However, there is an unwritten rule in connection with the banking sector: agent-based macro models model the banking sector in a way that banks create deposits in parallel with the extension of loans, as it is in reality. It would be easy to incorporate the approach that banks lend on the savings, but as agent-based models would like to use assumptions that are as close to reality as possible, they immediately implement the real operating mechanism of the banking sector.

DSGE models are fully consistent models, which also relates to the accumulation of wealth, including the accumulation of capital and financial assets as well: it is clear from what resources the capital is created, and together with financial wealth, financial liability of the same degree also emerges immediately. The equations of the model automatically provide for the above. As agent-based modelling is not about solving equations, attention must be paid upon launching the model (when giving the initial values) that the pecuniary variables of the individual agents should be in harmony with one another at the macro level as well: an actor can have financial savings only if another one has debt, including banks' balance sheets as well. It also needs to be considered that the wealth of households, corporations and other actors should be in conformity with the real assets of the economy. And it must be taken into account not only when giving the initial values, but also upon updating the variables of each actor as well as during the various decisions and transactions. The models built up this way are called *stock-flow consistent* models. While DSGE models are inevitably stock-flow consistent as a result of budget constraints and equilibrium equations, special attention must be paid to this aspect in the case of

agent-based models. Consistent modelling of financial assets and other components of wealth is greatly facilitated by the application of the *balance sheet matrix* and the *transaction flow matrix*. These matrices contain values aggregated by type of actor, and demonstrate in a transparent manner what other actors' debt the individual actors' wealth is coupled with in the given state of the model (*balance sheet matrix*), and how the components of wealth change during a given period (*transaction flow matrix*). In parallel with that, it is worth preparing the individual balance sheets of each type of actor as well.

Stock-flow consistent models are based on *Copeland's* (*1949*) *quadruple entry principle*: double-entry accounting is applied in the case of both participants of a transaction. *Godley and Lavoie* (*2007*) developed it further, and discuss the origin and flow of credit, money, income and wealth in a fully consistent framework within a Keynesian economy. Although their model is not agent-based, almost all of the models presented are based on their stock-flow consistent approach. This approach comprises endogenous money, which (in parallel with the monetary base) is created by lending, and banks create deposits by lending, and do not lend on the deposits collected before.

There are many types of agent-based macro models, but in recent years three approaches have started to emerge, which serve as a starting point for other research as well. One of the basic models was developed by *Delli Gatti et al.* (*2011*); their paper provides an intelligible and at the same time thorough introduction to the agent-based paradigm. The model is based on relatively simple rules, which provide a good illustration of the market adjustment mechanisms as well. The EURACE model (*Deissenberg et al. 2008* and further developments), on the other hand, attempts to involve many segments of reality at the same time, but as a result, tracking the mechanisms is more difficult. *Dosi et al.* (*2015*) present a model which is sufficiently complex for examining fiscal and monetary policy issues as well, but the mechanisms still remain more or less transparent. The chapters below present an enhanced version of each model, which better focus on the banking sector.

In reviewing the models we present their basic assumptions, and in connection with their explanatory power we briefly mention what empirical observations they can reflect. However, we do not discuss the subjects of calibration and validation (for that see e.g. *Grazzini and Richiardi 2015*, *Grazzini et al. 2017*, and *Lamperti et al. 2018*).

The review of the selected models facilitates the understanding of agent-based macro models and the presentation of the divergent assumptions used by the researchers of this school to create models. It is worth mentioning, however, that other models also exist, which are more or less similar to one another and to the models to be presented, and maybe one of these other models will become the

prevailing one in the future. *Caiani et al.* (*2016*), for example, describe a stock-flow consistent model that they expressly intend to use as a benchmark for future models, and they also present a method that can be applied for determining the initial values.

Chiarella and Di Guilmi (*2011*) examine the transmission of the fragility of the financial sector to the real sector in the case of financial crises, then they also look at how various fiscal policy and regulatory steps may affect the outcome of the shocks (*Chiarella – Di Guilmi 2012*). *Salle et al.* (*2013*) in their agent-based model attempt to remain as close to the new Keynesian traditions as possible, while the actors' expectations are determined by simple rules, which also change through learning. *Salle* (*2015*) expands it further with information provided by the central bank.

Delli Gatti et al. (*2010*) model the financial accelerator, where lending networks evolve between the individual companies and banks. *Riccetti et al.* (*2013*) completed this model with multi-period loans, while *Riccetti et al.* (*2016*) introduced companies' market capitalisation, and also carried out monetary policy examinations.

In spite of its relatively simple assumptions, the model of *Popoyan et al.* (*2017*) is already able to examine the interaction of monetary and macroprudential policies, and in respect of the banking sector the significance of research of this kind is increasing. Their model is based on an earlier version of the model of *Ashraf et al.* (*2017*).

Krug (*2018*) also examines the interaction of monetary policy and macroprudential policy, and the corporate sector is based on *Stolzenburg's* (*2015*) agent-based, Solow-type growth model.

3. Macroeconomics from the bottom-up

Delli Gatti et al. (*2011*) wrote a book on their agent-based model entitled *Macroeconomics from the Bottom-up*. The bottom-up approach is true for all agent-based models. The objective of the book is to provide an introduction to agent-based modelling, also presenting a prototype model, a simpler version of which can already be found in the work of *Delli Gatti et al.* (*2008*). The model already includes a simple lending banking sector as well. Below is a presentation of its version further developed by *Assenza et al.* (*2015*), where the banking sector also receives more emphasis.

There are three types of actors in the model: households, firms and banks. Households either make a living from wage income (workers) or from dividend income as owners of firms (capitalists). Each capitalist owns one firm. Distinction is

made between consumption-good firms (*C* firms) and capital-good firms (*K* firms). *C* firms produce the homogeneous consumption good with the help of labour and capital, whereas *K* firms produce capital goods using labour. Technology is linear in both sectors of production: labour productivity is constant in both sectors, while capital and labour are perfect complements in the consumption-good sector.

Firms and households may also accumulate financial wealth in the form of deposits, and firms may borrow in order to finance production costs or investment if they do not have sufficient financial wealth, i.e. deposits, to cover their expenses during a given period. There is no cash in the model; all financial transactions are carried out through the banking sector. For the time being, the model disregards competition among banks and the liquidity issues of the banking sector. Therefore, as a simplification, in addition to the central bank there is only one commercial bank, but it allows for an adequate examination of the role of lending in cycles. Capitalists have equal shares in the bank.

In total, there are 4 markets in the model: consumption goods market, capital goods market, labour market and credit market. Firms produce the same product in the consumption goods market, but sell it at different prices. Labour is homogeneous, and each firm pays the same amount of wage in all periods. Companies receive loans in the credit market with an interest rate determined on the basis of their riskiness, which also affects the amount that can be borrowed.

During a given period, the sequence of events is the following:

1. Depending on the planned output, companies advertise new vacancies in the labour market if they need more labour than in the previous period. Otherwise, they randomly dismiss as many employees as justified by the lower production.

2. The labour market opens: the unemployed randomly contact a determined number of firms, and they are employed by the first firm where there is still a vacancy (new employees stay with the given firm until it dismisses them).

3. Based on previous periods' data, the bank estimates a logistic regression for the probability of default of the companies that apply for loans.

4. If a company needs further funds in addition to its deposits for the payment of wages or for its investment costs, it applies for a bank loan. The bank decides on the interest rate on the newly disbursed loan and on the size of the loan that can be granted depending on the riskiness of the company in question.

5. If a company did not receive a large enough loan, it randomly dismisses a sufficient number of its employees to be able to pay the wages of the remaining ones. Production takes place in both sectors, and companies pay their employees' wages. A given percentage of the capital used for production depreciates.

6. The capital goods market opens: *C* firms randomly contact a specified number of *K* firms, and purchase from them until they reach the size of their planned investment (or until the individual *K* firms run out of their inventories or the *C* firms run out of money). Capital goods are durable, so unsold capital goods remain in stock (and will be on sale again in the next period).

7. Households decide on their consumption expenditure in the given period.

8. The consumption goods market opens: each household can see the prices of a specified number of firms, and always purchases from the cheapest firm until running out of its money earmarked for consumption (and still there is product for sale at the firms that it contacted randomly). Unsold products are scrapped.

9. The firms pay interest and repay the adequate part of their loans. In the case of positive profit, they pay dividends to their owner.

10. In the case of positive profit, the bank disburses dividends to the capitalists.

11. The *C* firms put into operation the newly purchased capital goods.

12. To replace firms that went bankrupt, their owners set up new ones from their own savings.

13. The *C* and *K* firms decide on the magnitude of production and the price of their product planned for the next period, and *C* firms also decide on the size of the planned investment.

In deciding on production and pricing in a given period, consumption-good firms take into account how the price of their product in the last period compared to the average price and whether there was excess demand for or oversupply of their product. In a given period, a firm changes either the magnitude of the planned production or the pricing. For example, if a firm in the last period sold at a price that was higher than the average, and still there was excess demand for its product, in the next period it plans to increase its output in proportion to the size of the excess demand, whereas if there was excess demand for its products while selling at a lower price than the average, the firm plans to raise the price and not its production. *K* firms also decide on production and pricing based on a similar logic.

When deciding on investment, firms take into account how much capital on average they had to use for production during the previous periods (with exponential weighting). The model comprises a long-term rate of capital utilisation, and firms invest as much as necessary to be able to produce with a capital utilisation that complies with this rate. The rate of capital utilisation is less than one, as a result of which firms can expand their production in the short run if needed.

A household's income in a given period consists of earned income or – in the case of capitalists – of dividends received from their firm (and the bank). When households decide on their consumption expenditure, they estimate their permanent income as the exponentially weighted average of the previous periods' incomes. Their consumption expenditure equals their permanent income and a certain proportion of their financial savings.

Households and companies keep all of their financial assets on an account held with the commercial bank. The bank does not pay any interest on the deposits, but by creating deposits it may extend loans, for which the bank charges a specific interest. In the case of the *C* and *K* firms, based on previous observations, the bank estimates a logistic regression for the probability of default using the individual firms' leverage. The resulting logistic regression systematically underestimates the probability of default in the case of firms that are about to go bankrupt (where the leverage ratio is too high). Firms may borrow every year, and they repay these loans separately, at the interest rate specified upon borrowing. In the case of all loans, a decreasing proportion of the original amount is repaid in the individual periods. When the bank determines the interest rate upon extending the loan, it takes into account the interest incomes expected during repayment as well as the expected principal loss with the help of the aforementioned logistic regression. The capital requirement is not applicable to the bank, but its credit supply is limited by an internal rule: in a given period the maximum amount of new loan disbursed to a company is such that the expected principal loss estimated on the basis of the logistic regression (probability of default × extended new loan) must not exceed a pre-determined proportion of the bank's equity. Accordingly, growth in the bank's capital stock increases the maximum size of loan that can be extended to a single firm, whereas in the case of a decline in the bank's equity an increasing number of firms may be bound by the credit constraint.

The model is stock-flow consistent; the relations between the individual actors' balance sheets are shown in *Table 1*. The balance sheet matrix reveals that the individual actors' financial wealth is coupled with the debt of other actors in the model. Therefore, the initial balance sheet data included in the individual agents' balance sheets also have to be given in a way that they should be in conformity with one another at the aggregate level. Following that, by applying quadruple entry accounting it can be ensured that the balance sheet relations are met at the aggregate level as well.

Table 1
Balance sheet matrix summarising the balance sheet items of the different types of agents

Balance sheet item	Households	C firms	K firms	Bank	Central bank	Total
Capital		K				K
Inventories		Δ^C	Δ^K			Δ
Deposits	D^H	D^C	D^K	$-D$		0
Reserves				R^B	$-R^B$	0
Loans		$-L^C$	$-L^K$	L		0
Government bonds					B	B
Equity	$-E^H$	$-E^C$	$-E^K$	$-E^B$		$-(K + \Delta + B)$

Note: Negative values constitute the liabilities side of the individual actors' balance sheets, whereas the positive values represent the assets side. K=physical capital at book value, Δ=inventories, D=deposit, R=reserves, L=loan, B=government bond, E=equity (financial wealth in the case of households)

Source: Assenza et al. (2015)

In the model, slight oscillations appear erratically around the long-term GDP, interrupted sometimes by significant downturns, with slow recovery. Comparing the GDP, investment, consumption and unemployment time series of the United States with the relevant time series of the model, we receive similar standard deviations and autocorrelations for the HP-filtered cyclical terms of the individual variables (there is only a major difference in the standard deviation of investment, which is double the empirical value in the model). The correlations with GDP of the lags of the individual variables also show developments similar to empirical observations.

Based on the model, by examining the flow of liquidity between sectors it is easy to understand the outbreak of major crises: prior to the outbreak of the crisis, *C* firms have 30 per cent of the liquidity that is in the system, whereas during the big crisis it declines to 5 per cent, while liquidity at *K* firms increases from 20 per cent to 60 per cent. During the upturn, *C* firms invest more and more, and the demand for capital goods increases, so their price also starts to rise. In parallel with this, the liquidity of *C* firms declines with the increase in their investment expenditures. Moreover, they have to take out more and more loans for that. With increasing the indebtedness of *C* firms, risks build up in the sector, the bank lends at increasingly high interest rates, and in addition, due to the vulnerability, for more and more firms it limits the size of the loans granted. This results in a fall in aggregate demand, which increases firm leverage and the probability of default through the decline in profits, thus further reducing bank lending. This mechanism exacerbates the recession. Finally, outstanding debt starts to decline in the consumption sector during the crisis, then the share of *C* firms in liquidity begins to rise, and bank lending also starts to increase as a result of the sounder structure.

4. Real estate price bubbles and business cycles

Supported by the European Union, the development of the EURACE model started in 2006 with the original aim of creating an agent-based model with a high number of agents, depicting the whole European Union. Due to its complexity and the required high computational capacity, programming for implementation of the model is being done in an environment developed especially for this purpose, called FLAME (Flexible Large-scale Agent Modelling Environment). *Deissenberg et al.* (*2008*) present the planned building stones of the model. The final model would comprise all the Member States, with the corporations, households, shops and other agents distributed in space. In addition, the EU is planned to be examined as an open economy, and energy would also be taken into account among the inputs. Agents' decisions may even cover daily activities. The final model is not ready yet, but various articles present some of the model versions of EURACE (e.g. *Cincotti et al. 2012*, *Raberto et al. 2012*, *Holcombe et al. 2013*).

This chapter presents the model called ICEACE (*Erlingsson et al. 2014*), which contains many simplifications compared to the EURACE model, but expands it to include the housing market and the construction sector. In the model, the effect of mortgage lending on real estate prices is examined, and changes in real estate prices have a direct impact on consumption and construction activity. Accordingly, on the whole, the correlation between mortgage lending and the real economy is examined in the model, while financial stability questions related to mortgage lending are also analysed.

Actors in the model are producers (consumption-good firms, construction firms), commercial banks and households as well as an equity fund, a central bank and a government. Both firms and households may borrow.

Both consumption-good firms and construction firms use labour for their production, based on linear technology. All companies have physical capital as well, the level of which is constant. In the case of consumption-good firms, it does not affect production, but the value of physical capital has an impact on the size of equity. In the case of construction firms, the size of physical capital functions as an upper limit for production. Firms may become indebted, but they do not borrow directly for production. They borrow to be able to pay dividends when liquidity is insufficient and also to be able to pay their interest expenditures. Regarding the loans, they do not repay them; they always only pay the interest on the principal.

Consumption-good firms price on the basis of unit cost, but the unit cost includes interest expenditures as well. Each consumption-good firm adds the same markup to its own unit cost. Every month, firms try to produce as much as necessary to be able to meet the expected demand taking into account their inventories remaining

from the previous period. Expected demand corresponds to the sales in the previous period, but if there are no remaining inventories, expected demand is increased to a specific degree. In order to avoid unnecessary oscillations, planned production is also adjusted with the help of a relatively simple formula.

In the housing market, homogeneous housing units are exchanged, purchased by households. The sellers are households and construction firms. Construction firms decide on new production every month, but completing one unit takes 12 months. The production rule is very simple: in the case of rising housing prices the individual firms randomly increase their respective production level, which is a random integer between their current production and the maximum production level determined by their physical capital, and in the case of declining housing prices it is a random integer between 1 and their current production level. Accordingly, when housing prices grow, individual production and aggregate production also increase, and when housing prices decrease, production also declines. Construction firms place the newly completed units as well as previously completed but not yet sold units on the market. Households will be sellers with determined probability in a given month (normal sellers), and they will be buyers as well with the same probability. In addition, households also have to take a unit to the market (they have to try to liquidate it) if they become too risky debtors, which is the case when their quarterly credit cost exceeds a certain percentage of their previous quarter's income. Seller households also take one unit to the market each, and each buyer also purchases one unit in a given month. Construction firms and the randomly selected seller households take their units to the market with a markup originating from even distribution, and in the market they add the markup to the average price of the previous period's transactions. The households forced to liquidate choose a price below the average price of the previous period's transactions from even distribution. The households selected for purchasing come one after the other in a random order, and they always buy the cheapest unit that is still for sale. If the given buyer does not have sufficient liquidity, he applies for a mortgage loan from a bank chosen by him. He receives the loan if the sum of the instalments of his outstanding loans and of the new loan does not exceed a pre-determined part of his quarterly income. The mortgage loans are variable-rate ones, but with fixed maturity.

Households decide on their consumption expenditure on the basis of the buffer-stock theory every month (*Carroll 2001*, *Deaton 1992*), for which they take their quarterly net income reduced by the instalments as a basis. However, consumption calculated on the basis of the buffer-stock theory is adjusted for the wealth effect stemming from the changes in real estate prices, i.e. they will consume more if real estate prices rise, and less when real estate prices decline.

Banks can only lend if their equity exceeds a part of the loans they extended, i.e. there is a capital requirement in the model. If the capital of the individual

borrowing companies is relatively too low or if certain households' repayment burden is relatively too high, banks write off an adequate portion of the loans concerned, which reduces their equity and thus their credit supply as well.

Every month, the central bank decides on the base rate using a Taylor rule. The government collects taxes, and provides unemployment benefit and general transfers to households. It may change their amounts from time to time, but strives to achieve a break-even balance.

Firms and banks pay dividend to the equity fund, and the equity fund distributes it among households and may provide funding from it to firms that have not received loans from commercial banks but can still be considered well capitalised.

Certain events in the model take place with quarterly frequency, others with monthly or weekly frequency. The events of a quarter can be divided into two: monthly-frequency events take place first, followed by the steps closing the quarter. Accordingly, the sequence of events is as follows:

Monthly-frequency events (three times in succession within one quarter):

a. Firms (including construction companies) decide on the level of production planned for the given month and on the prices, and determine the amount of labour required for the planned production.

b. The events listed below follow one another in the labour market:

   i. The firms that want to increase their labour utilisation raise the wage offered by them by a certain percentage. They offer jobs for the vacancies.

   ii. The firms that want to reduce their use of labour dismiss an adequate number of employees (who become temporarily unemployed).

   iii. Every employee may leave their workplace with specified probability, looking for higher salary. Firms offer new jobs for the resulting vacancies. These employees accept the best paid jobs one by one (until there is a vacancy offered).

   iv. Unemployed households accept the best paid jobs one by one (until there is a vacancy offered).

c. The events listed below follow one another in the housing market:

   i. Construction firms place their completed units on the market, and the households selected randomly to be sellers as well as the households obliged to fire sale place one unit each on the market at an adequate price.

   ii. One after the other, the randomly selected buyers purchase the cheapest available unit, provided that they have sufficient liquidity or they are able to take out a mortgage loan. If the seller had a mortgage loan, he reduces his principal debt from the income.

d. Households determine their monthly consumption expenditure.

e. Consumption-good firms determine the prices of their products.

f. Households consume every week (four times in a row): arranging them in random order every week, one after the other they try to spend the relevant portion of their monthly consumption expenditure at a randomly selected company (provided that the given company has enough products). The lower the price of a company's product, the higher the probability that households will choose the given company. Unsold products remain in stock.

g. Employed households receive wages from their respective employer companies, and pay income tax to the state, whereas the unemployed receive unemployment benefit from the state. Each household receives the same amount of general transfer from the state.

h. Production takes place using the employed labour: the produced consumer goods are stockpiled, and the housing units whose construction started reach a state one month ahead (if adequate labour is used). The completed products and units become part of the inventories.

i. The central bank changes the base rate.

End-of-quarter events:

a. Households pay instalments to banks. The adequate part of the loans of households with too high instalments is written off. Banks change the mortgage interest rates depending on the base rate.

b. Firms apply for loans if they do not have sufficient liquidity for dividend and interest payments.

c. If a firm has not received a sufficient amount of loan, it reduces the intended dividend disbursement, and applies for capital to the equity fund.

d. If a firm was also unable to receive funds from the equity fund, it goes through an illiquidity procedure, during which a part of its debt is written off. In the case of firms with negative equity the entire debt is written off, and new firms enter the market instead of them.

e. The firms pay interest to the banks, and the companies and banks pay dividend to the equity fund.

f. The equity fund pays dividend to the households, and the households pay taxes on the dividend income.

g. The government changes the rates of taxes and degree of transfers.

In the model, households may only receive a mortgage loan if the sum of the instalments including the new loan does not exceed a certain (β) part of their income. Accordingly, higher β means riskier, while lower β represents more cautious bank lending. The model was run with several β values, and the higher ones resulted in higher house prices and more volatile GDP. In the case of a sufficiently high β, the model generated business and housing price cycles as well in an endogenous manner, whereas the higher β resulted in higher fluctuations. This is attributable to the feedback of mortgage lending to the housing market and the real economy. In the case of a higher β, an increasing number of households can purchase more and more housing units in the housing market, initially pushing up the housing prices in every period. The rise in housing prices affects the real economy in two ways: firstly, as a result of the price increases, construction firms build more, and boost their labour demand and the wages paid, which adds to households' consumption. Secondly, the rise in housing prices also encourages households to consume more through the wealth effect. As a result of the increased consumption, not only construction firms but consumption-good firms also raise their production. The looser the credit constraints, the faster the GDP growth is initially. However, during the upswing, in parallel with the rise in housing prices, households become increasingly indebted as a result of purchasing increasingly expensive housing units. During the upswing, the central bank also raises the base rate, resulting in further growth in households' instalment burdens. As households consume on the basis of their net quarterly income reduced by the instalment, after some time the economic growth and the wealth effect become unable to offset the negative impact of the increase in instalments on consumption. Moreover, in the case of certain households the instalment may become so high with the increase in the base rate that they may be forced to liquidate a housing unit, or they may even become non-performing, especially if they become unemployed. As a result of fire sales, housing prices start to fall, which deepens the recession through the decline in construction activity and the wealth effect. The first recession mainly results in households' becoming non-performing, which is less typical of companies, although

their capital declines. During the second cycle, the weakened firms amplify the cycle: following the first recession, with the normalisation of housing prices and a decline in households' indebtedness, a new growth period may start, but the firms begin the second cycle with lower capital in the model. When the economy turns into recession again, in addition to households, firms also become increasingly non-performing, which further erodes the lending capacity of commercial banks through a major fall in the equity of the banking sector, and deepens the recession even further.

The model highlights the feedbacks between mortgage lending and the real economy well, but at the same time the modelling of the housing market disregards many frictions, assuming that households increase or reduce their housing wealth by one unit at a time. Nevertheless, there are agent-based housing market models, in which complete real estates are exchanged. *Axtell et al.* (*2014*) model the housing market of Washington, D.C. on the basis of actually observed transactions, and their model also results in the cyclical change of housing prices. *Baptista et al.* (*2016*) also model the sale and purchase of complete homes instead of parts. They distinguish buy-to-let investment, and in their model the presence of investors results in the amplification of housing price cycles. *Mérő and Vágó* (*2018*) built a demand-led housing market model based on Hungarian data. In addition to generating housing price cycles they examined the effect of the macroprudential instruments that regulate the lending for housing. All the three models generate households and/or homes setting out from micro databases. Although the latter models use more realistic assumptions regarding the housing market, for the time being, real economy feedback is missing from them.

5. Credit cycles and countercyclical capital buffer

Dosi et al. (*2015*) present an agent-based model in which demand rests on Keynesian foundations, while technological development rests on Schumpeterian foundations, and in which they can analyse the effects of both fiscal and monetary policy decisions. *Dosi et al.* (*2006*) present the first model version in which the business cycles already evolve in an endogenous manner. This model was expanded in several steps (*Dosi et al. 2008, 2010, 2013*).[1] *Hosszú and Mérő* (*2017*) took the version published in 2015 as a basis for elaborating a model in which they were able to generate longer lending cycles than business cycles, as is observed empirically as well (*Drehmann et al. 2012*). They simplified some of the assumptions of the model, but made lending more complex. Due to the detailed banking sector and the generation of credit cycles this version is presented below.

[1] Regarding the further versions of the model, see e.g. *Dosi et al.* (*2017a*, *2017b*).

The model (similarly to the other models presented) contains one consumption good, which is produced by heterogeneous firms and can be sold at different prices. The consumption good is produced with the help of labour and physical capital. The capital is produced by heterogeneous capital-good firms using labour, and in the different periods they are able to produce capital of various productivity. Households offer their homogeneous workforce to consumption-good and capital-good firms, and consume. Consumption-good firms may take short- and long-term loans from commercial banks, although the latter are represented by one bank, considering that the model does not examine the vulnerability of individual banks or the competition among banks. In addition to market participants, the model contains three authorities: central bank, government and macroprudential authority. The central bank acts as lender of last resort, but keeps the base rate at an unchanged level. The government collects taxes and gives unemployment benefit to the unemployed households, and helps the commercial bank in the case of bankruptcy. The macroprudential authority determines the countercyclical capital buffer rate in all periods. Monetary policy and fiscal policy are exogenous, and the model puts the emphasis on the examination of the macroprudential policy, which can be examined due to the fact that the model generates credit cycles of adequate length (even as long as 20–25 years) (cf. *Schüler et al. 2015*).

As in the other two models presented, there is no cash in this model either; both firms and households keep their money in deposits at the commercial bank, while the account of the state is managed by the central bank. In the case of the state's indebtedness, both the central bank and the commercial bank may hold government bonds.

Consumption-good firms produce using capital and labour. Each unit of capital allows the production of one unit of consumption good, i.e. the capital stock determines the capacity of the consumption-good firm. However, there may be differences in productivity across the individual capital goods, which shows how many units of labour are required for producing the consumption good using the given capital. A consumption-good firm always purchases capital from the same capital-good firm, but the company it is in contact with may offer capital goods of higher and higher productivity in the various periods.

Firms' production decision depends on the demand in the previous periods. They quantify their expectation regarding the demand in the given period accordingly, and they try to produce enough to have some surplus above the expected demand (however, the unsold stocks cannot be taken over to the next period). If they cannot achieve the production level planned for the given period due to insufficiency of their capital stock, they have expansion investment demand. However, in addition to expansion investment demand, replacement investment is also possible for them, which means the replacement of the less efficient capital stock, and thus their unit

cost will decline. The size of the replacement investment is determined on the basis of a simple rule: they try to replace that part of their capital stock with capital available for them in the given period in the case of which the saving on the unit cost is recovered within a certain period of time.

Labour is homogeneous, and wage is determined at the macro level, so each firm pays the same amount of wage. Consumption-good firms have to pay the wage and the investment costs before they realise income from the production of the given period. Based on the planned production and investment, consumption-good firms quantify their expenses for the given period, and if they do not have sufficient deposits to cover these expenses, they apply for bank loan: they apply for short-term working capital loan to cover labour costs and for long-term investment loans to cover investment.

Capital-good firms receive the price of the capital good together with the order, and thus they do not have any liquidity issues, and they do not borrow. The technology of all capital-good firms is hit by a small idiosyncratic positive shock, as a result of which the efficiency of the capital produced by them improves to different degrees. At the same time, with a certain probability, firms may copy the technology of another, randomly chosen company. In addition to the idiosyncratic shock, with a low probability, the economy may also be hit by a larger exogenous shock as well, which improves the technology of a randomly chosen firm. However, as a result of learning (copying), this technology slowly spreads in the economy.

There are four ways for households to gain income: their primary income is the wage, but they are also the owners of the firms and the commercial bank, and thus they may receive dividend income from the profits of the firms and the bank. If they are unemployed, they receive unemployment benefit from the state, and the bank credits them with interest on their savings (which mean their bank deposits). In each period, households spend a certain portion of their permanent income on consumption, and they determine their permanent income as the exponentially weighted average of the previous periods' income (taking account of the sources of income listed above). Consumption expenditures are distributed among the individual firms according to their market shares. The market shares of firms depend on the relative price of the good produced by them as well as on the earlier market share. The former condition facilitates competition, while the latter one takes stickiness into the system.

Consumption-good firms compute the average labour cost they can produce the product at, and they add some markup, the degree of which may vary. If a company was able to significantly reduce the unit cost as a result of its replacement investment, it applies a higher markup, but in a way to keep the price of its product competitive. This higher markup declines during an autoregressive process. As

a result, the increase in productivity initially raises the profitability of the individual companies, before feeding through into real wages with the decline in the markup.

The lending activity of the commercial bank is regulated by the capital requirement, and the latter also contains the countercyclical capital buffer rate. The macroprudential authority determines the value of the countercyclical capital buffer rate (CCB_t) for the given period in line with the Basel III requirements; namely, in the case of expansion, on the basis of the previous period's credit gap (GAP_{t-1}):

$$CCB_t = \begin{cases} 0\%, \text{if } GAP_{t-1} \leq 2\% \\ 2.5 * (GAP_{t-1} - 2\%) / 8\%, \text{if } 2\% < GAP_{t-1} \leq 10\% \\ 2{,}5\%, \text{if } 10\% < GAP_{t-1} \end{cases} \quad (1)$$

The capital buffer is eased by the macroprudential authority if there is a decline of at least 5 percentage points in the credit-to-GDP ratio (compared to the trend of the GDP).

The commercial bank ranks the firms on the basis of the return on sales, and satisfies the loan applications on the basis of this ranking, as long as its equity allows it. However, first it disburses working capital loans, and switches over to the disbursement of investment loans when it has satisfied demand for working capital loans at all of the companies. As a result, if the credit supply is tight, the volume of investment loans declines first, leading to higher volatility in investment. At the end of each period, firms repay the working capital loan with interest on it, but in the case of investment loans they only pay off a certain percentage of the outstanding debt. If, however, a company's loans outstanding exceed a given percentage of its production costs, or if the growth rate of the loans outstanding is too high, it prepays a certain amount depending on its liquidity.

In the model, each period corresponds to a quarter. For transparency, in the case of this model as well we disclose the sequence of events in the individual periods, also highlighting some further details of the model:[2]

1. Nominal wages are defined for the given period. The macroprudential authority determines the level of the countercyclical capital buffer.

2. Consumption-good firms set their prices.

3. The technology of capital-good firms sustains an idiosyncratic shock; the capital-good firms determine the price of the capital produced by them and send out the price and the technological characteristics of their capital goods to the consumption-good firms in contact with them.

[2] The list was taken from the original article word for word.

4. The bank determines the volume of loans that can be still disbursed and ranks the firms based on their creditworthiness (profitability).

5. Consumption-good firms define how much to produce during a given period and how much to invest for the purposes of capacity increase and replacement (productivity increase). Depending on corporate deposits and the amount of money necessary for production and investment, firms submit their loan applications to the bank.

6. The bank grants loans to the firms in consideration of its credit constraints. Loans are granted on the basis of the pre-defined corporate ranking: firstly, the bank disburses working capital loans required for production during the given period. This is followed by investment loans also based on the firms' ranking.

7. Production: if consumption-good firms received only a portion of the loan amount for which they applied, they first try to achieve the targeted production level and intend to use only the remaining liquid resources for investment, conveying their investment intention to the capital-good firms they are in contact with. Both capital-good firms and consumption-good firms hire the required number of employees and pay wages, while the goods produced are placed in inventory. After production, a part of the consumption-good firms' capital depreciates. The state pays unemployment benefits to the unemployed.

8. Consumption: the market share of consumption-good firms evolves, while households determine their consumption expenditure. Households distribute their consumption expenditures among the various firms based on their market share, but in the event of excess demand, they may even purchase from corporations with excess, ignoring the market share. Firms purchase capital goods, install them and replace the necessary quantity.

9. End-of-period cash flows:

   a. the firms pay tax to the state; interest payments in a determined order: the firms pay interest on their loans outstanding at the end of the previous period and on their working capital loans in the given period; the bank receives interest on the government securities it held at the end of the previous period; the bank pays interest on the closing deposit stock of the previous period and on its central bank loan outstanding (if there was any) at the end of the previous period.

   b. the firms try to repay the working capital loans, and finally they also repay a specific portion of their closing stock of investment loans for the previous period;

c. the government bails out the bank if the bank's own funds are insufficient and it fails to comply with regulatory requirements;

d. the firms pay dividends to the households;

e. the bank pays taxes to the government and then pays dividends to the households;

f. at the end of the period, we record the debt owed by the various agents and their interest payment obligations for the next period based on the prevailing interest rates.

In the model, the economic cycles evolve as a result of low-probability but significant exogenous technical shocks, leading to an increase in the GDP growth rate in the medium term. Productivity growth starts from one firm, but as a result of copying the technology it spreads in the economy, and accordingly an increasing number of firms replace some of their respective capital stocks with more efficient capital. The persistence of productivity growth is a result of the spread of the technology. The increased investment demand reduces unemployment and adds to consumption, as a result of which firms carry out not only replacement investment but capacity increasing investment as well, amplifying GDP growth. With a decline in investment, the GDP growth rate also starts to decrease.

During economic expansion, firms have to borrow more for the higher investment. Consequently, long-term loans outstanding increase. However, when GDP growth declines, loans outstanding start to decrease only slowly, and thus in the case of the next economic cycle the firms increase their investment against the background of higher indebtedness, resulting in a further rise in loans outstanding. Accordingly, credit cycles may be longer than economic cycles. During the next upswing, the higher level of loans outstanding imposes a greater repayment burden on companies. However, not every company can afford to offset the repayment burden with the same ease. Loan repayment is typically less difficult for those companies that start replacement investment at the beginning of business cycles (innovators). Their production costs are lower than those of other companies, and therefore their profitability increases, allowing them to offset the repayment burdens. As a result of lower production costs, the innovators' market share grows, as they reduce their markup. By contrast, with their replacement investment the companies that invest later (followers) can only avoid a decline in their market share. As they will not be more efficient than the innovators, their profitability will be lower than that of the innovators. Accordingly, it is more difficult for them to offset the repayment burden, and they repay their long-term loans more slowly. The companies that have weaker technologies and those followers that were more indebted from the outset may go bankrupt after some time, especially when GDP growth starts to

decelerate. As a result, the equity of the commercial bank declines, leading to a fall in credit supply, and thus fewer companies will have access to investment loans, which reduces aggregate demand, resulting in the bankruptcy of even more companies. The model includes a closed economy, and thus the credit constraint may result in an even larger decline in GDP: while in an open economy some of the credit constraint reduces import demand, in a closed economy the credit constraint is entirely reflected in a decrease in domestic aggregate demand.

In the model, two things may attenuate the recession. Firstly, the government may bail out the commercial bank when its equity is insufficient, and thus the decline in credit supply will be lower. Secondly, the countercyclical capital buffer may also contribute to a lower decline in credit supply during recession, as the released capital buffer allows for the extension of new loans. During the model simulations, the countercyclical capital buffer results in slightly lower average GDP growth: firstly, the capital adequacy ratio may bind the lending activity earlier, and secondly, due to the higher capital requirement the bank pays less dividend, which reduces aggregate demand through the lower consumption of households. Nevertheless, when the countercyclical capital buffer is applied, recessions are also smaller, i.e. the macroprudential instrument under review not only increases the stability of the banking sector, but also reduces the cyclical fluctuations in GDP.

6. Comments on the models in the light of experiences

There may be many kinds of agent-based models, although some common features – such as deposit creation by lending and stock-flow consistency – are starting to become standard practices. However, each model has its own world, which is difficult to comprehend at first sight. When setting up DSGE models, in many cases the only question is what equation the authors use to depict the problem under review, while the framework of thinking is practically uniform, and thus the models are easier to understand. Very often the reader can automatically recognise the mechanisms when seeing the structure of the model. However, in the case of agent-based models the mechanisms of the model should be described in a rather detailed manner for complete and sure understanding. It is not enough to just describe the rules, because the readers do not necessarily have sufficient experience to see the set of rules as a coherent entirety. *Delli Gatti et al.* (*2011*) published a book about their model, which allowed them to describe the model in detail, with many references to the mechanisms. Nevertheless, in the case of publications in journals it may require troublesome work from the reader to precisely understand the working of the model.

A great advantage of agent-based models is that upon creating the decision-making rules applied they can relatively easily include empirical observations, although

care needs to be taken as the many applied rules should also remain manageable at the level of the model as a whole. As it is not necessary to keep the model as a whole analytically manageable, the creators of agent-based models are strongly tempted to simultaneously include all kinds of rules that seem to be close to reality in the model. Consequently, the model may become incomprehensible very quickly: although the creator of the model may have an idea about the basic expected results of each rule, the interactions of individual rules need to be understood in detail. In relation to the expansions of the EURACE model it often happens that so many assumptions are included in it at once that the economy is able to show major fluctuations even in a short time. Although the results do not have to be deduced, with the help of some examples it is necessary to think over in the case of each rule what dynamics it may take into the system and why. If we understand the processes, it may also help in the adequate amendment to and complementing of the rules as well. *Delli Gatti et al.* (*2011*) and *Dosi et al.* (*2015*), on the other hand, use fewer assumptions than the EURACE model, and basically also give more likely results in the case of the variables under review.

In agent-based models, smoothing is important when creating the rules (for example, one company should not want to completely satisfy a surge in demand). If no smoothing is applied, some developments may result in bigger and bigger fluctuations. At the same time, care must also be taken to include automatic stabilisers to a certain extent in the model, which are somehow able to prevent the economy from reaching very extreme values. While rational expectations in DSGE models do not allow the model to become extreme, in the case of agent-based models it is easy to create a model in a way that over time the economy either explodes or disappears. For example, in the model of *Hosszú and Mérő* (*2017*), in the case of an inappropriately chosen unemployment benefit any extreme could occur if the indebtedness of the government is not prevented. If the unemployment benefit is too high, aggregate demand may be too high, whereas in the case of too low unemployment benefit aggregate demand may even gradually fade away. Against the background of lower unemployment benefits, this latter mechanism may occur even more often in the model of *Dosi et al.* (*2015*): the consumers do not receive dividends, but as a result, their earned income becomes lower on the whole than the total value of the products sold with a markup on the wage cost, and consequently without having any other source of income the consumers would only be able to consume less and less.

As far as the stylised facts reproduced by agent-based models are concerned, the models highlight those results that exist at least in a qualitative manner, but of course it is not mentioned in how many things the results should be closer to reality. *Assenza et al.* (*2015*), for example, indicate to what extent the standard deviations and autocorrelations of the various macro variables as well as the correlations

between the lags in GDP and the other macro variables are similar to the empirical values, but the endogenous recession that evolved in the model is too protracted.

Agent-based models often refer to the fact that the cycles evolve in them in an endogenous manner. There are 100 companies in the model of *Delli Gatti et al.* (*2011*), and they point out that the endogenous cycle may be caused by idiosyncratic shocks to companies, as opposed to the exogenous productivity shock of DSGE models. At the same time, the size of companies shows a left-skewed distribution, and some relatively large corporations evolve (in an endogenous manner). If, however, the idiosyncratic shock affects one of the large corporations that accounts for a significant portion of the production, this shock is not necessarily far from an exogenous aggregate shock. Nevertheless, for the development of a recession, vulnerabilities continue to build up in an endogenous manner.

The development of agent-based models poses a major challenge to developers: instead of analytical deductions, it is necessary to analyse the direct effect and interactions of numerous rules, and calibration also often requires hard work. The values of the parameters included in the individual rules have to be fine-tuned, otherwise one easily receives dynamics that are far from reality.

Agent-based models may require lots of calculations. In the case of *Assenza et al.* (*2015*) as well as *Hosszú and Mérő* (*2017*) there are still relatively few actors: to compute the decisions of a couple hundred agents at the complexity level applied does not require much calculation. However, when the order of magnitude of the number of agents changes considerably (which was set as a target by the EURACE), running a model may take a long time. This may result in problems during both development and calibration. The codes need to be run very many times during development to understand the processes, to try out the many rules and for troubleshooting as well. During calibration, a lot of running is also necessary in order to find the right parameters. And for an appropriate modelling of the banking sector, the number of agents needs to be increased: for example, in each period, adequate observation regarding the companies that went bankrupt is needed, as if only some companies may go bankrupt on average during a period, loan losses may show too high volatility. If one would like to expand the macro model with a housing market as well, many households also need to be included in order to have a sufficient number of transactions in every period.

7. Summary

As a result of the crisis, more and more economists started to develop agent-based models, instead of mainstream models. At present, in these models it is easier to simultaneously include frictions concerning the real economy, the housing market and lending. Agent-based models increasingly attempt to include the results of

behavioural economics in the assumptions applied, in order to make the modelling as realistic as possible. The banking sector is also depicted in a way that deposits are created by lending. Upon examining the risks inherent in lending, one important aspect is to take into account the heterogeneity of debtors, and if heterogeneity is included in the model on the basis of micro databases, real losses can also be quantified in a better founded manner. As a result of these properties, more and more agent-based macro models are being developed, complemented with an increasingly sophisticated financial intermediary system and/or housing market. For the time being, many models reflect some qualitative features, but other models managed to be calibrated for several quantitative correlations as well. Over time these models may become suitable for providing well-founded simulations for regulatory decisions.

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China in Search of Equilibrium – Transition Dilemmas of Growth and Stability*

Laura Komlóssy – Gyöngyi Vargáné Körmendi

China's economic growth and stability are key not only to the population of China: due to its size and trade relations, it would affect all actors of the global economy to a lesser or greater degree if unexpected events or strong deviations occurred in the world's second largest economy. As major imbalances and risks have accumulated in the Chinese economy in recent years, the professional community is still divided on the question of whether the central government will succeed in soft landing and set the economy on a more balanced and sustainable growth path, or whether an abrupt adjustment is already unavoidable, and it is only the time and severity of the consequences of an economic decline that are questionable. In this essay, we present the policies that ensure sustainable growth, the risks that complicate implementation and the economic policy measures aiming to mitigate such risks.

Journal of Economic Literature (JEL) codes: E61, P21

Keywords: China, new macroeconomic equilibrium, stability risks, soft landing

1. Introduction

Economic growth and the degree of risks surrounding it are *key aspects to the political leadership of China,* as this is one of the cornerstones of the legitimacy of power. Thus, there is a continuous *balancing between achieving short-term growth objectives and ensuring long-term sustainability*; the latter is served by restructuring aimed at enhancing efficiency and by risk-mitigating measures (*Székely-Doby 2018*). However, due to the risks that have accumulated in the meantime, the question of whether a soft landing is actually feasible or an abrupt adjustment is already unavoidable, and it is only the time and severity of the consequences of the Minsky moment[1] that are uncertain, is continually arising.

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* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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[1] This denotes the moment when in an economy several, hidden risks manifest themselves suddenly and simultaneously, and asset prices collapse, followed by a wave of bankruptcies.

In this paper, we review the topics related to sustainable growth: the directions that are meant to ensure this, the risks that hinder implementation – with special regard to those warning about the danger of crisis-like adjustment – and the economic policy steps aiming to mitigate such risks. Accordingly, we present the risks arising from the transformation of the economic structure, the demographic and environmental challenges, the problems stemming from accumulated debt, the risks inherent in asset prices, and particularly in real estate prices, as well as the challenges of the new model related to the financial system. We endeavour to shed light on the individual topics and the correlations between them in a comprehensive manner; however, in view of the diversity of the topics, we are not in the position to elaborate on them within the scope of this paper.

2. Growth objectives and structural reforms

For the last four decades*, the primary objective of the Chinese reforms and economic structural adjustment has been to improve efficiency on a continuous basis.* This is only one tool[2] in the partial changeover from a planned economy to a market economy. Consequently, the rapid, full economic transition seen in Central and Eastern European countries did not occur in China; instead liberalisation occurred and occurs only in the areas designated by the political leadership at any given moment. The current meaning of dynamic growth has changed significantly in past decades. *While it previously targeted double-digit growth, today a much more moderate growth is deemed feasible.* Recognising and having this accepted was an extremely important step for the central administration. When the growth target related to 2020 was announced in 2012,[3] it not only made clear that average growth will be substantially lower than before, but also that the *central government is strongly committed to achieving the designated new level.*

As a result of the current opportunities, the accumulated risks and the international environment, *the growth strategy has changed considerably several times.* Initially, the reallocation of labour force from agriculture to industry commenced by establishing rural enterprises, and later by opening towards foreign investments and technologies. All of this resulted in a major increase in labour force efficiency (*Hu – Khan 1997*) and also raised the capital level. In the early 2000s, an export-oriented growth strategy increasingly came to the fore, which, however, was no longer sustainable after the economic crisis of 2007–2008. Then, efforts were

[2] The Communist Party of China still refers – as its ideological fundament – among other things, to Marxism-Leninism and Maoism. http://english.cpc.people.com.cn/206972/206981/8188424.html. Downloaded: 14 December 2018

[3] On 8 November 2012, at the opening ceremony of the 18th National Congress of the Communist Party of China, President Hu Jintao set the target of doubling China's 2010 GDP and per capita income in respect of both urban and rural population by 2020. http://en.people.cn/90778/8010379.html. Downloaded: 10 November 2018

made to substitute flagging external demand by further increasing the already high investment ratio. However, the risks and constraints of this became obvious in a few years, making a changeover to a new strategy imperative. *The new direction intends to ensure steady growth by stimulating domestic consumption,* by strengthening the service sector and modern industries, and pushing heavy industry to the background. *The central government has lately referred to this as structural adjustment from high-speed growth to high-quality growth.*[4] The changeover and the management of the problems accumulated as a result of the previous models are a substantial challenge. This is further complicated by the challenges of the international environment, the demographic processes and the environmental issues.

2.1. In search of new macroeconomic equilibrium

Chinese economic growth can be regarded as the economic success story of the past four decades. Together with the growth of its economic size and openness to the global economy, it also gained increasing importance. In the past four decades, as a result of its economic opening, China had easier access to foreign capital, it deepened its role in the global value chains, and its economic growth also significantly accelerated – particularly from 2001, when the country joined the World Trade Organisation (WTO), which was accompanied by gradual improvement in the standards of living and a distinct fall in the poverty rate (*Gyuris 2017*). Over the past four decades, China transitioned from being one of the poorest countries to being the second largest economy in the world, already accounting for one-third of global economic performance.

However, China *now increasingly faces two interconnected challenges: decelerating growth and an increase in inequalities.* While in 2007 real GDP growth exceeded 14 per cent, this rate has halved in recent years and in 2017 the rate was only around 7 per cent. This *deceleration is mostly attributable to structural factors,* as the impact of factors supporting the earlier rapid convergence is gradually wearing off. As a result of the one-child policy, the population of working age has been gradually decreasing since 2010, and thus – similarly to the developed countries – China is also *facing the ageing of the society.* The *redundant capacities* built as a result of excessive investments and the *incremental capital output ratio* (ICOR)[5] *reduce the return on capital, and represent decreasing impulse for investments for economic growth* (*Figure 1*).

[4] For example, the press release of the central bank. http://www.pbc.gov.cn/english/130721/3656521/index.html. Downloaded: 7 December 2018

[5] The quotient of the investment ratio and GDP growth rate. An increase in the ratio indicates a decrease in investment efficiency.

Figure 1
Changes in ICOR

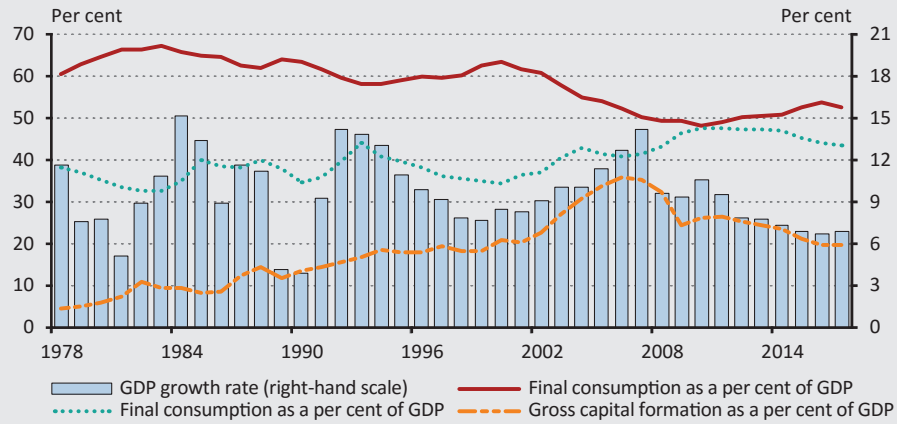
Source: OECD Economic Surveys: China 2017

Moreover, *total factor productivity* (TFP) also *slowed down* substantially. According to the technical literature, in recent years, potential growth fell to 7–8 per cent[6] compared to the average of around 10 per cent observed in the 2000s, and according to the forecasts, it may slow down below 6 per cent (*Dieppe et al. 2018*).

The *pre-crisis growth model* was primarily based on industrial production and the undervalued yuan, which substantially *increased external imbalances.* In the pre-crisis years, China's current account surplus was as high as 10 per cent of GDP, which has substantially decreased since then. The recovery of the external balance is partly attributable to the appreciation of the real exchange rate in the past decade and is also reflected major changes in demand. Starting from 2008, in parallel with the decline in external demand, it was primarily the role of investments that appreciated (*Figure 2*)*, as the central government offset the negative consequences of the crisis by boosting investments,* which led to a major rise in corporate indebtedness. In the post-crisis years, the investment ratio was outstanding – even compared to other Asian countries with a similar level of industrialisation – and it persistently exceeded 47 per cent, *which led to increasing internal imbalances in addition to the external ones.* In parallel with the substantial decline in the investments' rate of return in recent years, repayment of the related loans became increasingly problematic.

[6] For more details, see *Alberola et al.* (*2013*), *Albert et al.* (*2015*), *Maliszewski – Zhang* (*2014*) and *IMF* (*2014*).

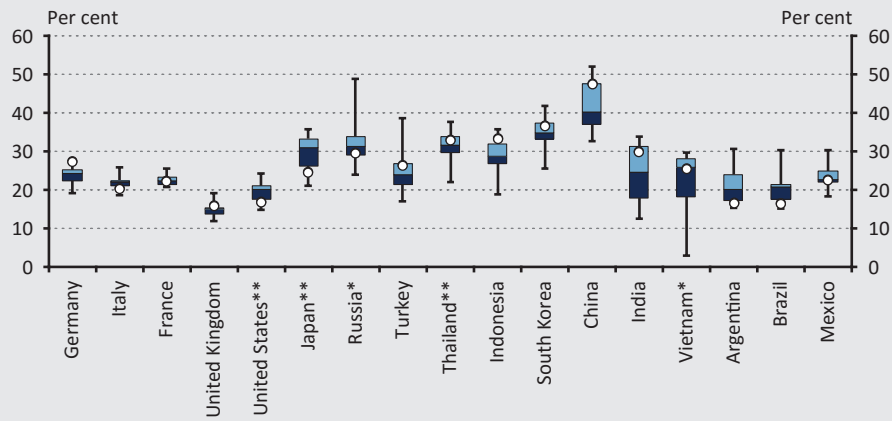
Figure 2
Changes in the growth rate and GDP composition based on absorption in China



Source: World Development Indicators

The imbalances characterising the Chinese economy are interconnected. *The previously high external imbalance and the present internal imbalances contributed to households' exceptionally high saving ratio,* which is outstanding even by international standards (*Figure 3*).

Figure 3
Saving rate as a percentage of GDP in an international comparison



Note: As a general rule, in the figure we illustrate the distribution of the saving rates between 1978 and 2017; due to absence of data, the data for Russia and Vietnam (*) relate to the period 1989-2017 and for the United States, Japan and Thailand (**) to the period 1978–2016. The box denotes the interquartile range, with the median value at the border of dark and light blue. The candlestick denotes the minimum and maximum values, while the circle represents the last observed data.

Source: World Development Indicators

The high saving rate reflects the demographic trends observed in the one-child policy and social policy, including the poor welfare and limited healthcare (*Choukhmane et al. 2016*), as well as the high income and welfare inequalities (*IMF 2017*). At the same time, the rise in the saving rate was also forced by the financial repression and the (mostly) closed capital account. The same policies also hindered proper risk assessment and capital allocation, which facilitated the surge in investments and the accumulation of debts (*Huang – Tao 2011, Pettis 2013*). *Thus, although the form of the imbalances in China has changed in recent years, the triggers were similar: the consequences of the current economic strategy and political system (Dieppe et al. 2018).* In addition to the internal processes, *a number of other factors, external trade or even geopolitical events may also influence the performance of the Chinese economy.* The Trump administration brought all these factors to the forefront, and for the time being it is difficult to assess the long-term consequences of those. One of the most significant factors is the China-US trade war, which commenced in 2018. In 2018, the United States raised customs duties in three rounds, affecting Chinese products in a total amount of USD 250 billion. In addition, US President Donald Trump held out the prospect of imposing additional duties on Chinese products worth roughly USD 267 billion, if the current negotiations fall through. The Chinese government responded to the sanctions of the United States by customs duties of similar degree, and last year it imposed duties on US products worth roughly USD 110 billion. US – China trade relations are still characterised by major uncertainty. According to economists' assessment, although the levying of duties has a negative impact on GDP growth in both countries, the negative impact of the trade war for China may mostly manifest itself in the deceleration of the reform process.[7]

Xi Jinping, elected as president of China in 2013, also recognised the unsustainability of the regime. The approved thirteenth five-year plan has set objectives for "economic and social development" for the period 2016–2020. The objectives include, among other things, doubling the 2010 GDP by 2020, increasing R&D activity, environmental considerations, social measures, including the easing of the one-child policy, the extension of urban welfare services, the rationalisation of state-owned companies and achieving full convertibility of the yuan.[8]

Raising households' consumption was the key to economic restructuring. As a result of the government measures, in recent years some growth in consumption as a percentage of GDP was achieved. This growth was supported by a number of state measures, such as the reduction of wage contributions, the introduction of a more progressive personal income tax scheme, as well as the increase in social, health and education expenditures. *However, the easing of the imbalances may be*

[7] http://www.geopolitika.hu/hu/2019/03/12/kereskedelmi-haboru-az-usa-es-kina-kozott/. Downloaded: 9 April 2019
[8] http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf. Downloaded: 6 December 2018

hindered by households' high saving rate. The shortcomings of the social safety net (pension and health insurance scheme), the consequences of the one-child policy, giving preference to owning your home, and the "hukou" system, still in place in large cities, all encourage the population to accumulate saving. The "hukou" system, which hinders social mobility, is a major contributor to the regional inequalities within the country. Although the economic performance of the western and central regions recently showed convergence, GDP per capita is still substantially higher in the eastern, coastal regions. The differences observed between east and west at the level of counties, can be also identified in the income inequalities between towns and villages (*Gyuris 2017*). The high inequality between incomes, observed at national level – the Gini coefficient has not improved in recent years – appears more cumulatively in the underdeveloped western region.

The *Belt and Road Initiative*, announced in 2013 and the *Made in China 2025* concept, presented in 2015, *may help improve the moderate productivity,* resulting from the previous economic structure, and *reduce the excess capacities accumulated in industry.* Within the scope of the Belt and Road initiative, large volume infrastructure investments would provide work for heavy industry and construction companies, which are struggling with major surplus capacities. The *infrastructure development*s *facilitate* the inflow of commodities, of adequate volume and quality, to China, as well as the export of Chinese products and services. The flow of labour force, capital and technology may be accompanied by a major improvement in efficiency, while the development of the transport infrastructure may also appear as a competitiveness improving factor. Improved efficiency is key to producing goods of higher value added, which is the basis of sustainable, balanced economic growth. Reduction of the economic and income inequalities between the eastern and western regions is essential for the further rise in household consumption. The initiative is also meant to mitigate this, since the land road to Central-Asia leads through the western areas. Railway improvements affecting the transport of goods have already commenced in fifteen eastern and central regions of China, and economic belts and logistics centres were established in several cities (*Brown 2017*). *The Made in China 2025 initiative has set the goal of improving the quality of manufacturing output*, since – although the performance of manufacturing made major contribution in the past years to the buoyant growth of the Chinese economy – the sector is characterised by low value added and labour-intensive production. The centre of the programme is the establishment of an innovative and sustainable manufacturing sector, built on quality and network integration, that helps China join the largest manufacturing economies (*HKTDC 2016*). In addition to the announced programmes, the reform of state-owned companies and the liquidation of zombie firms, which operate with major losses, would be also essential to increase productivity. In terms of productivity, the state-owned companies lag far behind private companies, but their assets and share in

investments are still significant (*Székely-Doby 2018*), delaying further improvement in internal equilibrium.

2.2. Demographic trends

The one-child policy, introduced at the end of the 1970s, *led to major distortions in the age and sex structure of the population* (*NBSC 2016*). Due to the drastic decrease in the fertility rate, China – similarly to the developed countries – *faces the ageing of the population.* Since the mid-2000s, the elderly population has continuously increased, and according to the UN's forecast[9] the number of inhabitants over the age of 65 will rise from the present 131 million to 371 million by 2050, of which the number of those over 80 will be up from 22 million to 121 million. In parallel with the increase in the median age, the number of working age inhabitants will also decrease significantly, as a result of which the old-age dependency ratio may also rise strongly. The astonishing speed of the ageing of the Chinese society also puts great pressure on social and economic development. The set-up of a nationwide pension system – which provides the fast-ageing population with proper financial support – may represent huge challenge for the central government; in addition, the consolidation and further development of the healthcare system may also represent challenges.

In addition to the ageing of the population, *gender imbalance* is also a major problem. The one-child policy gave preference to boys, as a result of which in 2017 the number of male population in China exceeded the female population by more than 30 million. Although recently the distortion in the sex ratio improved, it is still far from that deemed ideal.

Recently, *the central government announced a number of measures to address the problems,* starting from the support of family planning to ensuring strict compliance with the prohibition of sexual discrimination. With a view to slowing down the ageing of the society, the one-child family model was also eased, as a result of which Chinese families may now have two children. In addition, the government emphasises the importance of strengthening the old-age provision system based on home care, supplemented and supported by the old age social care institutions provided by the community and the government. In order to reduce the financial pressure, which accompanies the ageing of the population, the government also proposed a gradual increase in the retirement age. In addition to the foregoing, in recent years the central government spent considerable amounts on enhancing the quality of education, particularly in respect of natural science education. The ratio of students enrolled in higher education also rose significantly between 2010 and 2014 (*Losoncz 2017*). This helped China appear in the world market not only with

[9] https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf. Downloaded: 6 December 2018

the copying of foreign products, but also by manufacturing self-designed products, often representing high-tech technology. Continuance of this trend may contribute substantially to ensuring that the decrease in the working age population does not automatically entail a major decline in GDP growth.

In addition to the demographic problems, *extensive internal migration from rural areas to urban areas represents an additional challenge.* China's urban population consists of two main types: those with local registration, known as "hukou", and those without. Many of the employees migrating from rural areas to urban areas have already worked in cities for many years, but they are still treated as "temporary immigrants" and face the risk that they may be sent back to the place of their original registration.

This uncertainty, and the restrictions imposed on those without registration, result in the break-up of families, since commuter employees leave behind their elderly parents, small children or even their spouse in the countryside. In the past decade, several hundred million Chinese peasants have set off to the cities to work in the hopes of making a better living. These people have made a major contribution to Chinese economic growth and urban development, while their fundamental rights are often not protected properly by Chinese laws. Although the central government's five-year plan for 2016–2020[10] includes the extension of "hukou" with 100 million commuting employees, this would affect only 40 per cent of the current "floating population".[11] With a view to implementing the ambitious urbanisation plan, the central government proposed several strategies, including – among other things – harmonised development of urban and rural areas, fostering urbanisation, improving small and medium-sized towns and supporting the settlement of rural population in towns.

2.3. Environmental issues

When talking about long-term equilibrium growth, environmental issues cannot be avoided for a variety of reasons. As is also emphasised by *Székely-Doby* (*2017*), due to the significantly high degree of environmental pollution and environmental degradation, it is a critical issue both in economic and social, as well as in political terms. Environmental pollution and degradation also entail major health and economic damages, while the improvement or elimination of the already developed situation is also extremely expensive. In addition to the foregoing, the improvement of energy- and material-efficiency is a particularly important form of increasing effectiveness, which – considering the finiteness of resources and the environmental

[10] http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf. Downloaded: 6 December 2018

[11] Based on the data of the Central Statistical Office of China, in 2017 the "floating population" amounted to 244 million persons. http://www.stats.gov.cn/english/PressRelease/201802/t20180228_1585666.html. Downloaded: 12 December 2018

effects of their exploitation – is essential for ensuring that economic growth is not accompanied by a proportional increase in the volume of required raw materials and fuels and in the degree of pollution. Under the duress of choosing between growth and environmental protection, the first was often given priority in the past; however, due to the increase in the degree of pollution this became less and less sustainable. Gradual improvement has already started utilising large volume of financial resources,[12] but there are major restrictions and thus in most of the cases results can be achieved only by extremely slow and gradual transition. This is because it is not enough to reduce the emissions of the already existing sources of pollution, since it is also necessary to take into consideration the large volume of new emissions, caused by the dynamic economic growth.

Environmental protection has been an important topic for China's political leadership for several decades: the principles were laid down in the constitution and in laws, and the strategy to be followed is described in a separate chapter also in the five-year plans. Among other things, these include the protection of nature and biodiversity, increasing material efficiency, expecting the reduction of emissions, the intention of extending waste and sewage treatment, the protection of arable land, and issues related to global climate change. The objectives are usually defined centrally, broken down into regional units, while the detailed elaboration and implementation of the plan is mostly the duty of the local authorities. In addition to the quantitative restrictions and controls based on standards and prohibition, financial incentives are also used to facilitate the realisation of objectives. For example, the banking supervision restricts borrowing by the strongly polluting and energy-intensive corporations through window guidance, while within the scope of the medium-term lending facility (MLF) the central bank accepts green loans and bonds[13] (*PBC 2018*) as collateral, which fosters the financing of environmental investments.

[12] While in 2007, 0.37 per cent of GDP was used for environmental protection from the central and local governments' budget, in 2015 and 2016 this value was 0.70 per cent and 0.64 per cent, respectively. During these eight or nine years GDP doubled. As regards to the results achieved, it is worth highlighting the reduction of air pollution, since this area received particularly keen attention in the past years. Based on the date of the Statistical Office of China, the number of days when the pollution level reached second degree pollution level was reduced in 23 out of 30 large cities.

[13] Green bonds are extremely popular in China; based on international definitions, in 2017 China was the second largest issuer globally, with a value of USD 22.9 billion. At the same time, the Chinese regulations – adjusted to the special features of the country – apply a broader definition than the international standard, thereby classifying additional bonds as green in the amount of USD 14.2 billion. On the one hand, the Chinese definition does not exclude projects related to fossil fuels, and on other hand, it also permits the financing of not only new projects, but also refinancing and working capital financing (*CBI – CCDC 2018*).

3. Aspects of growth models in the financial system

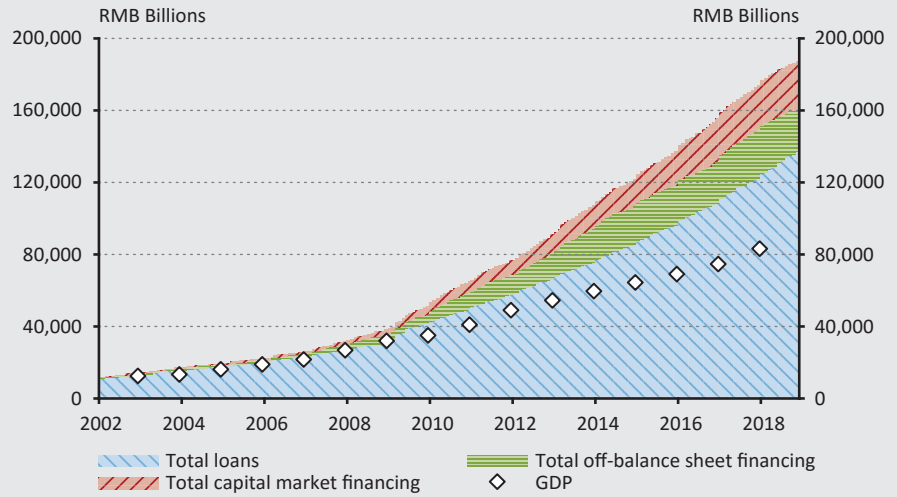
The mixed economic structure and *earlier growth models led to the accumulation of major risks in the financial system,* which the central administration tries to remedy by reforms and enhanced control. Although since the cancellation of the credit quotas in 1998, banks decide decisively on their lending policy independently, taking full responsibility, however the central administration still relies very strongly on credit institutions in majority state or local government ownership when implementing its growth plans. State-owned companies still enjoy substantial advantage when applying for credit,[14] since in their case lenders assume an implicit state guarantee. Local governments also borrowed and issued bonds extensively, thereby substituting external demand – lost as a result of the global financial crisis – with their investments and infrastructure development projects. *Thus, the growth model based on investment was implemented relying on extremely dynamic credit expansion* (*Figure 4*). However, as a result of this, state-owned companies' investments of low efficiency also received financing, thereby burdening the banking sector with substantially riskier loans than originally assumed.

This process also took place outside the banks' balance sheet, in a slightly different structure. Through *the shadow banking system,* private investors granted loans, also assuming implicit state guarantee – but here not in respect the borrower, but rather of the state-owned and local government-owned banks, acting as an intermediary – for the implementation of projects, the risks of which they failed to assess with due care. *Thus, this form of intermediation also created a large volume of transactions, the return on which is much riskier* than anticipated by investors, thereby lowering the efficiency of macroeconomic allocation of capital. For many years, the operation of lending outside the balance sheet of the banking sector was supported by several factors: on the one hand, the loans thus originated supported the growth objective of the central government, and on the other hand the shadow banking system assisted the process of financial liberalisation by its close-to-the-market-mechanism price setting. Since the latter function is no longer needed, and the growth supporting nature is substantially reduced by the risks which have materialised, the central administration has opted for the stricter control and suppression of the shadow banking system.[15]

[14] This is also confirmed by the speech of Pan Gongsheng, Deputy Governor of the central bank, delivered on 6 November 2018. http://www.pbc.gov.cn/english/130721/3660929/index.html. Downloaded: 6 December 2018

[15] https://www.bloomberg.com/news/articles/2018-01-23/china-s-15-trillion-shadow-banking-edifice-showing-more-cracks. Downloaded: 17 December 2018

Figure 4
Aggregate financing of real economy



Note: Outstanding lending of the banking sector comprises loans denominated in RMB and foreign currency. Off-balance sheet financing comprises trust and entrusted loans and undiscounted bankers' acceptances. Capital market financing aggregates corporate bond and equity issuance.

Source: Macrobond, World Development Indicators

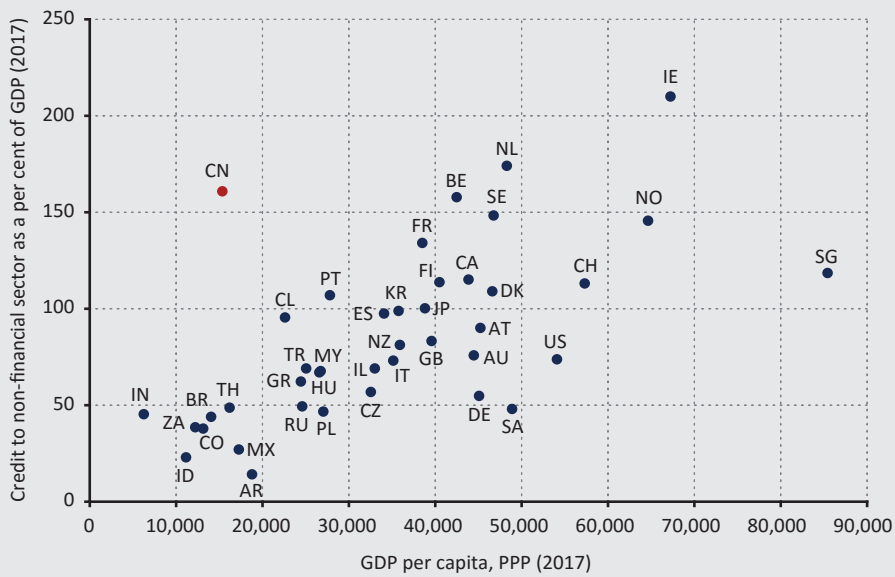
In addition to the legacy of the previous growth model, the new model also involves challenges for the banking sector. Consumption-based growth would be in line with a more balanced lending strategy financing private companies, households, small businesses and the agricultural sector, instead of banks that formerly mostly provided financing for state-owned corporations. However, the *accomplishment of the retail market necessitates major changes in the banks' procedures* with a view to reaching the potential customer base, properly assessing loan applications and managing risks. Growth in new markets is also accompanied by an increase in banks' risks: due to mortgage lending, their exposure to real estate market dynamics strengthens, while small businesses and agricultural producers hold inherent risks, previously unseen, due to their operation and features completely different from those of large companies.

In addition to changing the macroeconomic strategy, the central administration also intends to support growth by increasing the efficiency of financial intermediaries, which in the longer term may be supported by the liberalisation process seen in recent years. However, not only did implementation of the reform measures take several years, the accomplishment of their results requires a long time. Due to the anticipated contraction of interest margins and the need to adjust to the more volatile markets, liberalisation generates new tasks for credit institutions.

3.1. Legacy of the old model: various forms of over-indebtedness

Corporate indebtedness – whether financed by the banking sector's or the shadow banking system's funds – *is extremely high i*n China, *even by international standards* (*Figure 5*). Based on experience gained from previous crises, this give rise to severe anxieties, since a dynamic outflow of credits is usually accompanied by weaker allocation of capital, thereby increasing the risk of return.

Figure 5
Corporate indebtedness and economic development



Source: World Development Indicators, BIS

In their capacity as lenders to large state-owned companies, large banks strongly feel the efficiency problems of at those companies. Corporate reforms have been dragging on for years, and to date significant progress has only been achieved by a few companies (*Székely-Doby 2018*). Until now the state provided no assistance for the reduction of outstanding lending. For the time being, problem loans were only transferred to the asset management companies within the respective bank's consolidation group, i.e. the risks and losses of those continue to burden the bank's capital adequacy. Although there is a debt-to-equity swap programme in place at the initiative of the government, in the absence of substantive reforms by the companies, this does not help resolve the situation. At larger banks, the non-

performing loan ratio still appears to be particularly low,[16] while the impairment coverage expected by the regulatory authority is extremely high, prompting banks to extend "evergreen" loans. The situation of smaller, rural commercial banks differs from this. These institutions were less specialised in large transactions; however, due to their different customer base, they reported a higher non-performing ratio, i.e. 4.23 per cent. Although by international standards this cannot be deemed high, it indicates the vulnerability of these institutions. Compared to the larger institutions, the level of impairment coverage is much lower, but still exceeds 100 per cent.[17]

One recurring concern of the international professional community is that *excessive credit outflow and the realisation of credit risks* – similarly to the previous credit crisis – *will necessitate the recapitalisation of the banking sector, which requires major resources.* The *supervisory authority is trying to prevent escalation of the problem by regular, strict actions and rigorous audits,* while the central bank does so by applying macroprudential policy built on an increasingly wider information base. In addition, the absence, to date, of any substantial intervention by the central administration may also be interpreted as an effort to clear up the myth of an implicit state guarantee, which may have positive impact on future loan assessments. There was also a precedent when based on the guidance of the central administration, with a view to curbing indebtedness, the growth rate of the outstanding borrowing of corporations was restricted at a rate below the GDP growth rate for roughly one and a half years.[18] At the same time, these measures do not resolve the existing problems, and thus if non-performing loans appear in large volumes, recapitalisation of banks by the state may become necessary. The state, in its capacity as the owner, may do so relatively smoothly, if it has the necessary resources, and thus it may avoid market turbulences and a credit crunch entailing real economy sacrifices. However, a situation that entails a major capital injection may result in a silent but definite turnaround in the credit cycle, since it would lead to a decline in the dynamics of corporate lending, if banks specified similar requirements for state-owned corporations as for private companies.

The credit portfolio originated *through the shadow banking system is of extremely variable quality.* Although no statistical data are available for the presentation of this, due to the heterogeneity of the borrowers this is inevitable. On the one hand there are companies that resorted to this form of financing, because as private companies they did not succeed in obtaining a loan in the traditional banking sector.

[16] Based on the September 2018 data of the China Banking and Insurance Regulatory Commission, the non-performing loan ratio was on average 1.47 per cent at the five largest state-owned banks, 1.7 per cent at the banks operating in the form of limited company, and 1.67 per cent at the urban banks.

[17] Based on the September 2018 data of the China Banking and Insurance Regulatory Commission, the impairment coverage ratio of non-performing loans was on average 205.94 per cent at the five largest state-owned banks, 190.47 per cent at the banks operating in the form of limited company, and 198.85 per cent at the urban banks, while at the rural commercial bank this ratio stood at 125.6 per cent.

[18] Based on the BIS data, the outstanding borrowing of non-financial corporations as a percentage of GDP decreased in the second half of 2016 and throughout 2017.

Presumably, many of them are of lower risk. However, there are also borrowers that intentionally chose this form of financing due to the shortcomings of risk assessment, since in the case of a real assessment they would have had no chance to access financing. A special type of borrowers could not receive a bank loan, because it is restricted by some regulation, including, for example, the companies active in polluter industries. In their case, changes in environmental regulations and potential restriction of emission appear in the credit risk, resulting in an increase thereof.

Since the credit institution only acts as an agent in the shadow banking loans, in theory, the credit risk is borne by the investors. Bankruptcies did occur up to now as well, but the degree of the indemnification of investors was typically not made public. Since there is no institutional framework that would guarantee any return for investors in such cases, *presumably the loss is shared based on individual negotiations.* Accordingly, the degree of the losses that the state may incur is also uncertain.

The previously permissive attitude toward shadow banking activity was replaced by increasing tightening. The banking regulatory commission formulated additional new rules first in respect of the asset management products, and later in respect of entrusted loans (*Varga 2017*); however, a spectacular result was only achieved after the new leader, Guo Shuqing took office in February 2017. This segment shrank substantially after the introduction of the new regulations, which is an extremely important and positive development in terms of preventing the further accumulation of risks. At the same time, obtaining financing in the new environment represents a challenge for many companies, and thus with a view to reducing growth sacrifices, the access of private companies to sufficient bank financing, urged by the central bank for quite a while, is even more important than before.

However, the institutional and product structure of the shadow banking system is not always simple. Meanwhile, an extremely complicated product or institution structure also developed, often because – due to the dividedness of the supervisory authorities and the different regulation of the individual areas – certain supervisory regulations could be circumvented.[19] The source of the problem was first managed by the more concerted action and then by the partial integration of the supervisory bodies in 2018; nevertheless, the existing, non-transparent structures did not cease to exist. Losses may still appear at institutions at which they are the least expected, and it is particularly difficult to settle the supervisory and regulatory issues, since it is often impossible to assess in advance all important consequences of a new regulation or restriction.

As regards indebtedness*, local governments* also deserve attention in addition to the corporate sector. Following the outbreak of the 2007–2008 global economic crisis,

[19] At the press conference held on 2 March 2017, Guo Shuqing mentioned the standardisation of regulations as one of his most important objectives: “the different regulators, different laws and rules cause chaos”.

local governments also tried to replace decreasing demand for exports by starting new, mostly infrastructure developments, financed from loans. Local governments typically had access to funds via credit institutions or state-owned corporations (*Wu 2014*), or they took out loans through the local government financial vehicles from shadow banking investors (*Csanádi 2014*). *However, the revenues generated by investments were often insufficient for the repayment;* the loan ultimately burdened the budget of the local authority, thereby hindering further local developments. According to IMF's estimate (*IMF 2018:47*), at the end of 2017 direct and indirect debt amounted to 20 and 24 per cent of GDP, respectively.

The *central government*– recognising the severity of the problem – *tried to manage the situation by implementing increasingly tight measures,* and thus prevent the further accumulation of debt by local governments. In order to reduce the costs of the existing debt, in 2015 it launched a three-year programme, which also permitted the refinancing of previous loans by bonds.[20] New borrowing was tightened in many respects. On the one hand, borrowing by local governments was restricted, while state-owned corporations were prohibited from lending, while banks could lend only in the form of bonds. As a result of the foregoing, new borrowing by local governments substantially declined, both in terms of the newly concluded transactions and of the refinancing portfolio. As a result of the measures, the investment activity of local governments declined and they postponed their development projects. Due to this, the central government fosters the penetration of a new form of financing. A key feature of the new generation local government bonds is that the revenue originating from the completed investment must cover the interest and repayment of the bond. The bonds may be purchased by banks; the largest, public institutions made separate allocation for this to ensure the realisation of the central government's extremely ambitions plans related to issuance.[21] However, it is questionable whether it will be possible to utilise the centrally determined facility in projects with adequate rates of return, also in economic terms, or rather, by the fulfilment of the central plans once again projects with poor rates of return will be realised, this time clearly burdening the banking sector.

Thus, the largest problem related to indebtedness is represented by the risks of the existing portfolios; the escalation of these may generate major losses, entailing a growth sacrifice. *The general government is dealing with the resolution of the situation increasingly intensively,* thereby trying to prevent further accumulation of risks. Based on the foregoing, the existing risky portfolio will represent a heavy burden in the future as well, but pending proper government policy, the escalation thereof in an uncontrolled, crisis-like manner is less likely.

[20] https://www.bofit.fi/en/monitoring/weekly/2018/vw201817_6/. Downloaded: 12 December 2018
[21] https://www.bofit.fi/en/monitoring/weekly/2018/vw201836_6/. Downloaded: 12 December 2018

3.2. Challenges of the new model

The new growth model, which is built on domestic consumption, would divert credit institutions from the financing of the overly indebted state-owned corporations sector to a more balanced *strategy, also lending to private companies and the retail sector.* In its annual report, the supervisory authority (*CBRC 2017*) proposed that banks should monitor the financing of innovative private companies and improve the access of the SME sector to loans and other banking services. As regards retail lending, up until now it was characterised primarily by the penetration of mortgage lending, thereby supporting the middle class in purchasing their own homes; at the same time, the report highlights micro credits, which credit institutions can use for combating poverty. *The easing of the lending constraints may give growth new momentum*, while by involving bank intermediaries, it is possible to keep lending risks under control. Although the penetration of peer-to-peer lending seemingly offered an alternative solution, in fact it led to the accumulation of risks and to the development of a pyramid scheme, inflicting a loss on investors.[22]

In the *SME sector*, not only the managers of companies report insufficient credit supply, but banks also perceive that businesses are unable to comply with their strict lending conditions.[23] Based on the foregoing, there still would be room for investments of potentially good return in this customer base. At the same time, banks face the difficulty that they have limited information on the creditworthiness of the SME segment and here they can rely on their experiences gained in respect of state-owned corporations to a lesser degree. Moreover, due to the substantially smaller transaction size, portfolio building also requires a longer time, and thus it is hard to achieve dynamic growth under prudent conduct. *Access of the sector to financing is strongly encouraged and supported by all areas of economic policy.*[24]

The easing of retail credit constraints facilitates the smoothing of consumption and increases demand on the housing market, thereby supporting the new growth model. Within the household segment, mortgage loans account for a large part of the outstanding borrowing, while unsecured bank loans are dominated by credit cards.[25] In the area of low-amount loans, traditional banks have powerful

[22] Peer-to-peer lending in China outstripped peer-to-peer lending in the rest of the world just in the matter of a few years. Although the volume thereof looks small in comparison to the banking sector's outstanding lending – amounting to roughly 1 per cent thereof – since it reaches a wide range of investors and borrowers, the substantial rise in defaults – partly due to the pyramid scheme – prompted the regulatory authority to apply tightening measures. Only a small part of the platform is able to comply with the new regulation, and thus this form of intermediation is expected to shrink drastically.

[23] https://www.reuters.com/article/us-china-economy-policy-smallfirms-analy/lost-in-transmission-chinas-small-firms-get-more-loans-on-paper-but-not-in-reality-idUSKCN1MQ0JT. Downloaded: 17 December 2018

[24] In its Medium-term Lending Facility (MLF), the People's Bank of China provides the banking sector with longer-term financing, while for the utilisation of the funds it determines preferred areas for lending. It encourages banks participating in the scheme to lend to the agricultural sector and the SME sector (*PBC 2014*). It also supports small and medium-sized enterprises that banks must use part of the liquidity released as a result of the reduced required reserve ratio for financing the sector. http://www.pbc.gov.cn/english/130721/3567947/index.html. Downloaded: 12 December 2018

[25] Based on the data of CBRC, at the end of 2016, 73 per cent of retail bank loans were mortgage loans and 17 per cent of them were credit cards (*CBRC 2017:211*).

competitors: lenders related to online trading companies have major information advantage on this market through the utilisation of the customers' trading data. Vigorous demand for mortgage loans is based on the Chinese population's insistence on having a self-owned home. In addition to this, home purchase for investment purposes also appeared, but the financing of this by banks – due to macroprudential considerations – is partly restricted. In recent years, retail lending rose dynamically, exceeding corporate lending and GDP growth.

Although banks which financed construction projects *were exposed to changes in real estate prices* in the past as well, their respective *risks have increased in parallel with the penetration of mortgage lending.* At the same time, the level of household indebtedness cannot be deemed high by international standards; the central bank, the bank regulatory commission and the local governments try to prevent the build-up of major risks by tightening lending conditions. The authorities often reduced exposure to the change in real estate prices by prescribing mandatory own contribution and limiting the number of homes that can be possessed by a single person. With these macroprudential measures they not only capped the risks that may be undertaken by banks, but also reduced the volatility of real estate prices. In those cities where a particularly strong rise in prices was observed – in certain cities price appreciation as high as 20–40 per cent was observed – the authorities usually intervened with a view to reducing prices. Similarly, measures aimed at the stimulation of demand were taken in locations characterised by a perceivable decline in prices.[26] Based on the statistics of 70 cities,[27] since 2006, a halt or decline in prices was observed on three occasions, the last time in 2015. Hence, it is a legitimate question whether there is any major overvaluation in the current prices. If yes, *based on experiences gained until now, in order to prevent a crisis-like outcome, there is high probability that the state will once again intervene if any problem arises.* Thus, although real estate market turbulences may reduce economic growth, there is little chance of a real crisis.

Due to the *financial liberalisation,* volatility – to be addressed by banks – is increased not only by the fluctuation of asset prices. Due to not having access to the central bank's set of monetary policy instruments, smaller banks are more exposed to the interbank market, and thus they must adjust their liquidity management to the larger fluctuations occurring on the market from time to time. In addition, the fact that the RMB exchange rate became more hectic, also requires more attention from the institutions, and the central bank has warned credit institution of this several times. Liberalisation of interest rates fosters competition between institutions, and thus later on interest margin may narrow, which represents a profitability challenge. *Adjustment to the process* and the preparation for this, are *key both for banks and the entire financial system.*

[26] https://www.bofit.fi/en/monitoring/weekly/2016/vw201614_4/. Downloaded: 17 December 2018
[27] Based on BIS statistics, aggregated for 70 large cities: https://www.bis.org/statistics/pp_selected.htm?m=6%7C288%7C596. Downloaded: 12 December 2018

Although the primary form of financial intermediation in China is still the banking sector, the *capital markets are developing dynamically, increasing both in terms of their size and significance.* Similarly to housing prices, China also has experiences in the overrun and adjustment of *stock exchange prices*: after a steep rise, a major adjustment was observed in stock exchange prices in 2007 and also in 2015–2016. The general government responded to the price decline with concerted actions in both cases, by equity purchases, stimulating economic policy measures, and it also attempted to curb adjustment by regulatory instruments. In similar situations the general government is likely to intervene actively in the future as well, and thus when considering the consequences of potential new turbulences, the costs of interventions, in addition to the muted effects, should be also taken into account.

4. Summary

The growth strategies applied in the past decades led to major macroeconomic and financial imbalances in the Chinese economy. The central government also recognised the unsustainability of the system, and thus it has set the changeover from quantitative to qualitative growth as its primary objective, trying to achieve this via a series of reforms both in the real economy and the financial sector. Although the opinions of the professional community diverge as to whether the central administration will be able to achieve a soft landing or – due to the accumulated risks sudden adjustment is already unavoidable – considering previous crisis experiences and the commitment of the central government to resolve the problems, there is a low probability of a meltdown with a spillover effect for the entire economy.

Considering the imbalances and risks, the area that requires intervention to the greatest degree is the problems related to state-owned corporations. Due to their poor efficiency they absorb resources from other areas of the economy, and in addition, through their excessive outstanding debt, they increase the risks of credit institutions. Moreover, until such time as comprehensive reforms manage to eliminate the mechanisms that cause inefficient operation, short-term growth objectives continue to enjoy priority over reforms aimed at sustainable growth, potentially exacerbating the problem further. Hence the reform of state-owned corporations is essential to ensure a shift from investment-driven growth toward consumption-driven growth.

In addition to the reform of state-owned corporations, urgent and major changes are also required in lending by the shadow banking system and the outstanding debt of local governments. However, in the latter two areas major regulatory measures have already been taken, which managed to break the former trends. The continuation and accomplishment of these processes is essential for a significant reduction of the accumulated risks. In addition, offsetting the unfavourable demographic trends,

a major reduction in environmental pollution and easing the lending constraints related to private companies and the retail sector are also essential to ensure the realisation of new, sustainable growth as dynamically as possible.

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Moral Economy – Beyond the Homo Oeconomicus*

Dániel Felcser

Samuel Bowles:
The Moral Economy: Why Good Incentives are No Substitute for Good Citizens
Hungarian translation: Az etikus gazdaság – Miért nem helyettesíthetik a jó ösztönzők a jó állampolgárokat?
Pallas Athéné Publishing House, Budapest, 2018, p. 276
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In his book, Samuel Bowles – head of the Behavioral Sciences Program at the Santa Fe Institute in New Mexico – examines what driving forces motivate people's decisions during decision-making, how decision-making processes are affected by incentives and other aspects of public policy, and what follows from all of this with regard to economic policy. For his analysis he uses various game theory and related behavioural science experiments, combining the relevant findings of behavioural economics, psychology, history of economic thought and game theory.

Criticism of the homo oeconomicus

The image of the completely self-interested homo oeconomicus has become widespread among economists and decision-makers. Nevertheless, research findings – including the works of Daniel Kahneman and Richard Thaler, Nobel Memorial Prize laureates in Economic Sciences – suggest that people are not as far-sighted, self-seeking and consistent as presumed by economists. In practical life, economic agents do not content themselves only with presuming the homo oeconomicus either: employers are looking for employees whose work ethic is strong, and banks finance projects that seem to be reliable. Searching for an empirically well-founded behavioural model, the author contrasts the generally prevalent assumption that economic agents follow their self-interest with the agents' non-economic motives.

The book points out that even the classical economic thinkers (Adam Smith, David Hume, John Stuart Mill) were aware of the fact that the homo oeconomicus is

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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a simplification of human behaviour, but they did not take into account the interactions between incentives-based policies and moral aspects. Policies often intend to create various motives with material incentives, whether it involves students' learning or reducing body weight. And in many cases the incentives really do affect the actors' behaviour, as it follows from economic theory which assumes that the actors only take into account the material benefits. In other cases, however, similar programmes do not achieve the intended effect, or their outcome may even be the opposite.

Then what are efficient incentives like? To understand this it is necessary to examine how people react to the various economic incentives and pieces of information. The behavioural science experiments mentioned by the author, which apply a wide range of game theory models, demonstrate that moral and similar kinds of aspects are practically present in all communities. Accordingly, actors make decisions not only on the basis of their self-interest, as other motives, such as selflessness, reciprocity, the avoidance of inequality as well as moral commitment also play a role. As an expressive example, he mentions the case at a day care centre where a fine was imposed on parents who were late picking up their children at the end of the day. Contrary to expectations, parents arrived even later, because they started to think of lateness as just another commodity they could purchase, which undermined the parents' sense of ethical obligation to arrive on time. In another example, however, the small tax on plastic bags introduced in Ireland resulted in a spectacular outcome, which may have been attributable to the intensive campaign that outlined the underlying moral reasons (environmental protection) prior to the introduction.

According to the conclusion of the book, efficient economic policy requires both economic incentives and ethical motives, but the former may 'crowd out' the latter. It has to be taken into account that economic incentives alone are unable to ensure fully efficient use of resources; ethical and other, non-economic motives are also important for that. Aligning these requires the establishment of a framework in which the actors internalise all the costs and benefits of their actions. The author points out that the prices determined by market competition alone are able to achieve this only if certain conditions are met. Complete contracts necessary for that, which price in all aspects of the exchange, cannot always be ensured, for example due to asymmetric information, and thus the economy departs from Adam Smith's 'invisible hand' theorem. Unregulated market interactions between self-interested actors also do not result in efficient outcome in the case of externalities or public goods.

If the necessary conditions are not met, public policy must take on a role in setting adequate prices in the form of taxes and subsidies, taking account of benefits and costs that are not included in private contracts. This is the way to get closer to a state in which prices reflect all of the social costs of the production and distribution of goods. According to the author's suggestion, it could be justified to reduce the role of economic incentives, and instead to strive to achieve synergies between economic and moral incentives.

The end of efficiently functioning market economies?

According to the author's assumption, the idea of fierce market competition and financial incentives affecting individual behaviour as designated by economists was followed by the unintended consequence that the incentive power of moral and other social motives declined. The circumstances considered necessary for market economy support self-interest, and may even jeopardise the social norms needed for the functioning of the markets, such as keeping one's word or the quality of unsupervised work. In other words, ensuring the conditions necessary for well-functioning markets with complete contracts (such as the right to private ownership, competition or mobility) may damage the social norms that allow mutually advantageous exchanges even with incomplete contracts. On the other hand, the institutions that support social norms may impair the functioning of markets, because the economy will be less close to the presumed ideal state ('invisible hand'). Accordingly, in a paradoxical manner, policies that intend to make markets perfect, may result in less well-functioning markets.

From this train of thoughts it would follow that social norms are harmed in societies where markets play a major role. Nevertheless, the findings of the behavioural science experiments – mentioned in the book – that examine groups at various levels of development, and were carried out in various parts of the world do not indicate this: the groups that are better integrated in the market economy did not prove to be more selfish than the less integrated communities. According to the experiments that examine generosity and the following of social norms, these behavioural patterns are stronger in the countries where there is more market interaction, and no wide-ranging decline in moral motives can be experienced. What social developments can offset the crowding out effect of economic incentives?

According to the book, the findings may be attributable to the fact that in market-oriented economies the experience of the actors is that doing business with strangers is often profitable. Adam Smith already noted that recurring exchanges with economic partners limit opportunistic behaviour, and this strengthens social norms. According to the explanation, the strength of markets is in the fact that although the state is unable to eliminate opportunism, via the rule of law, social insurance and other institutions it is able to limit extremely disadvantageous outcomes (e.g. loss of ownership). With that it can substitute the importance of family relations, and creates an opportunity for the development of generally valid norms. And this risk-reducing aspect, on the whole, increases confidence in market exchanges and results in wide-ranging cooperation. Accordingly, markets in market-oriented societies sometimes result in the strengthening of moral motives. The author formulates his public policy proposals using the aforementioned findings, and thus both those who are interested in the theoretical aspects as well as those interested in the practical aspects of the subject may find useful and interesting information in the book.

Let Us Learn from Our Own History – Experiences from a Century and a Half of Public Finances*

Pál Péter Kolozsi

Csaba Lentner:
Az állampénzügyek fejlődéstörténete Magyarországon a dualizmustól napjainkig
(*Evolution of Public Finances in Hungary, from the Age of Dualism to the Present Day*)
L' Harmattan Publisher, 2019, p. 280
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What is the best way to understand economic processes? Through individual, historical examples, or rather through models that are abstract and therefore independent of space and time? Economists have been dealing with this question since economics emerged as a discipline of its own. According to one extreme opinion, it is enough to survey the events of the past ("those who forget history are doomed to repeat it"), while others believe that every economic era is different ("this time is different"), and therefore looking back provides no solution to our current problems.

The relationship between economics and economic history has swung like a pendulum for the last 100 years: in the early decades of the 20th century economics was never taught in higher education without a course in economic history, but today it is quite rare that university students have such courses in their curricula. One of the most influential economists of the past century, Joseph Schumpeter, who was born in the Austro-Hungarian Monarchy but settled in the United States in the 1930s, argued that an economist needs to merge three disciplines in himself, namely economic history, economic theory and statistics, with the last one enabling the integration of the first two. This approach was adopted by the universities during this era, and the three pillars of courses in economics used to be theory, methodology and economic history. However, in the second half of the last century significant changes took place in this field. Economic history was displaced from courses of economics, and the pillars of the curricula became microeconomics, macroeconomics and econometrics: the inductive historical

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approach that relies on historical experience lost its influence, and the deductive, abstract way of thinking that starts from theoretical foundations became a widely espoused scientific standard. The theory of Robert Lucas formulated 40 years ago ("Lucas criticism") has become a kind of general guideline for social sciences, which postulates that it would be naïve to base economic models and economic policy decisions on past observations – the only way to build up properly substantiated macroeconomics is to use stable microeconomic, i.e. theoretical foundations.

However, the past decades – and particularly the economic crisis that erupted in 2007–2008 – cast a new light on this approach. The mere fact that in 1993 two economist-historians who dealt with institutional matters received the Nobel Prize in Economics (Douglass North and Robert Fogel) implies some kind of change, but economic history was especially appreciated when at the outbreak of the crisis economic policymakers had to face the fact that the mainstream theory, which had become very abstract and removed from practical problems, was not ready for crisis management, and historical experience was the only source available for decision-making. History is not a formula that can be taken automatically without any reservations, however, combined with substantiated theoretical knowledge, it is actually highly usable base material for resolving the problems of the present, for addressing the actual challenges – this may be how we can summarise the approach espoused by economists who question the mainstream economic logic and emphasise the relevance and added value of historical experience. In Hungary, one of the best known representatives of these economists is Csaba Lentner, who collected 150 years of experience concerning public finance in his book published in the spring of 2019 with the title "*Evolution of Public Finances in Hungary, from the Age of Dualism to the Present Day".*

The monograph consists of seven chapters, providing a proper structure for the 150 years under examination. Chapter I is a kind of introduction, which defines the purpose why the book was written and places it in the domestic field of science and history of ideas. Chapter II presents the state-directed economy of the dualism era, i.e. it focuses on the period between 1867 and 1918, particularly on the economic aspects and effects of the Compromise of 1867 and points out how the calmer political atmosphere favoured economic life, and how the support given to industry contributed to the "build-up of a state-controlled market economy from the feudal society of estates within a short time." Chapter III presents the economic administration of the interwar period, with special regard to the consolidation of Bethlen and the military development of the 1930s, including the targeted industrial policy actions of the era (such as the 1938 armament programme of Győr). Chapter IV discusses the public finances and economic administration of the planned economy, starting with socialist industrial policy, through the regulatory reform of 1955–1956 and the new economic mechanism of 1968, all the way to the

decline of the planned economy. Chapter V specifically deals with the conditions of the political changes within the economic situation of the transition, accession to the European Union, privatisation and presentation of the banking system of the transition to the market economy, and the crisis management initiatives taking the form of adjustments. Chapter VI focuses on the economic administration and system elements of the active functioning of the state after 2010, specifically presenting the Fundamental Law that provided the foundations for the changes and the related statutes (stability act and other acts on public finances) as well as the system-level changes that occurred in the space of monetary policy (changes in taxation structure, renewal of the control of public finances, fiscal structural reforms, turnaround in fiscal and monetary policy). It is in this chapter that Csaba Lentner defines the "Hungarian model" that crystallised from the actions implemented after 2010, which he interprets on three levels: first as successful crisis management, second as the policy of wage convergence, decreasing utility costs and the policy of widening the opportunities for establishment a family and creating a home, and third as the totality of the public policy turnarounds creating the conditions for a turnaround in competitiveness. Chapter VII summarises the major arguments of the work, including the theoretical and systemic conclusions, the corollaries on the importance of fiscal discipline and having "a good taxation system", furthermore, the renewal of the policy of the central bank after the crisis and the revival of institutional thinking.

The book entitled "Evolution of Public Finances in Hungary, from the Age of Dualism to the Present Day" describes the processes of economic administration of the period since 1867 taking a systemic approach, examines the interaction between fiscal policy (government) and the central bank in thorough and novel way, accessibly presents the major theories of public finances, and moreover provides a systemic framework for the mechanisms of the state. Although the monograph itself focuses on the last 150 years, in its introductory chapter it presents the historical-interpretative framework of Hungarian public finances, going back all the way to the time of the establishment of the Kingdom of Hungary. In Lentner's book the era of dualism, then the two world wars, the system of planned economy, the regime change and the period after 2010 are presented and placed into a Hungarian historical framework in the broad sense of the term. It is actually one of the strong points of the monograph that it views the current processes in public finances from a historical perspective, and this is how the two main arguments of the author becomes understandable, notably that (1) the weaknesses of the transition to the market economy made the system of public finances unsustainable, which became clear during the crisis of 2007–2008, and (2) from 2010 a new era began in Hungary, strengthened by a high level of authorisation by the society and new legal regulations, which implemented a model where the state has an active influence on the economy.

The monograph integrates seamlessly with the scientific works by the author published so far, but also goes beyond them. His book published in 2013 with the title "Public Finances and Study of Government Finances" presents the Hungarian public finances framework reorganised after 2010, while "Regime Change and State Finances. Facts and Misconceptions", published in 2016, analyses and evaluates the period after the political changes, i.e. the two and a half decades following 1990. The monograph published now looks back to the cradle of Hungarian capitalism, the era of dualism, and then analyses the highlighted economic periods of Hungarian history – i.e. on the one hand it goes back earlier in time than the previous books, and on the other hand it connects the analysis of current developments to the conclusions that can be drawn from the last one-and-a-half century, thereby giving a kind of scientific summary of the earlier works by Lentner.

Lentner's opinion is that government finances cannot be "squeezed" into the scope of economic science, and that the examination of the evolution of the state economy should rather be built on the "intellectual flourishing of political science and jurisprudence of 1000 years". This idea was present in other publications by the author as well, but it develops into a thesis in this monograph. The author already mentioned in several works, but clearly stated in this monograph that the appreciation of the state observed in recent years means a new chance, from which "perhaps, an exact area of science of public governance could emerge in the disciplinary field between economic science and jurisprudence".

The monograph clearly supports the idea that knowledge of the evolution of Hungarian public finances provides the only opportunity and method to understand the current challenges and to recognise the possibilities in this field, and also that concerning the case of Hungarian public finances, knowing the Hungarian experiences and domestic authors is at least as necessary as knowing the international literature. On a related note, Lentner's monograph clearly fills a gap in that it presents the sometimes painfully lesser known authors of the domestic literature on public finances to the interested reader, those who were active during the era of dualism as well as those of our time. This book can be considered a freshly unique piece in the world of science, which is becoming increasingly global and thus more and more uniform: in addition to references to the outstanding international literature, it does not neglect domestic authors, whose knowledge of the terrain and attachment to the domestic conditions significantly enhances the relevance of the reference list.

According to Lentner, the current Hungarian economic system is best defined as state-directed capitalism, which considers the public finances theory and practice of the era of dualism as a kind of "intellectual precedent", with special regard to the necessity of the state taking on a more powerful role. After an analysis of historical periods, especially the era of dualism, Lentner arrives at the conclusion

that the historical examples justify the crisis management methods applied in Hungary from 2010, meaning that centralisation is not an aim, but rather a tool in the implementation of consolidation, similarly to stronger influence and control of the state in the economy. In the same way, in the "building of capitalism", in the elimination of the backlog in development, state centralisation and influencing the economy does not represent the "end result", but rather a transitional state, until the economy "recovers", adding that the state should not let go of the hands of market players even after that, and its reasonable coordination activity remains necessary.

Lentner's book provides food for thought also for those interested in scientific methodology. It is a common opinion in scientific circles that quantitative research is superior to qualitative research focusing on qualitative features (cf. "qualitative is poor quantitative"). Certainly, the time of theories without factual substantiation is over, but having seen the shortcomings of abstract economic thinking in recent decades it would be a difficult task to refute that ignoring the non-economic (institutional) factors put in focus in the analyses of historians would also lead to serious errors. Now is the time to re-evaluate economic history, this being an effective way to bring economic theories closer to reality. Knowledge of economic history could be very instrumental in understanding: what are the factors that enable growth and development, in what way, why and when can important changes happen, with special regard to factors essential for long-term growth. One can always learn much from examples that "have stood the test of reality", and in uncertain periods like the one we are living in, conclusions drawn from historical analogies could become especially important. Naturally, this is only true if we can not only describe what has happened, but we also have a properly substantiated theoretical knowledge enabling us to understand the causal relations between events of the past (recalling an old epistemological dichotomy: «erklären» instead of «verstehen»).

The monograph "Evolution of Public Finances in Hungary, from the Age of Dualism to the Present Day" fills a gap from several aspects, as a work that can facilitate the scientific and public discourse on public finances. I wholeheartedly recommend this book to economists and readers who are not economists but are interested in public finances, because of the outline of the framework of a systemic discipline of public finances, the accurate and consistent presentation of domestic processes, the systemic level summary of the Hungarian model that has developed over the recent period of almost one decade, as well as the exceptional richness of the domestic and international references.

Systemically into the Same Puddle – Foreign Currency Lending from Several Perspectives*

Tamás Nagy

Balázs Bodzási (editor):
Devizahitelezés Magyarországon – A devizahitelezés jogi és közgazdasági elemzése (*Foreign Currency Lending in Hungary – Legal and Economic Analysis of Foreign Currency Lending*)
Corvinus University of Budapest, Budapest, 2019, p. 431
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Balázs Bodzási, head of department at the Corvinus University of Budapest, invited 17 experts from the banking, regulatory and legal professions to write a volume of essays, which deals with one of the key aspects of the past 15 years in Hungarian economic policy, i.e. foreign currency lending. The multi-author work examines the development of lending practices, which continue to generate heated professional and emotional disputes even 10 years after the crisis, and the economic, legal and social aftermath thereof. Although several issues were recently settled, litigations are still pending. Today, the problem is clearly no longer a financial stability issue, but rather a painful social issue, and there are many who are still "not raised by the tide", despite the economic boom.

In chapter one, entitled "*Foreign currency loans 15 years ago in Hungary", László Balogh* recalls the birth of foreign currency loans in Austria around the middle of the 1990s. Due to the presence of Austrian banks in the CEE region, the product spread rapidly with common criteria. This was also supported by the similar macroeconomic environment and business strategy characterising the region. The parent bank's liquidity and ample funding facilitated the spread of the product, offering a high margin with a low cost of funds. At the same time, the lack of households' natural hedge, as well as the plan to introduce the euro, were also common features. As a result of the permissive regulation, foreign currency lending became a systemic risk, and later – as it proved true – a social policy issue. Of the domestic triggers, the author highlights the market vacuum that developed after the termination of the state interest subsidy, which was "addressed" by foreign currency loans. He recalls the role of the Hungarian Supervisory Authority and the

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absence of its legal tools in operation at that time. Economic policy considerations "argued for" non-intervention. The author reminds the audience that it is wrong to assume that somebody "authorised" foreign currency lending, since it was the result of the foreign exchange liberalisation accompanying OECD membership and commitments to the EU. On the other hand, the asymmetric bank-client relation, the unilateral amendment of interest rates and fees, as well as the application of the exchange rate spread, were Hungarian features. Painful realisation of the systemic risk that had built up occurred with the pass-through of the economic crisis. The author reviews the legislative regulations adopted within the scope of crisis management: transformation of the Supervisory Authority, *de facto* prohibition of foreign currency retail lending and management of the outstanding portfolio, which became necessary thereafter, including the early repayment at preferential exchange rate, the exchange rate cap/overflow account schemes, the moratorium on evictions, and the National Asset Management Agency (Nemzeti Eszközkezelő – NET). The final phase-out of foreign currency retail loans and the settlement of the unfair, unilateral amendments did not take place before 2014. This was conditional on the creation of not only the legal foundations, but also the macro fundamentals. In the course of conversion into forint, the Magyar Nemzeti Bank (MNB) provided the currency necessary for conversion and supervised the settlement methodology. In 2015, both mortgage loans and unsecured loans were converted into forint, the timing of which – in the light of the Swiss central bank's (SNB) decision – was perfect.

In the chapter entitled *"About the conversion of foreign currency loans into forint and the timing thereof", András Becsei* also writes about this topic, among other things, recalling the agreement between the Government and the Hungarian Banking Association in November 2014, following which the Parliament adopted the act commonly referred to as the "forint conversion act". He takes stock of the legislative decisions and the Curia decisions (unity of law resolutions) underlying the decision and details the conditions related to the economic environment: foreign exchange reserve adequacy and interest rates on loans. The conversion into forint and the settlement jointly resulted in lower instalments, decreasing credit risk and vulnerability, and thereby stronger stability. Subsequently, also considering the time of the SNB's decision, the timing of the measures proved to be optimal. The author highlights the foreign currency sales by the MNB, as a result of which conversion was implemented in a manner that was neutral in terms of the exchange rate and the markets, as well as the potential shock that would have been caused in the debtors' instalment and principal debt by the change in the CHF exchange rate. Finally, the lessons learnt in the region are presented in a box, coming to the conclusion that in other countries of the region the measures were less successful than in Hungary.

In the chapter entitled "*Risks of the variable and floating interest rates", Edina Berlinger* presents – through a specific loan contract, in the form of a case study –

the practice of unilateral interest rate change and the resulting conflicts, regulatory challenges, as well as the search for solutions starting from the banking code of conduct to the regulation of settlement. The third part of the chapter analyses the present risk of variable rate loans in the new lending cycle, within the context of the regulatory environment. The author finds that the variable interest rates and the handling fees were a kind of Hungaricum. In connection with the Code of Conduct, she emphasises that it represented soft regulation, on a voluntary basis, for the banks' lending practices (pricing), the provision of information and the procedures applicable to non-performing loans, which is usually standard practice in countries with a legislative deficit. In the practice of Hungarian banks, the decoupling of the loan interest rates from the CHF reference rate – in contrast, for example, to the pricing practice in Poland – further worsened debtors' solvency. Legislation put an end to this in 2012 by adopting the act commonly referred to as the Transparent Pricing Act, and later, in 2015 the possibility of changing the interest rate spread and the interest rate was regulated. The unfair practices of banks, and the resulting losses of the customers, were stopped by the related Curia's unity of laws resolution and later by the Settlement Act. Referring to the Habitat for Humanity report, it is established that the problem of crisis legacy has not been resolved, and today it is primarily of social nature. The author also makes a few critical remarks in relation to the early repayment at preferential exchange rate and NET, and at the same time makes a recommendation for the development of an income-proportionate collection system tailored to non-payer debtors. In relation to the present credit cycle, the stability risk may be represented by the interest rates, where – as a result of the MNB's regulatory measures – interest rate fixation gained ground in new lending.

In the work *"Legal measures in Hungary aimed at the management of the problems related to foreign currency-denominated consumer loans", Balázs Bodzási,* the editor of the book, highlights the dominant role of property ownership in Hungary and recalls that home creation has always played an important role in economic and social policy. Foreign currency loans, which featured particularly favourable initial instalments and an initially stable exchange rate (but completely disregarded the risks), "substituted" the cancelled interest subsidy. In this period, banks tended to make their decisions based on the collateral. Accordingly, households were "creditworthy" for having their own home even with a lower wage level; in 2004 this resulted in the construction of 43,000 new homes. Following the appearance of pass-through from the crisis and the painful effects thereof, the author deals in detail with the civil law features of the foreign currency-denominated loan contracts. In relation to the nullity of the contractual schemes, he recalls the position of the Curia, according to which the scheme does not breach the law, is not against good morals, is not usury, is not aimed at impossible services and is not a fictitious contract. However, after signing the contract changes occurred in the lending relationship which generated severe disproportions. Although this does not make

the contracts void, subsequent intervention may become necessary if the parties fail to remedy it jointly. And this is already the case of contract amendment by law. As regards the issue of unfairness, the validity of the scheme does not preclude individual nullity; in this regard, the case of unfair contractual terms and conditions, which has EU legal background, is one of the key issues, the interpretation of which is the competence of the European Court of Justice (ECJ). As regards the requirement of transparency, it was found that it is not the primary subject of the contract that constitutes unfairness, if the terms and conditions are clear and understandable. Within the ECJ's practice, the author highlights that consumers must always receive sufficient information on the legal and economic aspects of the liabilities; furthermore, unfairness may be assessed if sufficient information was not available to the consumer. At the same time, as an open issue, it must be clarified more precisely in which case the lack of information may be regarded as not sufficiently clear and understandable conditions of the contract. In his opinion, open issues include what can be expected from consumers in relation to exchange rate risk, when it is possible to transfer the exchange rate risk fully to the consumer, whether upon full nullity of the contract it is possible to restore the situation before the contract and the type of settlement to be applied between the parties. Finally, he makes a recommendation concerning debtors which did not benefit from the above measures, e.g. for a substantially simplified personal insolvency procedure.

In the volume of essays, *Barbara Dömötör* takes a new approach in her work entitled *"The Hungarian* '*Big short*' *– Rational and irrational reasons for the spread of foreign currency loans*". In this piece, she examines the non-fulfilment of the uncovered interest parity – the financial "story", which was instrumental in the spread of foreign currency lending – i.e. the apparent arbitrage possibility of the inconsistency of the substantial interest spread and stable exchange rate. When foreign currency lending surged, everybody "bet on" the strong forint, and foreign exchange market volatility was dominated by expectations rather than the macroeconomic fundamentals. Technically, a foreign currency loan can be regarded as a forint loan with forward sales of foreign currency, and thus the borrowers were better off with foreign currency loans than with forint loans as long as the (rising) exchange rate remained below the forward rate. Hence, foreign currency lending was nothing more than a "short sale" of foreign currency at a national level. Looking back to 2008, the spot and forward rates suggest that on the whole borrowers of foreign currency loans were better off. In relation to foreign currency loans, the author presents two behavioural effects: framing, i.e. the decision-making environment, which was influenced both by the initial level of exchange rates and the APR calculation method, and the change in risk attitude, were the spread of foreign currency loans supported underweighting of the related risks. She establishes that for the individual decision-maker a foreign currency loan represented a better alternative than a forint loan even under a higher level of risk aversion, and thus it was possible to justify the decisions rationally. On the other

hand, the perception of losses was heightened by the fact that level thereof was not compared to those on forint loans. Based on this, although a foreign currency loan may be a realistic option in the corporate sector, for households it represents a nationwide burden, and thus regulatory restrictions must be in place to prevent the generation of systemic risks by rational decisions at the level of individuals.

One of the most comprehensive analyses of the publication, presenting the cause and effect circumstances, is the work by *Bálint Dancsik, Gergely Fábián and Zita Fellner (Circumstances of the development of foreign currency lending).* The historical review recalls the most important cornerstones related to indebtedness. The first credit cycle since the turn of the millennium was supported both by demand and supply factors: the state interest subsidy, then the interest spread of foreign currency loans under stable exchange rate, which was strengthened by the shift in banking competition to the retail market. At the same time, by 2008 the shortcomings of the consumer protection regulation, monetary policy struggling with high inflation and financial imbalances left Hungary in a vulnerable situation. By then, the majority of outstanding borrowing of households was already dominated by foreign currency loans, with nobody clearly bearing the responsibility for this; moreover, there are even arguments why it may have appeared to be a rational decision; in addition, the pre-crisis narratives also supported the developments. The consequences are known. The purpose of the paper is to synthesize the reasons from two aspects: presenting the reasons in a context and analysing the lasting consequences of the "original sin". The spread of foreign currency lending was conditional on the "willingness" of three actors, namely: the preferences of households, banks' access to foreign currency funding and permissive regulations, i.e. on the whole, demand, supply and institutional conditions. Of these, within households' motivations it is easier to make a distinction between demand and supply effects by questionnaire-based surveys. The micro-level surveys highlight households' expectations, trust, wealth position, financial awareness and risk assumption. When examining the motivations of the supply side, it is clear that as a result of the saturation of corporate lending, financing was diverted to the retail market, which – bearing in mind the state subsidies – appeared to be good timing: the range of creditworthy and solvent debtors increased. When the interest subsidy was cancelled, only foreign currency loans were able to guarantee the price level necessary to maintain solvent demand and the profit, which exceeded that realisable on corporations. With saturation of this market, banks clearly moved toward risk-based competition. The necessary foreign currency funding was provided in two ways: short-term external, typically parent bank, funds and through off-balance sheet foreign currency swaps. At the same time, the rise in the loan-to-deposit ratio also indicated that the sector became increasingly dependent on short-term external funds and the rollover of such. The most important institutional conflicts included (1) the central bank's policy, which, according to some, excessively overcompensated inflation and sovereign risk, which led to

a stronger than "adequate" exchange rate; (2) consumer protection regulation, where the rules imposed no particular restriction on the process, and it was not clear which institution should deal with the macroprudential problem, and the instruments allocated were also unsuitable; and (3) the conditions of alternative financing and access to bank funding. After the crisis studies focused on identifying the development process. They pinpointed the trends that led to increasing vulnerability and the odds of a bank crisis. Common features included the outflow of credits in large volumes, deterioration in the balance of payments, reliance on short-term external funding and a major positive credit gap. In 2005, outstanding lending in Hungary exceeded the equilibrium level, reaching its maximum in 2008–2009. The balance of payments deficit was mostly financed via banks' short-term external debt, and thus two "conditions were met". However, it should be noted that credit outflow did not heat the real estate market to the same degree as before or similar to other crises. At the individual level, the realisation of the exchange rate risk and the interest rate increases by banks had a considerable effect, as a result of which the instalment on a typical mortgage loan rose by 80 per cent. It can be also clearly identified that a large part of the non-performing loans – 60 per cent of the present portfolio – can be linked to a narrow period of risk-based competition.

The purpose of the second work by the MNB's experts, *Bálint Dancsik, Gergely Fábián and Zita Fellner*, entitled *"Beyond finances: Why don't delinquent households pay?"* is to identify the factors that influence the debt servicing capacity and willingness of non-performing debtors or those with restructured loans. The paper examines the changes in the amount of these debtors' outstanding debt in 2014–2015, considering the income position of the debtors, the loan characteristics and the features of the settlements. The analysis found that there was less chance for a decrease in the debt for those with higher relative indebtedness, i.e. where the loan-to-value ratio (LTV) is higher due to the lower income or higher number of dependents. The research identified the factors that reduce willingness to pay; namely, when the outstanding debt rose several times compared to the loan amount drawn down, when the purpose of the loan was consumption, or when there are several non-performing debtors at the given place of residence. They also examined the effect of social capital and "social stigma", as well as the length of the default. It also bears significance to which institution the debtor owns money, which may indicate to what extent collection strategies motivate debtors to perform. At the same time, it reduced the debt when the institution terminated the loan contract, the loan was restructured, the debtor had higher income or real estate prices rose in the respective settlement.

In his work *"Some experiences of the defendants in litigation related to foreign currency loans"*, *Zsolt Lajer*, with his vast experience in foreign currency loan litigation from the aspect of banks, recalls that the disputes – the number of which increased tangibly from 2011 – are still ongoing at all levels of the judicial system. The history of these cases is not too long, but it is by no means closed. Thus, at

present the author may share only temporary, partial and subjective experiences. At the same time, the repayment difficulties that led to the legal disputes can be linked not only to the "foreign currency lending", but also to the high degree of indebtedness and the deteriorating repayment capacity after the outbreak of the crisis. The author finds that there is no major difference in the NPL ratios at the product level (foreign currency/forint), although the matter was taken to court almost only by foreign currency borrowers. However, a larger part of the issues discussed in the cases could as well relate to forint lending. It was a shocking discovery in the litigation that in such a well-known legal area as foreign currency lending, the general terms and conditions or nullity of the contract raise basic questions with no answer from modern legal practice, and these were also not addressed properly upon drafting the contracts. The author demonstrates several examples of the consequences of imprudent action triggered by "coercion to act", related to EU law, examples abroad or the self-regulation of market participants. As regards the banks, he found that during the litigation they failed to manage properly the often justified criticism and professional issues. The banks' attitude to the right of unilateral contract modification or clearly explaining the absurdity of some of the plaintiffs' train of thoughts deserve attention. The author is of the opinion that by now the cases are also driven by the (business) interests of the legal representatives involved. The partial wins in the cases are often only judgements of marketing value. At present, it is uncertain when the legal disputes may end, and when new ones may commence. However, the resolution of the problem is conditional on the following factors: the financial and housing situation of the debtors should be settled, which requires support from the state, such as the tenement flat programme or the recast of personal insolvency. It should not be worth it for the "industries" overlaying the debtors to convince the stakeholders to start new litigation. This requires firmness in judicial practice and action from the chambers. Based on the example of the exchange rate spread and the unilateral contract amendment, the author urges the legislator not to wait for years before taking corrective actions in similar cases.

As regards the regulatory issues, *Izabella Tebeli ("Importance of financial consumer protection in the stress situation generated by foreign currency loans")* recalls that the intensive enhancement of consumer protection commenced only after the crisis both in Hungary and in the EU. This was also triggered by a kind of pressure. The authors allocates government measures to three groups: (1) direct assistance for debtors in a difficult situation, which became increasingly direct from the first agreement with banks in 2008 until the legal measures after 2011; (2) taking consumer protection measures to ensure proper information on the risks inherent in borrowing and the features of the product; (3) measures aimed at enhancing the financial awareness of the population, the purpose of which is to make households capable of assessing risks and making conscious decisions. The paper examines the government's measures in the period 2009–2017, as to what degree those assisted

debtors. The author finds that after 2008 the state replaced the former neoliberal policy – relying on the self-regulation of the market – by clearly taking a regulatory position. The measures taken followed the "middle course", by sharing risks among the participants, where the primary goal was to guarantee housing and then to eliminate the exchange rate risk. Presumably, the individual measures alone would have not been sufficient; however, the solutions built on each other and offered to different clients provided significant help. The spread and deepening of financial literacy, with the collaboration of the market participants at all levels of society, is a necessity across cycles.

In addition to retail foreign currency lending, which attracted great attention, in his paper entitled *"Developments and risks of corporate and project financing foreign currency loans in Hungary", György Walter* touches on the corporate lending practices, and particularly on project financing. The available data and literature already allow for an analysis of the segment, which was characterised by similar risk-based "excessive lending" as the retail sector. The main issues presented in the paper are: How did the dynamics of foreign currency lending and risk figures change before and during the crisis compared to forint loans? How was this influenced by project financing? From the 2000s, foreign currency loans were key to the surge in outstanding lending and also to the reduction thereof. He finds that within corporate loans, project financing was dominated by foreign currency loans, accounting for roughly 90 per cent of the loans. After the crisis, these decreased more slowly due to the inflexibility of the project structures, the longer maturities and slower realisation of collateral, as well as to the cautiousness of banks. When examining the risk indicators he found that banks had to recognise higher provisions for foreign currency project loans and the portfolio was characterised by much worse NPL ratios. According to the author, later on it would be also worth examining why the higher provisions for foreign currency project loans were recognised only with a delay. Experiences show that the workout process of these loans dragged on, and thus they remained in the balance sheets much longer, exerting a prolonged negative effect.

In her paper entitled *"Foreign currency-denominated lending as seen by the regulator", Aliz Zsolnai* points out that in a process similar to the spread of foreign currency lending it is the responsibility of the regulator to act proactively, and if that proves to be insufficient, to intervene reactively. Consumer protection is key to counterbalancing the information and knowledge asymmetry. In terms of the success of the regulatory measures the receptiveness of the actors was determinant, which was also corroborated by the continuously increasing level of the debt burden. On the other hand, the firmness of the regulatory measures also increased in parallel with the escalation of the problem from the level of individuals to the vulnerability of the economy, while the way for the closing steps – which ended the vulnerability of the debtors, the financial sector and the state, resulting from the foreign currency-denominated loans – was cleared by the decision of the Curia.

Towards New Frontiers in Pricing*

János Barancsuk

Gábor Rekettye – Jonathan Liu:
Pricing – The New Frontier
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Gábor Rekettye, Professor Emeritus at the University of Pécs, can look back on a rich professional career.[1] He is the author of several books in Hungarian on the subject of price marketing, which is a crucial field, but is incomprehensibly neglected by domestic researchers. Nothing demonstrates the author's undying merits better than the fact that while working towards filling this gap, he satisfies a highly relevant need, seeing that amidst the turbulent economic conditions in our world and with the increasing globalisation of competition, pricing in a professional manner has become a particularly important tool for achieving company objectives. Moreover, the accelerating pace of technological development, the saturation of markets and the spread of the Internet put the question of pricing in a new context and present new challenges for managers who are compelled to throw out previous "masterstrokes".

The fact that his latest book on this subject co-written with *Jonathan Liu*, a professor of Malaysian and Chinese origin at *Regent's University London,* was published by *Transnational Press London* represents the completion of Mr Rekettye's mission and underlines the international recognition of his work. Published in English and produced in both colour and monochrome versions, the book is available in shops not only in the United Kingdom, but also in Hungary, Germany, Norway, France, Italy, Spain, the USA – and even in Japan and Australia. It is also accessible via paid applications on Google Play, Amazon.com and Kindl Ebook.

While the work represents an unquestionably high professional level, it is also an enjoyable book to read, since the authors facilitate the understanding of the

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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[1] During his career, Gábor Rekettye worked in industry, in foreign trade and in international trade diplomacy, and he has also had a career in higher education. The landmarks of his work include several books and textbooks, along with more than 300 scientific publications.

subject by means of numerous examples, case studies and charts. It is perhaps no exaggeration to say that thanks to the success of their efforts, even a layman can get the gist: on the one hand, the nature and interrelationship of domestic and international factors as well as micro- and macroeconomic factors influencing pricing; on the other hand, strategic drivers, methodology or ad hoc – though representing progressive approach – rules of thumb, tricks and knacks of correct pricing adopted in response to the challenges of this fast-changing environment.

Bridges between theory and practice

The book's unique merit is that, while it tries to give readers an understanding of the *techniques and strategies* shaping the development/establishment of prices and to explore the backgrounds and business milieu thereof, it also undertakes to bridge the gap between practical and theoretical approaches to this subject. It is a very rare attempt to consciously link the categories of marketing, market theory and pure (theoretical) economics and to apply them to each area, thereby giving practical substance to abstract, general microeconomic models. It is not by chance that the work of Mr Rekettye and his co-author may be of interest to all readers whose activities relate to *business areas*, *education* or *theoretical fields*.

What are the most typical manifestations of the aforementioned theory-practice dichotomy? First of all, while in theoretical economics prices are generally *indicators* influencing allocation decisions, according to the concept and practice of marketing, prices are *decision variables*. In light of the fact that the concept of the efficiency of an "invisible hand" ensuring the proper functioning of the price mechanism is regarded as a romantic myth *on real markets*, even the reviewer who is versed in the theoretical fields of economics must acknowledge that the approach of marketing is more relevant here. After all, in the increasingly multidimensional world of business generating situations of partial monopoly and interdependences, *everyone* is endowed with the ability *to set the price* and it is only reasonable to use this power. (This is so even if economic operators are *price takers*, since this behaviour is also a result of a decision, a consequence of the *positioning decision* of the management.)

The contradiction between theoretical and practical approaches can also be perceived if we observe that, while in well-known mainstream (basic) models profit-oriented actors on the supply side endeavour to determine the *output* level (or the unit price, often interpreted as its implication) corresponding to the point at which marginal cost intercepts marginal benefit (the so-called *Cournot point*), this method appears to be completely absent from corporate marketing *practice*, which mainly concentrates on *pricing decisions*. Is it perhaps deficiencies in the corporate information system that enforce the application of "rules of thumb" which are

nowhere near the "theoretically optimal" decision? We have to ask the question at this point. Or is it the case that the apparently more down-to-earth and profane terminology and methods of the management responding to realities which are always more complicated and complex than models – even if only unconsciously or instinctively – will eventually result in a situation close to the maximum level of profit.

The book by Mr Rekettye and his co-author makes for excellent reading, among other things because it presents us with these contrasts and concepts in approach/methodology. Therefore, it is expressly recommended, even as a learning tool, for readers who are perhaps familiar with the abstract fields of micro economy and market theory (industrial organisation), but are less confident in the practical world of business. (The reviewer – setting a good example – recommends the book for students attending his microeconomics courses as a useful supplement to the curriculum converting the very substance thereof into a reading that provides a "visceral experience".) And while reading through the chapters dealing with the *concrete and genuine* steps, mechanism and considerations in the development/establishment of prices, we find the answers to the above-mentioned questions, either implicitly or hidden between the lines. For example, we cannot help wondering: is the frequent occurrence of *volume-based* decisions in microeconomic models indeed realistic? Could it be that a distributor offers a newly marketed product without specifying a unit price – thus leaving this task to the demand side?[2] We don't have to think too hard to figure it out: perhaps only in the case of certain types of auctioning, which appears to be far from a general, dominant sales method.

From the book we also learn that in the course of price formation (calculation), a very high proportion of companies in the European Union still apply the method of adding a predetermined margin or "expected" *markup* (a sort of *normal profit*) to the unit cost. However, it is a positive but not yet sufficiently widespread practice to use *value-based pricing* seen by the authors as being progressive and worthy of implementation. The whole point of value-based pricing is that the upper limit of possible pricing decisions (essentially the *reservation price*) is defined by ascertaining (and, if possible, influencing) the customer's perceived value (pp. 94–100). The contrast of these two formulas may be read as the opposition between the objective and subjective theories of value (and the theories of price based thereon) known from the history of science, however, the reviewer believes that in practice, the two principles can coexist. On the one hand, costs and a margin can only be factored into the price to the extent that the company is able to acquire a market and customers to accept them. On the other hand, the lower limit of the zone of possible pricing decisions is eventually determined by expenditures.

[2] This subject is dealt with, among other things, by the theory of supply shocks and market cleansing. See e.g. *Carlton, D.W. – Perloff, J.M.* (*2003*)*: Modern industrial Organization*. Panem Kiadó, Budapest, Chapter 17.

Turning back to economic theory, it is relevant to note here: in a case where business expectations are not fulfilled (estimation of demand curve is wrong or overly optimistic, i.e. *ex post* price is below *ex ante* acceptable threshold value), the price can also perform a *guidance* function. This can be explained by the fact that outstanding costs and/or lower margins than expected can force out companies (investors) from the industry, and vice versa.

However, some research findings[3] suggest that the relevance of the demand curve itself is often dubious, i.e. there is often no close, structural correlation between prices and the volumes intended to be purchased. After all, demand intention is influenced by a number of psychological, social and institutional factors that are also mentioned in the work by Mr Rekettye and Mr Liu, which – although they are caused by price changes– trigger uncertain, unpredictable, and sometimes atypical customer reactions as a result of their complex interrelations. In such circumstances, pricing considerations certainly cannot rely on mainstream recommendations; instead, other aspects outlined in the book (e.g. the relationship between price and quality, tying arrangements, references, attitudes towards competitors) motivate pricing decisions and determine the orientation thereof.

It is certainly not the case that the intended prices do not affect the achievement of company objectives, demand, revenue, margin, etc. due to reasons described above – if it were so, research in the area of pricing would become meaningless. However, it is important to realise that factors determining effectiveness exercise their impacts in a complex, multidimensional context, which is also replicated in the diversity seen in corporate price strategy. It is a credit to the authors that they warn against the automatic application of any price calculation method; instead, they urge practitioners to recognise, consider and comply with decision criteria, which are becoming extremely complex and are often interconnected in a turbulent way.

The basic context of pricing

The following section reflects on the major topics of the book consisting of 14 chapters, noting that the presentation of the monograph exploring almost the entire repertoire of price marketing can only be incomplete and the weighting of its messages – reflecting the reviewer's specific approach – subjective.

Part 1 (covering Chapters 1–5) deals with the basic context of pricing. Chapter 1 discusses today's trends and changes in the economic and natural environment which have led to an increased importance of price function and placed pricing objectives in a context that differs from the past. The authors point out that the

[3] E.g. *Zsombor Heindl* (*2011*)*: The role of the social networks in the utility function-based consumer behaviour*. Thesis, University of Pécs, Faculty of Business and Economics, Pécs.

changes in consumer habits (increase in price awareness) and the globalisation of competition have narrowed the leeway for price policy, while the increasingly composite product structure and the growing share of services in consumption result in a more complicated price structure.

Chapters 2–4 are basically theory-oriented and are the closest to the concepts and correlations known from mainstream economics. This is where the relationship of prices and consumer behaviour is presented. However, beyond the interpretation of the demand curve and the elasticities of demand, and beyond the explanation of the basic types of market structures, we can already see here the ability to translate theoretical knowledge into practical solutions. The analysis of factors determining customers' *value perception* (the term refers here to product characteristics), *price perception* and *price sensitivity* (applicable in a much broader context than price elasticity) – and stemming not least from psychological and social embeddedness – brings theory into action, and "infuses life" into the trains of thought described by theory. These chapters also cover the classification of costs and the role of costs in pricing. The break-even analysis presented here provides an interesting comparison with the short-term microeconomic closure model, but greater emphasis should have been placed on the presentation of the limitations of the calculation of the break-even point (e.g. distortions arising from the assumption of *constant* unit costs). At the same time, the application of this method to several products and the close logical connection between linear programming procedures, providing a wider range of applications, are remarkable.

Chapter 5 provides an introduction to the *concrete* methods of pricing. This is where the authors compare the pricing techniques based on the traditional "cost plus margin" formula with market-based pricing, describing the pitfalls of applying the former and the advantages of the latter. Juxtaposing the two techniques clearly underlines Mr Rekettye's and Mr Liu's commitment to a market- and customer-oriented approach; it is highlighted that customers' value judgement is dominant in the effectiveness of companies. (It is also demonstrated that progressive economists in the field of price marketing – characterising them by paraphrasing Oscar Wilde's *bon mot*[4] – do consider the value in pricing.) Based on this credo, a detailed insight is provided into the techniques of market-based pricing, though they are all based on the same premise: consumers' value judgement (demand decision) is formulated in the context of marginal benefits attributable to the company's offer and customer expenditures. Let us realise: it is ultimately about taking into consideration the principle of optimisation known from theoretical economics (Gossen's law), even if it is not always apparent during the study of price policy considerations replicating the complex and complicated context of real markets. Translating this into the language of theoretical economics: market-based pricing has enough leeway to

[4] "What is a cynic? A man who knows the price of everything, and the value of nothing."

affect both consumer preferences (indifference map) and the slope of the budget line, in addition to shifting the cost curves by exploring more effective procedures, and adapting to competitors through ideas that can be best interpreted "in the language" of game theory.

Tactics and strategies of pricing in the distribution channel

Part 2, i.e. Chapters 6–10, forms the backbone of the book and focuses on *price strategy* and *tactics* to be followed in the dimensions of time, customer features and product characteristics. The authors explain the various aspects of the correlation between quality and price level, the elements of pricing policies for launching new products, the possibilities of market segmentation based on price and perceived value, and they also discuss the recommended behaviour towards price competition in the different stages of the life cycle. All of this, of course, is presented with the same attitude: discussing business practice in a theoretically sophisticated manner and exploring theoretical concepts with a practice-oriented approach.

In a separate chapter, the authors discuss the methods of price differentiation (price discrimination, non-linear pricing), indicating that this technique is becoming increasingly significant in parallel with the spread of services. However, price structure (price stratification) is also seen as a strategic issue, which is manifested in practice in the form of pricing the elements of the company's offer. It may be interesting to compare this with the price policy considerations of *product differentiation*, which puts product range decisions in the context of the company and its competitors. The authors draw the attention to important correlations when they describe the pricing issues entailed by different types of product line stretching or when they address the technique of bundled pricing used in the case of tying.

Part 3 including Chapters 11–14 discusses the context of pricing with regard to different segments of the distributions channel – even a foreign market can be identified as such. It also outlines which actors have the ability to be a price maker, and which ones are forced to act as a price taker, depending on the power situation in a distribution channel. Within the presentation of the types of commercial pricing, a description is provided of the nature of price psychology and price promotion. Issues of online pricing policy which is gaining increasing ground are also examined here.

Presenting the special features of pricing in markets transcending national borders, the authors set out from the impacts of globalisation processes on the international scene. This where the particular dilemma of choosing between global and differentiated pricing (and setting an initial price level when entering the global market) is presented, in addition to the nature of transfer pricing in multinational companies, as a peculiar subject.

The final chapter gives readers an overview of the technique of successful price negotiations, providing good advice on how to apply the knowledge acquired through reading the foregoing in a bargaining process under real conditions, in an interpersonal situation. Therefore, this chapter basically takes a psychological approach, insofar as it covers the psychological aspects of customer types, the adaptation thereto and the process of price negotiations.

The book received endorsements from internationally recognised experts in marketing. The reviewer joins their opinions: he is sure that the book will be a good help for corporate professionals, students and teachers in economic higher education and for all those who are "just" interested in the subject.

The Marketing Subcommittee at the Hungarian Academy of Sciences, according to the votes of its members, selected this book for The Best Publication of the year 2018 in the Category of Professional Books. The Award of Excellence was handed over to the authors at the Conference of The Association of the Hungarian Educators in August 2019.

Report on the Pension and Children 2.0 Conference*

Katalin Botos

Hungarian economists concerned about Hungary's deteriorating demographic situation and the search for a solution to improve it have been studying the theoretical background and practical necessity of linking pension to parenthood for at least a decade.

In 2012, this issue was discussed at a Budapest conference which attracted great interest. The presentations and comments at this conference were also published in a book edited by Erzsébet Kovács (from the Corvinus University of Budapest). Since that time, consideration of the issue and the search for a solution has become even more intensive, and as the problem has become even more acute, public and political attention to the issue has increased. This topic also appeared in the 330-point competitiveness programme of the Magyar Nemzeti Bank.

Consequently, after seven years several economists thought that it would be worth repeating the 2012 conference with the title "Pension and Having Children 2.0", at which researchers of the topic could present (primarily to each other, but also in opposition to each other) what progress they had made in analysis and research and what results and outcomes they had achieved thus far.

The academic conference, organised by civil persons and supported by the Demographic Round Table, was held at the Corvinus University of Budapest on 13 June 2019. The conference organisers thought that proposing specific solutions was not incompatible with academic way of thinking; moreover, they thought that the very meaning of the word "economics" (which stems from the ancient Greek term "oikonomia", meaning "household management") obliges economists to provide practical solutions. The proposed solutions varied widely. However, most of the participants agreed with the basic concept, i.e. to somehow link the pension benefit to the number of children one has and raises. It was stressed that the primary reason for the reform is to make the system more equitable, as the current pension system is expressly against having children. As it is, having children results in a less advantageous financial situation both during active and retired years, compared to

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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other citizens who are in a similar situation but do not have children—even though everybody needs the upcoming generation, citizens with and without children alike. Conference attendees also agreed that equitable solutions need to be guaranteed for the childless to ensure their security in old age. Reforms should, therefore, be in the interest of every Hungarian citizen.

Twelve papers were presented at the conference. Most of the presenters held an academic degree.

The keynote speech was held by *Pál Demény*, an internationally renowned demographer and member of the Order of Saint Stephen of Hungary. Starting from the Fundamental Law of Hungary, he deduced how the secure livelihood of the elderly should be ensured in Hungary: "Hungary shall contribute to ensuring a life of dignity for the elderly by maintaining a general state pension system based on social solidarity and by allowing for the operation of voluntarily established social institutions." (Paragraph (4) of Article XIX of the Fundamental Law of Hungary). He was of the opinion that the wording of this provision was moderate; more specifically, the expression "shall contribute to" may be regarded as an implication that both components of ensuring a life of dignity for the elderly (namely the general state pension system and self-reliance) are important, but their relative weights are not defined. In the past, adequate security in old age required the raising of a sufficiently high number of children until their productive adult age. The public pension institutions of modern societies and the individual saving options have greatly contributed to the significant reduction of the economically necessary rates of fertility and a radical erosion of the cultural and ideological foundations of the previous intergenerational transfer. However, the distorted age structure caused by a collective demographic behaviour that does not ensure simple reproduction of the population obviously undermines the viability of modern public pension systems. At the same time, in terms of individual savings, this also punishes parents who, by raising children, contributed more to some kind of reproduction of the productive population. Given this situation, the collective interest requires a family-friendly, i.e. fertility-increasing turnaround. Proper reform of the public pension system could greatly contribute to the success of such a turnaround. The goal is simple: individual fertility and financial security in old age need to be re-connected in a regulated institutional framework. Pro-natalism is, of course, in accordance with the requirement of equity.

The solution proposed by this renowned demographer 34 years ago would be to transfer a (state-defined) share of contributions to parents. Implementation of such a reform would not distinguish between already-retired people and future retirees. It would be automatic, simple and feasible in a gradual manner. One significant requirement for the long-term efficiency of the reform (which would require constitutional protection, if possible) would be that continuous reforms

that would undermine the efficiency of the system, including its pro-natalist effect, do not take place in the increasingly ageing society.

Both *Katalin Botos and József Botos* argued that the pension system requires a fundamental paradigm shift. The previous insurance-based paradigm in which we "save money" for *our* retired years should be replaced with an *investment-based paradigm*, specifically a human-investment-based paradigm. We should realise that we do not pay the pension contribution to ourselves but to the previous generation that raised us and invested considerable energy, i.e. money and time, in this "venture". Repaying this investment is equitable and this is what the benefits provided for pensioners from our contributions correspond to. It is, naturally, not only the parents, but also the state (i.e. the other citizens) that invests in parenting. While the taxes and contributions paid by new generations of employees provide a refund for the state for its expenditures, parents do not receive anything of the sort. Couples with children actually pay *double contributions*: the "official" pension contribution from their wages and the amount spent on parenting (from which we can deduct child-raising allowances; the financial burden families undertake is, however, still considerable). Complementing the employment-linked pension benefit with a child-backed channel to ensure proportionate compensation for the education investments of parents would, therefore, be equitable. At the same time, current forms of pension savings should be reviewed and pension savings for security in old age should be given priority. The childless could put the money they *save* by *not spending on children* into such schemes, regardless of the fact whether their childlessness is intentional or not. This solution would be completely equitable. We can say that this would provide people with children with a child-backed supplementary pension, while the childless could supplement their work-based pension with asset-backed savings. In addition to making the system fundamentally more equitable, this system would, in the long run, have a pro-natal effect. It would also be more expedient, with consideration of several other criteria, to put the mandatory public system on a score-system basis to mitigate several other tensions.

Zsuzsa Morvay from the National Association of Large Families emphasised that maintaining social security requires the reproduction of contribution payers, i.e. the raising of a sufficient number of children who become contribution payers. Insured people of active age can contribute to maintaining the pension system not only financially, but by raising children as well. The latter is, however, not sufficiently reflected in the conditions of the current pension system. She drew attention to the missing revenues due to working abroad and to the need to settle this issue internationally. Her ideas were not far from the concept presented by József Botos and Katalin Botos.

In their study, *Iván Róbert Gál* and *Márton Medgyesi* focused on the determination of the rate of intergenerational redistribution which is justified by spending on

children. Though their research found that nearly half of the Member States of the European Union have some kind of child-linked allowances in their pension regulations, these are, however, only symbolic. The rules to determine individual pension benefits in pay-as-you-go pension systems are mostly based on, or apply some kind of a model of, the individual contribution history, i.e. a process of transfers the beneficiary paid to the older part of society. All of that is despite the obvious fact that the amount of disbursable pensions is independent of this. The pension the beneficiary receives depends on the contribution-paying capability of younger people, i.e. on the previous investments the beneficiaries made in the human capital of the young through parenting, care, family allowances, education, healthcare and other spending. This inconsistency does not create unequal conditions on its own, if transfers in the two opposing directions, i.e. from the active to the children and from the active to the elderly, correlate on the individual level. The speakers found that this was not the case. Compared to the childless, people who raise children provide considerably higher transfers in their active age for the same transfer they receive in old age. In other words, compared to the childless, people who raise children need to pay considerably more for the same amount of transfer received in old age. They supported their statement, on the one hand, with stylised careers divided on the basis of child-raising and plotted on the basis of the age groups of the items in the National Accounts and Household Satellite Accounts and, on the other hand, by comparing the present values of the transfer amounts accumulating during the careers in question.

József Banyár thinks that the views, ideas and concepts concerning the pension reform can be divided into two groups: pro-natalist and anti-natalist ones. In his opinion, however, an increase in the birth rates would only be a side effect. It is not the main reason for the reforms. He is of the opinion that parenthood should be considered in modern, pay-as-you-go pension systems (and only in such systems) because the current system is economically *schizophrenic*, as it distributes the capacities of children (and grandchildren) to pay pension contributions, while it absolutely does not factor in who contributed to ensuring this capacity and to what extent. Currently, there is no automatism that would create a balance between raising children and the promised pension. According to the extremist idea of Banyár, *only child-raising should ensure an entitlement to pension*. If you do not have children, you should save for your old age in an asset-backed system. As the author puts it, nobody should expect his or her unborn and unraised children to provide pension for him or her. He is of the opinion that this makes the two questions—namely thorough rethinking savings in addition to contribution payment and their extraordinarily secure regulation—nearly as important as determining the pension one is entitled to for having children.

Szilvia Szegő and *András Giday* also noted that the current pension system needs to be adjusted. According to them, the current system says, *in a false demographic message*, that a stable pension system is possible without children. Regarding the pension system as a tool to encourage an increasing birth rate, they presented a unique reform idea. They would encourage parenthood by transferring a part of the *general government revenues* received for children to a separate fund (note "general government revenues" can mean both taxes and contributions). According to their model, payments over five years would be enough to provide a monthly benefit of HUF 20,000 per child for parents over 65, divided between the father and mother in a 40:60 ratio. If the fund had a surplus, it would be lent back to the general government sector to fund related areas. This model is expected to generate jobs and economic growth in Hungary.

I. János Tóth proposed a combination of the traditional and modern pension systems. Similarly to the concept of Szegő and Giday, he suggests funding the pension paid to parents directly from their own children. In other words, he suggests that adults be allowed to transfer a portion of their taxes (he specifically mentions the *personal income tax*) to their retired parents; moreover, he would also leave the distribution of the amount (including 0–0 per cent) to them. This would, in his opinion, increase the autonomy of the payer and reduce bureaucracy.

Somewhat similarly, *György Németh* would also provide a specified percentage of the gross wages of children as a benefit for their parents from the general government revenues. He specifically stressed that pro-natal incentives should be applied outside the pension system.

Péter Mihályi discussed the issue within the formal context of mainstream economics. In his opinion, today's Hungarian families, when they decide to have children, calculate their individual utility with a steeply decreasing marginal utility and a barely decreasing average cost. The marginal cost of raising subsequent children does in turn barely reduce in a developed society, and they remain near the average cost. The highest cost factor is obviously the sacrificed wage, as access to employment of mothers rapidly declines with an increasing number of children, and thus, their career wages decrease quickly. The social usefulness of the children to be born is nearly the same; there is no reducing yield. Accordingly, encouraging families to have more children would be demographically desirable. In his opinion, however, "what state support can do is only to mitigate the disproportionalities due to the burdens associated with parenthood; it cannot meaningfully increase the general willingness to have children."

Attila Bartha studied the feasibility of pension reforms, rather than their necessity, in sociological and political terms. He analysed the potential main supporters of pension reforms and how technocrats and elected political leaders approach

the issue. What happens if the actors concerned are not strongly committed to reforms due to the delicate political nature of the issue but are also aware of its sustainability. In such a case, reforms to improve sustainability are primarily *parametric*, *because paradigmatic* reforms would imply significant support from the majority of the society for the public discourse concerning the reforms. This relationship typically does not exist in case of pension system reforms that aim to avoid acute crises in public finances; it might, however, exist in the discursive context of longer-term demographic, family policy processes such as the ones currently in question.

Analysing the demographic situation, *József Benda* pointed out that Hungarian society is in the last minute of the last hour in a process leading to a clear and drastic population decline, which is partly due to its pension system which guaranteed livelihood in old age even without children. The falling proportion of women of childbearing age would make *encouraging having many children* especially important. The role children play in the pension system should also be stressed. In his opinion, however, this produces a slow effect, given the gravity of demographical determinations, and further rapid action would also be necessary.

The conference achieved its goal, namely to exchange views. Regardless whether childbirth is encouraged within or outside the framework of the pension system, and whether the pro-natal effect is given a focus or is only regarded as a side effect, the issue of having children is indisputably related to *the functioning of major distributive systems*. Expecting that the criteria for the long-term sustainability of the pension reform would, as Attila Bartha put it, overcome concerns in "the discourse over demographic and family-policy processes" and lead to a feasible, consensus-based proposal is perhaps more than an illusion.

Report on the 2019 Conference of the Economic History Society*

Bence Varga

Every year, the *Economic History Society* (EHS) operating within the School of Social and Political Sciences at the University of Glasgow organises a conference on topics related to economic history in the broader sense. The 2019 Conference was held at Queen's University in Belfast, Northern Ireland. Before presenting the key messages of the Conference, it is worth briefly describing the EHS, and its origins and activities.

The EHS was founded in 1926 with the object of promoting the study of economic and social history, and facilitating professional relations between students and teachers of the field. The EHS aims to achieve its goals through annual conferences, through cooperation with other societies founded with similar objectives, and by promoting publications of studies in the field. Since 1927, it has published its own journal entitled *Economic History Review*. British economist *Richard H. Tawney* (1880–1962), an economic historian, professor at the London School of Economics and proponent of economic history in education, played an outstanding role in the foundation of the society. In his memory, a Tawney Lecture is presented annually at the EHS conference by an internationally respected professor. As in previous years, this year's conference was attended by several hundred participants including university instructors and PhD students from many top universities (e.g. University of Cambridge, University of Oxford, London School of Economics, University of Tokyo, University of Edinburgh), and representatives of several banks and research institutions (e.g. European Investment Bank, German Historical Institute). At the 2018 conference at Keele University, the author of this report presented a lecture on the evolution of the supervision of insurance companies in Hungary.

At this year's conference, *Michele D'Alessandro*, university instructor at the Bocconi University, discussed the development of the supervision of Italian savings banks (1927–1935). In the 1920s, there were many reasons behind the need for financial supervision reform in Italy: the failure of two large banks, prudential problems

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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experienced even by smaller banks and the vulnerability of saving banks all contributed to the reform. The focus was especially on saving banks, since, of the financial institutions, they held the largest domestic deposit base and had the largest portfolios of government paper. The bulk of their clients came from the middle class, which was strongly supported by the government. Prior to the supervision reform, saving banks were subject to supervision by the Ministry of Economy and the Ministry of the Interior. However, this period was marked by a shortage of supervisors, a lack of expertise, and saving banks' low reporting frequency. The reform occurred in two stages. In the first stage, in 1926 commercial banks and cooperatives were made subject to supervision by the Bank of Italy, while from 1927, savings banks became subject to closer supervision. Accordingly, supervision was established on a regional basis. A sufficient level of expertise was also available, and supervision work was exercised with a more efficient division of tasks. In parallel with this, a guarantee fund (Common Guarantee Fund) was established, which can be basically regarded as a precursor to modern deposit insurance in Italy.

By comparison, it is worth recalling here briefly the evolution of the supervision of savings banks in Hungary. Renewal of the supervision in Hungary took place in a similar period, a few years ahead of the reform in Italy, with the formation of the Central Corporation of Banking Companies (Pénzintézeti Központ) in 1916. As an integrated institution, the Central Corporation of Banking Companies supervised not only savings banks, but also banks and cooperatives. Although its duties were not confined to supervision, this task was a key activity. The Central Corporation of Banking Companies is seen as a forerunner of the current modern supervision, because, among other things, it implemented well-defined, detailed supervisory programmes.

Tatsuki Inoue, a PhD student at the University of Tokyo, presented the evolution and regulation of pawnbroking in Japan in the period between 1884 and 1934. In Japan, pawnbroking was formulated at the end of the 12th century, centuries ahead of the emergence of the banking system. The latter took place during the Meiji era in the second half of the 19th century, in parallel with the creation of a modern market-based financial system and unification of the national currency system. In relation to lending, charging interest was socially acceptable, but interest rates were limited: accrued interest could not exceed the principal amount (mostly guidelines were provided for the rate of interest). The number of pawnbrokers tended to decline in this period, falling from 30,662 of 1884 to 19,694 by 1916. Subsequently, there was a slight increase, but the number remained below 20,000 in subsequent years. In the 1910s, outstanding pawn loans increased sharply (by a factor of 15). This can be explained by the fact that the Spanish flu hit Japan, and the cost of obtaining the necessary medicines was often financed by pawning goods. In the absence of valuable property, 80 per cent of the pawned items included clothes or objects in everyday use, e.g. bed linen and mosquito nets, reflecting rather

poor conditions. The initial rules governing pawnbroking were mainly established with a view to reducing and preventing theft. Therefore, in the course of their activity, pawnbrokers had to closely cooperate with the police. Regulations later also required that pawnbrokers enter into an association, the leadership of which was able to exercise a certain degree of control over the activity of pawnshops.

Regarding Hungary, pawnbroking was affected mainly through the Hungarian Royal Pawnshop (Magyar Királyi Zálogház) in the 19th century. The organisational form of supervision over the Pawnshop continually changed in those decades, in response to internal events. Earlier, in the period of the 1848 Revolution and War of Independence, it was the administrative department of the Ministry of the Interior that was responsible for supervisory duties. After the Compromise, these tasks were taken over by the Hungarian Royal Ministry of Agriculture, Industry and Trade (Magyar Királyi Földmívelés-, Ipar-, és Kereskedelemügyi Minisztérium), then by the organisationally separate Ministry of Trade (Kereskedelemügyi Minisztérium) following the entry into force of Law XVIII of 1889. By that time, Pawnshop was not the only one involved, as supervision was extended to other pawnbroking institutions formed in the meantime. The Ministry of Trade inspected the activities of pawnbrokers on an annual basis and prepared a written report on the audit. The inspections mainly involved the veracity of balance sheets and an estimate of the value of managed assets.

Eoin McLaughlin, a researcher at University College Cork, presented a lecture on microfinance in Ireland between 1836 and 1845. Microfinance in Ireland dates back a very long time: in the 1720s a fund was already established to provide finance to weavers. Its founder was the writer *Jonathan Swift*. In later years, the Dublin Musical Society also established a similar fund, which financed – among other things – the performance of *G.F. Händel's* oratorio, the Messiah. However, these institutions only became more widespread by the 1840s, when 533 loan societies existed. They were able to expand their activities to smaller settlements and villages as well, in contrast to banks, the number of which was 10 at that time and whose activities were concentrated mainly on big cities. Uniquely, in Ireland there were also charitable loan societies operating on a charity basis. These were of immense significance during the Great Famine (1845–1849) that occurred when the potato crop failed. The famine marked a watershed in the history of Ireland.

The Conference underlined the importance of the knowledge of economic history, highlighting the existing resources and the need for future research in economic history. For, as *John M. Keynes* put it, ultimately, most of us "are usually slaves of some defunct economist" without being aware of it. The Proceedings including the papers can be downloaded from the Internet site of the EHS, together with publications from previous years (http://www.ehs.org.uk/home/index.html). The next EHS Conference 2020 will be hosted by St. Catherine's College, Oxford.

INSTRUCTION FOR AUTHORS

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 800–1,000 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 are 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.
- Manuscripts should be sent as attachment by e-mail in MS Word file. Figures and tables should be sent in MS Excel file both in Hungarian and English.
- In case of further questions related to the manuscript visit the following website: *http://english.hitelintezetiszemle.hu/letoltes/authors-guide-en-1.pdf*

Thank you!

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