

Zsuzsanna Hosszú, Gyöngyi Körmendi, Bálint Tamási and Balázs Világi: Impact of the credit supply on the Hungarian economy*

We examine developments in credit supply in recent years and the significance of its role using different approaches and various methods. Based on these, we can establish that credit supply is a significant factor in terms of the development of the Hungarian economy both during crisis periods and during the normal economic cycle. The procyclical behaviour of the financial sector considerably contributed to the excessive credit outflow before 2008, and to a large extent, it was the driver behind economic activity during that period. At the same time, the economic downturn, lasting since 2008, is also significantly attributable to the credit supply behaviour of the banking system. Taking a closer look at the corporate credit market, we can state that the contraction which has ensued since the onset of the crisis until now was attributable to the tightening of supply and a decline in demand, in a fifty-fifty ratio. However, the picture may be qualified further according to the size of the companies: in the case of large enterprises the shrinkage of the credit portfolio is attributable more to the fall in demand, while in the case of small companies to the tightening of supply. Analysing the issue broken down by industries, we find that not all competitive and export eligible industries can borrow in the required volume, while there are other industries which, compared to their economic prospects, encounter much more generous credit supply – most probably out of necessity. Such distortions in the distribution of resources may generate welfare losses.

INTRODUCTION

During the crisis, which started in 2008, the volume of disbursed loans and economic growth both declined considerably. In order to understand this process, however, it is essential to clarify the extent to which the slowdown of lending can be attributed to diminishing credit demand and/or to the contraction of credit supply. The identification of credit demand and supply factors is also not independent of the issue of whether the decline in the growth of the real economy is caused by the curtailment of lending, or the other way around. Namely, if it is the decline in credit demand that dominates the processes, restrained lending is predominantly attributable to the slowdown of economic growth and the decline in investment activity; however, if the determinant factor is the decrease in credit supply, then the reduction of lending may have a negative impact on economic growth. A more in-depth understanding of the processes may be helpful in developing the proper economic policy instruments to address the problems.

In this article, we describe the role of credit supply using approaches that in part have been published already, considering the results generated by the various methodologies. With the help of aggregated time series, first we identify and study the importance of credit supply shocks relying on the structural vector autoregressive (SVAR) model, describing the entire economic system simultaneously. We quantify the relation of the functioning of the credit institution system to economic growth, relying on the Financial Conditions Index (FCI), received as a result of the enhancement of this model. Following the analysis of the simultaneous systems, we present a partial equilibrium model, which focuses on the corporate credit market and divides the portfolio decline observed in that area into demand and supply factors. Next, we move on to the detailed disaggregated review of corporate lending, examining the extent of changes in demand and supply by corporate size, industry and export eligibility, based on the data of the Central Credit Information System. Due to its level of detail, this review may also serve as a basis for the development of targeted economic policy measures.

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

AGGREGATED APPROACHES

Identifying and defining the importance of credit supply shocks – SVAR model

One of the most common methods for identifying credit supply – i.e. defining which part of the change in credit volume and interest can be attributed to the behaviour of the financial intermediary (banking) sector – is to estimate *structural vector autoregressive* (SVAR) models. In the case of the Hungarian economy, a study by Tamási and Világi (2011) applies this method using quarterly data between Q1 1995 and Q4 2009. The key feature of the method is that the values of the estimated parameters are primarily determined by the data rather than the assumptions of a predefined model; at the same time, it is possible to identify with them the structural shocks that can be interpreted in economic terms.

A credit supply shock implies an unexpected change in a fundamental feature of the financial intermediary system (technology, preferences, expectations, etc.), and the impact thereof on lending practice. The model identified two types of credit supply shock: one of them is connected to the behaviour of banks' management/staff, while the other is suitable for capturing the credit supply changes induced by the economic policy environment.

In the case of the first type of credit supply shock, we set out from the fact that, with rising probabilities of bankruptcy and in an increasingly risky economic environment, banks are unlikely to pursue an expansive lending policy. A plausible explanation for the parallel increase in risk and credit disbursement is that, due to some exogenous reason, the risk assessment of the banking system has changed. Thus, we regard it a positive credit supply shock when corporate bankruptcy ratios and the credit portfolio increase together. The advantage of the applied identification pattern is that it is unlikely that other shocks are able to generate the constellation used for the identification of the shock; therefore, this is a rather robust procedure. However, its disadvantage is that it is too conservative: it does not always identify the credit supply shocks induced by the change in risk assessment.

The second credit supply shock can be identified by the exogenous increase in the interest margin, which may be prompted by changes in several factors. First, the change in the margin may be caused by altered intensity of competition. Second, the various types of taxes imposed on banks also influence the margin: for example, banks can pass the impact of the new tax on to customers at a rate depending on the flexibility of the credit demand function, and they do

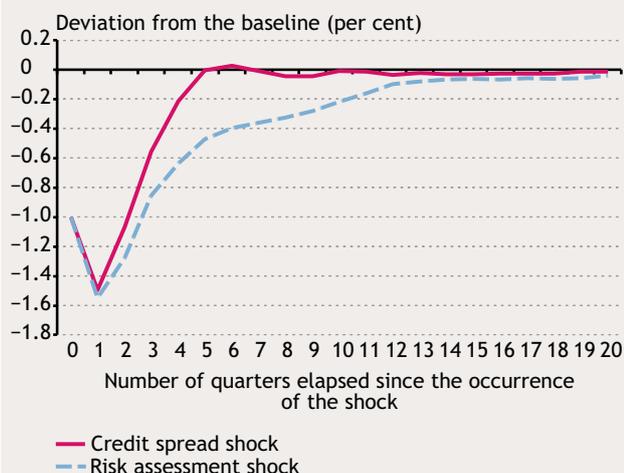
so primarily by increasing the margins. Third, in line with the argument used in the case of the banking tax, it is obvious that credit spread shocks can be also connected to banks' capital constraints coming into effect. Because if banks' regulatory capital falls below the minimum for whatever reason, they will be forced to execute a capital increase which, in turn, will make lending more expensive for them and they may try to pass the increased expenses, at least partially, to customers. It may have similar effects if banks are forced to adjust their behaviour due to their liquidity position. Moreover, the credit spread shock may be also connected to the exogenous change in regulatory rules as they significantly influence the liquidity and capital adequacy limits of banks. Developments in the interest margin may be traced back to other factors as well, such as changes in the cost of funds or the impact of the economic cycle on credit risk; however, these factors are already described by the systematic behaviour of the model, and thus they cannot be considered as exogenous shocks.

The question arises, however: do the two, differently identified credit supply shocks truly capture different phenomena? In order to resolve these doubts, we present the impulse responses of the two credit supply shocks in the case of a few key variables. As illustrated in Charts 1.a – 1.d, the impacts of the two shocks differ significantly. In the case of a risk assessment shock, the reaction of the credit portfolio and real GDP is larger and more permanent than in the case of a credit spread shock. In the first year, the risk assessment shock, resulting in a 1 per cent decrease in the credit portfolio, generates a 0.21 per cent fall in real GDP on average, while a negative credit spread shock of a similar magnitude results in a fall of 0.18 per cent for the same period. It should be also noted that in the case of risk assessment shocks, credit expansion is not accompanied by a substantial decline in the margin. This gives rise to another distinct difference in interpretation: the risk assessment shock primarily captures the *quantitative adjustment* (credit rationing), while it follows from the construction of credit spread shocks that they represent the credit supply changes accompanying the *price adjustment*.

Most economists agree that the current economic crisis is predominantly attributable to the behaviour of the financial intermediary system. At the same time, it is less obvious whether during normal periods the financial sector plays a significant role in the trends of macroeconomic cycles. In the case of the Hungarian economy, this issue may be analysed with the SVAR model, using the method of variance analysis (variance decomposition).

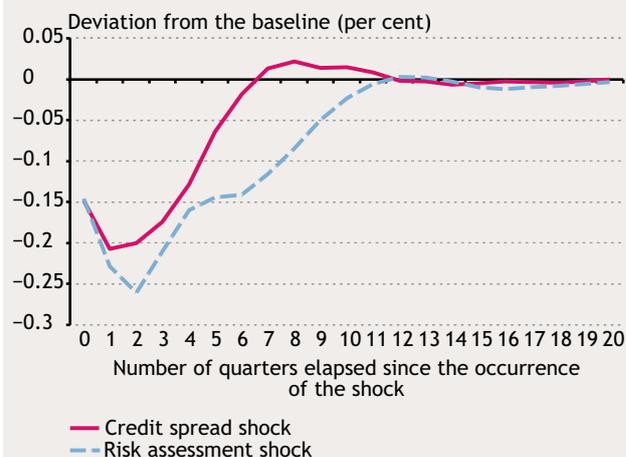
In order to compare the impact of credit supply shocks with other factors, we need to identify two additional structural

Chart 1.a
Impulse responses of the corporate credit portfolio to the different credit supply shocks upon a shift of -1 per cent in lending



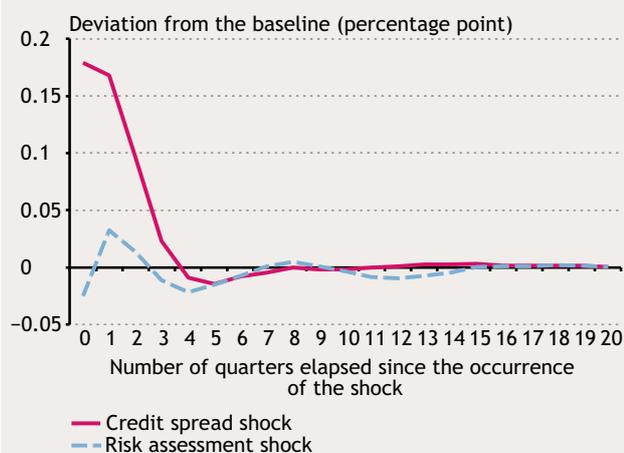
Source: MNB.

Chart 1.b
Impulse responses of the real GDP level to the different credit supply shocks upon a shift of -1 per cent in lending



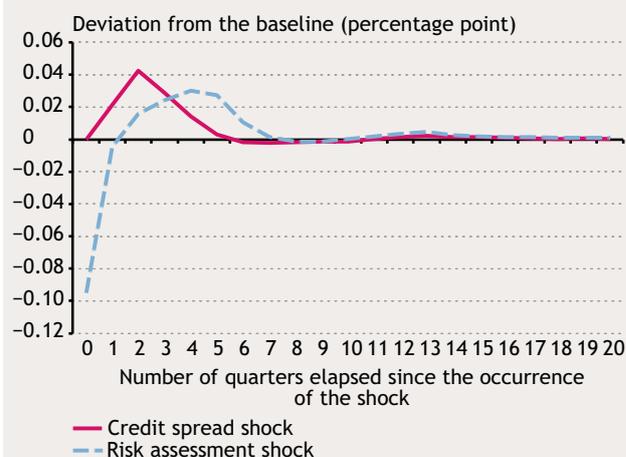
Source: MNB.

Chart 1.c
Impulse responses of the corporate interest margin to the different credit supply shocks upon a shift of -1 per cent in lending



Source: MNB.

Chart 1.d
Impulse responses of the corporate bankruptcy ratio to the different credit supply shocks upon a shift of -1 per cent in lending



Source: MNB.

shocks: a monetary policy shock; and, following the model of Vonnák (2010), the expected risk premium shock of foreign investors. In small, open economies, the latter shock has a considerable impact on the development of the economic cycle; therefore it is important to examine it. In the following, we refer to these two latter shocks jointly as macroeconomic shocks because, as opposed to credit supply shocks, these have been regularly analysed in standard macroeconomic SVAR literature.

Relying on the variance analysis, we can determine the percentage at which individual shocks explain the

unconditional variance of certain endogenous variables characterising the business cycle. Since the variance analysis pertains to the entire sample and the crisis period has only a small weight in the sample, the conclusions drawn from it help to answer the question above, i.e. whether the banking sector influences the economic cycles in normal periods.

Table 1 shows the percentage at which the unconditional variance of the macroeconomic variables is explained by the four identified structural shocks together. We found that the identified shocks explain almost 40-50 per cent of

Table 1
Part of the unconditional variance of the macro variables explained by the shocks identified

(per cent)

BUBOR	Nominal effective exchange rate	Real GDP	Consumer price index
45	51	42	42

Source: MNB.

Table 2
Decomposition of the part of the variance of the macroeconomic variable explained by structural shocks

(per cent)

	Risk assessment shock	Credit spread shock	Monetary policy shock	Risk premium shock
BUBOR	11	18	28	43
Nominal effective exchange rate	24	19	26	31
Real GDP	24	23	20	33
Consumer price index	24	26	26	24

the individual variances, which is essentially consistent with the results described in the international literature, according to which various technological and demand shocks also play an important role in developments in the economic cycles. This study is not intended to identify these shocks.

Table 2 illustrates the rate at which the variance of the individual variables, of the part explained by the identified shocks, is attributable to individual structural shocks. We found that in the case of BUBOR, of the four structural shocks the role of the risk premium shock is dominant, followed by the monetary policy shock, while the role of the two credit supply shocks is significantly smaller. The macroeconomic shock has also larger significance in the case of the nominal exchange rate, but it is much less dominant than in the previous case. However, in the case of real GDP and CPI, the role of credit supply and macroeconomic shocks is completely balanced. In both cases, they explain roughly a fifty-fifty ratio of the variance part captured by the identified shocks.

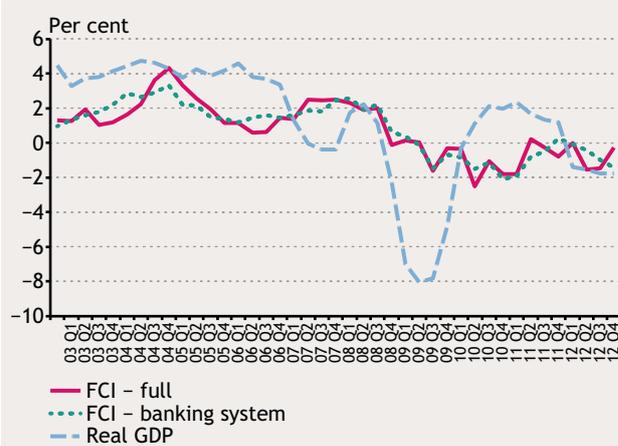
In summary, it can be stated that the dynamics of the most important macroeconomic variables (except the interest rate) are influenced by credit supply shocks roughly to the same extent as by the monetary policy and risk premium shocks, to which the literature has attached special significance until now. In other words, we may conclude that the functioning of the banking sector has a significant impact on economic cycles not only during periods of crisis; indeed, it is as responsible for developments in the economic cycle during normal periods as changes in the monetary policy or investors' risk appetite.

Relationship between economic growth and the banking system – Financial Conditions Index

In addition to short-term interest rates and the nominal exchange rate representing the behaviour of the money market, the Financial Conditions Index (FCI) consolidates the information included in the other price, quantitative and qualitative variables characterising the financial intermediary system into a single indicator variable. The FCI measures the impact of the financial sector on the real economy: specifically, the annual growth rate of the FCI shows the rate at which the financial and banking system contribute to the annual growth rate of real GDP.

The weights of the variables determining the FCI are derived from a VAR (vector autoregressive) model based on

Chart 2
Growth rate of real GDP and contribution of the FCI



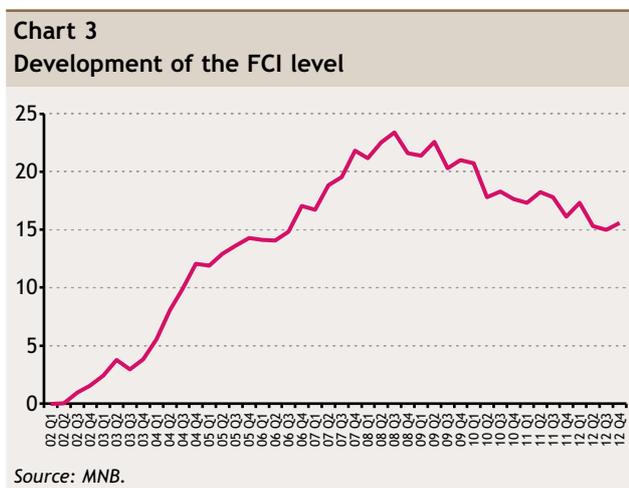
Source: MNB.

the Bayesian structural VAR model developed by Tamási and Világi (2010). However, in calculating the FCI we also use the time series of the consumer credit volume (including the home equity loans), as well as the bank interest margin associated with them. In addition to the full FCI, partial indices may also be calculated. Thus, for example, the banking system FCI without the money market impact is generated by the weighting of loans and interest margins. The weights of loan volumes and interest margins are calculated in the index based on the impulse responses of credit supply shocks, while the weights of BUBOR and the exchange rate are calculated based on the impulse responses of the monetary policy and risk premium shocks.

In Chart 2 the annual growth rate of the FCI shows the rate at which the financial intermediary system contributes to the annual growth rate of real GDP.

The chart reveals that at the end of 2008, i.e. before the start of the financial crisis in Hungary, the contribution of the Hungarian financial intermediary system to economic growth was significantly positive, despite the fact that from the end of 2006 the growth of the real economy had already decelerated due to other factors. On the other hand, the financial intermediary system greatly contributed to the economic downturn after 2008 and its behaviour became procyclical. At the trough, the annual slowdown of real GDP was 8 per cent, a quarter of which was generated by the financial sector. In 2012, the banking sector partial index system made a continued negative contribution to the growth of the real economy; at the same time, as a result of improving interest conditions, the impact of the full FCI is neutral.

Analysing the FCI level, we can compare individual periods as regards the tightness of financial conditions. When the index of financial conditions in Q1 2002 is set to 0, Chart 3



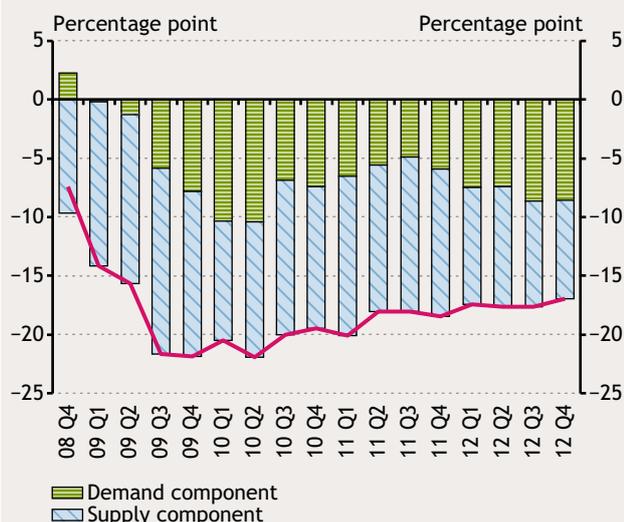
indicates whether the financial conditions in subsequent quarters were tighter or looser by comparison (the lower the level, the tighter the conditions). According to the chart, financial conditions are still much tighter than in early 2008, before the outbreak of the crisis.

Identification of demand and supply in the corporate credit market – a partial equilibrium model

The equilibrium model used by Sóvágó (2011) divides the change in lending into parts explained by demand and supply factors. Demand and supply are identified by a simultaneous econometric model, using a panel database. It estimates a supply and a demand function. The supply equation contains the price and non-price conditions of lending, the creditworthiness of borrowers, as well as the variables capturing the liquidity position of banks. Real interest, as a price variable, also appears in the demand equation in addition to the variables related to economic activity. The applied method assumes an equilibrium, as the interest rates on loans are market clearing prices. At the same time, the imperfections of the credit market (e.g. the information asymmetry) were included in the supply equation considering two channels: on the one hand, through the results of the bank lending survey, which captures the non-price conditions of credit supply, and on the other hand, through the corporate bankruptcy ratio, which approximates the borrowers' creditworthiness. Accordingly, supply may shrink due to creditors' increased risk avoidance, which is reflected in stricter lending conditions, or due to the deterioration of the companies' creditworthiness, which is captured by a rise in the corporate bankruptcy ratio.

Chart 4, which breaks down changes in the annual growth rate compared to Q3 2008 into supply and demand components, illustrates the cumulative impact of credit supply and demand on lending. Based on this, after the onset of the crisis, supply restraints were primarily responsible for the weakening of lending activity. Credit demand started to decrease only later; in Q1 2010 the extent of the impact of the demand and supply on lending was similar. Due to the change in supply and the strengthening of demand, supply constraints became more pronounced by the end of 2011; the relative weight of the demand and supply factors was about 1/3-2/3 at the time. As a result of weakening economic activity, demand played a more marked role in the changes in the amount of new loans, and thus, by the end of the year demand and supply factors contributed to the cumulated decrease in the corporate credit portfolio almost to the same degree once again.

Chart 4
Changes in the annual growth rate of loans to non-financial corporations compared to September 2008 and the breakdown thereof to demand and supply components



Note: The line and bar charts indicate cumulated values.
Source: MNB, Sóvágó (2011).

DISAGGREGATED APPROACH – ANALYSIS ACCORDING TO COMPANY SIZE AND INDUSTRY

In order to quantify the sectoral impacts of credit supply, based on micro databases we first prepared a model similar to the systems used for bank credit assessments for the 2007-2011 period. In this context, considering corporate characteristics and the general macroeconomic environment, we estimated the probability of default for companies with outstanding loans.¹ Using year dummies, we measure the role of the macroeconomic environment in changes in the risk attached to companies with outstanding loans in the

specific years. Subsequently, based on the average corporate characteristics of the companies with loans, we can establish the extent to which banks have responded to changes in the economic environment by changing lending standards – for example, the extent to which the conditions companies must meet became stricter after the crisis compared to the pre-crisis period. With this method, we can also estimate the role played by the tightened supply and the downturn in credit demand in the change of the volume of new credit amount during the years of the crisis.

According to our estimates performed on the database of the corporate Central Credit Information System, between 2007 and 2011 roughly 50 per cent of the change in the volume of credit disbursements is attributable to supply reasons. Due to the deteriorating economic situation, banks face higher credit risks, to which they respond by increasing credit margins and by narrowing the range of companies to which they extend loans. According to our estimates, the risk of new loans extended increased significantly, despite the fact that banks strive to lend to lower-risk companies.

The tightening of credit conditions affects various partial segments of the corporate credit market to a different degree; therefore, we should examine the issues according to the size, industry and export eligibility of the companies as well.

Table 3 illustrates developments in loan disbursements before the crisis and in the last year of the sample, broken down by size (micro, small, medium and large companies) based on the methodology outlined above. We found that fewer loans were extended in all four categories, but the decline in the case of micro-companies, which are the riskiest and most dependent on the domestic macroeconomic environment, was considerably larger than in the other groups. It is also clear that this could be primarily attributed

Table 3
Changes in new loan amount broken down by corporate size

	New loan portfolio (HUF billions)				
	2007	2011	Change (per cent)	Demand (per cent)	Supply (per cent)
Micro	1,730	828	-52.14	-61.68	9.54
Small	1,120	999	-10.80	28.48	-39.29
Medium	1,160	785	-32.33	-4.66	-27.67
Large	1,460	1,250	-14.38	-49.32	34.93
Total	5,470	3,862	-29.43	-14.26	-15.17

Source: CCIS.

¹ Upon credit assessment banks usually consider not only the probability of default, but also the loss given default; however, we have no data available concerning the latter, and thus we limited our analysis to the probability of default.

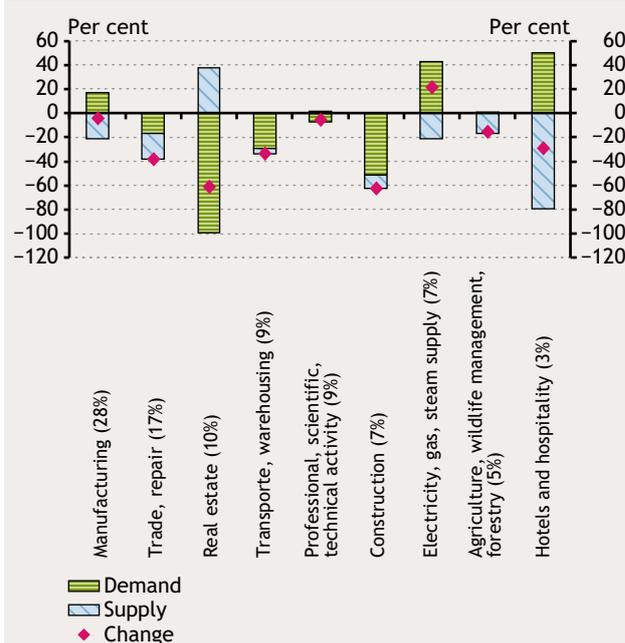
to the fall in demand, as credit conditions were even eased somewhat in this segment. By contrast, for medium-sized, and particularly for small companies the decline is more attributable to contraction on the supply side; i.e. in the case of these company groups, the tightening credit conditions presumably represent real obstacles for the companies.

In the large corporate segment, the downturn in lending was due to weaker demand, even though banks eased supply conditions. The reason for this is that this segment is the least risky group; accordingly, as a result of increasing risk avoidance, banks wish to shift their lending toward this segment and therefore, credit market processes are not hindered by supply constraints. At the same time, as a result of postponed investment in the context of an uncertain macroeconomic environment, demand lags behind that observed during the years preceding the crisis which, on the whole, leads to restrained loan disbursements.

When we perform the same calculations in a sectoral breakdown, we find significant heterogeneity (Chart 5, Table 4). Sectors where the change generated by the demand and supply is different in its sign deserve special attention. The shift in credit demand observed between 2007 and 2011 is presumably connected to the economic prospects of the sector, which could be largely explained by the protracted structural shift in demand. Sectors hit by a more significant downturn as a result of the recession are characterised by higher bankruptcy rates and lower investment activity, which in turn reduces their credit demand. Thus, we can also measure the viability of an industry by the decline in its credit demand. Based on the argument presented above, the banking system functions

well if it eases credit supply constraints for the more viable sectors, i.e. if the credit constraints are tighter where there is a protracted fall in demand. When the demand effect is positive while the supply effect is negative, over this time horizon it may suggest that, although the sector is viable and would be able to achieve higher output, credit supply constraints impede this – such sectors include agriculture, manufacturing, electricity, gas, steam supply, air-conditioning, as well as hotels and hospitality.

Chart 5
Changes in amount of new loans from 2007 to 2011 broken down by sector



Note: In the chart the figures in the bracket after the name of the industries indicate their share in the full credit portfolio in 2011.
Source: CCIS, MNB.

Table 4
Changes in amount of new loans broken down by sector

	New loan portfolio (HUF billions)				
	2007	2011	Change (per cent)	Demand (per cent)	Supply (per cent)
Agriculture, wildlife management, forestry, fishery	260	220	-15.38	1.15	-16.54
Manufacturing	1,190	1,140	-4.20	17.23	-21.43
Electricity, gas, steam supply, air-conditioning	181	220	21.55	43.09	-21.55
Construction	532	200	-62.41	-51.69	-10.71
Trade, repair	1,360	841	-38.16	-16.84	-21.32
Transport, warehousing	361	240	-33.52	-29.36	-4.16
Hotels and hospitality	172	122	-29.07	50.47	-79.53
Real estate	845	329	-61.07	-99.05	37.99
Professional, scientific and technical activity, administrative and service supporting activity	346	327	-5.49	-7.23	1.73

Source: CCIS.

However, if the demand effect is negative and the supply effect is positive in a sector, the banking system is lending to companies that are in fact less viable. Such sectors include, for example, real estate transactions, and credit conditions were not tightened significantly for the construction industry either, which suffered a steep decline. This phenomenon is presumably attributable to involuntary lending by banks, i.e. they continue to lend to companies which were granted loans previously, but due to increased risks, they are no longer creditworthy. Such disbursements take place because for lack of these loans, the former, large loans would default, thereby significantly increasing loan losses.²

The sectors are also heterogeneous in terms of the size of borrowers. For example, in 2011 the share of large companies in all companies varied between 0.2 and 12.8 per cent in the different sectors. As we found, banks tightened credit conditions to different degrees depending on size; therefore the results of the demand-supply decomposition by sector may be also influenced, besides the viability of the industry, by the typical company size of the individual sector. Thus, we also performed our estimates without the large companies. This resulted in a much more homogenous picture in respect of the supply effect: except for real estate transactions, we measured a supply effect of roughly -20 and -30 per cent in the key sectors, and the contrast in the sign of supply-demand effects moderated or did not even materialise.

The sectoral differences in the tightening of credit supply could be also explained by the heightened risk of certain sectors, or if the sectors were riskier from the start; this,

however, was concealed by the favourable economic environment preceding the crisis. Table 5 illustrates the average probability of default and changes in the probabilities of default, broken down by sector. According to our findings, among the key sectors the largest surge in risk occurred in real estate, professional, scientific, technical, administrative and service support activities and in the hotel and hospitality sector. We found nevertheless, that the supply effect was usually less contractive in the very same sectors.

We measured the long-term prospects and profitability of the sectors not only on the basis of changes in credit demand. The long-term viability of a sector is largely determined by the expected medium-term demand for the given sector's products and services. An economy that accumulates large external debt is forced to adjust and downsize the debt portfolio when external financing becomes more expensive. This is typically accompanied by a fall in internal consumption and a rise in net exports, i.e. demand shifts from the sectors producing for domestic consumption to those producing also for exports. As a result, the decline in credit supply could be partially warranted in the case of non-exporting sectors with an expected, protracted downturn in relative demand; however, this might generate welfare losses for sectors that improve the trade balance.

With that in mind, in the following we attempt to illustrate with various indices the export capacity of the individual sectors (Table 6). We used three indices for this exercise: the share of exports in the sector's sales, the ratio of

Table 5
Average probability of default and its developments in individual sectors

	Average probability of default (per cent)		
	2007	2011	Change
Agriculture, wildlife management, forestry, fishery	1.98	2.30	0.31
Manufacturing	1.62	2.75	1.13
Electricity, gas, steam supply, air-conditioning	1.60	1.65	0.05
Construction	3.29	4.94	1.64
Trade, repair	1.96	3.72	1.76
Transport, warehousing	2.06	4.33	2.27
Hotels and hospitality	1.74	3.12	1.38
Real estate	3.49	7.35	3.85
Professional, scientific and technical activity, administrative and service supporting activity	1.41	4.58	3.17

Source: CCIS.

² However, it should be noted that we were unable to control several factors – e.g. the interest rate, state guarantees and available collaterals – during the analysis, which may influence the results as well. Furthermore, a few credit contracts of extreme amount may also cause distortions. An example for this is manufacturing, where in 2011 a single loan agreement was concluded for the amount of HUF 300 billion, and if we remove this single observation from the sample, the supply effect changes roughly to minus 20 per cent.

Table 6
Export capacity of industries in the years following the crisis

	Export sales / Total sales (per cent)	Exports/imports (per cent)	Export capacity based on the input-output table (per cent)
Agriculture, wildlife management, forestry, fishery	10.3	291.6	113.5
Manufacturing	58.9	122.8	139.4
Electricity, gas, steam supply, air-conditioning	4.1	31.7	80.8
Construction	3.0	55.3	19.6
Trade, repair	14.3	38.6	78.7
Transport, warehousing	22.4	108.0	103.8
Hotels and hospitality	2.0	31.2	17.5
Real estate	2.8	84.8	27.3
Professional, scientific and technical activity, administrative and service supporting activity	16.6	142.1	44.0

Source: CClS, MNB.

exports to imports (in the case of net exporter companies this figure is above 100 per cent) and the index based on the input-output table for domestic output. The latter was calculated as follows: we examined the output growth of individual sectors in the case of an export demand increase of one unit, and the share of individual sectors in the output growth. We derived the same ratio for the entire national economy output and then divided the two by each other. If the result exceeds 100 per cent, it means that the growth of export demand increases the production of the industry more than the growth of domestic demand. This ratio could be useful as it can capture not only the industries producing directly for exports, but also when other exporting sectors have a large weight in the demand of a certain sector.

Manufacturing and transport & warehousing proved to be export eligible sectors based on all three indices. Accordingly, based on this approach, these are the sectors that should experience credit supply constraints to the smallest degree. By contrast, we found that credit supply in manufacturing might be a bottleneck, while in the sectors fully depending on domestic demand – construction and real estate – credit supply was not tightened perceptibly.

In summary, supply side credit contraction according to company size mainly impacts small- and medium-sized companies, although this is not justified based on their credit demand; on the other hand, the lack of disbursements to large companies is attributable to the lack of demand. All of this suggests that the contraction of credit supply – primarily by size – does not follow the sectoral restructuring of resources which would be desirable for balance, and thus it can generate welfare losses. According to our estimates,

the relative shift in credit supply does not support the sectors facing a better outlook over the long term, while – presumably due to involuntary lending – the banking system assumes excessive risks in other sectors. At the same time, these sectoral results may be significantly distorted by events that have no structural explanation; therefore, in order to draw more detailed conclusions it is always necessary to perform a robustness analysis as well.

CONCLUSIONS

In this study, we quantified the effects of credit supply on the Hungarian economy based on aggregated and disaggregated approaches, basically relying on three methods. The first method – the SVAR and the FCI, which is derived from the former – is based on aggregated data, and considers the simultaneous interaction of the financial sector and the real economy. The second method is a partial equilibrium method, i.e. it focuses on the credit markets and handles the events of other parts of the economy as exogenous; and finally, the third method is based on disaggregated data.

All three methods unanimously demonstrate that credit supply factors play an essential role in developments in lending activity both in the pre-crisis period and the period elapsed since the outbreak of the crisis.

With the help of the SVAR model we demonstrated that in the period since 1995 credit supply shocks have explained the fluctuation of the interest rates, exchange rate, lending and real GDP at least to the same extent as the monetary policy and risk premium shocks. Furthermore, we demonstrated with the help of the FCI that the procyclical

behaviour of the financial sector considerably contributed to the excessive credit outflow before 2008, which, to a large extent, generated economic activity during the period. At the same time, the economic downturn, lasting since 2008, is also largely attributable to the credit supply behaviour of the banking system.

Based on the partial equilibrium model, following Q3 2008 the decline in lending was initially caused mainly by the fall in credit supply, followed by a decline in credit demand. By the beginning of 2010, the two effects reached similar levels; however, subsequently the effect of constrained supply was more pronounced again. From 2012 credit demand weakened again, and thus by the end of 2012 the corporate credit contraction seen since the outbreak of the crisis was explained by the demand and supply effects to a fifty-fifty ratio.

The results of the analysis performed on the disaggregated databases of the corporate Central Credit Information System are consistent with the above. Based on the findings, the downturn in lending between 2007 and 2011 is attributable to supply factors to a degree of roughly 50 per cent. As far as company size is concerned, reduced supply

primarily hit small- and medium-sized companies. Furthermore, the relative shift in credit supply does not support the sectors that are expected to face better prospects over the long term, while – presumably due to involuntary lending – the banking system assumes excessive risks in other sectors. All of this suggests that the contraction of credit supply does not follow the sectoral restructuring of resources, which would be desirable for balance, and therefore, it may generate welfare losses.

REFERENCES

- TAMÁSI, B. AND B. VILÁGI (2010), "Identification of credit supply shocks in a Bayesian SVAR model of the Hungarian Economy", *MNB Working Papers*, 2011/7.
- SÓVÁGÓ, S. (2011), "Identifying supply and demand in the Hungarian corporate loan market", *MNB Occasional Papers*, 94.
- VONNÁK, B. (2010), "Risk Premium Shocks, Monetary Policy and Exchange Rate Pass-Through in the Czech Republic, Hungary and Poland", *MNB Working Papers*, 2010/1.