THE 2008 THROUGH 2011 CREDIT CRISIS IN CZECH ECONOMY, AND POSSIBLE LESSONS TO BE LEARNED

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Abstract: Based on a body of statistical data, the study proves the inherent laws of the credit crisis development in the Czech economy from 2008 to 2011. The interpretation of information from the Czech Statistical Office shows that the creation of gross added value from lending began to drop before the crisis broke out. Relying on this data, the study works with a hypothesis that the behaviour of the banking sector in the given years was closely related to the global financial crisis in general; nevertheless, the willingness to provide corporations with new capital through corporate lending would show a decreasing tendency in any case. The study also discusses the possibility of creating a “financial fragility” model based on a bigger number of indicators, with the gross added value created per lending unit playing an important role. The trend expressed as time series of proportions between the loans granted and the gross added value would then indicate further development and may serve as a supporting indicator in analyses of the credit market developments.

Keywords: Credit crisis; Czech economy; banking; debt; financial fragility

1. Introduction

Credit crises are standard signs that accompany recessions and periods of economic stagnation in all economies based on private ownership, market and free decision-making of economic entities. This situation is related to the normal, and in essence banal, relationship between money and other assets. If the return on assets drops while the associated risk rises, investors shed assets (i.e. sell the risk) and transfer them to cash, since holding on to assets generates or may generate loss. That is why the price of money rises. The problem is that a crisis makes the search for a new balance impossible as the risk becomes too substantial and cannot be offset by rising interest rates. As the general economic situation gets worse and the investment-related risks thus rise, so drops the willingness of the banking sector to undergo these risks, i.e. lend money to the real economy. These relationships are self-evident and it is pointless to prove them in any manner whatsoever.
However, the question remains whether the entire mechanism may have other accompanying features, or whether there may be aspects of the situation that may indicate further development in some advance. If so, it would be possible to create a model that would, with a specific degree of probability, indicate that the financial system is on the road to a credit crisis, and thus to economic recession, on the basis of the development trends shown by some data.

2. Specific Features of the Czech Economy

Czech economy is a relatively liberal one; the general level of taxation, state interventions in the economic system and other economic parameters do not tend to be worse than in the rest of the European Union. The Czech koruna is fully convertible, and cash flow is free of any restrictions. The country forms a part of the Schengen Area, and most restrictions to the employment of Czechs abroad have ceased to exist, with the labour allowed to move freely. If we were to briefly summarise Czech economy, it differs from the most developed European economies primarily in the productivity of work and thus lower standard of living and income, which is reflected in a slightly lower general price level, although the prices have closed the gap to the EU standard substantially. Lower enforceability of law, and the generally lower quality of legislation, including the vast number of enacted and constantly amended laws that create an illegible legal environment, forms another differentiating factor. This all results in small legal awareness of the citizens and mistrust in the legal system’s capability of normal operation. The third differentiator is the high rate of corruption in the country – in the 2010 Transparency International corruption perceptions index, it ranked 53\textsuperscript{rd} with a 4.6 index on a scale from 0 (highly corrupt) to 10 (very clean) (TI 2011). What is striking in this context is that the Czech Republic’s ranking has deteriorated in the recent years: for instance, the country ranked 46\textsuperscript{th} with a 4.8 index in 2006 (TI 2007). In terms of political situation, the Czech Republic has been continuously a rather unstable country, with the major parties (social democrats leaning to the leftist socialists, and the centrist liberals) unable to find common ground, their election results balanced, and the resulting coalition agreements very fragile.

Czech economy is exceptionally dependent on exports. The exports of goods and services are extraordinary when compared to the gross domestic product, with only very few countries showing higher dependency on exports than the Czech Republic (a group that includes Slovakia, for instance). The share of exports in GDP is shown in the following chart:
As we can see, the Czech Republic is a very open system by today’s standards, a system that inevitable assumes growth as well as crisis impulses from its surroundings. German economy, as the biggest business partner, plays a key role in this respect. Any diversification to markets beyond the European Union is virtually non-existent, or, more precisely, is unimportant.

Czech economy is usually ranked among standard European economies, its nature resembling the situation common in the original EU Member States the closest among the Central and Eastern European post-communist states. However, there are many signs that will justify labelling the Czech economy as a transitioning economy that is in transition from the socialist economic model (a conservative communist party of the Stalinist type ruled the country from 1948 to 1989) to a standard market democracy. As already mentioned, this signs include, but are not limited to, insufficient legal certainty, weak judiciary system, high corruption and others.

2.1. Development of debt in the private non-financial sector and its interpretation

One of the hints suggesting that the Czech economy is in the transitional phase is the frequent attempts at interpreting the behaviour of economic entities as having an agenda, i.e. that besides making profit the entity in question pursues “strategic aims” of another state, acting on its behalf. Another variation on the theme is forcing economic entities to behave in a “socially responsible”
way. In this context, responsible does not relate to environmental or social issues; instead, corporations are called upon not to primarily seek their own profit and are expected to contribute to achieving aims pursued by the society at large. While the phenomenon is also identifiable in developed and completely standard economies, transitional economies suffer from excesses such as this with increased frequency as they often become subject to official government rhetoric or even agenda.

These “conspiracy theories” or the calls upon banks “to become involved in the national reconstruction” were already apparent during the first credit crisis that the Czech economy went through in 1997 to 2000, with its impacts being tangible in banking until 2002. The first crisis emerged as the result of specific Czech factors: the situation was triggered by a currency crisis that had been ushered in due to attempts at maintaining a solid exchange rate in an increasingly imbalanced economy. The continuing crisis of the banking sector was a part of the overall economic downturn. It had begun in the mid 1990s after a series of bankruptcies of small and middle size private banks that collapsed due to classified loans. The crisis then continued with an extensive “recovery” of the entire state banking industry which totalled 140 billion CZK (approximately 4 billion USD at the time); the situation peaked with the fall of the third largest bank in the country at the beginning of the new millennium and, again, this was due to classified loans and risky transactions. Following the privatization of major banks, a more sophisticated approach was applied to credit risk management which influenced the situation in 2002 to 2004. Identifying a lesson to be learned from this specific crisis is therefore not an easy task.

As far as the second major credit crisis is concerned, it began in 2008 as apparent from the following two tables.

**Tab. A: Total loans, corporate loans and household loans (in CZK million)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total loans</th>
<th>Corporate loans</th>
<th>Household loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>693100</td>
<td>600300</td>
<td>92800</td>
</tr>
<tr>
<td>1994</td>
<td>811500</td>
<td>703700</td>
<td>107800</td>
</tr>
<tr>
<td>1995</td>
<td>916700</td>
<td>814900</td>
<td>101800</td>
</tr>
<tr>
<td>1996</td>
<td>1013900</td>
<td>910500</td>
<td>103400</td>
</tr>
<tr>
<td>1997</td>
<td>1098700</td>
<td>988200</td>
<td>110500</td>
</tr>
<tr>
<td>1998</td>
<td>1046700</td>
<td>939500</td>
<td>107200</td>
</tr>
<tr>
<td>1999</td>
<td>1001000</td>
<td>888700</td>
<td>112300</td>
</tr>
<tr>
<td>2000</td>
<td>963900</td>
<td>841000</td>
<td>122900</td>
</tr>
<tr>
<td>2001</td>
<td>775400</td>
<td>636100</td>
<td>139300</td>
</tr>
<tr>
<td>2002</td>
<td>724198</td>
<td>542682</td>
<td>181516</td>
</tr>
</tbody>
</table>
The first table reveals the impacts of the two crises on corporate and household loans in the periods of 1997-2002 and 2008-2010. During the first downturn, the reduced willingness of banks to provide loans was partially absorbed by banks transferring a part of their assets to institutions that had been set up by the government for the purpose, with the “cleansing” of bank portfolios prior to bank privatization thus distorting the picture. However, the second case is a statistically-documented credit crisis.

The next table shows the development of corporate loans provided by banks over the period of 02/2010 to 02/2011. The interpretation and analysis of these figures need to be performed along with the interpretation and analysis of the above table.

Tab. B: Corporate loans (in CZK million)

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>01</td>
<td>02</td>
</tr>
<tr>
<td>Loans</td>
<td>918</td>
<td>908</td>
</tr>
<tr>
<td>Month</td>
<td>01</td>
<td>02</td>
</tr>
<tr>
<td>Loans</td>
<td>908</td>
<td>910</td>
</tr>
</tbody>
</table>


We may see that during the thirteen-month period (02/2010 – 02/2011) no major shift in banks’ willingness to provide loans took place. In simplified terms, banking in relation to the real economy went through an unprecedented stagnation, worsened by the fact that it followed a dynamic period of reduced loan totals.
What followed was a slight growth in corporate lending; nevertheless, the volumes of lending in September 2011 were yet to reach the level existing before the crisis fully broke out. The development was marked by some statements by non-financial corporations and political representation that were not anchored in facts, whether partially or completely. They claimed that:

- Banks had ceased to provide loans since they did not have sufficient funds available as they had had to transfer some of their assets abroad to help their parent banks. This statement was based on the assumption that the parent banks of Czech financial establishments (Erste, Société Générale, KBC) had significant problems due to the decreased value of their assets and the possession of bonds issued by some governments. It seems logical that the parent companies would look for possibilities of alleviating these burdens by forcing their subsidiaries in the Czech Republic to buy them.

- Banks had refused to provide loans due to “erroneously setting” the risk assessment standards, which adversely affected even healthy operations. This belief was based on the assumption that the banking system is subject to straightforward directives, with the headquarters providing its branches with a comprehensive system of conditions and parameters that cannot be modified or adjusted in any way.

- The staff of banks were afraid of being dismissed so they tried to keep low-profile and avoid any mistakes, hence the excessive prudence in loan provision. This opinion was based on the assumption that due to the overall reduction of activity within the financial economy, banks would have to rationalize their operations, i.e. would reduce their headcount.

When we look at the above statements in more detail, we arrive at the conclusion that none of them provides a satisfactory explanation of the situation or, even, that it reflects the reality in any noteworthy way.

The first claim may be refused in its entirety – at the time when banks cut down on the amount of provided corporate loans, household loans continued growing as the former table reveals. Looking at “total loans” in 2008 to 2010, things are clear: while corporate loans continued plummeting (with the 2008-2010 reduction of 105 billion CZK, i.e. 6 billion USD) total loans continued growing (by 71 billion CZK over the same period, i.e. 4.1 billion USD) due to the growing indebtedness of families (household loans were up by 176 billion CZK, i.e. more than 10 billion USD). It is apparent that at the general level, banks did not suffer from a lack of funds.

The second claim is based on the “erroneous setting” of parameters. However, the term “erroneous” has different interpretations from the bank’s perspective and from that of non-financial corporation. A more careful analysis, which we are about to perform, is to prove beyond any doubt that the increased prudence of the financial sector fully corresponded to the development of the real economy; the reduced economic activity had caused banks to reduce their offering targeted at industry and, as an analysis of the applicable statistical data
reveals, the reduction in the economic activity was more important than the reduction in the amount of provided loans.

As to the third claim, it lies beyond the realm of economics and as such is very uneasy to analyze as the relevant data are not available. However, judging by the information that is available, we may assume that of the three claims presented by companies, this one is the most justified. But as usual in these cases, such circumstances are only of marginal effect and cannot provide a satisfactory explanation of the entire situation.

2.2. Debts of Czech businesses as an assessment parameter

To identify the root causes of the decrease in loans between 2008 and 2010 (and their stagnation in 2011), we need to go further back in time. In 2002 and 2008, business debts almost doubled (growing by 467 billion CZK, i.e. 27.5 billion dollars). The amount of loans in 2008-2010 dropped by 10 percent, or, if we compared this reduction (of 105 billion CZK) to the situation in 2002 (where total loans were worth almost 543 billion CZK), it would represent approximately 19 percent.

This suggests that in terms of the entire first decade of the current century, the variation of 2008-2010 and the current stagnation of loans has been a rather unimportant or relatively less important shift, at least mathematically speaking. The period has nevertheless had a significant impact on Czech businesses and caused an increased number of insolvencies, overdue payments and payment incapacity as well as other phenomena, such as increased unemployment, that also need to be taken into account. As we are yet to see, the second credit crisis was nothing in comparison with the reduced loan totals and the duration of the first credit crisis. This claim, however, requires a data analysis.

Comparing both periods within the independent Czech economy (following the split of the Czech and Slovak Federative Republic on 1 January 1993 and the emergence of the Czech Republic) that we have defined as periods of “credit crisis”, we see two distinct developments that caused banks to reduce the amount of loans that they provided.

The first credit crisis was linked to a long period of economic stagnation that was marked by a five-year period of gradual lending reduction, with the total loans (at 988 billion CZK) at the beginning of the crisis (end of 1997) being higher than they are at the present time, i.e. in Q1/Q2 2011 (910 billion CZK). (One important thing to note is that in 2002 to 2011, industrial production sales grew by 42 percent and the average interest rate for new loans went down five percent.) And it was not until after the year 2002, when the total corporate loans hit the lowest point of 542.7 billion CZK, which was less than during the first year of the independent Czech economy in 1993, that the situation started to change, although the first two post-crisis years (2003 and 2004) were marked with stagnation and a very limited growth in lending.
The second crisis, which began in late 2008, lasted throughout 2009 and turned into stagnation in 2010, was much more dynamic. Loans hit their lowest mark in April 2010, with their total below 897.6 billion CZK, i.e. approximately at the levels of the end of 2007.

Even this basic analysis reveals that in comparison to the 1997-2002 crisis, the 2008-2010 credit crisis, triggered by the global financial turmoil, and the subsequent economic depression were by no means as durable and deep in terms of its effects on Czech businesses. The explanation is simple: The recently imported crisis found the Czech banking sector strong and stable as opposed to the crisis of 1997 that had been ushered in by a CZK collapse that caught the sickly financial sector off guard; to make matters even worse, the Czech National Bank tried to tackle the issue of currency instability caused by economic factors by significantly increasing its interest rates. Understandably, this led to suffocation of the economic activity and further worsening of the damage although it did reduce inflation quickly. As we may see, the first crisis was so lengthy also as a result of the Czech economy suffering from significant imbalances.

We may therefore conclude that both crises are in fact incomparable; one of the reasons (and possibly the most important one) is that the second crisis hit the Czech banking sector that operated within a standard or near-standard financial system, with a healthy credit portfolio (at least relatively). As opposed to that, while before the first financial crisis, the state-run banks (or, more precisely, banks with majority stakes held by the state) had given loans out irresponsibly and smaller banks went out of business despite the prevailing economic boom, the second crisis hit a consolidated and well-secured sector where the amount of classified loans was on a par with the European average or even slightly below it.

So the major difference is in the way in which banks assessed risks earlier and in the period of 2007 to 2010. While in the 1990s, indebtedness of a company, slightly hyperbolically, was no issue to banks, recently it has been a very important (if not the key) indicator in the assessment of creditworthiness.

2.3. Factors affecting corporate lending

Banks’ willingness to lend money to businesses is generally affected by a number of external influences that play a decisive part in the amount of loans available. These influences may be divided in those on the part of the creditor (bank) and those that affect behaviour and actions of the debtor (company). These include but are not limited to the following:

- Influences on the part of banks:
  • Amount of funds available to the bank for investment;
  • Existence of other investment opportunities;
  • Demand for loans on the part of the government;
  • Demand for loans on the part of households;
  • Other opportunities;
• Business default development (risks involved);
• Bank’s assessment of future business development (production, sales, prices);
• Amount of projects that comply with bank’s standards;
• The price that the central bank pays for monetary sterilization (i.e. the setting of key rates);
- Influences on the part of businesses:
  • Lending conditions offered by banks:
    • price,
    • repayment length,
    • other conditions;
  • Securing options;
  • Need for borrowing capital, necessity of investments, lack of operating capital;
  • Value of equity;
- External influences:
  • Quality of the legislative framework and costs of company liquidation;
  • Political stability;
  • Consistency and predictability of actions on the part of the central bank;
  • Regulation.

As apparent, some of the above decision-making factors on the part of banks merely reflect those on the part of companies and, as such, these factors may be coupled together: For example the amount of capital available to a bank for investment at a given time influences the conditions that the bank offers to its client – the price of money and the overall conditions. Based on these conditions, the company then decides whether the price is appropriate and the loan, as offered, is to the company’s benefit. Risk assessment on the part of the bank is also linked to quality of collateral etc. While these relationships are so trivial that we take them for granted, in situations where financial system loses balance and is prone to fragility, i.e. in financial and credit crises, many people seem to be surprised that the above relationships do not apply absolutely but, rather, merely under “normal” circumstances. For example, business managers are reluctant to understand that banks refuse to lend them operating capital in spite of their company offering valuable collateral security and being a long-standing trustworthy client. In business we are willing to accept the idea that the price of money changes based on dozens of factors; however, we are not ready to accept that sometimes the price of money is overweight by a priceless risk premium that makes the owners of the capital refuse to grant any loans at all.

This is a situation similar to that faced by governments on the financial markets – if the interest demanded on Italian ten-year bonds (similarly to the Greek bonds before that) reaches seven percent, the investors will come to the limits of the risk they were willing to accept and refuse further exposure.
External factors are also important; in this respect, let us look at the regulatory framework. To a large degree we may say that at times of economic boom the amount of loans grows more dynamically than the actual performance of companies. As opposed to that, in a crisis the amount of lending drops faster than the corporate performance (expressed e.g. as corporate sales). The reasons behind that are more or less summarized by the above parameters whose effects tend to be multiplied at times of economic boom as well as depression, as apparent from the extensive critique of the pro-cyclical character of BASEL II. In a valuable contribution to the discussion on the matter, its authors (Geršl, Jakubík, 2010) simulate the impact of regulatory measures on economic development, concluding that: “The simulation of effects of reverse impacts has shown that under some circumstances the effect of reverse impacts on the real economy may represent 1–2 percentage points of y-o-y GDP growth over the period of at least one year. The pro-cyclical character of the financial system should thus be considered in drafting economic or macroprudential policy.” [4] This conclusion needs completing: BASEL II rules were adopted in 2006 and implemented, following extensive discussions, over the period of 2007 to 2009. It is fair to note that businesses were aware of the threats that regulation entailed for them and their financial stability in (back then merely potential) financial or sales crisis (as any wide-spread sales crisis will inevitably result in a credit crisis, as will any financial crisis. The former due to the decreasing sales of debtors, i.e. the increased risk of their default, while the latter due to a lack of liquidity on the part of banks or due to other financial reasons. It has been clear for a while now that just as BASEL II enables banks to expand more dynamically at times of growth, the same rules force them to a more significant restriction of lending at times of depression.

The following table shows some interesting relationships between loans and sales (for the sake of simplification, only industrial corporations, representing the average non-financial debtors from among Czech businesses, have been considered).

**Tab. C: Indices of corporate loans (Year-on-year, as at the year’s end) and industrial production sales (year-on-year, as at December of the relevant year)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Loans - index</th>
<th>Sales - index</th>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/2001</td>
<td>85.3</td>
<td>110.1</td>
<td>+24.8</td>
<td>+8.0</td>
</tr>
<tr>
<td>2003/2002</td>
<td>102.1</td>
<td>102.3</td>
<td>+0.2</td>
<td>-1.3</td>
</tr>
<tr>
<td>2004/2003</td>
<td>103.6</td>
<td>114.9</td>
<td>+11.3</td>
<td>+1.7</td>
</tr>
<tr>
<td>2005/2004</td>
<td>113.2</td>
<td>106.6</td>
<td>-6.6</td>
<td>-8.1</td>
</tr>
<tr>
<td>2006/2005</td>
<td>114.7</td>
<td>105.7</td>
<td>-9.0</td>
<td>-15.3</td>
</tr>
<tr>
<td>2007/2006</td>
<td>121.0</td>
<td>109.4</td>
<td>-11.6</td>
<td>-2.5</td>
</tr>
<tr>
<td>2008/2007</td>
<td>111.9</td>
<td>89.6</td>
<td>-28.9</td>
<td>-1.7</td>
</tr>
<tr>
<td>2009/2008</td>
<td>91.3</td>
<td>98.2</td>
<td>+6.9</td>
<td>0.1</td>
</tr>
<tr>
<td>2010/2009</td>
<td>98.1</td>
<td>113.0</td>
<td>+14.9</td>
<td>-3.5</td>
</tr>
</tbody>
</table>

Explanatory note:
I: Difference between the value of the loans index and the value of the sales index for the relevant period;
II: Difference between the value of the loans index and the value of the sales index for the relevant period where the value of the index of loans in the next period (T+1) is subtracted from the value of index of base-period sales (T);
1) Author’s estimate that is based on an assumption that the total loans provided to Czech non-financial corporations by banks will have attained 975 billion CZK by the end of 2011.

The interpretation of the values of “I” and Correlation “II” is clear: When comparing the sales and the loans in each of the years, we see clearly that under the growing economic boom following 2004, the loans started to grow faster than the sales (years with the minus sign); we can also see that the process was getting more dynamic up until 2008 where the difference was almost 30 points due to the significant decrease in sales. We see that banks acted in a pro-cyclical manner and that their effort to further boost the already booming economy by providing additional loans was increasingly less justified by corporate performance (provided we accept sales as the key indicator of the repayment ability).

However, “II” shows that banks were able to adjust their behaviour to deal with the economic reality over the next year. The differences identified under “II” are far less important than those identified under “I”, which points to the fact that banks were able to detect risk in a timely manner, which, in turn, enabled them to act relatively rationally.

2.4. Development of debts and gross value added for each CZK in loans

The threats that banks had to increasingly deal with included most notably the development of the overall economic parameters within the Czech economy, with a few red flags becoming apparent even before the economic downturn started at the end of the first decade of the 2000s. Even though based on the latest studies, Czech corporations are among the least indebted within the European Union (both in terms of their debts with banks or in terms of borrowed capital within their balance sheets), some relevant surveys carried out in the Czech Republic have revealed (Dubská 2009) that the share of gross value added generated for each CZK in loans within the national economy has declined steadily. This decline, however, has not been the result of the 2008–2010 economic downturn but had been triggered several years before the emergence of the crisis that came along with the deep recession in developed countries. This inevitably ushers in the question whether the “credit crisis” in the Czech economy might have had been marked by other specific features.
Let’s now try to look at the issue from a different perspective, through the years of an investor. Based on an Erste Group study, Czech corporations are among the least indebted within the European Union. The study, some parts of which were published in the media in 2010 shows that most debts have been incurred by the corporate sector in Ireland, Spain, Portugal and Belgium. Their gross indebtedness amounts to 300 to 400 percent of value added that they produce, or, to their net profit (net of taxes) from nine to twenty years ago. The corporate sector in the Czech Republic and Slovakia has incurred the lowest amount of debt from all EU non-financial corporations and its gross indebtedness is lower than the value of its value added generated over a year, or in other words, corresponds to the corporate sector’s net profit from three to four years ago. Juraj Kotian, a member of the research team and Erste analyst for Central Europe, has commented on the situation as follows: “Over the last decade, the non-financial corporate sector has become net borrower in many European countries. The strong growth of investments has resulted in a sharp increase in revenue, although debts have increased equally as much. That is why the corporate sector has to focus on balancing out this development by improving profitability of their business operations and by removing debts.” Equally as interesting is another of his statements: “Given their higher capital returns, the countries of Central and Eastern Europe should remain attractive for corporate sector investments. As soon as investments are back up, businesses in these countries will be able to profit from a stronger influx of foreign capital thanks to their significantly lower debts.” (Erste 2010)

While the data provided within the study seem interesting, their interpretation is carried out purely along the lines of banking. The interpretation is based on an assumption that growth in investments (or the growth in lending offering) is purely dependent on valuation of capital; this, however, is not the case and if we looked at a random list of influences affecting lending, we would find quite a few items that have nothing to do with or are only vaguely connected to capital returns. Additionally, other studies have proven that even though the Czech production sector is not among significantly indebted, its capacity to repay borrowed funds has been declining for some time (although this has not necessarily resulted in a higher number of credit defaults).

This means that the credit stagnation, as seen in the second half of 2010 and in 2011, must have another explanation since Czech businesses and the production sector in general have not had excessive debts and, to the contrary, should be able to absorb new capital unlike some other sectors.

This could logically lead us to a conclusion that banks do not lend because they cannot do so due to regulatory requirements; however, this is equally not true. As the following chart shows, the health of the banking sector in the Czech Republic has not been significantly affected due to the crisis and its key parameters remain solid. As far as capital adequacy of banks is concerned, the situation in 2009 was much better than had been predicted. By the same token, while credit defaults showed some growth (as we are yet to see), their number was far from posing a threat to the stability of the entire system. In this respect we may say that the implementation of BASEL II within the Czech banking sector has not brought the kind of pro-cyclical effects that theoretical
works warned against and that some other countries have experienced. This has been the case namely because the impacts of the crisis across the Czech financial sector have not been as hard-felt as in other countries and banking in the Czech Republic has proven resilient to the crisis, both in term of liquidity as well as potential losses due to classified loans.

Graph B: Estimates of non-performing loans (NPL) ratio and capital adequacy ratio (CAR): last year’s scenarios versus 2009 outturns

![Graph B: Estimates of non-performing loans (NPL) ratio and capital adequacy ratio (CAR): last year’s scenarios versus 2009 outturns](source.jpg)


The already cited work “Comparison of Effectiveness of Bank Loans in Production Industries within the Czech Economy” by Drahomíra Dubská offers some very interesting insights:

The performance of borrowed funds started declining as early as 2006, i.e. at the time when the growth in industrial production was above 10 percent and inflation was more or less negligible;

Obviously, the demand for borrowings in an environment of “cheap money” went beyond the real need of businesses. As the development was not reversed even during the subsequent periods, we may conclude that corporations would mostly spend the money on their operation (cost expansion) and on investments that later proved insufficiently profitable;

The following table (showing differences in some data concerning loan totals due to the slightly different calculation method used by the Czech National Bank, with its results being somewhat lower, although the overall trend is still visible) reveals that in 2005-2008, gross value added generated for each CZK in loans went from 3.13 CZK to 2.44 CZK, i.e. was at below 80% of the state earlier in the decade. In simplified terms, this translates into the “profitability” or “productivity” of loans being more than 20 percent lower.
Tab. D: Gross value added (in CZK million, current prices) and bank loans in CZK and foreign currencies (in CZK million) for selected sectors

<table>
<thead>
<tr>
<th>Year</th>
<th>Sector</th>
<th>Gross Value Added</th>
<th>Loan totals</th>
<th>GVA generated per 1 CZK in loans (in CZK; based on loan totals)</th>
<th>Gross Value Added</th>
<th>Loan totals</th>
<th>GVA generated per 1 CZK in loans (in CZK; based on loan totals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Agriculture, hunting, fishing</td>
<td>80,420</td>
<td>22,603</td>
<td>3.56</td>
<td>73,489</td>
<td>25,444</td>
<td>2.89</td>
</tr>
<tr>
<td>2006</td>
<td>Mining, quarrying</td>
<td>36,401</td>
<td>10,591</td>
<td>3.44</td>
<td>37,944</td>
<td>17,148</td>
<td>2.21</td>
</tr>
<tr>
<td>2007</td>
<td>Manufacturing</td>
<td>704,925</td>
<td>171,671</td>
<td>4.11</td>
<td>762,847</td>
<td>194,443</td>
<td>3.92</td>
</tr>
<tr>
<td>2008</td>
<td>Electricity, gas and water supply</td>
<td>103,791</td>
<td>33,737</td>
<td>3.08</td>
<td>127,705</td>
<td>29,979</td>
<td>4.26</td>
</tr>
<tr>
<td>2009</td>
<td>Construction</td>
<td>167,996</td>
<td>20,331</td>
<td>8.26</td>
<td>179,756</td>
<td>28,764</td>
<td>6.25</td>
</tr>
<tr>
<td>2010</td>
<td>Wholesale and retail trade, repair of motor vehicles and personal and household goods</td>
<td>342,396</td>
<td>133,707</td>
<td>2.56</td>
<td>380,314</td>
<td>153,025</td>
<td>2.49</td>
</tr>
<tr>
<td>2011</td>
<td>Hotels and restaurants</td>
<td>52,839</td>
<td>6,914</td>
<td>7.64</td>
<td>50,753</td>
<td>10,277</td>
<td>4.94</td>
</tr>
<tr>
<td>2012</td>
<td>Total</td>
<td>2,205,760</td>
<td>703,646</td>
<td>3.13</td>
<td>2,398,140</td>
<td>809,320</td>
<td>2.96</td>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Agriculture, hunting, fishing</td>
<td>75,761</td>
</tr>
<tr>
<td>2008</td>
<td>Mining, quarrying</td>
<td>36,261</td>
</tr>
<tr>
<td>2009</td>
<td>Manufacturing</td>
<td>872,407</td>
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<tr>
<td>2010</td>
<td>Electricity, gas and water supply</td>
<td>129,171</td>
</tr>
<tr>
<td>2011</td>
<td>Construction</td>
<td>199,240</td>
</tr>
<tr>
<td>2012</td>
<td>Wholesale and retail trade, repair of motor vehicles and personal and household goods</td>
<td>401,670</td>
</tr>
<tr>
<td>2013</td>
<td>Hotels and restaurants</td>
<td>55,071</td>
</tr>
<tr>
<td>2014</td>
<td>Total</td>
<td>2,647,901</td>
</tr>
</tbody>
</table>

Considering data in e.g. manufacturing, which is essentially the key industry, gross value added generated for each CZK in loans in 2005 was at 4.11 CZK; in 2008, the same value stood at 3.48 CZK. While the decrease was less pronounced than for the entire national economy, at 15% it was still significant – a development like this could not go unnoticed by banks and shows that there had been processes within the economy that must have resulted in some difficulties even before the actual crisis set in.

These undoubtedly included the gradual increase in total credit defaults that grew, in 2009 alone, more than 10 billion CZK each quarter, approaching six percent of total loans. (ČNB 2010) While these amounts were not too bad, and could even be considered excellent in some economies at the time of boom, the conservative Czech banking industry (that had become less accommodating following the first credit crisis of 1997 to 2002) perceived them as a potential threat (for example, the percentage of credit defaults on total loans in early 2010 had doubled compared to end 2007).

3. Potential for a “Fragility” Model

Discovery of the mechanisms behind both credit crises (if only using the Czech environment of the two last decades as example) opens some additional space for follow-up considerations. These may include the possibility of creating a structured model that could show, if applied correctly, the optimised response of the banking sector to the development of economic data based on some parameters.

The model is a variation on the “financial fragility” models created in the past few decades primarily to explore the stability of bank portfolios or the entire banking sector in the course of pending changes in substantial parameters, e.g. in response to changes in the key rates announced by central banks, developments in the debtors’ defaults, i.e. essentially a response to the assumed or already started inflationary development and to cash-flow development in the real economy. Of course, this is an extremely interesting opportunity: “Perceiving and being aware of the need for prevention against the rise of crisis phenomena is very important for society as well as for the legal entities and natural persons. (…) Ignoring and/or paying insufficient attention to the risks could bring negative consequences for all participating parties.” (Zánická Hollá, et al., 2010)

In terms of “financial fragility” of banking institutions and their portfolios, this issue has been addressed by the team of Goodhart, Sunirand, Tsomocos, among others. Their results accurately reflect the simplification of the matter that is necessary to create a mathematical model of “financial fragility” and the fact that the model loses any sense without this simplification: it is stripped of its actual usability: “The second set of insights relates to the implications of the main innovative feature of our model, which is that the real world is heterogeneous; agents and
banks are not all alike. This has some, fairly obvious, implications. The result of a shock may depend on the particular agent, part of the economy, on which it falls. The response of a bank to a regulatory change will generally depend sensitively on the particular context in which that bank finds itself, and will vary as that context changes. The result of a shock can often shift the distribution of income, and welfare, between agents in a complex way, which is hard to predict in advance. In short, heterogeneity leads to greater complexity. What we lose, by including it in our model, is simplicity; what we hope to gain is greater reality. In this latter respect, however, simulations, such as these, are always somewhat lacking. We have chosen the initial conditions, and so the outcome is the somewhat artificial construct of our own assumed inputs. We accept this, and we offer this paper, and these results, as a stepping-stone, a stop on the route, of our continuing research.” (Goodhart et al., 2004).

The creation of a model that would use a few indicators to formulate probabilistic behaviour models and, above all, detect potential development in the area of defaults, and thus propose optimised response by financial institutions, will be inevitably limited by the same problem that was faced by the team of Goodhart, Sunirand, Tsomocos. If we were to comprehensively reflect the circumstances surrounding phenomena so complex as relations between lenders and borrowers, and then to create a certain scale or a map of potential responses of financial institutions to changes in market behaviour and to financial fragility, the formulae would have to be extremely complex. Therefore, it is clear that some simplification must be involved.

A key role in this “financial fragility” model will be inevitably played by some parameters that are themselves comparisons. Therefore, creation of gross added value will undoubtedly surface as a key term in relation to the value of the loans granted. In simple terms, we can say that if the creation of added value per lending unit rises or stagnates, there is no apparent reason why the lenders’ resistance should be tested by default. However, this correlation constitutes an extreme simplification, and it will be suitable to add further parameters later on so that the result is more accurate as an objective view of the matter.

4. Conclusion

The analysis of the two credit crisis periods in the Czech economy of the past two decades has hinted at a possible correlation between some values, a correlation that may potentially create an opportunity to recognise signs of credit crises more accurately. Out of these parameters, we have addressed mainly the creation of gross added value and default. We may assume that with a wider research effort, it could be really possible to create (using long time series) a certain estimate of the mechanism behind the creation and development of a credit crisis, which could be then used as the analytical basis for the examination of responses by organisations and institutions in certain periods of time. With a
suitable interpretation of the behaviour shown by economic entities in lender-borrower relations, this examination may predict the potential risks posed by the credit crisis.

Acknowledgment

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Literature


