

## USE OF THE CZECH CENTRAL CREDIT REGISTER FOR FINANCIAL STABILITY PURPOSES

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*This article contains basic information on the Czech Central Credit Register (CCR) and documents the use of the CCR for fulfilling the objective of financial stability. It describes in detail the construction of credit risk indicators produced by the CNB on both a routine and ad hoc basis in its macroprudential supervisory work. The article concludes by briefly describing the CNB's plans to collect granular credit information. The extension of data collection to information on mortgages and consumer credit provided to households is linked with current European initiatives to establish a cross-border credit database. Detailed data on this credit segment are needed for some macroprudential tools, such as the loan-to-value ratio.*

### 1. INTRODUCTION

Credit registers are an important source of information on loans provided in the economy and play a key role in the assessment of the quality of financial institutions' loan portfolios. Such information is crucial for monitoring and managing credit risk at both the single-institution and whole-economy level. The need for a detailed knowledge of credit market developments has led to a surge in the number of credit registers administered by public and private institutions over the last decade (Djankov et al., 2007). Public and private registers can be seen as complementary to some extent, but perform rather different functions (Miller, 2003).

The establishment of such registers has been driven by the need for banks to exchange data on the credit commitments of loan applicants. Information sharing generally helps financial institutions to reduce the information asymmetry between prospective borrowers and lenders, which in turn enhances the quality of lending processes. The empirical literature shows that credit registers reduce adverse selection and improve the provision of credit (Pagano and Jappelli, 1993), reduce excessive lending by banks (Bennardo et al., 2009) and reduce lending to risky clients (Hertzberg et al., 2011). On the other side of the coin, access to credit register data promotes financial innovations and drives greater competition between banks, which ultimately means better credit conditions for potential clients (Dent, 2014; World Bank, 2013).

Besides the goal of eliminating information asymmetry between lenders and borrowers, individual loan data (primarily from public registers) are increasingly being applied in banking supervision and in the area of monetary and macroprudential policy. The credit market situation cannot be correctly assessed without analysis of the credit conditions. Credit register data are vital for monitoring credit risk and correctly configuring macroprudential tools.

They play a central role in stress testing of banks and can also be used for other analyses – for example for breaking down credit growth into supply and demand factors (see, for example, Plašil et al., 2013). Finally, credit registers are an invaluable source of information for research work and academic publications.

The Central Credit Register (CCR) administered by the Czech National Bank is a key credit register in the Czech Republic. All banks and branches of foreign banks doing business in the Czech Republic are CCR participants. This article describes the main features of the CCR and its use in macroprudential analyses geared towards fulfilling the objective of financial stability. It also provides information on the current European AnaCredit initiative to establish a cross-border credit database. This initiative predetermines the CNB's future steps in the collection of loan data on a loan-by-loan basis.

### 2. COMPARISON OF THE CCR WITH OTHER CENTRAL CREDIT REGISTERS AROUND THE WORLD

The Czech Central Credit Register was created in line with international trends and is by no means unique. According to World Bank data (*Doing Business, Getting Credit*, June 2014) 91 countries currently have a public central credit register (in most cases run by the central bank) and 36 (including the Czech Republic) have both central and private registers. In the EU, 16 countries currently have a central register and a number of others (the Netherlands, Luxembourg, Greece, Finland, Estonia and Cyprus) plan to introduce one in the near future.

Central registers differ widely from country to country in the type and scope of information they contain. The main differences lie in the mandatory loan registration threshold, in the sector coverage of the credit market and in the nature of the data reported (either all loans or negative reporting of NPLs only). As far as thresholds are concerned,

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TABLE 1

Main data fields available in MORIFIS	
CATEGORY	FIELD
Bank details	Code of lending bank
	Type of bank (large, medium-sized, small)
Client details	Client identification information (replaced by anonymous code)
	Legal form
	Country of residence
	Institutional sector (ESA 95/ESA 2010)
	NACE category
	Workforce and turnover categories
Loan details	Loan identification information (replaced by anonymous code)
	Date of creation and maturity information
	Type and purpose
	Currency
	Sector classification
	Total amount
	Current amount outstanding
	Risk category
	Principal and interest past due
	Number of days past due
	Collateral type

Source: CNB

in some countries (including the Czech Republic) the register contains all loans regardless of amount, whereas in others the thresholds range from EUR 50 (Portugal) to EUR 1,500,000 (Germany). As for sector coverage, roughly 60% of registers collect data on all those concerned, while some countries (including the Czech Republic) limit themselves to data on only part of the credit market. The registers also differ in whether they record loans only, or loans plus off-balance-sheet items (such as in Austria).

When compared with other registers, the Czech CCR is fairly standard in terms of the above aspects. It is a large information system containing information on all bank loans provided to legal entities and individual entrepreneurs regardless of amount. The CCR database does not have information on mortgages and consumer credit. This can be seen as its main drawback from the supervisory perspective.<sup>1</sup> The main purpose of the CCR is to reduce risky claims in the Czech financial system by enabling CCR

participants (i.e. banks) to exchange information effectively. As with similar projects in other countries, the central bank acts as guarantor and administrator of the system and is responsible for its further development. Basic information about the CCR is therefore also available on CNB website.<sup>2</sup>

Other credit commitments besides traditional loans and overdrafts are also subject to mandatory CCR registration. They include current account debit balances, undrawn lending arrangements and standby credits, and guarantees issued. The records are updated once a month, allowing supervisors to identify emerging risks in a timely manner.<sup>3</sup> Internal credit monitoring at the CNB is normally done outside the CCR database. The necessary records are transferred for analytical purposes to a separate module (independent of the CCR) called MORIFIS (MONitoring RIsks to Financial Stability). With rare exceptions,<sup>4</sup> MORIFIS contains identical information to the CCR. However, to ensure greater protection of personal data and reduce the likelihood of data being abused, the individual records are anonymised for standard users so that specific borrowers cannot be traced out.

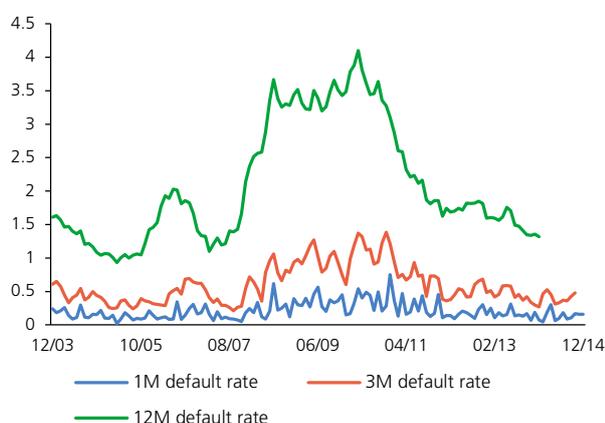
Besides the identification data of the bank that registered the loan in the database, MORIFIS (like the CCR) contains detailed information on the borrower and selected loan characteristics (see Table 1 for details). Unlike most registers in the EU, there is no information on collateral value (France and Spain also do not collect this information). Other missing attributes include PD and LGD (see the Glossary) and interest rates, but other countries rarely collect such information either. The German, Austrian, Belgian, Irish and Romanian registers contain PD, while LGD is available only in the recently established Irish central register and interest rates are contained only in the Irish, Latvian and Slovenian registers. Although registers in some countries contain more characteristics than the CCR, the CCR database still offers enough scope for a wide range of credit risk analyses to be performed.

1 This is due mainly to historical factors, as this segment of the credit market was not so significant at the time the CCR was established. Basic information about such loans is currently contained in the Client Information Bank Register (CIBR) operated by a private company called Czech Banking Credit Bureau, a.s. Another register, which also contains information on loans from non-bank lenders, is SOLUS. The collection of mortgage and consumer credit data is covered in section 4 of this article.

2 [https://www.cnb.cz/en/supervision\\_financial\\_market/central\\_credit\\_register/cru\\_obsah.html](https://www.cnb.cz/en/supervision_financial_market/central_credit_register/cru_obsah.html).

3 Most registers in the EU update their data monthly. The exceptions are Germany (quarterly), Ireland (every six months) and Latvia (daily).

4 One difference is the time for which client histories are stored. Only a 10-year history of client debt liabilities is stored in the CCR, whereas all records are kept indefinitely in the MORIFIS module used for internal analyses.

**CHART 1**
**Default rates on loans to non-financial corporations**  
(in %)


Source: CNB, authors' calculations

### 3. USE OF THE CCR FOR CREDIT RISK MONITORING

The CNB uses CCR data to produce a set of credit risk indicators on both a regular and ad hoc basis. This section presents selected indicators to demonstrate the CCR's breadth of application in the financial stability area. To save space, we focus on defining these indicators and deal only in passing with their economic interpretation.

#### The default rate and its use

The key indicator obtained from CCR data is the default rate, i.e. the proportion of good loans that will fall into default in the next few months (usually 3 months or 12 months).<sup>5</sup> It can therefore be viewed as an estimate of the probability of a sound loan falling into default in a future period of pre-defined length. A default event is defined (see CNB Decree No. 163/2014) as occurring either when it becomes likely that the borrower will not meet his or her commitments duly and on time without the lender resorting to collateral to satisfy the claim, or when at least one instalment (of an amount deemed significant by the lender) falls more than 90 days past due.<sup>6</sup> Banks themselves can use default rates to calibrate rating models in advanced credit risk methods (the IRB approach). The probability of default (PD) estimated in these advanced methods differs from the

default rate in that it can also depend on macroeconomic variables and individual characteristics of the debtor (e.g. indicators from financial statements). However, the PD should equal the long-term average default rate for each rating grade.

Chart 1 presents the default rates on loans to non-financial corporations in the Czech Republic over the period 2003–2014. It is clear from the chart that credit risk increased during 2008 and remained elevated until the end of 2011. The 12-month default rates at the end of 2013 are close to all-time lows.

The default rate is a key risk indicator. It can be evaluated on its own, but is often inputted into other analyses. For example, it is an important input for regular macro stress tests of banks, where it is used to calculate credit losses and to estimate capital requirements for credit risk. CCR data can be used to calculate default rates for individual branches of activity, enabling specific PDs to be estimated for individual banks based on the NACE composition of their portfolios. CCR data also make it possible to conduct a variety of ad hoc analyses in stress testing exercises (such as concentration tests and tests of the sensitivity of credit risk to property development projects).

#### Credit standards indicator

The default rate can also be used for monitoring other forms of credit risk. For example, it enables more accurate assessment of the tightness of credit standards. At times of rising competition, banks can be pressured into relaxing their credit standards excessively. This can be reflected in their interest margins narrowing to a level that is insufficient to cover credit risk. A simple indicator relating the size of the margin to the expected future materialisation of credit risk can be used to get a general idea of the current credit conditions.

To construct this indicator, one first needs to transform the interest margin and default rate time series on the interval [0,1] such that the value of one corresponds to when the margin was lowest and the default rate was highest.<sup>7</sup> In both cases, this corresponds to the situation that is least favourable from the risk perspective. By contrast, the transformed series take the value of zero when the margin was historically highest and the default rate was lowest. The resulting indicator is defined as the sum of the transformed

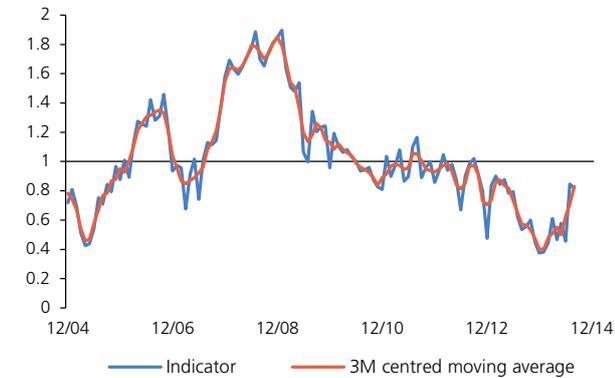
<sup>5</sup> Alternatively, the default rate can be defined on the basis of the number of good loans that have fallen into default.

<sup>6</sup> The default rate and the NPL ratio relate to the same event, i.e. to default. However, the default rate is a (usually forward-looking) flow indicator of the change occurring over a certain period of time, while the NPL ratio is a stock indicator of the amount of NPLs at a particular point in time.

<sup>7</sup> Quantiles obtained by the kernel estimator for the cumulative distribution function were used for this purpose.

CHART 2

### Indicator relating the size of interest margins to THE future materialisation of credit risk (index, maximum = 2, minimum = 0)



Source: CNB, authors' calculations

Note: Interest margins are defined as the difference between interest rates on new loans to non-financial corporations and the 3M PRIBOR as a proxy for the risk-free interest rate.

margin and default rate series and can therefore take values in the range of 0–2. Rising indicator values mean that margins are falling with no matching change in credit risk and/or that margins are not responding to the rising probability of future credit risk materialisation (alternatively, margins may be falling while the PD is rising). A resulting indicator value of around one corresponds to the situation where margins and the default rate were historically roughly in equilibrium (for example, where high margins were accompanied by a high default rate or where low margins were accompanied by a low default rate). The extreme values (2 and 0) indicate historically high and low risk respectively.

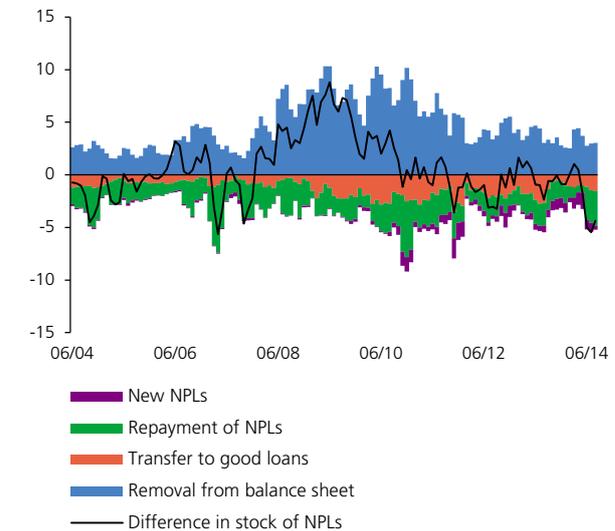
Chart 2 shows that there was a gradual relaxation of the interest rate component of the credit standards in relation to PD for non-financial corporations during 2014. Although the figures are still slightly below average in historical terms, the trend points to a need to start following credit standards more closely again

### Breakdown of NPLs into the effects of individual factors

Besides the default rate, the most frequently used indicator of credit risk is the ratio of NPLs to total loans. However, developments in this stock indicator can be affected by various factors, making them difficult to interpret in terms of credit risk. Credit register data make it possible to analyse these factors in depth. The difference in the value of NPLs between two successive periods can be broken down into several factors, whose effect is given by following relationship:

CHART 3

### Factors affecting the amount of non-performing loans (CZK billions)



Source: CNB, authors' calculations

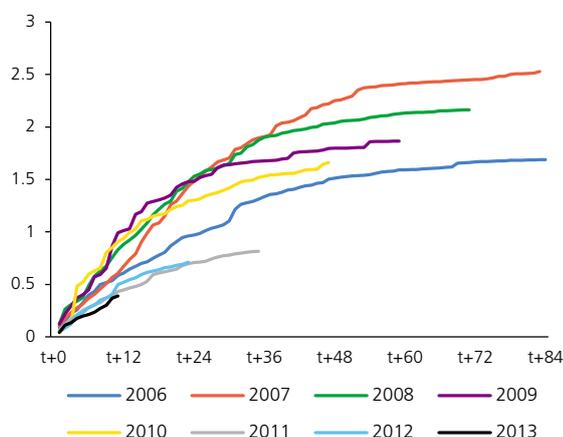
$$S_t - S_{t-1} = DF_t - REP_t - NDF_t - O_t,$$

where  $S_t$  is the amount of NPLs at time  $t$ ,  $DF_t$  is the inflow of loans newly categorised as NPLs,  $REP_t$  is the amount of NPLs being repaid,  $NDF_t$  is the value of loans moved from the NPL category back to the good loans category (a “negative” outflow) and  $O_t$  is the value of loans removed from the bank’s balance sheet (i.e. sold off or written off).

Chart 3 depicts the breakdown of NPLs into the individual factors. It can be seen that the high inflow of new loans into the NPL category lasted until roughly the end of 2011. The relatively favourable evolution of NPLs in the following period is due not only to a lower default rate, but also to the repayment of NPLs and the transfer of some loans from this category back to the good loans category (with both factors contributing in roughly equal measure). More frequent removal of NPLs from banks’ balance sheets is also apparent in the post-crisis period.

### Credit risk vintage analysis

Changes in the default rate in a set of loans provided in the same period (quarter, year) can signal a deterioration or improvement in the quality of recently provided loans. Vintage analysis partitions the loan portfolio by loan provision date and tracks the cumulative default rate. A steeper cumulative default rate curve indicates higher risk in the set of loans, while a less steep curve signals lower risk. A situation where loans provided in recent periods have

**CHART 4**
**Credit risk vintage analysis**  
 (cumulative default rate in %)


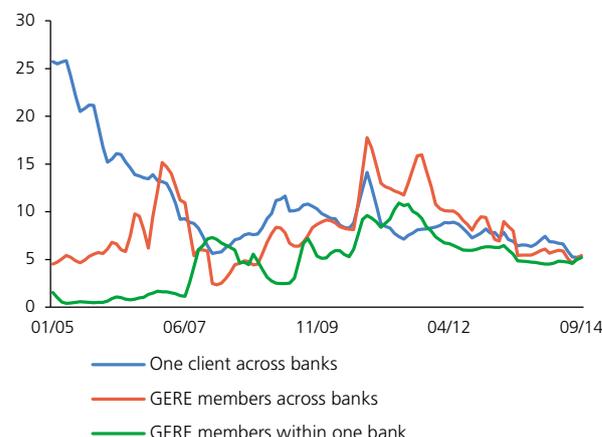
Source: CNB, authors' calculations

steeper curves can indicate a worsening overall economic environment or excessive relaxation of credit standards. A deterioration in loan quality in recent periods can, for example, provide an additional reason for activating the countercyclical capital buffer.

Chart 4 shows the cumulative default rates for loans provided in the individual years of 2006–2013. Loans provided in 2007–2008 display the highest cumulative default rate. This indicates that at the peak of the credit boom, banks tend to lend to relatively risky clients, who are more vulnerable to a deterioration in economic conditions. Loans provided during the 2009 recession initially showed risk levels similar to those provided in 2008, but the recovery in 2010–2011 considerably limited further growth of these cumulative default rates. Loans provided in 2013 currently seem less risky than those provided in other years, as their risk curve is currently much flatter. This may be due to the macroeconomic recovery or to the low interest rate environment, which is making it easier for lenders to service their debt.

**Differences in client risk classification across banks**

CCR data can also be used to analyse the consistency of loan risk classification across banks. Within a single bank, a client who defaults on one loan will then have all his other loans with that bank classed as NPLs. However, the same may not apply across banks – a single client may have a different rating with one bank than with another. It is reasonable to assume that if a client defaults with one bank, its risk ratings with other banks will soon be affected. This, in turn, may cause credit risk to rise in the near future.

**CHART 5**
**Value of loans at an increased risk of reclassification as NPLs**  
 (standard loans; CZK billions)


Source: CNB, authors' calculations

Differences in risk classification and the evolution of those differences over time may also indicate how much the CCR is truly helping to eliminate information asymmetry through effective exchange of data between banks.

The CCR can also be used to measure how consistently loans are classified across groups of economically related entities. Such groups consist of firms that have close asset and/or economic links (for example strong client-supplier relationships). These strong links mean that repayment difficulties can soon spread from one member of the group to the rest. Consequently, if loans within the group have different risk ratings (either within one bank or across banks), some fraction of the good loans can be expected to become subject to an increased PD in the future.

Chart 5 plots standard loans provided to clients who have an NPL with another bank. The chart also depicts the value of good loans provided to members of a group of economically related entities, at least one of which has an NPL within a single bank or across banks. The observed values show that in the case of NPLs, the number of instances where loans to a single member are classed differently across banks (the blue line) has decreased significantly since the CCR was established. This indicator increased temporarily during and immediately after the financial crisis in line with the general rise in credit risk, but the current values are among the lowest ever recorded. Likewise, in the case of loans to members of a group of connected clients, the differences in risk classification within a single bank and across banks (the green and red lines in Chart 5) widened in the post-crisis period but have

subsequently gradually narrowed. The loans in the banking system at an increased risk of being reclassified as NPLs in the near future due to a higher probability of the borrowers concerned running into difficulties currently total CZK 16 billion (the sum of all three indicators). This is a very small figure in historical terms.

#### 4. OTHER STEPS TAKEN BY THE CNB IN THE AREA OF INDIVIDUAL CREDIT DATA COLLECTION

The Czech banking sector has gone through some major changes since the CCR was created in 2002. Probably the biggest has been a surge in the popularity of mortgages and a resulting large increase in household indebtedness. Loans to private individuals now make up more than half of the bank credit portfolio and there is still room for further growth. The dynamic expansion of this credit segment has the potential to generate excessive risks to financial stability. If the probability of materialisation of these risks increases, they will need to be mitigated using macroprudential tools. However, such tools, especially in the area of property exposures (LTV, for example), cannot be applied without detailed data on loans to individuals, which the CCR lacks.

Another major change affecting the functioning of the banking sector has been the switch by some banks to the advanced approach to measuring credit risk. In this regard, it would seem useful to have information on internal bank parameters such as PD, LGD, the interest rate and collateral for individual loans, as such information could facilitate more effective supervision. Girault and Hwang (2010) put these parameters among the minimum set of attributes that a credit register should contain so it can best be used to strengthen the work of national supervisors and macroprudential authorities.

The CNB plans to obtain the aforementioned attributes together with detailed data on loans to private individuals under the recently launched European Analytical Credit Dataset (AnaCredit) initiative. The aim of AnaCredit is to collect harmonised information on loans and credit risk in the EU and to provide the information that the Eurosystem needs to perform its roles in the areas of monetary policy analyses and actions, financial stability risk monitoring and management, and supervision of credit institutions. According to preliminary information, the plan is to collect (among other things) granular credit data on loans to legal entities and individual borrowers with total exposures exceeding EUR 25,000 (with a reporting threshold of EUR 100 for loans with default). AnaCredit significantly expands both the coverage and number of attributes collected (to

approximately 130 items). A European regulation on the collection of data in the AnaCredit database is expected to be issued during 2015, and actual data collection is expected to start in 2018 for legal entities and in mid-2020 for individuals.

The question remains as to what exactly the relationship will be between the information collected for the AnaCredit database and that collected for the original CCR. Several options are currently under consideration and the definitive proposed solution has not yet been worked out. The CCR, however, must continue to serve its main function of enabling banks to exchange information on the credit commitments of clients.

#### 5. CONCLUSION

Besides enabling banks to exchange information on the credit histories of loan applicants, credit registers are an invaluable source of information for supervision and macroprudential policy. This article contains information on the content of the Central Credit Register administered by the Czech National Bank and documents the use of the CCR for monitoring risks to financial stability. Besides the default rate, it presents several additional analyses that give a more detailed picture of current tendencies in the credit market.

Although the CCR provides relevant information on credit risk, the system does not contain sufficient data for the macroprudential authority to be able to perform its duties. The CNB is therefore having to respond. New data requirements are arising mainly due to changes in the credit portfolio structure and the transition of key banks to the advanced approach to measuring credit risk.

The CNB plans to implement the collection of granular credit data under the AnaCredit initiative. The ambition of this initiative is to establish a cross-border credit database to collect harmonised information on loans and credit risk at EU level.

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