

# Tamás Balás<sup>1</sup>: Comparison of the indicators describing the loan portfolio quality of the banking sector<sup>2</sup>

*Since loan loss provisioning continuously reduces banks' profits, as a result of the economic crisis, the importance of portfolio quality indicators has increased considerably. In order to draw well-founded conclusions, however, it is essential to review the content and suitability of the indicators which are used. The evaluation of individual indicators is basically determined by their correlation with the 'expected loss'<sup>3</sup> and through that with the realised loan loss. Apart from the model-based PD (probability of default) estimation, the others are ex-post portfolio quality indicators and many of them have only limited connection with loan losses. Due to definition problems and factors affecting the indicators, the nominal levels may often lead to incorrect conclusions in international comparison. At the same time, these indicators typically follow the trends in portfolio quality with regard to a given country. In Hungarian practice, the cost of provisioning to the average outstanding loan is considered to be the most important indicator, because it has the strongest relationship with loan losses. Accordingly, this is the indicator that we estimate in our forecasts using models.*

## WHY LOOK AT THE INDICATORS OF LOAN PORTFOLIO QUALITY?

Banks' most important risk is credit risk, which has a continuous negative effect on banks' profitability and capital adequacy through loan losses. Therefore, both regulatory authorities and banks pay special attention to the measurement and management of credit risks. One of the relevant means is the continuous monitoring of the quality of the credit portfolio. This is especially important in the present recessionary environment, as banks' loan portfolio quality is steadily deteriorating.

In the international literature, various indicators are used to describe loan portfolio quality, and they are also frequently used in comparisons between countries. Due to the lack of a common definition, however, there may be considerable differences between their contents. Consequently, a cross-sectional comparison of levels in individual countries may lead to incorrect conclusions. In addition, it also happens quite often that default is defined differently within a given country in various periods, and thus a comparison in time may be difficult to interpret. The picture is even more complicated because there are several ways to deduce loss from portfolio quality; thus, for example, accounting,

economic or individual banking aspects may result in different loss rates.

For a suitable evaluation of the key indicators of the Hungarian banking sector's loan portfolio quality, we review their contents and related problems in the following.

## INDICATORS BASED ON THE DEFAULT PERIOD AND BANK RATING

The most common indicator to describe portfolio quality is the ratio of non-performing loans (NPL) to total outstanding loans. In international practice, non-performance typically means that a loan is overdue for more than 90 days. However, in some countries a shorter delay of more than 30 days or more than 60-days is also defined as non-performance (Chart 1). The explanation of the prominent role of loans past due more than 90 days is that with these debtors there is very high probability that the transaction will become irreversibly non-performing, and that as a result the bank will suffer loan losses.<sup>4</sup> The basic explanation for monitoring delays shorter than this, in addition to the fact that loans in default of more than 90 days will subsequently emerge from among them is the effort to obtain information as early as possible if defaults on repayment are increasing.

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<sup>2</sup> The views expressed are those of the author and do not necessarily reflect the official view of the Magyar Nemzeti Bank.

<sup>3</sup> Expected loss can be interpreted as the product of multiplication of the expected probability of default (PD) and the loss given default (LGD), thus it is worth judging any individual portfolio quality indicators as well in terms of the transformation of this correlation, namely how accurately they can capture the expected losses.

<sup>4</sup> Due to the reason indicated above, the so-called Basel II regulation also pays special attention to and treats transactions with an at least ninety-day delay in their material obligations as non-performing ones. In the Hungarian regulations, Government Decree No. 196/2007 contains the definition of default.

Those loans are usually also considered non-performing in cases in which the credit institution has obtained information that serves as a basis for assuming that repayment of the loan may fail, even if there is no delay yet. An example of the latter may be the initiation of liquidation or bankruptcy proceedings in the case of non-financial corporations, since at that moment the customer's debt is not yet necessarily overdue.<sup>5</sup>

The greatest advantage of the default-based portfolio quality indicator is that it is simple to define, and individual loans are categorised the same way by all credit institutions within a given country. However, because of its static character it only refers to the past. Its greatest disadvantage is that it has only limited ability to create a link between portfolio quality and the loan loss provisioning, which is mainly attributable to the following aspects.

1. As it is a stock indicator, its value may be influenced significantly by all factors that also have an impact on the outstanding amount. The most important of these is the sale of non-performing portfolio. It is easy to see that if large amounts of problematic loans are excluded from the balance sheet during a clean-up, the ratio of non-performing loans to the total outstanding stock will decline significantly, while the recorded losses will be related to the sold portfolio as well. The indicator does not contain any information on the maximum amount of further provisioning that could have potentially become necessary in the future on the excluded loans. Therefore, it is even conceivable that these loans are completely covered by loan loss provisioning, and thus would not influence the bank's profit/loss in any way any more. Accordingly, if selling the non-performing loans to companies engaged in work-out activity is a common practice of banks, then this indicator will be underestimated. The result is similar in the case of loan securitisation.

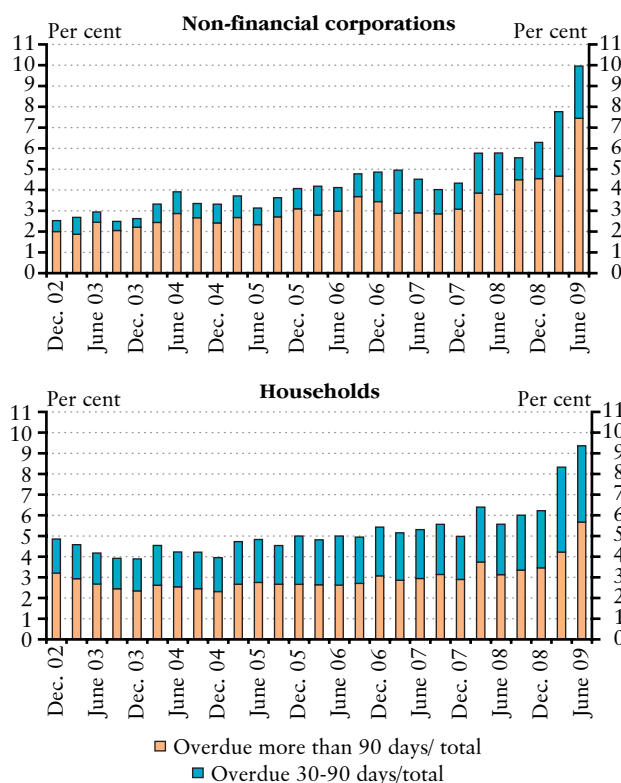
2. Although theoretically the indicator would be important for the supervisory authorities and analysts because of its link to expected losses, the indicator does not provide any information on the coverage of non-performing loans (e.g. the existence of mortgage). It is obvious, however, that the LGD of a non-performing loan with real estate collateral should be considerably lower than that one without any collateral, but they carry the same weight in the indicator.<sup>6</sup>

3. The exchange rate may also affect the value of the indicator. Hungarian households and corporations have significantly become indebted in foreign currency in recent years, and thus when the exchange rate changes, loans denominated in foreign currency are revalued automatically. In the event of a forint depreciation the amount of FX loans expressed in forint increases, and it declines when the forint strengthens. If the share of non-performing loans within forint and FX loans is different,<sup>7</sup> changes in exchange rates modify the value of the indicator through the composition effect.

Although it is perhaps the most frequently used portfolio quality indicator in international literature, because of its aforementioned deficiencies it only has a limited relationship with loan losses. In addition, the difference in data content hinders comparison between countries as well.<sup>8</sup> Accordingly, we think that this indicator is able to capture the trends in changes in portfolio quality, but shows weaker correlation with the level of loan losses.

**Chart 1**

**Non-performing loans to total loans in the banking system**



Source: MNB.

<sup>5</sup> The definition of default pursuant to the Basel II / CRD and the relevant definition issues are discussed in detail in Chapter 7 of Part I of the *Validation Guidelines on the Implementation, Assessment and Approval of Internal Ratings Based Approaches and Advanced Measurement Approaches* published by the HFSA. ([http://www.pszaf.hu/en/left\\_menu/regulation/supervisory\\_methodologies/validation\\_guidelines](http://www.pszaf.hu/en/left_menu/regulation/supervisory_methodologies/validation_guidelines))

<sup>6</sup> Practically, this means that the expected loss is affected not only by the PD, but also by the LGD.

<sup>7</sup> The different portfolio quality of forint- and FX-denominated loans is typical of the Hungarian banking sector as well.

<sup>8</sup> Countries usually disclose NPL ratios that often contain loans that are overdue for more than 30 or 60 days, and not 90 days.

**Table 1**

**Expected loss intervals belonging to rating categories**

Rating category	Magnitude of expected loss
Problem-free	0 per cent
To be watched	between 1 and 10 per cent
Substandard	between 10 and 30 per cent
Doubtful	between 30 and 70 per cent
Bad	above 70 per cent

Source: 250/2000. government decree on accounting rules of credit institutions and financial corporations.

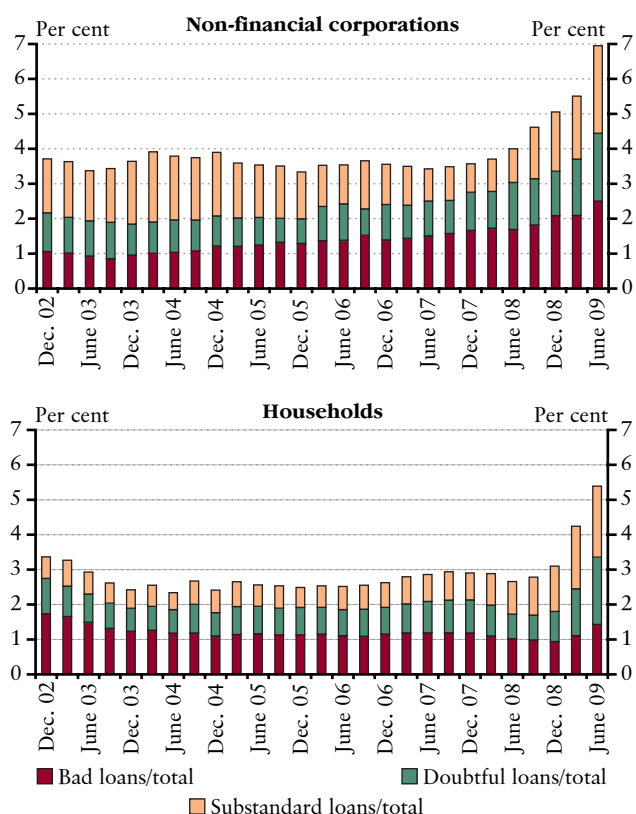
The other frequently used portfolio quality indicator is based on banks' credit rating categories (Chart 2). In Hungary, all credit institutions have to classify their receivables into 5 categories, on the basis of their expected losses: problem-free, to be watched, substandard, doubtful and bad. When determining expected losses, collaterals must be taken into account. Only those loans can be classified as problem-free that are not past due yet, and no loss can be expected during the total maturity of the loan. Taking into account the collaterals, in the individual rating categories the expected losses must be as Table 1 shows.

The indicator compares the amount of the loans in the last three categories to total loans. As the basis of the rating category is the expected loss,<sup>9</sup> the advantage of this indicator is that the collaterals are already taken into account to some extent. Therefore, compared to the previous indicator, this one is theoretically able capture the effect of the change in portfolio quality on profit more precisely. Taking the collaterals into account is especially essential in household loans, where the share of mortgage loans exceeds 60 per cent of total loans. Since the LTV (Loan-to-Value) ratio is considered to be conservative in international comparison, and no real estate bubble was observed in Hungary, 'only' a lower LGD is expected for a significant part of mortgage loans when they become non-performing.

Aside from the advantages of the portfolio quality indicator based on credit rating categories, it has also several disadvantages. In addition to the fact that it only refers to the past, this indicator is also based on stock data, so among the problems listed for the previous indicator, sales (1) and the change in the exchange rate (3) may affect the value of the indicator in a similar manner. Significant differences are experienced in the definitions of categories of loan quality across countries, so this indicator is also not suitable for

**Chart 2**

**Ratios of non-performing loans to total loans by their classification in the banking system**



Source: MNB.

international comparison. Moreover, an additional problem with this indicator is that while in the three rating categories the expected loss is different, they are taken into account with the same weight in the measurement of portfolio quality. As a result of all this, the indicator based on bank ratings is also able to predict expected losses only in a limited manner, and it is rather suitable for capturing the trends of changes in portfolio quality.

<sup>9</sup> The expected loss of individual loans may be influenced by various factors: e.g. the extent of default, the value of collaterals, exchange rate effect, subjective aspects, etc.

## DATA FROM CENTRAL CREDIT INFORMATION SYSTEM

The Central Credit Information System (CCIS) contains credit information on both non-financial corporations and households, but the data stored about the two segments are basically different. The 'Corporate System' is a positive debtor list data base, which means that the system contains the receivables of the reference data providers vis-à-vis all non-financial corporations. In the event that a company fails to meet its payment obligation, it is also recorded in the database. The 'Retail System', however, has a negative debtor list, as it only contains the data of those retail clients who failed to meet their respective payment obligations for at least 90 days, and the amount of non-payment must exceed the minimum wage. The biggest problem with both databases is that they relate to different data providers compared to the banking sector. Since we typically use banking system in our analyses, the data that can be obtained from the CCIS cannot be compared to other information available for us. Moreover, there are additional difficulties arising with both systems, rendering comparison practically impossible.

The biggest problem with the use of corporate loans from the CCIS is that data are recorded in the system only in two cases: at the start of the loan and when the client is in default. This would be adequate if there were only loans that are drawn immediately and in full, and the principal has to be paid back in one sum at maturity. However, very often drawings take place in a protracted manner and only partially, while repayment by small and medium-sized enterprises is usually continuous. Consequently, the data in the CCIS that relate to loan amounts do not show the current status; they may overestimate the latter significantly.

As for household loans, usability is largely limited by the fact that the data published refer to the number of loans and not to the outstanding stock. As defaulting stocks are mainly related to lower-amount loans without collateral, the indicators calculated from them may reflect a distorted picture of the extent of the non-performing loans.

At the same time it is important to emphasise that the primary objective of the CCIS is not to provide analysts with

portfolio quality indicators, but to make it possible to learn through queries whether a client is in default.<sup>10</sup>

## THE PROBABILITY OF DEFAULT (PD) AS PORTFOLIO QUALITY INDICATOR

The PD (probability of default) is an economic indicator of the probability of loans' becoming non-performing. This indicator can be interpreted both ex-post and ex-ante. However, if it refers to the past, it is typically called the default rate. The PD for the future shows the extent of the probability of default of a loan over one-year time horizon. Since PD is a frequency indicator, calculated from the number of contracts, it can be different from ratios based on outstanding stocks. Although there is no approved best practice for the estimation of the PD, it is typically done with models. In these models, the probability of default is usually quantified using macro variables or, in the case of households, behavioural, socio-demographic variables and ones that are typical of the products.

Basically, two approaches are applied in the estimation of the PD: 'point-in-time' and 'through-the-cycle'. In the case of the former, the probability of default is determined on the basis of the current economic situation, while in the case of the latter the PD captures the long-term trends, providing an average value typical of the economic cycle. The new Basel capital regulation already allows banks to determine capital needs using an internal rating based (IRB) model, although there are strict requirements vis-à-vis the models applied (e.g. estimations must be unbiased and conservative).

If the loss given default (LGD) is known, by using the PD a link can be created between the portfolio quality based on the frequency of default and the loan losses. It supplies information on loan losses not only with regard to the past, but also in a forward-looking manner. At the same time, the method applied and the definition of default largely affects the results. Therefore, despite the fact that the models must be approved by the supervisory authorities, a cross-sectional comparison of results across countries is hard to implement. The situation is made even more complicated by the fact that many banks have not yet applied the model based on internal rating, thus even the possibility of making comparisons within one country is limited.

<sup>10</sup> At the same time, the negative list is not suitable for determining clients' behaviour profile and for setting up behaviour-based rating systems that can be created from it. Therefore, it would be necessary to compile a positive debtor list for the household sector as well.

## RATIO OF LOAN LOSSES TO THE AVERAGE PORTFOLIO

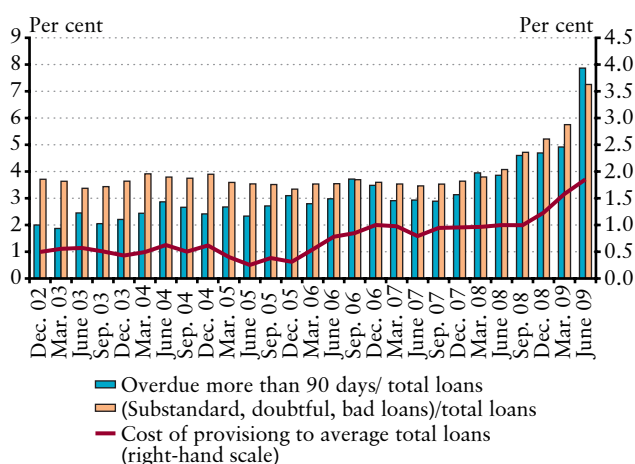
The indicator that has a direct link to the profitability of credit institutions is the ratio of the profit-reducing effect of loan loss provisioning to the average stock of outstanding loans. This is a mixed indicator: its denominator has stock character, while its numerator is of result character, so it is a flow type indicator. Calculated for segments or even products, this indicator may practically be interpreted as risk cost. As the numerator of the indicator already contains the losses from write offs and sales within the framework of portfolio clean-up as well, these transactions affect the resulting values only to an extremely small extent.<sup>11</sup> While the indicator is the best for approximating the result effect of the change in portfolio quality, in special cases it may deviate from the actual quality of the portfolio: if a bank does not carry out provisioning in a prudent manner and in the event of dynamic provisioning. The first case typically takes place when, driven by profitability aspects, instead of the actually necessary loan loss provisioning a bank accounts for only enough provisions not to jeopardise a given year's profit.<sup>12</sup> However, this only postpones the necessary provisioning to a later period. In the case of dynamic loan loss provisioning,<sup>13</sup> in turn, the aim is to smooth out losses stemming from cyclicity. For this purpose, in a favourable economic environment, higher loan loss provisions are recorded from higher earnings, while at the bottom of the cycle there is a lesser need to burden the otherwise also deteriorating profitability with the increasing credit risk costs. The extent of the expected losses and that of the actually recorded provisions visibly depart from one another in both cases. Accordingly, the indicator is becoming under- or overestimated. Nevertheless, we believe that this indicator captures best the effect of the changes in portfolio quality on profitability, as this indicator contains the loss of both the recorded loan loss provisions and of the write-offs and sales. Therefore, due to this property, this is the indicator that is emphasized the most in our analyses and forecasts.

## COMPARISON OF PORTFOLIO QUALITY INDICATORS

Although the portfolio quality indicators of corporate loans extended by the banking sector have typically shown a co-

Chart 3

### Major quality indicators of the banking sector's corporate loan portfolio



Source: MNB.

movement in the past 5 years, there are often significant differences between their levels. In particular, a significant difference between the two stock-type indicators is observed early in the period under review: in some periods the indicator based on bank rating is nearly twice as high as the indicator using non-performing loans (Chart 3). It is worth emphasising that the changes in the indicator based on loan losses and in the two stock-type indicators often reflected opposite trends prior to the crisis. However, as a result of the crisis, all indicators show strong deterioration, but even in this period a significant difference is observed between the dynamics of the changes in individual indicators.

With regard to households loans the three indicators examined show considerably more co-movement (Chart 4) over the entire time horizon than what is observed for the corporate sector. It is also true, however, in this case that the dynamics of stock indicators are lower than what is seen in the case of the indicator using the profit-reducing effect of loan loss provisioning.

We expect further portfolio deterioration in both the households and non-financial corporation segments in the future, although to different extents. We modelled the future developments in the indicators on the basis of the PD

<sup>11</sup> As the denominator of the indicator contains average stock, it does matter when a loan is written-off or sold. However, compared to the total outstanding stock, these transactions are usually negligible, so it has no substantial effect on the value of the indicator.

<sup>12</sup> In Hungary, a typical example for this was the Postabank story in the late 90s.

<sup>13</sup> Although dynamic loan loss provisioning is not allowed in Hungary, it was still observed that having high profitability some banks accounted for higher loan loss provisions than necessary, which they will release in later years.

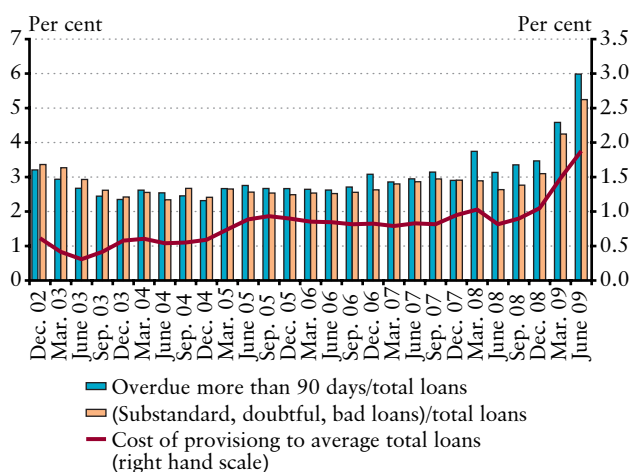
**Table 2****Forecast of major portfolio quality indicators**

%	Actual			MNB forecast	
	Dec. 2006	Dec. 2007	Dec. 2008	Dec. 2009	Dec. 2010
<b>More than 90 days overdue loans/total loans</b>					
Households	3.08	2.90	3.47	10.26	9.59
Non-financial corporations	3.48	3.13	4.70	11.27	15.67
<b>Substandards, doubtful, bad loans/total loans</b>					
Households	2.63	2.91	3.10	9.16	8.57
Non-financial corporations	3.60	3.64	5.22	12.52	17.41
<b>Loan losses/total loans</b>					
Households	0.82	0.95	1.05	3.10	2.90
Non-financial corporations	1.00	0.95	1.23	2.95	4.10

Note: When preparing the estimation, in the case of loans overdue for more than 90 days and the rating-based indicator we projected the dynamics of the loan losses to total loans to the actual data for December 2008.

Source: MNB.

and the LGD, as we do not have sufficient information on individual banks' objective functions.<sup>14</sup> Based on currently available information, we are of the opinion that in the case of households the required provisioning will reach its maximum by December of this year, allowing a slight decline to be observed next year (Table 2). In the non-financial corporations segment, however, we expect a more protracted process; therefore, the highest provisioning requirement is foreseen at the end of next year.

**Chart 4****Major quality indicators of the banking sector's household loan portfolio**

<sup>14</sup> For more details, see Chapter 4.5 of Recent Analyses.