

# **Risks of Commercial Real Estate Financing Based on the Experiences of Supervisory Reviews\***

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*Following the global economic crisis, project financing and as part of it, commercial real estate financing came into the limelight for both the international and Hungarian banking system. One of the underlying reasons of this phenomenon is that banks suffered their biggest losses due to the concentration of real estate portfolios, while real estate portfolios always represent outstandingly high credit risk as economic cycles exert a strong impact on the value and the income-generating capacity of commercial real estate projects. Based on the experiences of the supervisory reviews conducted by the MNB at large Hungarian banking groups, this study presents the risks associated with commercial real estate financing, the challenges identified with respect to the measurement of risk, and in this context, the challenges related to the calculation of capital requirements, and among others, the issue of cyclicity and the possible solution direction.*

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

**Keywords:** real estate financing, economic cycles, risk management

## **1. Introduction**

Numerous Hungarian professional publications have addressed the general characteristics of structured financing as part of corporate financing, specifically project and real estate financing, as well as the features and risks of these types of exposures (*Walter 2014, 2016; Nádasdy – Horváth – Koltai 2011*). Exposures where the primary source of repayment of the credit is the income stemming from the utilisation of the property (sale, rental, facility management), including also condominium and gated community building projects, are referred to as commercial real estate financing. This study also focuses on the commercial real estate financing portfolios financed by banks, but we intend to show the issues and the proposed solutions expressly from the perspective of the supervisory authority, in the light of the experiences gathered during the supervisory review. The reason for selecting this topic is that the Hungarian banking system suffered its biggest losses on its commercial real estate financing project exposures, in tandem with

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

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retail foreign currency mortgage loans. More than 50 per cent of the HUF 2,800 billion, mainly project exposures related to real estate financing, financed by the largest Hungarian bank groups and banks subject to complex supervisory reviews<sup>1</sup> (hereinafter: complex banks) became non-performing, and their credit losses in excess of HUF 750 billion represented a loss rate of more than 26 per cent projected to the project portfolio. Complex banks, in the red for several years between 2009 and 2014, built up an outstandingly high concentration in the commercial real estate financing segment, a portfolio more than two times higher than their solvency capital measured against the reference period as at the end of 2008.

The supervisory review process has long devoted special attention to commercial real estate financing portfolios. All of the problems presented in this study – portfolio segregation (segmentation), project valuation and rating, capital requirements calculation and cyclicity – came up during the audits and are real and practical issues affecting risk management. The study reflects the experiences gained from the discussions conducted with the banks during the audits, as well as the experiences gained from inspecting the project loan proposals, cash flow plans, impairment calculations, project real estate valuations, project rating systems, and credit risk parameter estimations. In our study, the source of the reports and figures related to the commercial real estate financing portfolios financed by the Hungarian banks were the data and documents, primarily the transaction level loan analytics requested by the authority for the audit.

Commercial real estate financing caused substantial losses on a systemic level, not only in Hungary but also in other European countries and the United States over the past years, although the economies with a long-standing developed financial system were fully aware of the outstanding risks associated with this segment. The American regulators analysed in a separate study the link between the commercial real estate market gradually becoming affected by a crisis at the end of the 1980s and the early 1990s and the banks' concentrated portfolio of commercial real estate financing (*FDIC<sup>2</sup> 1997*); the comprehensive study published by the ESRB<sup>3</sup> on that topic identified three cycles on the commercial real estate markets of the United Kingdom over the past decades (*ESRB 2015*).

The risk associated with commercial real estate financing is caused by the sensitivity of the project's value and income-generating capacity to economic cycles. This cyclic nature is easily observable by reviewing the macroeconomic variables influencing the main earnings potential of the main types of commercial properties, such as offices, residential developments, shopping malls, hotels and industrial properties. The multiple impacts of an economic bust, such as increasing unemployment, a downturn in the construction industry and real estate markets coupled with

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<sup>1</sup> The following banks were subject to the complex supervisory review during the period under review: a Budapest Bank, a CIB, Erste, FHB, K&H, MKB, OTP, Raiffeisen, Sberbank and Unicredit.

<sup>2</sup> Federal Deposit Insurance Corporation.

<sup>3</sup> European Systemic Risk Board.

decreasing consumption and a deteriorating income position of households (e.g. hotels and shopping centres), the deteriorating position of the financial, insurance and other service sectors, decreasing employment within these sectors (e.g. office) exponentially contribute to the deepening of the cycle and to the accumulation of losses. Hence, in the case of commercial properties, the interaction of many different macroeconomic variables moving together and strengthening one another exerts an indirect influence on the commercial real estate market through the relationship between demand and supply.

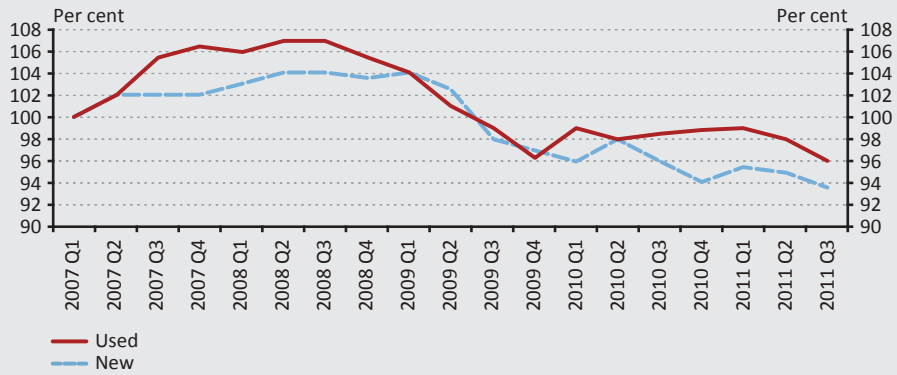
At the beginning of the global economic crisis, a substantial downward drift in prices was seen both for residential and commercial properties. Commercial real estate prices dropped by 43.7 per cent in the United States, by 44.2 per cent in the United Kingdom and by 56.3 per cent in Ireland, with residential properties also losing between 13–34 per cent from their value in less than one year in these countries.



When looking at the Hungarian market, trends similar to the international ones could be observed. The price of both new and used residential properties dropped by nearly 10 per cent by the end of 2009 compared to the third quarter of 2008, and in the case of new residential properties this declining trend continued also in subsequent years. The number of condominiums sold on a quarterly level dropped to less than half by the fourth quarter of 2009 compared to its peak in the second quarter of 2008 (around 40,000 properties) and remained at that level in subsequent years (CSO 2012).

**Figure 2**  
Changes in residential property prices in Hungary

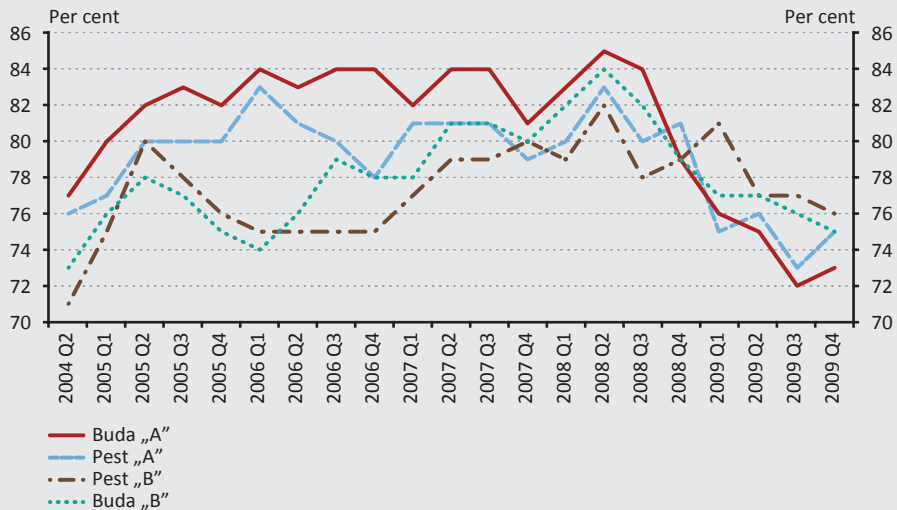
2007 Q1 =100%.



Source: KSH 2012.

Looking at the office market, the change in the occupancy rate of offices is outstanding. The occupancy rate of category A offices in Budapest dropped by more than 10 per cent between the middle of 2008 and the end of 2009, while the rental of category B offices also declined between 6 to 8 per cent. Office rental prices essentially stagnated between 2005 and 2008, but dipped sharply in 2009; compared to the previous period, the price of used offices fell by around

**Figure 3**  
Occupancy rate of offices in Budapest, 2005–2010



Source: GKI 2010.

8 to 10 per cent, while the price of newly built properties dropped by 4 to 5 per cent (*GKI 2010 and 2015*).

The extent of credit losses entailed by the decline in real estate prices confirmed that real estate financing is a capital-intensive banking activity and that risk management controls considerably more sophisticated than previously needed to be implemented. The excessive risk taking prevailing prior to the crisis was mainly observable in the emergence of high concentration, growth expectations ignoring demand, and speculative real estate financing, accompanied by several internal fraud cases, also confirmed by the banks in the course of the supervisory reviews. But at the deepest point of the cycle, however, developments to the very contrary of the above could be observed: the banks that built up a high concentration practically completely stopped their project financing, and even today, this type of financing continues to be strongly selective. Under the current circumstances, the biggest challenge for both the banks and the regulators is to be able to evaluate the real estate financing projects that have survived the economic downturn and the ones that restarted after the economic turnaround independently from the cycle and differentiate them from the aspect of risk. A project assessment independent from the cycle and a rating system reflecting this approach would enable the regulators to substantially mitigate the pro-cyclical nature of the capital requirement prescribed for project exposures.

It is important to stress that the current economic recovery and the positive developments on the real estate market can, on their own, only drastically reduce the realised losses, but not the potential risks, without modifying the risk management processes and the lending practices. Due to the cyclicity of the sector, neither good portfolio quality nor a low capital requirement level – to be generated for covering risk – derive from the low loss level observed in the good years. This is because capital must be generated not for the times of economic booms, but for stress situations of the same gravity as seen in previous years.

However, in the case of the Hungarian banking system, the challenge is not only the prudent risk assessment of the credits that survived the economic downturn and the credits disbursed afterwards, but also the elimination of historic process-related shortcomings and the strengthening of control functions. Going forward, the banks will have to continue paying attention to the proper quantification of the risks associated with the non-performing real estate financing portfolios, and also to the capital coverage of unexpected losses on top of the expected losses already reflected in the level of impairment. In 2015, the size of the non-performing portfolio exceeded gross HUF 1,200 billion, despite the significant portfolio cleaning performed recently, such as partial or full right-offs and asset disposals. This value, exceeding HUF 500 billion in net terms or 50 per cent of exposure, may still have a substantial loss potential should project values continue to fall unexpectedly.

## **2. Risk characteristics of commercial real estate financing**

The precondition to monitoring the risks and to setting up appropriate risk controls is to first and foremost define which exposures can be classified as commercial real estate financing. According to the general definition, every exposure the recovery of which is mainly secured from the income generated from property utilisation is to be regarded as commercial real estate financing. The closest to this definition is the one regarding specialised lending project exposures (SL) as per the CRR<sup>4</sup> implementing the Basel II directive (*BCBS<sup>5</sup> 2001 and 2006*), which stipulates for the institutions applying a methodology based on internal rating that they have to handle the exposures – essentially meeting the following criteria – separately from the regular companies:

- Apart from the financed assets, the corporation does not have any substantial asset portfolio, and does not perform any other activities apart from the operation of the financed assets;
- the financing bank has substantial control over the financed assets and the cash flow generated by them;
- the company's source of income, and as such, the repayment of the credit mostly comes from the cash flow generated by the financed assets.

A recurring problem regularly encountered during the supervisory reviews is that the banks fail to appropriately apply the above-mentioned segmentation principles as a result of which several banks manage some project type real estate financing deals within their regular corporate portfolio where the risks of the portfolio, and primarily the risks stemming from the concentration remain partially hidden. The risk associated with the specialised lending exposures is mainly defined by the earnings potential of the financed project; this is the reason why it must be emphasised that the close link between the income generated by the asset (the property) and the source of the loan repayment must be considered as a priority for the segmentation.

A segmentation problem may occur in connection with the interpretation of all three SL criteria. It must first be mentioned that if the bank fails to ensure control over the asset (being the collateral) and the cash flow, or if the bank commits to the financing not based on the risk associated with the project, i.e. not based on the project's cash flow but based on collateral, this should not exempt the bank from classifying these transactions as SL exposures.

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<sup>4</sup> Capital Requirement Regulation – Regulation (EU) No 575/2013 of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.

<sup>5</sup> Basel Committee on Banking Supervision.

Secondly, it may be problematic to determine whether the financed company could be regarded as a project company (SPV<sup>6</sup>) established to operate the financed commercial properties. We can generally say that, based on the look-through principle, the risk associated with the exposure of a holding company integrating clearly commercial real estate projects, or the risk associated with the exposure of an asset management company, which was previously held by project companies, and which took over commercial properties – account taken of the risk mitigating impact of some possible diversification factors – is equivalent with the risk of the underlying real estate project portfolio; therefore the evaluation of the exposure's risk should be done in the same way as the evaluation of the underlying portfolio, that is, primarily based on the calculation of the earnings potential of the project properties. A special case characterising this issue involves funds investing in commercial properties, i.e. the exposure to the investment units of such fund. Exposures to collective investment undertakings represent a separate exposure class for both the banks applying the standard method and the ones applying the IRB<sup>7</sup> method, which, however, should be taken into account even in this case as a risk equivalent to commercial real estate financing based on the look-through principle.

Numerous problems occur in relation to interpreting the third SL classification criteria. Most often, banks do not consider the financing of project companies – otherwise exclusively involved in the real estate business – as real estate financing due to the fact that these companies rent properties and undertake guarantees within the group. In such cases, the risk transfer can only be taken into account if the lease agreement corresponds to the maturity of the loan and the guarantee and the group relations are sufficiently strong.

Building plot financing and real estate projects still in the construction phase, generating income only in the future through either resale or utilisation after the completion of the development, represent the riskiest sub-segment of commercial real estate financing; they have a risk profile fundamentally different from the risk profile of regular corporate exposures, therefore it is especially important to manage them separately from regular companies.

The reason why it is important to segregate commercial real estate projects from the corporate portfolio becomes obvious by presenting the most fundamental risk indicators. Based on the data in *Figure 4* showing the default<sup>8</sup> rates in time series of projects and corporate portfolios of large Hungarian banks, we can see that over the past 10 years projects consistently had a higher default rate than the corporate portfolio. During the crisis years we can see that the default rate of project loans increased to three to four fold compared with the previous period while the default rate of companies increased

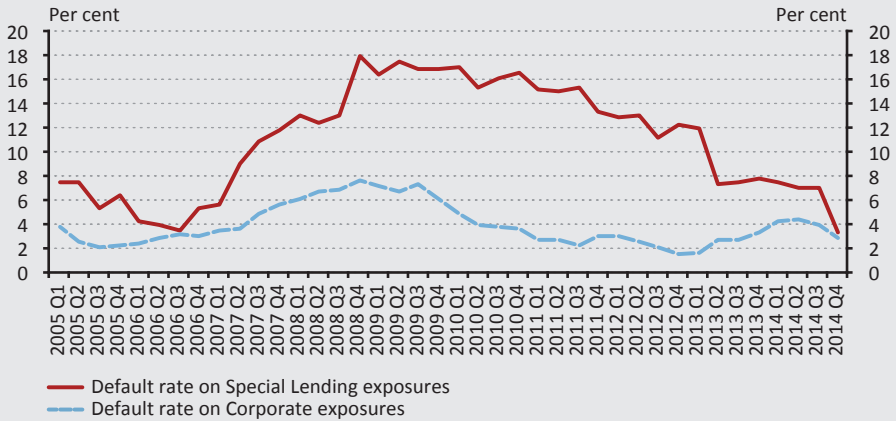
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<sup>6</sup> Special Purpose Vehicle.

<sup>7</sup> Internal Ratings Based Approach.

<sup>8</sup> Non-performing.

**Figure 4**  
Default rates of project and corporate exposures

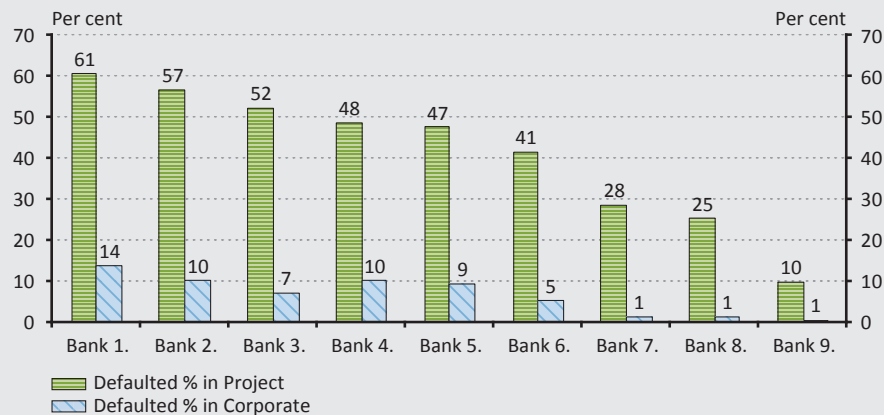


Source: MNB.

only by 1.5 to 2 fold. The improving trend only started considerably later and even to date has still not yet reached the average of the pre-crisis years.

Figure 5 shows the analysis of project portfolios outstanding at the end of 2014. Despite accelerating portfolio cleaning measures, the proportion of non-performing project loans weighted by volume is still 4 to 5 times higher than that of corporate loans at the majority of the banks and in some cases this proportion even exceeds 50 to 60 per cent of the portfolio, which shows that the collection and the management

**Figure 5**  
Proportion of deals in default within project and corporate portfolios



Source: MNB.



of non-performing project loans require significantly more effort compared with corporate loans, which again shows a higher risk level.

The main reasons accounting for the difference between the risks associated with commercial real estate financing and normal corporate financing are as follows:

- real estate financing is an especially cyclical sector;
- the creditworthiness of the project client (its probability of default, i.e. PD<sup>9</sup>) and the value of the project property (its loss given default, i.e. LGD<sup>10</sup>) have a close correlation with one another and with the economic cycle;
- the projects typically have high individual exposure and very low own equity;
- due to their nature, the credit risk associated with projects can be assessed based on a well-defined set of criteria, primarily based on the project's earnings potential (DSCR<sup>11</sup>) and the evaluation based on this factor (LTV<sup>12</sup>) and the characteristics of the project property, its cash flow stability, the strengths and the market position etc. of the sponsor.

In addition to the above credit risk characteristics, we could also mention the interest, operational, regulatory, foreign currency and concentration risks as well (MNB 2015). Hungarian professional literature has some excellent overviews of the arising risks and their management (Nádasdy – Horváth – Koltai 2011).

On the one hand, interest risk may influence the quality of the overall portfolio and thus its risk through the capitalisation ratio in the course of the yield-based evaluation. On the other hand, interest rates on the loans are variable as opposed to the rents, so they may have a negative impact on repayment capacity.

Operational risk should also be highlighted, primarily internal and external fraud, as well as inappropriate business practices, which caused substantial losses within the domestic project portfolios. Committee documents, police reports, internal audits initiated by the banks in that topic, or in the given case even the complete replacement of the entire project underwriting staff evidence these cases of fraud.

The value of the properties and their economic feasibility may be influenced by the risks stemming from the regulatory environment, and the changes in tax liabilities and environmental protection regulations or even the level of state subsidies. This factor may have a negative and/or positive impact on the projects' value, but their realisation cannot be forecast at all or can be forecast only to a limited extent.

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<sup>9</sup> Probability of Default.

<sup>10</sup> Loss Given Default.

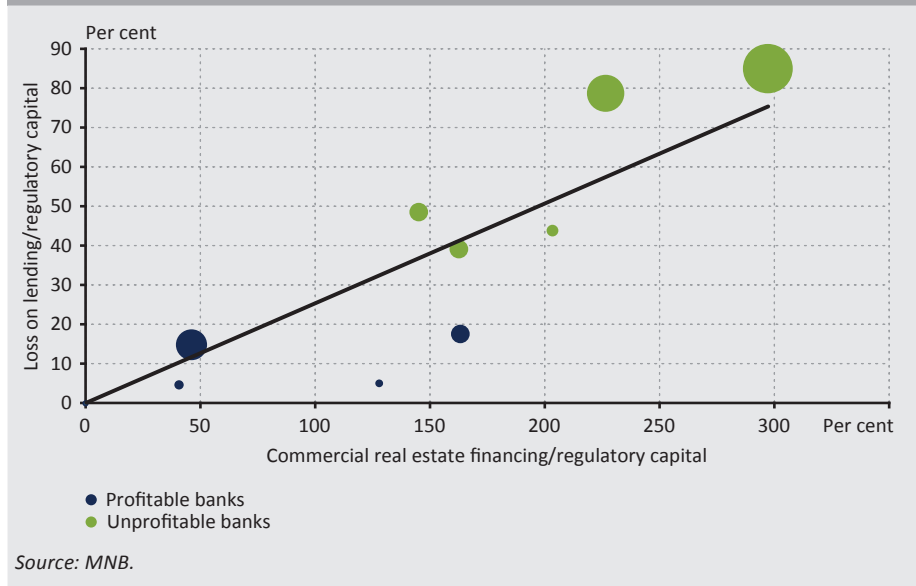
<sup>11</sup> Debt-Service Coverage Ratio.

<sup>12</sup> Loan-to-value ratio.

An especially dangerous situation can occur when the loan is disbursed in foreign currency, because in addition to the foreign currency risks, the volatility of foreign currency exchange rates may further deteriorate the volatility of the interest rate. In some cases, foreign currency risk remains concealed, because while the rent of the business is set in euro, in line with the currency of the loan, the business itself generates HUF revenues, and therefore the exchange rate risk is only partially covered.

The concentration of commercial properties built up without any control, and the inadequate control by the banks of the concentration risk explain that the losses arising from credit and other risks mentioned above also caused substantial problems at the level of the Hungarian financial system. *Figure 6* shows that the commercial real estate financing exposure at the end of 2008 compared to solvency capital at the reference date and the credit loss related to this portfolio was especially high at the loss-making banks. While loss-making banks extended credits amounting to more than double their solvency capital, profitable banks' loan portfolio within that segment was slightly more than half their solvency capital. We can see in the figure that even among the profitable banks, there are some that suffered a moderate loss despite the proportionately high concentration, which shows that these institutions had successfully selected better quality projects. However, what we can see in general is that the banks that built up a high concentration suffered major losses, and for the future this highlights the necessity to set up an effective risk limit system and the fundamental rethinking of the project rating evaluation models.

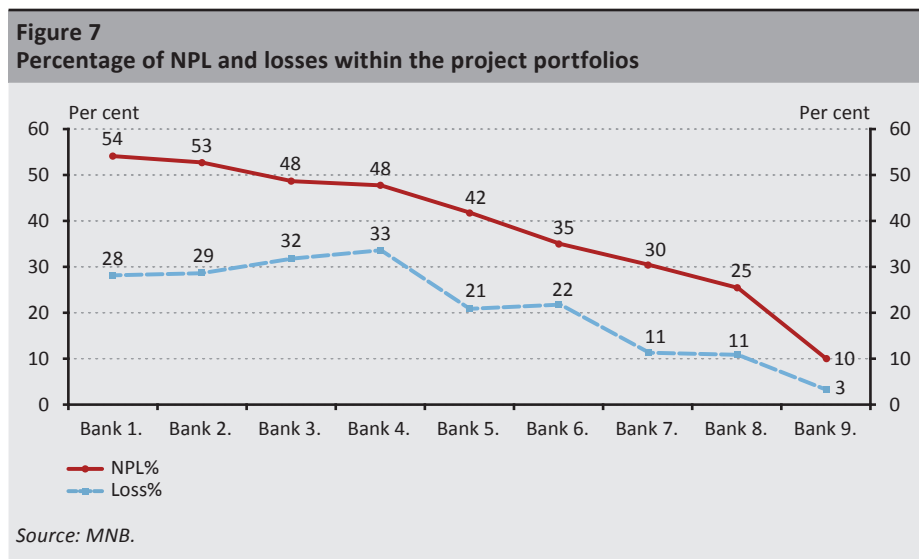
**Figure 6**  
**Concentration of real estate financing between 2011 and 2013 in the case of complex banks operating profitably and those that generated losses**



### 3. Measurement of risks associated with commercial real estate financing

Let us now take account of those challenges that banks may face when assessing the risk of commercial real estate financing projects and defining their capital requirement. Concerning these issues, we will also outline some possible solutions.

Based on the data of the MNB ICAAP<sup>13</sup>-SREP<sup>14</sup> audit performed in 2015, project financing complex banks booked losses equivalent to 20 to 30 per cent of the financed exposure with a 40 to 55 per cent NPL<sup>15</sup> rate in general (*Figure 7*); the majority of these losses was generated from the defaults concentrated for the years 2009–2012 (*Figure 4*). During these years, banks recorded credit losses often many times higher than the 8 per cent standard capital requirement, which revealed the inadequacy of the supervisory capital requirement level and the necessity to devise risk-sensitive methods.



Based on our experiences, the majority of the project financing banks that used to be active in the past do have a sufficient number of default observations available, enabling them to develop a model based on internal rating, using PD/LGD parameters and use it for their internal capital requirement calculation.

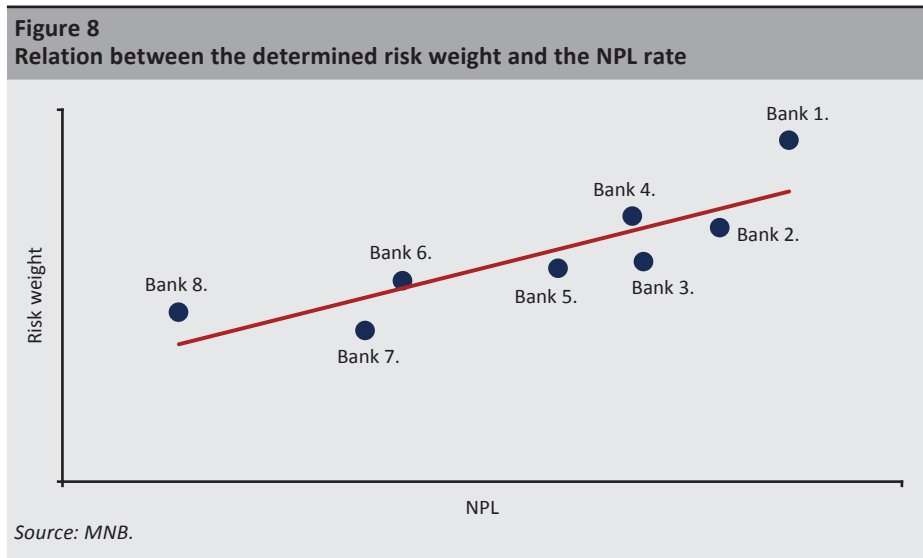
Based on the ICAAP-SREP audits conducted by the MNB in 2015, the capital requirement levels of the performing commercial real estate financing portfolios

<sup>13</sup> Internal Capital Adequacy Assessment Process

<sup>14</sup> Supervisory Review and Evaluation Process.

<sup>15</sup> Non-performing loan.

vary enormously as the result of the mainly PD/LGD based IRB calculation, but the correlation with the proportion of the portfolios that became non-performing earlier is fairly strong (Figure 8).



It can be established based on the figure that the NPL ratios developed in the past fully support that there may be substantial differences among the risks of the portfolios, depending on the banks' risk appetite. On the other hand, the strong correlation between the current, still performing portfolio and the NLP rate can be explained by the fact that during the crisis and thereafter – based on the rating systems applied by the banks – no substantial quality improvement of the performing portfolio could be observed, that is, the risk ranking that could be characterised by the NPL levels based on the previous portfolio quality also remained on the current portfolios. This picture will only be changed in the future by performing portfolio cleaning and if the different risk profile of new project loans become dominant.

During the parameter estimation applied for internal capital calculation, a wide range of issues stemming from the special risk characteristics of project financing occurred during the supervisory reviews and when determining the capital requirements, so the banks will have to continue placing particular emphasis in the future on managing these issues, focusing in particular on:

- handling the estimation and statistical uncertainties stemming from the number of components with a conservative allowance;
- handling the PD-LGD correlation, that is, the close correlation between the PD related to the creditworthiness of the project and the LGD related to the value of the project property;

- defining the downturn<sup>16</sup> value of the LGD in connection with the sensitivity to the cycles of the project property's value and earnings potential;
- selecting a sample period representative from the aspect of the entire economic cycle, taking the downturn period into account with the proper weight, also considering the fact that in the case of commercial real estate financing, the impact of the crisis may last considerably longer than in the case of ordinary corporate exposures.

The issue of cyclicity, which is especially relevant from the aspect of commercial real estate financing, deserves special attention. The value of project properties may be especially volatile and may frequently change during the lifetime of the project due to various market events. Due to the close correlation between the client's risk and the value of the project property, the low LTV stemming from the current high property prices does not necessarily entail a low loss potential, because the default of the client and the drastic drop in property value go hand in hand, which, on the level of risk parameters, means the correlation between and the harmonised movement of the PD and the LGD. Moreover, risk parameters not only move in correlation with one another, but also with the state of the economy, which may also cause the poly-cyclicity of capital requirement, that is, capital requirement increases during the downturn period while it decreases during the boom period, which may further aggravate the economic crisis with the further weakening or strengthening of lending willingness. Moreover, in addition to the cyclically changing risk parameters, capital requirements may be undervalued in the good years and overvalued in the bad years. The objective of the supervisory authority is that the capital requirement be independent from the cycle if possible, which must be considered during the evaluation and the measurement of the risks associated with the commercial real estate portfolio. Cyclicity is to be managed, on the one hand, during PD estimation within the time series of the default rate by the proper selection of the proportion of boom and downturn periods, and on the other hand, by taking into account the downturn estimation in the LGD, and the correlation of the PD-LGD.

However, the issue of cyclicity can really be observed through the rating system, in the migration between rating categories. Although the risk parameters measured by rating category may be cycle-independent, if the variables of the rating system strongly correlate with the economic variables, in such case the capital requirements will be pro-cyclical due to the migrations that follow the change of the economy. The values of the risk characteristics also used in the rating systems of commercial real estate projects are strongly cyclical, be it either quantitative (LTV, DSCR), or the qualitative parameters (strength of the sponsor, competitive environment). A partial

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<sup>16</sup> Can be observed in economic downturn.

solution to the above problem may be the long-term, cycle-independent evaluation of the various risk factors, especially the project property value such as the LTV and the DSCR (*REFG*<sup>17</sup> 2014), and a more thorough analysis of the stress tolerance of the project value and its taking into account with a higher weight during the rating process. The stress tolerance can primarily be analysed by stressing the project's cash flow plan, by way of incorporating exchange rate stress, rent decrease or other deteriorating real estate market trends. By using a rating system implementing these criteria, we can ensure the forward-looking assessment of the risks associated with the newly disbursed exposures, and the validation of the cycle-independent changes that take place within the lending practice and the risk profile.

The above-mentioned criteria of the risk assessment of performing projects must to be taken into account in the case of every institution that uses a methodology based on a rating system and PD/LGD estimation for their internal capital calculation. If the institution is not able to estimate the PD, then a methodology using a simple weighing method based on the slotting rating may also be applied. In its consultation document published in March 2016, the Basel Committee raises the possibility to discontinue the PD/LGD methodology for specialised lending exposures, referring to the general shortage of data available for the banks and would enable only the use of the slotting methodology for the banks applying the IRB (*BCBS 2016*). The slotting methodology means a rating<sup>18</sup> system containing 4 (+1 non-performing) categories based on the classification of project risk characteristics and the supervisory risk weights and expected loss levels defined for it. The slotting methodology is able to properly reflect the risks of the performing portfolio in tandem with appropriate qualitative validation – which the banks applying this methodology for their regulatory capital calculation are obliged to do anyway – in the case of a correct calibration adjusted to the defined risk weights and expected loss levels taking into account the aspects listed in this chapter, although the 4 categories may not be enough to separate projects with different risks.

In our introduction we mentioned that the risks of not only the performing, but also the risk of the non-performing commercial real estate financing portfolios deserve special attention. More importantly, the identification of the non-performing status of commercial real estate financing deals caused problems on a high number of occasions, especially in the case of running projects. The reduced interest and principal burdens resulting from restructuring, the balloon-bullet structure<sup>19</sup>, and the lack of repayment delay often conceals the fact that the client's earnings potential is insufficient for repaying the loan even if account is taken of the sponsor, which is the condition of default as defined by the legislation.

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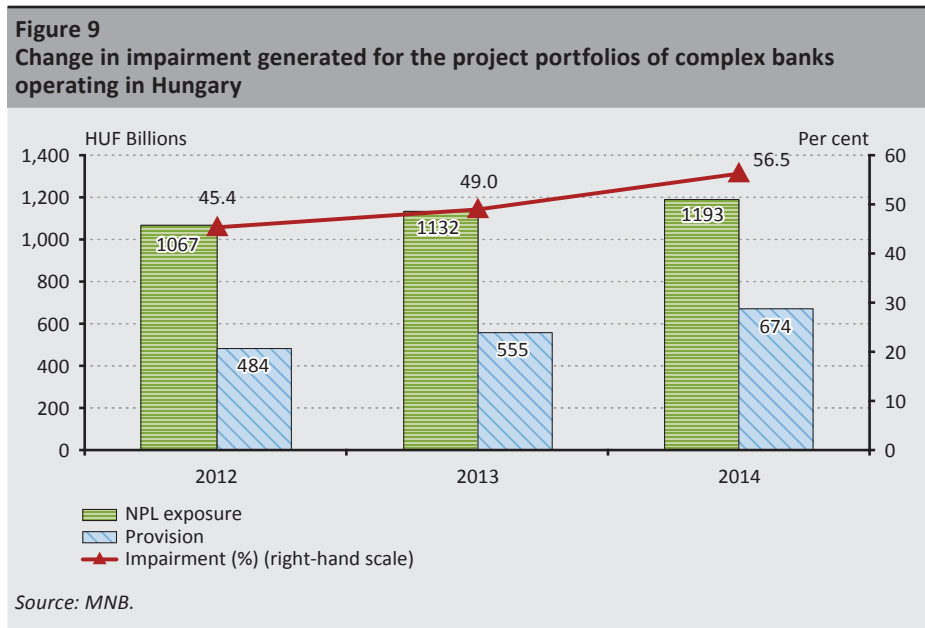
<sup>17</sup> Real Estate Finance Group.

<sup>18</sup> Rating.

<sup>19</sup> A loan structure whereby the entire principal or a substantial part of it (typically 60 to 80 per cent) is repaid by the debtor at the end of the maturity in a lump sum.

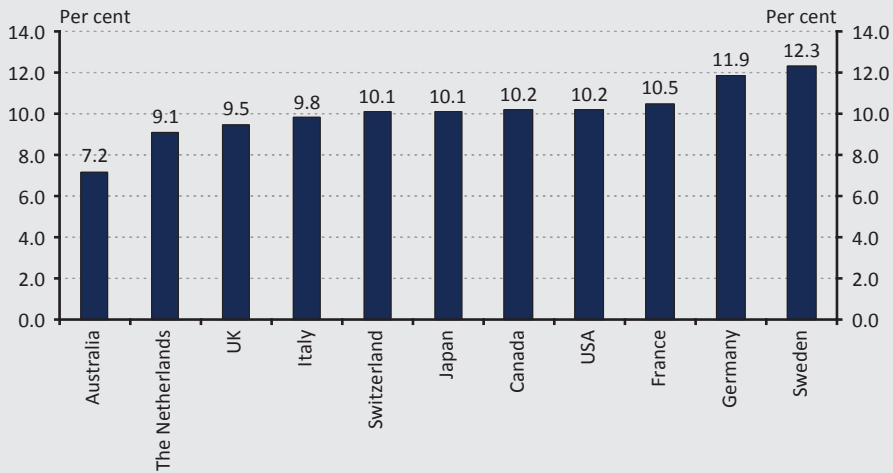
Although the practice followed by the banks shows an improving trend, along with the issue of identifying the default status, the fact that Hungarian banks booked increasing losses year after year not only for the newly defaulting projects, but also for the previously non-performing ones by generating additional impairment also poses an additional problem. While during the period between 2009 and 2012 the correction of an excessively optimistic impairment practice was not prudent enough, and hoping for a fast turnaround of the real estate market was underlying the sometimes spectacularly increasing impairment coverage levels, in later years the increase in coverage levels was rather driven by further deteriorating and stagnating commercial property market prospects and the increasingly conservative evaluation.

Figure 9 shows the increase in the impairment levels of the complex banks on non-performing project portfolios as from 2012. Based on the data of the supervisory reviews performed in 2015, the impairment level of non-performing projects reached 56.5 per cent.



Previous experiences also show that despite prudent impairment practice, additional unexpected losses may be incurred on the non-performing commercial properties during the collection process. The evaluation of project properties represents a serious challenge worldwide, but especially under downturn circumstances, entailing a liquidity shortage on the market. The international outlook suggests that under clean market conditions the difference between the evaluation and the final sales price is in general around 10 per cent (Figure 10).

**Figure 10**  
**Difference between the evaluation and the actual sales price of real estate financing projects between 2005 and 2014**



Source: ESRB 2015.

Based on the increase in impairment levels and the recovery experiences of the sold, yet problematic commercial properties, we can see that under downturn circumstances the uncertainty associated with the valuation of non-performing project properties, i.e., their “unexpected” losses may be considerably higher than the 10 per cent observed under normal market circumstances. The experiences of the recent supervisory audits show that the impairment generation of the Hungarian banking sector improved considerably, both in terms of prudent portfolio management and the development of the estimation methodology of expected losses. Overall, the impairment levels established by Hungarian banks are gradually coming closer to the expected loss levels, that is, the net book value reduced by impairment is fairly close to the project value, and therefore capital only needs to be generated for unexpected losses. Therefore, based on the above experiences, assuming a prudent impairment level, it can be expected that, in the course of internal capital calculation, banks generate a capital requirement level reaching at least 12 per cent of the net exposure on top of the impairment (this corresponds to a 150 per cent risk weight), which expresses the “unexpected” decrease in the project value valued in line with the expected circumstances. Selecting the 12 per cent level is thus primarily justified by the increased loss levels observed during the adverse market movements of the past years, and the fact that the unexpected losses potentially occurring under downturn circumstances are justifiably higher than the 10 per cent normal market volatility. The issue of a risk level dependent on the cycle remains an open question, since in the case of an economic boom, any further depreciation may be considerably higher than under



downturn circumstances. A more sophisticated solution for quantifying the risks of also non-performing portfolios could be the stress testing of the cash flow, serving as the basis of the valuation.

#### 4. Conclusion

In this study, we presented the key risks associated with commercial real estate financing that caused the most substantial losses for the Hungarian banking system and addressed those issues that came up during our discussions with the banks in the course of the reviews, then we also outlined the possible solution directions. Together with the issues related to segmentation, we also presented those aspects that justify the segregated management of commercial real estate portfolios from the regular corporate portfolios.

Thereafter, we presented the challenges that arise during the measurement of credit risk in terms of commercial real estate financing (the rating system, credit risk parameters such as the PD and the LGD) and as such, the correlation between the PD and the LGD and the issues of representativeness and cyclicalities. As part of risk measurement, we emphasised the importance of stressing the earnings potential and the most possibly cycle-independent evaluation of the project.

Finally, we made a proposition for the capital requirement level of non-performing portfolios based on the observation that during economic downturn periods, project values exhibit enormous deviation and the same is also evidenced by the gradually increasing impairment levels seen over the past years.

One of the key objectives of our study was to present the aspects that, if duly considered, might mitigate the pro-cyclicalities of the capital requirement of commercial real estate financing portfolios and ensure proper solvency even in the case of an unexpected crisis situation, a particularly current issue today during this era of real estate market recovery, when risks could be easily underestimated.

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