# Modelling of provision under new International Financial and Reporting Standard (IFRS 9)

Kádár Csaba
Corvinus University of Budapest
1093, Budapest
E-mail: csaba.kadar@uni-corvinus.com

**KEYWORDS**
Model, impairment, IFRS9, economic cycle.

**ABSTRACT**

The impairment recognition in International Financial and Reporting Standard will change significantly in 2018 with IFRS 9. The reason of the update of the current IAS 39 standard is related to the global financial crisis. In this paper I am modelling the possible effect of the new standard to the allowance calculation compared with the previous standard. I set the focus on the two main dimensions of impairment recognition, namely time and amount. These characteristics of the introduced model in IFRS 9 are closely related to the economic cycle. During the analysis, I include the effect of macro environment to the allowance and highlight the expected changes and possible upcoming uncertainty of impairment estimation.

## INTRODUCTION

In the last few decades, significant changes appeared in the field of financial regulation. Some of them are related to the increasing complexity and volume of financial deals and exposures, and interdependencies between different sectors and entities. Others are consequences of the last financial crisis, which generated a regulatory dumping all over the world. The sweeping changes of financial infrastructure have remarkable effects to the "real" economy as well. Great parts of the most relevant developments are connected to the reserving capability and reserves of the banks both from prudential - solvency capital - and accounting – allowance - sides. Of course there should be relevant and significant differences between the prudential and accounting regulations (Borio and Tsatsaronis 2005).

The update of International Financial and Reporting Standards (IFRS) are one of the main evolutions at international level. Maybe the biggest impact inside IFRS has the IFRS 9, the new standard related to the classification, measurement and accounting of financial instruments, for financial sector.

## SCOPE OF THE PAPER

In my current paper I am examining the effect of impairment model of the upcoming IFRS 9 standard coming into force after 2018. I compare the results with the currently used standard of IAS 39.

The explanation and justification behind the revision of currently used impairment models was that the existing accounting standard recognized the credit loss with delay and less in amount as it is needed. According to these I am examining two hypothesises, one is related to the timing and one is related to the amount of allowance recognition. The first hypothesis is whether the IFRS 9 will recognise the impairment loss earlier and the second hypothesis is that the IFRS 9 will recognise higher impairment amount compared to the IAS 39 one. Existing IAS 39 standard is based on incurred loss model (Tardos 2005; Szabó 2005), which means that only already "incurred" loss could be taken into account in impairment calculation, while according to the new standard there will be an expected loss model (IASB 2014). It means that future losses stemming from or based on expectations on past or current circumstances - with forward looking - should be included as well. This change is intended to cover the timeliness issue between the discrepancies of existing standard. The concerned related to the shortfall in amount is handled with prescription that when there is a significant change after initial recognition of the financial assets than the entity should calculate expected credit loss for the full lifetime of the instrument instead of 12 months' one. This requirement is called as 'staging rules'.

Definition of significant credit risk increase after initial recognition includes qualitative and quantitative criteria as well. Qualitative criteria consist of day past due, work-out, forbearance and early warning indicators, while qualitative criteria are connected to the rating systems as change of rating grades and related probability of default since initial recognition.

In that sense the macroeconomic circumstances are getting an important role in IFRS 9 through the

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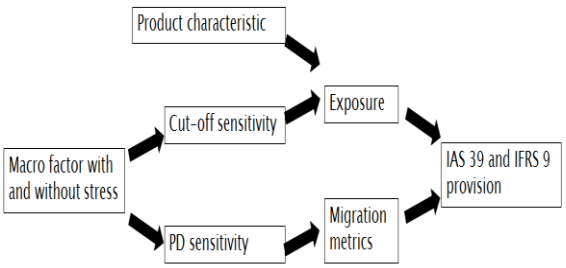
comparison of initial and current credit risk expectations, which could be the driver of impairment as a systematic factor. Because generally there is a big uncertainty in the estimation of macro circumstances, it is worth to analyse the effect of such a macro stress or a shock to the impairment amount.

Currently introduced model is the sub-model of a greater one which examines the IFRS 9 changes with the interaction of Basel III prudential rules especially with countercyclical capital buffer and try to highlight the combined effects of the prudential and accounting rules.

## MODELLING PROCESS

In this model I investigate the effects of the upcoming impairment model on a hypotatic portfolio with characteristics - based on reasonable judgement - described in chapter Exogenous variables. The modelling process depicted by the following diagram:




Picture 1: Effects in the model

Modelling process is a deterministic calculation. The outcome of the model is the amount of provision according to IAS 39 and IFRS 9 for sequence of periods with different macroeconomic states. The final provision of a given period is determined by the current and future exposure of the deals in the portfolio multiplied with loss given default and default probabilities coming from migration metrics (see details later in Table 4). Number of deals is given by the cut-off sensitivity – as rejection rule – of the given financial entity to the macro factor. Product characteristics and migration metrics are influenced by the macro factors as well. It is worth to note that the cut-off sensitivity is not a crucial part of the sub-model so that conclusions do not change without it.

### Exogenous variables

Before I show the steps of the calculation process I introduce the exogenous variables and simplification used in the model.
Exogenous variables and related simplification are the following:

- Unconditional probability – so where macroeconomic circumstance is still not incorporated - is constant at 10% for all rating grades.
- Unconditional acceptation rate is constant 80%. So rejection rate is 20%.
- Loss given default (LGD): loss recognized after default. Constant value of 10% is used.
- Amortisation of deals exposure (principal balance): Linearly up to the maturity. Default maturity is 5 years. So exposure of the given deal are 100, 80, 60, 40, 20 in the sequence years after draw down.
- Applicant: Number of possible applicant is constant at 100.
- Migration metrics ($M_{0,1}$): during the calculation the following cumulative unconditional migration metrics is used:

Table 1: Migration metrics

| t0->t1 | Rating A | Rating B | Default |
|---|---|---|---|
| Rating A | 0,7 | 0,9 | 1 |
| Rating B | 0,2 | 0,9 | 1 |
| Default | 0 | 0 | 1 |

It means that we have only 2 non-defaulted rating grades and 1 defaulted category without recurrence. Cumulative values means that the migration probabilities are cumulated from the first value in each rows. So exclude the effect of different rating grades I set the direct default probability to the same level, which is 0,1 as 1 minus 0,9.

- Staging rules: At initial recognition all the exposure are in rating A. During modelling I will use a simplified staging criteria namely if the exposure migrated to the rating B then the exposure will be in stage 2 and lifetime expected loss needs to be calculated instead of 12 months' one.
- Macro factor: add information about the state of the economy of the given year as a systematic factor. One baseline and one stress scenario are used during modelling with the following standard normally distributed variables:

Table 2: Scenarios

| Time period in year | 1-9 period | 10 | 11 | 12 | 13 | 14 | 15-20 period |
|---|---|---|---|---|---|---|---|
| Baseline scenario | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Stress scenario | 1 | -1 | -1 | -1 | 0,5 | 0,5 | 1 |

So the economic circumstance in case of baseline scenario is a constant mild expansion - because 1 means that circa 85% of the possible outcomes are worse. After the 9 period there is a shock in the stress scenario where the -1 means that the 85% of

the possible outcome are better. After 12 period the state of economic is start to converge to the baseline scenario.

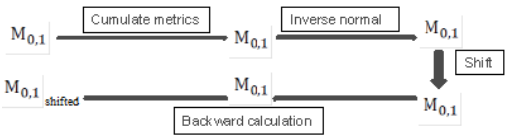
- The cut-off sensitivity (acceptance rate of applicants as a new debtor) set to 10% and migration metrics – so PD – sensitivity set to 10%. During the modelling process the increase of the sensitivity does not change the final results.

**Endogenous variables**

As described above the major interactions are between PD and macro factor and between acceptation rate and macro factors.
For the dependency of the PD and the acceptation rate Vasicek formula (1) is used:

$$p_A(X) = \Phi\left(\frac{\Phi^{-1}(\overline{p}_A) - \sqrt{\rho_A}X}{\sqrt{1-\rho_A}}\right). \quad (1)$$

Where the X is the macro factor with standard normal distribution and the $\rho_A$ is the correlation between macro and unconditional PD and acceptation rate. $p_A(X)$ refers to the conditional PD and acceptation rate calculated on the same way, but with different correlation factor to the systematic macro factor (Janecsko 2004).
If we have the conditional PD value – defined above -, we can use it to adjust the unconditional migration metrics to get the conditional migration metrics of the given year. The adjustment process of the unconditional migration metric with conditional PD values (2) looks like the following (named as z-shift adjustment):




(2)

Where $M_{0,1}$ is the unconditional migration metrics (3) with all the rating grades as showed in Table 1 above:

Table 3: Structure of migration metric

$$M_{0,1} = \begin{pmatrix} m_{1,1} & m_{1,2} & \cdots & m_{1,d} \\ m_{2,1} & m_{2,2} & \cdots & m_{2,d} \\ \vdots & & \cdots & \\ m_{d-1,1} & m_{d-1,2} & \cdots & m_{d-1,d} \\ 0 & 0 & \cdots & 1 \end{pmatrix} \quad (3)$$

If we have the conditional migration metrics for all the years adjusted with the actual unconditional PD value then we can calculate the state of the exposures in year t (Gruenberger 2012) after initial recognition (4) as:

$$M_{0,t} = M_{0,1} \cdot M_{1,2} \cdot \cdots \cdot M_{t-1,t} \quad (4)$$

After we get the state of the exposure we get to know that the given exposure is in rating A, rating B or in default. Under IAS 39 in case of non-defaulted rating grades we calculate the impairment value based on the loss of the previous year, because of incurred loss model. Under IFRS 9 if it is in rating A than according to our assumption, we need to calculate impairment for the next 12 months' expected credit loss. If it is in rating B we need to calculate impairment for the whole lifetime. In case of default under both standards I suppose that the exposure will be written down to the appropriate recovery rate - (1-LGD).
So impairment formulas look like the followings:

Table 4: Calculation types

| Type of impairment calculation | Calculation formula |
|---|---|
| **IAS 39 Incurred loss** | LGD * conditional(t-1)PD * Exposure |
| **IFRS 9 (stage 1) 12 months' expected credit loss** | LGD * conditional(t)PD * Exposure |
| **IFRS 9 (stage 2) Lifetime expected credit loss** | ∑LGD * conditional(t)PD(t) * Exposure(t), where t goes from the current year up to the final maturity of the deal |
| **IFRS 9 expected credit loss** | IFRS 9 (stage 1) 12 months' expected credit loss<br>+<br>IFRS 9 (stage 2) Lifetime expected credit loss |

**RESULT OF THE MODEL**

After the calculation with the model introduced in section Modelling process, we got the intended and expected results. According to this the IAS 39 allowance values are less in amount and in case of change of economic circumstances response of impairment increase lags behind IFRS 9 values. So it seems that both hypothesises are proved to be true. Look at the details of the results.

It is worth to mention that if we compare the IAS39 and IFRS 9 requirements without staging rule – so when all the exposures remain in stage 1 - than the IAS 39's values lag behind the IFRS 9 ones. As depicted in Figure 1 the impairment rate – impairment divided by exposure – under IAS 39 starts to increase later at the beginning of the recession and starts to decrease later at the end of the recession compared to IFRS 9. At the beginning it is important, because the loan loss provision appears later in the profit and loss statement and maybe it is resulting that the lending activity is not moderated in time. This feature is illustrated with the higher blue line (IAS39) compared to the purple line (IFRS 9 all exposure in stage 1) in period 11. At the end of it, there is maybe a reverse effect to the lending activity because higher provision goes

to the profit and loss statement reducing the bank's willingness to offer loans.
The effect of the increase in amount could be reviled if we compare the red line (IFRS 9) with purple line (IFRS 9 all exposures in stage 1). With it we catch the effect of staging criteria, so in our simple example, where the loans migrate to the rating B, provision for the whole lifetime need to be calculated.

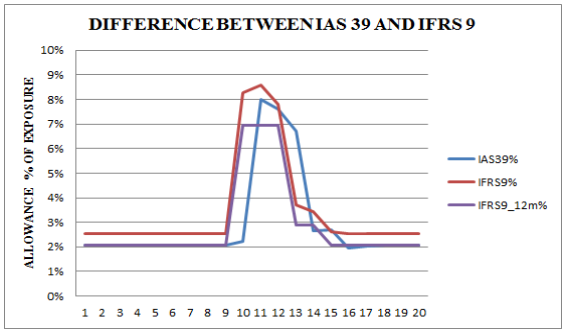



Figure 1: Impairment in IAS 39 and IFRS 9

After the comparison of the result of IAS 39 and IFRS 9 impairment values in different economic states, it is valuable to examine the reaction of the provision to unexpected macroeconomic changes.
To calculate it, I run the model with a baseline and a stress – unexpected – macro factor scenario detailed in Table 2. Because of the fact that the IAS 39 impairment includes only the incurred losses, such changes result no difference in expected and actual provision numbers. But it has effect to the IFRS 9 impairment because of forward looking feature if it. Indeed, it is effective only to the deals which are in stage 2 (rating B), so lifetime expected credit loss need to be calculated. It is illustrated with Figure 2, where red line shows if I do not have information about the upcoming shock and orange line shows, where I have exact information about it. Orange line is higher in its allowance in period 7, 8 and 9. It is because we have already incorporated the higher lifetime provision of the unexpected shock for the remaining exposure of such a deal, which will be still in the portfolio during the recession. So it is clear that the unexpected shock demolish the timeliness effect of the IFRS 9 impairment values.

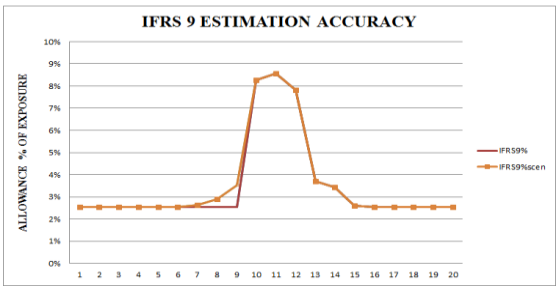



Figure 2: Estimation accuracy

## CONCLUSION

This paper has provided an analysis between impairment requirement of the current IAS 39 and upcoming IFRS 9 standards. The focus was on the two main dimensions of impairment recognition, namely time and amount. I set up one hypothesis for each of the dimension. I got the result that in my examination the hypothesis are true, so IFRS 9 recognise loan loss provision earlier and with higher amount then IAS 39. I also show that the timeliness of the provision is demolished if there is an unexpected shock or uncertainty in the economic circumstance.
Clearly, further research is needed to highlight the detailed effect of the IFRS 9's impairment method, maybe with an extended model where prudential regulation is incorporated as well. It means that not only the change and magnitude of loan loss provision are analysed, but together with capital requirement (expected shortfall) and countercyclical capital buffer as well. Some of the issues are already discussed in (Wezel at al. 2012) where dynamic provisioning is analysed as an expected credit loss based method or in (Gruenberger 2012) where capital requirement is incorporated.

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## AUTHOR BIOGRAPHIES

**CSABA KÁDÁR** was born in Csongrád, Hungary and went to the Corvinus University of Budapest, where he studied financial risk management and investment analysis and obtained his degree in 2006. He started his PhD in 2015. Before that, he worked as a supervisor at HFSA, risk manager and risk consultant in the financial sector. His research area is prudential and accounting regulation and related financial models. His e-mail address is: csaba.kadar@uni-corvinus.com.