PROVISIONING MODELS VS. PRUDENTIAL MODELS

Juan Carlos García Céspedes (*)

(*) Juan Carlos García Céspedes is Capital, Planning & Liquidity (Financial Management Group) director at BBVA.

Abstract

This article discusses the interaction of and relationship between accounting and capital rules. In 2018 accounting rules adopted IFRS9, changing the way provisions are calculated from an "incurred losses" to an "expected credit losses" paradigm (ECL).

Following a broad description of provisioning and prudential models, the author analyses in greater detail how IFRS9 affects average capital requirements and their cyclicality.

The conclusion is that under current capital requirement rules and the IFRS9 framework, both average capital requirements and their cyclicality will probably increase.

Additionally, the author examines the foundations of current capital formulas that were developed under the incurred loss provisioning system.

If it is true that ECL is a better predictor than the previous provisions mechanism, supervisors and regulators should conclude that a review of the capital requirement framework is needed in order to include this reduction in unexpected losses in the capital requirement calculation.

On the other hand, if ECL does not prove to be a better predictor for real losses than the previous provisioning methodology, accounting regulators should rethink the ECL concept.

1 Introduction

Recently accounting rules have adopted IFRS9, changing the way provisions are calculated from an "incurred losses" paradigm to a "conditional expected loss" paradigm.

The global financial crisis brought to the light the limitations of the incurred loss approach, summarized in the sentence "too little, too late".

Consequently the G20 required accounting standard setters to define approaches to recognise credit losses which would be more forward looking, trying to include information about the (current and future) macroeconomic environment. In other words, the G20 was calling for the adoption of expected credit loss approaches for the computation of credit losses.

As Antonio Sánchez Serrano (2018) "Financial stability consequences of the expected credit loss model in IFRS9" says:

"Following the G20 mandate, there has been a move from incurred loss approaches for the recognition of credit losses to expected credit loss approaches. Since 1 January 2018, European banks follow the approach defined by IFRS 9, according to which, exposures are allocated to three stages depending on their relative credit risk. Overall, the timelier and fuller recognition of credit losses is expected to bring substantial benefits to financial stability[1]."

1 If the reader is interested in understanding how works IFRS 9, there are some useful introductory documents included in the references' chapter like "IFRS 9, Financial Instruments Understanding the basics, PWC", "IFRS 9 and expected loss provisioning - Executive Summary (December 2017). FSI Descriptive", "In depth IFRS 9 impairment: significant increase in credit risk (December 2017), PWC" or Pilar Barrios and Paula Papp "FRS 9: A new model for expected loss provisions for credit risk" (January 2017).

"However, IFRS 9 is not going to be applied with perfect foresight. On the contrary, expected credit loss models would be able to anticipate downturns only shortly before their occurrence. At the onset, a system-wide sizable increase in provisions associated with expected credit losses can be expected, which may have undesired procyclical effects via banks' profits and regulatory capital."

"The paradigm shift in accounting for credit losses may call for a policy reflection on […] the interaction with the current regulatory framework.»

The debate about the pro-cyclicality of IFRS9 is on the table and policymakers must understand the interaction between cyclicality, new provisions' rules and capital requirements' models.

More detailed information about cyclicality can be found in some references as "Jorge Abad and Javier Suárez (July 2017) - Assessing the cyclical implications of IFRS 9 – a recursive model" or "Harry Huizinga and Luc Laeven (May 2018) - The Procyclicality of Banking: Evidence from the Euro Area".

This article is mainly focused on a particular facet of the cyclicality issue; the interaction between IFRS9 and capital (prudential) requirements, trying to analyze 3 basic questions:

- If IFRS9 will affect the average capital requirement level.
- If IFRS9 will affect the volatility of the capital requirement.
- If Basel II capital requirement formulas should be changed or adapted to take into account IFRS9.

The conclusion of section 7 seems to support the idea that the interaction between current capital requirement rules and IFRS9 will increase both, the average capital requirement and the cyclicality of the capital requirement[2].

Other relevant articles included in the references' section are:

- Basel Committee on Banking Supervision (July 2005). "An Explanatory Note on the Basel II IRB Risk Weight Functions"; where the reader can understand the foundation of the capital requirements formula under internal models.
- "Expected credit loss approaches in Europe and the United States: differences from a financial stability perspective" (January 2019). European Systemic risk Board (ESRB); where the reader can learn about the different approaches followed by Europe and US on accounting provisioning.
- Jorge Abad and Javier Suárez (July 2017) "Assessing the cyclical implications of IFRS 9 – a recursive model" Occasional Paper Series No 12. European Systemic risk Board (ESRB), where authors simulate the behavior of a Financial

2 As this paper is not a research article based on empirical work, you must be careful about the conclusions. This article does not expect to demonstrate that IFRS9 increases cyclicality with no doubt; however, it offers some hints that could be useful for future empirical papers.

Institution under a IFRS9 provisioning paradigm and show how capital cyclicality increases under different scenarios.

2 Provisioning models vs. prudential models

Recently, accounting rules have changed the way provisions are estimated. The previous accounting paradigm was based on the concept of "incurred losses". Now, with the new changes implemented by IFRS9, the approach has changed from "incurred losses" to "Expected Losses".

Expected losses (EL) are a new concept in accounting. However, in prudential regulation, expected losses are a key component in the capital requirement calculation.

From the implementation of Basel II regulation, Financial Entities can use internal models for calculating their credit risk capital requirements. The theoretical foundation of these internal models relies on the concept of unexpected credit loss.

A bank needs capital in order to cover unexpected losses.

From a prudential point of view, the role of provisions is to cover what is expected to happen however the role of capital is to cover what is unexpected to happen (but can happen).

It must be noted that this prudential point of view of provisions is different from the accounting point of view.

Before IFRS9 implementation, the role of provisions was to cover what has happened (that is, to cover incurred losses). This view has been recently modified with the new IFRS9 regulation. Under IFRS9 the role of provisions is to cover what is expected to happen.

Later we will see that, amazingly, what is expected to happen can be different from a prudential point or from an accounting point of view.

It could seem strange that accounting rules and prudential rules could differ given they deal about very similar concepts (at least theoretically), however, it must be noted that objectives of Prudential Regulation and accounting are quite different.

On the one hand "accounting regulation" is focused on the "value of assets" trying to give an unbiased view of that value to investors and other stakeholders. In that sense accounting is interested in estimating the level of loss associated to each loan in the Bank's portfolio, given the current conditions but also future expected conditions[3].

However, on the other hand, "prudential regulation" tries to establish and define backstops to achieve safest financial systems. In this sense, prudential regulation is focused on the "prudential value of assets" and how to guarantee that the amount of capital is enough to cover the prudential (stressed) value of assets under an adverse scenario.

3 This is one of the biggest characteristics of IFRS9. IFRS9 provisions consider the future expected evolution of the economy. IFRS9 is not only considering the current situation but it also tries to guess what is expected for the future.

Prudential regulation is not only interested in the current or expected level of loss but is also interested in the potential future level of loss under an adverse scenario (technically, prudential regulation tries to estimate a loss distribution percentile).

Although accounting and prudential regulations seem to use similar concepts (EL), their aim is clearly different.

3 Measuring the Expected Loss

In this section we will see that there are different definitions or approaches to measure the expected loss.

3.1 CONDITIONAL OR UNCONDITIONAL

First of all we will define two different concepts of expected losses, conditional expected loss vs. unconditional expected loss.

- Conditional expected loss is the expected level of loss given the macroeconomic state of the economy.

- Unconditional expected loss is the expected level of loss without taking into account the macroeconomic state of the economy.

Unconditional expected losses can be thought as the average of the conditional expected loss over all possible macroeconomic states.

Historically, prudential regulation has preferred unconditional models (later we will discuss on this more deeply).

In its explanatory note on the Basel II IRB Risk Weight Functions (July 2005), the Basel Committee on Banking Supervision defines capital as the loss surprise over the unconditional expected loss. On the other hand accounting regulation (IFRS9) has preferred to focus on conditional models.

3.2 TIME HORIZON

Also expected losses can be different depending on the "time horizon". Typically there are two principal possibilities; "one year expected losses" vs. "lifetime expected losses":

- One year expected loss is the expected level of loss for the next year.

- Lifetime expected loss is the expected level of loss considering the residual maturity of a loan or portfolio.

3.3 MIXING CONDITIONALITY AND TIME HORIZON

As the reader can imagine, both axis can be mixed so we can obtain 4 different concepts of expected losses:

One year unconditional EL	Lifetime unconditional EL
One year conditional EL	Lifetime conditional EL

As we will see later, IFRS9 uses conditional EL and, depending on the portfolio stage (1, 2 or 3), it uses one year EL (for Stage 1) or lifetime EL (for Stages 2 or 3).

On the other hand, Capital regulation uses unconditional EL[4] and one year time horizon for non-defaulted assets or lifetime for defaulted assets.

Technical jargon also uses the name "Point In Time EL (PIT EL)" for conditional expected losses and the name "Through The Cycle EL (TTC EL)" for unconditional expected losses.

4 How is expected loss measured? IFRS9 vs. Capital models

As we have said in the previous section, Capital models and IFRS9 models use different approaches in order to measure expected losses.

Provisioning (IFRS9) models are based on conditional expected losses (for both PD's and LGD's) however capital models are based on a mixture of unconditional expected PD's (TTC) and stressed LGD's (unconditional "stressed" expected loss).

But also time horizons are different.

In order to estimate the adequate level of provisions, accounting models (IFRS9) have defined expected credit loss (ECL) as:

- Stage 1: "one year expected losses, using conditional PD's and LGD's".
- Stage 2: "lifetime expected losses, using conditional PD's and LGD's".
- Stage 3: "lifetime expected loss using conditional LGD's (PD=100%)".

On the other hand, prudential regulation uses its own definition of Expected Loss (Capital EL):

- Non-defaulted assets: "one year expected losses using TTC PD's but Downturn LGD's[5]".
- Defaulted assets: "lifetime expected loss BE (best estimate) plus additional unexpected losses (PD=100%)".

It is important to note that segmentation is also different. IFRS9 uses "stages (1, 2 or 3)" but capital rules uses "defaulted vs. non-defaulted", with the additional problem that there is no guarantee for a perfect match between both segmentations.

Normally Stage 1 assets are non-defaulted assets, Stage 3 assets are defaulted assets, but Stage 2 can be composed by both, defaulted and non-defaulted.

Next table shows a summary of the different approaches[6]. In order to facilitate the discussion, the table assumes that non-defaulted assets are Stage 1 plus Stage 2, and defaulted assets are equal to Stage 3 assets.

4 To be precise, capital regulation uses the concept of "downturn EL", that is, an EL calculated using an unconditional PD and a downturn LGD.

5 Downturn LGD means "expected LGD under an adverse macroeconomic scenario" so Downturn LGD is basically a conditional expected LGD.

6 The discussion is mostly based on PD and LGD, however same issues apply to CCF (credit conversion factor).

TABLE 1

		Stage 1	Stage 2	Stage 3
		Non Defaulted		Defaulted
Provisions	Time Horizon	One year	Lifetime	Lifetime
	PD's	Conditional	Conditional	100%
	LGD's	Conditional	Conditional	Conditional
Capital EL	Time Horizon	One year	One year	Lifetime
	PD's	TTC	TTC	100%
	LGD's	Downturn	Downturn	Best estimate + Unexpected

SOURCE: Own elaboration.

5 What does Unexpected Loss mean?

From the implementation of Basel II regulation, Financial Entities can use internal models for credit risk capital requirements (subject to the supervisor's approval).

The theoretical foundation of these internal models relies on the concept of unexpected credit loss (for a portfolio of loans).

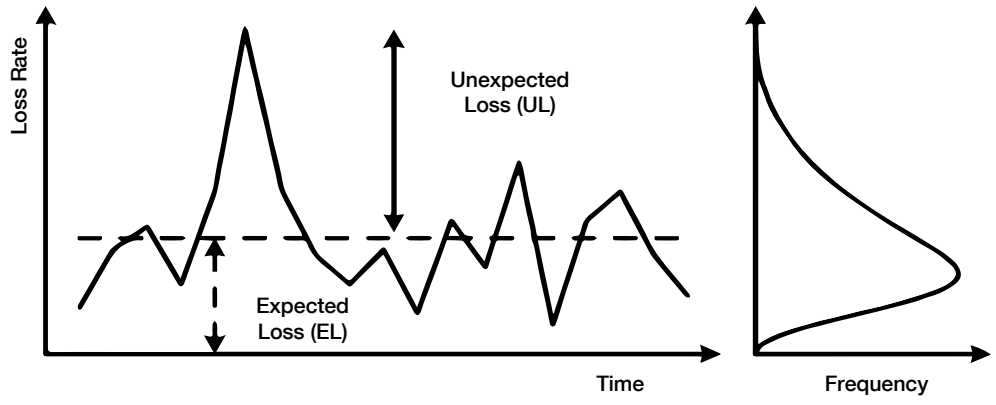
A bank needs capital in order to cover unexpected losses.

From a prudential point of view, the role of provisions is to cover what is expected to happen but the role of capital is to cover what is unexpected to happen (but can happen).

Next paragraphs and charts, are extracted from the document "An Explanatory Note on the Basel II IRB Risk Weight Functions", July 2005 Basel Committee on Banking Supervision.

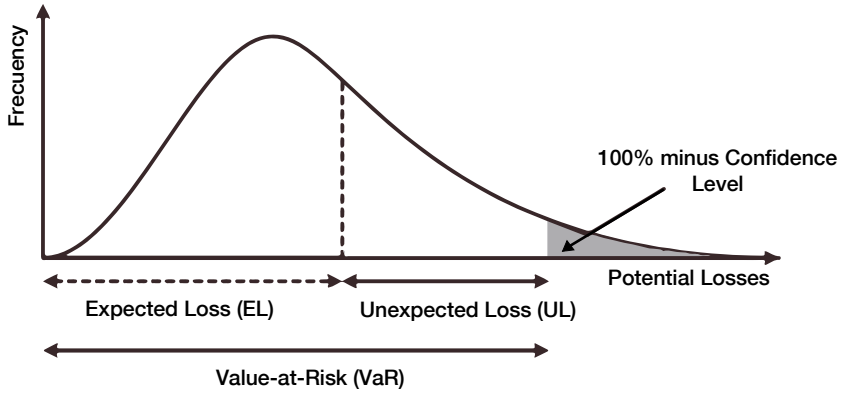
EXPECTED LOSS, UNEXPECTED LOSS AND LOSS DISTRIBUTION

FIGURE 1



SOURCE: BIS.

EXPECTED LOSS, UNEXPECTED LOSS AND CAPITAL REQUIREMENT FIGURE 2



SOURCE: BIS.

"… As explained above, banks are expected in general to cover their Expected Losses on an ongoing basis, e.g. by provisions and write-offs, because it represents another cost component of the lending business. The Unexpected Loss, on the contrary, relates to potentially large losses that occur rather seldomly. According to this concept, capital would only be needed for absorbing Unexpected Losses."

"Nevertheless, it has to be made sure that banks do indeed build enough provisions against EL. Up to the Third Consultative Paper of the Basel Committee, banks had thus been required to include EL in the risk weighted assets as well. Provisions set aside for credit losses could be counted against the EL portion of the risk weighted assets - as such only reducing the risk weighted assets by the amount of provisions actually built. In Figure 2 above, this would have meant to hold capital for the entire distance between the VaR and the origin (less provisions)."

"… In the end, it was decided to follow the UL concept and to require banks to hold capital against UL only. However, in order to preserve a prudent level of overall funds, banks have to demonstrate that they build adequate provisions against EL. In above Figure 2, the risk weights now relate to the distance between the VaR and the EL only."

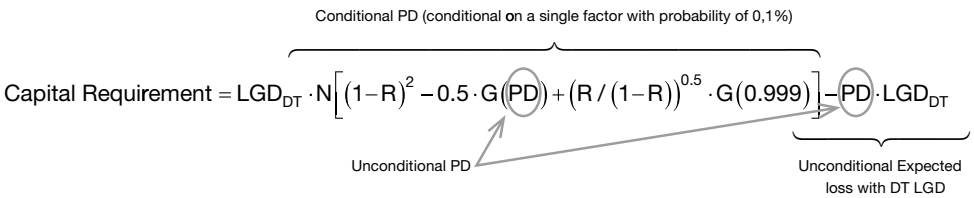
From the previous paragraphs, it seems clear that Basel II prudential regulation assumes an unconditional expected loss and tries to measure the volatility of losses around the expected loss (see Figure 1)

The difference between the expected loss and a given percentile of the loss distribution is the minimum level of capital a financial institution must hold (see Figure 2).

Basel II uses "Asymptotic Single Risk Factor (ASRF) Models", in order to estimate an analytical formula for the percentile of the credit loss distribution.

Fixing the confidence level (99,9%) and the level of assets correlations, capital requirement formulas can be deduced.

Next formula shows (a simplified version of) the Basell II risk weight functions, where explicitly it can be seen that the capital requirement is the credit loss percentile minus the unconditional one year expected loss:



Or in a more condensed form:

$$\text{Capital Requirement} = LGD_{DT} \cdot f(PD, R, 0{,}999) - PD \cdot LGD_{DT} = \\ = LGD_{DT} \cdot f(PD, R, 0{,}999) - \text{Capital EL}$$

This approach assumes that Capital EL is adequately covered by credit provisions, however in order to guarantee this, Basel II require banks to compare their level of provisions with the expected loss[7].

If it is not the case and the level of provisions is lower than Capital EL[8], banks must cover this shortfall with capital.

Interestingly, in the case of a surplus of provisions vs. Capital EL, there is an asymmetry in capital regulation and this does not mean a capital surplus.

$$\text{CET1 Requirement} = \left[LGD_{DT} \cdot f(PD, R, 0{,}999) - PD \cdot LGD_{DT}\right] + \\ + \text{Max}(0, PD \cdot LGD_{DT} - \text{Provision})$$

or

$$\text{CET1 Requirement} = \left[LGD_{DT} \cdot f(PD, R, 0{,}999) - PD \cdot LGD_{DT}\right] + \\ + \text{Max}(0, \text{Capital EL} - \text{ECL})$$

Under Basel II, Capital requirement depends on:

- Confidence level (99,9%): fixed by the regulator.
- Correlation: fixed by the regulator.
- PD: The higher the PD, the higher the capital requirement[9].
- LGD_{DT}: The higher the downturn LGD, the higher the capital requirement.
- The provisions shortfall (ECL vs. capital EL):
  - When capital EL > ECL: CET1 must be adjusted (reduced).
  - When capital EL < ECL: CET1 is not adjusted.

7 In fact this comparison must be done separately for defaulted and for non-defaulted assets.

8 Actually, remember that Capital EL is a kind of stressed EL, equal to PD x Downturn LGD. We can call "Capital EL" to this "stressed EL" calculated using a downturn LGD instead the average LGD.

9 This is true for low levels of PD. If PD is high enough (≥50%), capital requirements are decreasing in PD. If capital is identified as loss surprise, is PD is high there is little surprise, in fact if PD=100% there is no surprise at all.

6 Definition of default

An interesting issue that arises when analyzing accounting rules and capital rules is the definition of default (DoD) issue.

As we have seen, for capital requirement purposes there are only two possible "stages", assets can be defaulted or non-defaulted and the Definition of Default (DoD) is stablished by the supervisor/regulator.

However, for accounting purposes, there are 3 possible stages:

- Stage 1 is where credit risk has not increased significantly since initial recognition. For financial assets in stage 1, entities are required to recognize one year ECL.

- Stage 2 is where credit risk has increased significantly since initial recognition. For financial assets in Stage 2 entities are required to recognize lifetime ECL.

- Stage 3 is where the financial asset is credit impaired. The concept of impairment must be aligned with the internal credit risk management. For financial assets in stage 3, entities are required to recognize lifetime ECL.

Recently, in order to homogenize DoD, European supervisors and regulators (ECB and EBA) have developed detailed rules (materiality thresholds, days past due counting rules, cures, treatment of forbearance).

An interesting question is how the definition of default impacts on Expected and on Unexpected Losses and, in a second step, how DoD can alter capital requirements.

Surprisingly, as we will see, a more conservative definition of default does not automatically mean a higher capital requirement.

Clearly credit loss does not depend on the definition of default. Credit loss is the loss suffered because a client/counterparty does not comply with its contractual obligations and this loss is independent of the "definition of default". Given that credit loss does not depend on DoD, also EL does not depend on the DoD.

DoD basically permits to separate the effect of default between PD and LGD:

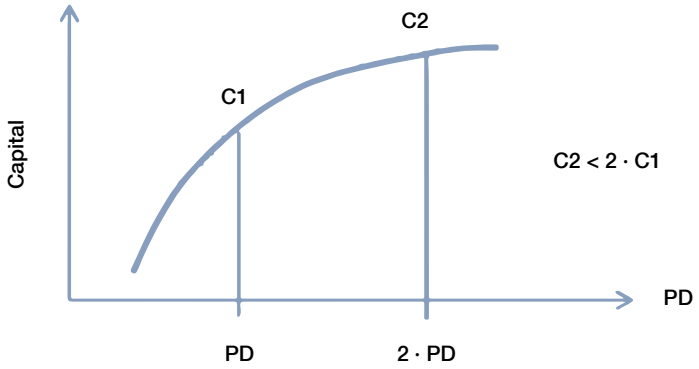
- A more conservative DoD means a higher level of PD and, at the same time, a lower level of LGD.

- On the other hand a less conservative DoD means a lower level of PD and, at the same time, a higher level of LGD.

But, independently of the DoD, the product of PD times LGD will keep constant.

The same discussion could be applied to the unexpected credit loss, to change the DoD should not affect the unexpected credit loss.

CONCAVITY OF CAPITAL FUNCTION FIGURE 3



SOURCE: Own elaboration.

However, things are different when we talk about the capital requirement formula:

$$\text{CET1 Requirement} = \left[\text{LGD}_{\text{DT}} \cdot f\left(\text{PD}, R, 0, 999\right) - \text{PD} \cdot \text{LGD}_{\text{DT}}\right] + \\ + \text{Max}\left(0, \text{Capital EL} - \text{ECL}\right)$$

It must be noted that f(PD,R,0,999) is a concave function on PD but Capital requirement formula is linear on LGD.

- If LGD doubles, then Capital requirement also doubles.
- If PD doubles, then capital requirement is less than the double.

As it can be seen in Figure 3.

In summary:

- A more conservative DoD implies higher levels of PD.
- A more conservative DoD implies lower levels of LGD.
- A more conservative DoD should not affect EL.
- A more conservative definition of default implies lower levels of Capital requirement.

Given that the Capital requirement (under Basel II) depends on the DoD, supervisors, in order to guarantee level playing field are strongly committed to assure that Financial Entities use the same DoD.

In this sense, for example, in Europe regulators/supervisors are publishing very detailed rules and guides about the definition of default.

7 Some thoughts about capital EL and ECL cyclicality

There is a debate about if IFRS9 will increase or not profit & loss cyclicality. Very close to this debate, there is another additional debate about how IFRS9 will interact with capital requirements and if finally capital requirements under IFRS9 provisioning rules will be more (or not) cyclical than it previously was (under incurred losses paradigm).

Perhaps it is worth to think about "how the real world is", independently of "how the real world is translated into an accounting entry".

Maybe the reader agrees with the statements below:

- Real Credit Losses are cyclical (meaning that there are periods of high level of credit losses and periods of low level of credit losses).

- Real Credit Losses do not depend on accounting rules (meaning that real credit losses are generated by defaulted loans independently of the level of allowances or how these allowances are estimated).

On the other hand, if we remember the capital (CET1) requirement formula under IFRS9 rules,

$$\text{CET1 Requirement} = \left[\text{LGD}_{\text{DT}} \cdot \text{f}\left(\text{PD}, \text{R}, 0, 999\right) - \text{PD} \cdot \text{LGD}_{\text{DT}}\right] + \\ + \text{Max}\left(0, \text{PD} \cdot \text{LGD}_{\text{DT}} - \text{ECL}\right)$$

Or

$$\text{CET1 Requirement} = \left[\text{LGD}_{\text{DT}} \cdot \text{f}\left(\text{PD}, \text{R}, 0, 999\right) - \text{PD} \cdot \text{LGD}_{\text{DT}}\right] + \\ + \text{Max}\left(0, \text{Capital EL} - \text{ECL}\right)$$

In the previous equation we see clearly how IFRS9 interacts with capital.

The second part of the previous equation is an "asymmetric" adjustment that depends on the difference between the level of provisions driven by IFRS9 rules (ECL) and the EL used in capital calculation (Capital EL).

ECL:

- Based on conditional PD's.

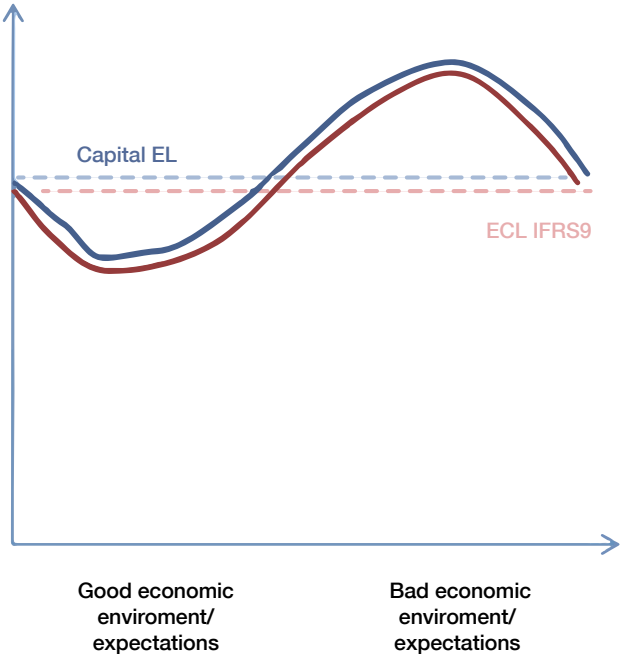
- Time horizon: 1Y (Stage 1) or lifetime (Stage 2 and 3).

Capital EL:

- Based on unconditional PD's (Trough the cycle).

- Time horizon: 1Y (for non defaulted assets) or lifetime (for defaulted assets) or if we assume that the definition of default is equal to the Stage 3, 1Y (Stage 1 and 2) or lifetime (Stage 3).

EL AND ECL EVOLUTION FOR "DEFAULTED / STAGE 3" ASSETS FIGURE 4



SOURCE: Own elaboration.

7.1 DIFFERENCES ON DYNAMIC EVOLUTION BETWEEN "CAPITAL EL" AND "IFRS9 ECL"

Assuming a common definition of default for both, capital regulation and IFRS9, basically there are 3 possible situations:

- "Defaulted/Stage 3" assets.
- "Non defaulted/Stage 2" assets.
- "Non defaulted/Stage 1" assets.

Next three sections will analyse the probable evolution of Capital EL and ECL for the previous 3 assets' status and under different macroeconomic scenarios.

7.1.1 "Defaulted/Stage 3" assets

In this case, both, Capital EL and ECL are "lifetime losses".

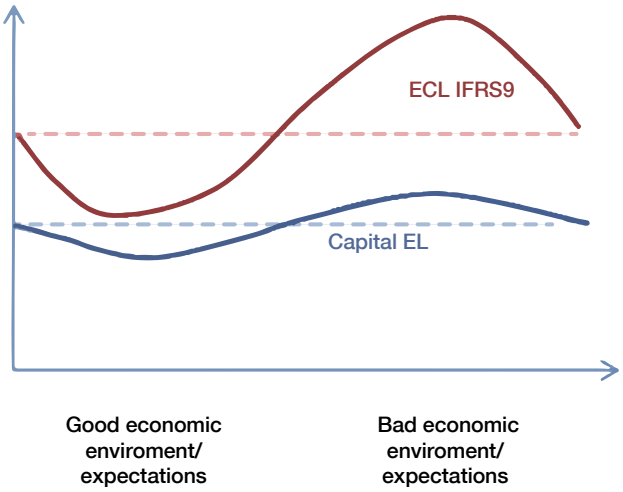
Capital EL will evolve depending on two basic drivers, the amount of defaulted assets (or stage 3) and the evolution of the "Downturn LGD".

IFRS9 ECL will also evolve depending on two basic drivers, the amount of Stage 3 assets (or defaulted assets) and the evolution of "conditional LGD", in general "Downturn LGD" will be higher than "conditional LGD", especially in good times, so ECL will be in general lower than Capital EL.

Anyway, the main driver for the evolution of both, capital EL and ECL will be the amount of defaulted/Stage 3 assets, that clearly is a very cyclical variable. For good times, the amount of defaulted or Stage 3 assets will be low, however, in bad times defaulted/stage 3 assets will increase significantly.

Figure 4 illustrates the typical shape of the evolution of the Capital and ECL through the cycle.

EL AND ECL EVOLUTION FOR "NON DEFAULTED / STAGE 2" ASSETS FIGURE 5



SOURCE: Own elaboration.

7.1.2 "Non defaulted/Stage 2" assets

In this case, Capital EL is a one year EL, however, ECL for Stage 2 assets is a lifetime loss.

Capital EL will evolve depending on three drivers, the amount of Stage 2 assets, the evolution of "one year PD through the cycle" and the evolution of "Downturn LGD".

Both elements, 1 Year PD TTC and Downturn LGD, should be quite stable over time, so main driver of the evolution of capital EL should be, as previously said, the amount of (Stage 2) assets that, again, should be very cyclical. In bad times, the amount of stage 2 assets should increase materially.

On the other hand, IFRS9 ECL will evolve also depending on 3 drivers, the amount of Stage 3 assets, the evolution of the "lifetime PD" and the evolution of LGD.

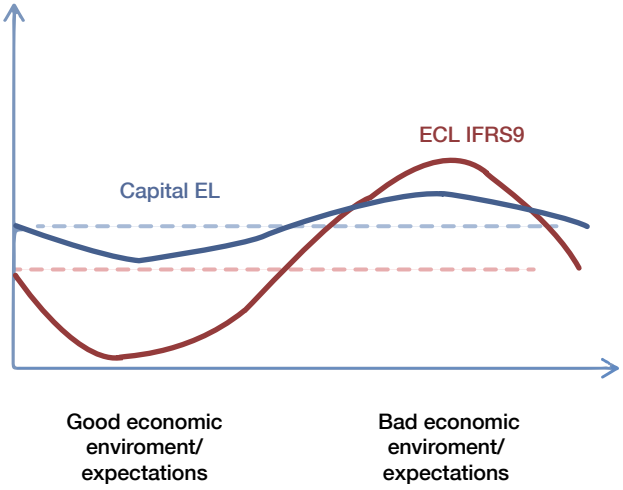
ECL should be in general higher than EL because:

- Amount of Stage 3 assets is equal for both.
- Downturn LGD should be in general higher than LGD.
- However, 1 year PD should be in general much lower than lifetime PD. Only for short term portfolios (typically less than 1 year) and in good times, conditional lifetime PD could be lower than PD TTC.

The combination of the three previous elements will drive the evolution of capital EL and ECL evolution, and, if assets average residual maturity is large enough, lifetime PD will make the difference.

Figure 5 illustrates how Capital EL and ECL evolution could evolve through the cycle:

EL AND ECL EVOLUTION FOR "NON DEFAULTED / STAGE 1" ASSETS FIGURE 6



SOURCE: Own elaboration.

– In good times, it should be expected a slightly higher ECL than EL (basically because ECL is lifetime and capital EL is one year).

– In bad times clearly ECL should be considerably higher than EL due to both, lifetime horizon and the use of conditional PD's for ECL vs. 1 year TTC PDs for Capital EL.

7.1.3 "Non Defaulted/Stage 1" assets

In this case, both, EL and ECL are one year losses, however EL uses TTC PD's and stressed LGD and ECL uses PIT PD's and LGD's.

In this case, the cyclicality driven by the amount of Stage 1 assets should be much lower than in the previous two cases, and in fact it should be countercyclical (in bad times the amount of stage 1 loans would decrease).

Under this framework it should be expected that in good times ECL should be lower than Capital EL and, on the other hand, in bad times ECL should be higher than Capital EL as Figure 6 shows.

7.1.4 Mixing all segments

Adding all previous effects into one picture:

ECL VS. CAPITAL EL TABLE 2

	Good times	Bad times
Stage 1	Shortfall	Similar
Stage 2	Surplus	Surplus
Stage 3	Shortfall	Similar
All portfolios	**Slight shortfall**	**Surplus (Stage 2)**

SOURCE: Own elaboration.

It can be expected that in good times, the difference between ECL and Capital EL, at aggregate level, should not be very material (with Capital EL perhaps slightly higher than ECL). However, in bad times, ECL should show a surplus when compared to Capital EL[10].

However, remembering the capital formula, the factor that takes into account the difference between Capital EL and ECL is highly asymmetric:

$$\text{CET1 Requirement} = \left[\text{LGD}_{\text{DT}} \cdot f\left(\text{PD}, R, 0, 999\right) - \text{PD} \cdot \text{LGD}_{\text{DT}}\right] + \\ + \text{Max}\left(0, \text{Capital EL} - \text{ECL}\right)$$

This means that:

- In good Times: It should be expected a slightly shortfall:
  - The level of provisions is lower than the Capital EL.
  - The shortfall is adjusted in capital increasing the capital requirement.
- In bad Times: It should be expected a Surplus:
  - The level of provisions is higher than the Capital EL (affecting P&L).
  - The surplus is not adjusted in capital (there is no reduction in capital requirements).

This means that under the current capital rules and using IFRS9 framework for provisioning:

a) In average (averaging good and bad times), capital requirement would increase, because ECL does not match exactly with Capital EL and the capital adjustment that takes into account this mismatch is asymmetric.

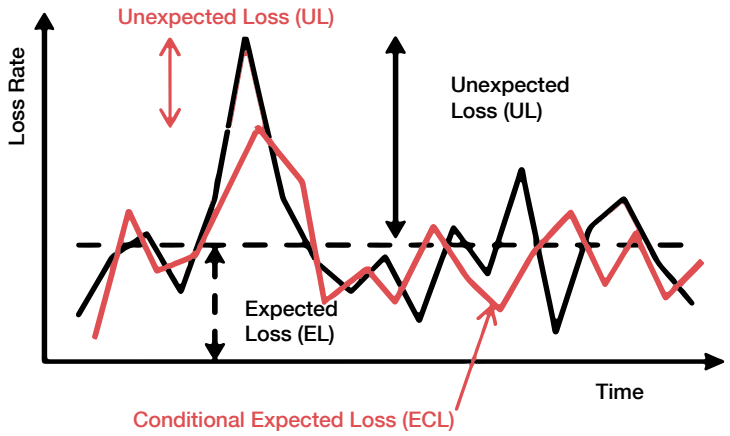
b) But also, Capital requirement would be more volatile, for example, all other things equal, and given that IFRS9 provisions are based on conditional estimations, a future expected change in macroeconomic scenarios would affect "now" the level of provisions (increasing or decreasing ECL) and consequently would affect capital ratios, positively or negatively, increasing volatility.

8 Should IFRS9 provisioning framework affect capital requirements?

As we have discussed previously, Basel 2 models were basically designed for estimating the unexpected loss, considering that the expected loss should be well covered by provisions. Capital is basically the unexpected loss, understanding this unexpected loss as the difference between the "real loss" and the (unconditional) expected loss.

10 If we analyse the difference between Capital EL and ECL through the cycle (averaging good and bad times), ECL should be higher than Capital EL because in stage 2 ECL is lifetime but Capital EL is 1 year.

UL UNDER EL OR ECL PROVISIONING SYSTEMS FIGURE 7



SOURCE: BIS and own elaboration.

However, under IFRS9 things are quite different. ECL is estimated as a conditional EL, so this means that IFRS9 tries to estimate the future level of losses (one year or lifetime) given the current (and future) macroeconomic scenarios.

Figure 7 ilustrates a theoretical evolution of the three concepts, the EL, the ECL and the "real loss".

In this case, we see as ECL changes over time, trying to "predict" the future level of real losses.

If we consider that ECL is a better predictor for the real level losses than it is the unconditional EL, it should be expected that the red line fits real losses (black line) better than the dashed line (dashed line is flat given it is an unconditional EL that does not take into account any future expectation).

In this is the case, the unexpected loss calculated as the difference between the red line (ECL) and the black line, should be lower than the unexpected loss calculated as the difference between the dashed line and the black line.

So, if provisions are based on "conditional expected losses" (red line) makes little sense to estimate unexpected losses comparing the percentile of the loss distribution with an EL based on a mixture of unconditional PD's and DT LGD's (Capital EL).

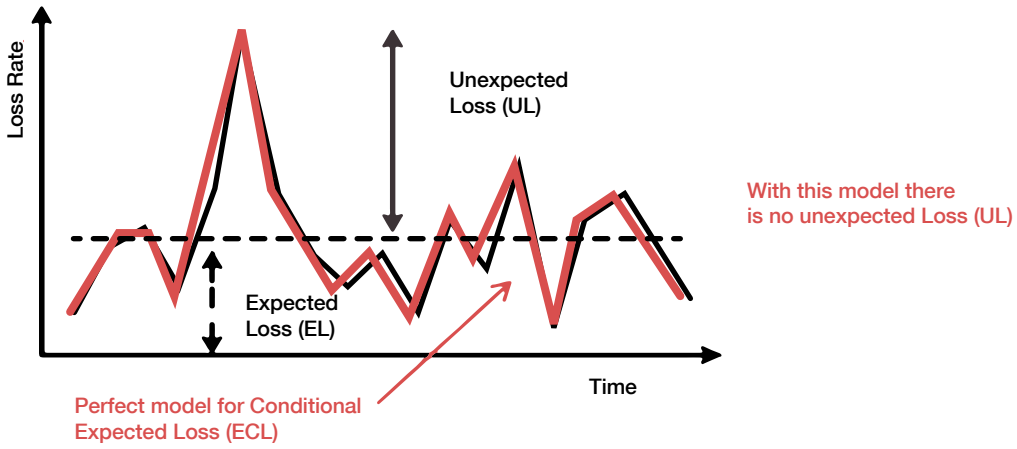
Perhaps the idea can be better understood if we analyze what happens in the limit.

Imagine a "perfect" IFRS9 model, where ECL would be a "perfect" predictor of real credit losses (one year or lifetime depending on the portfolio).

In this case, Banks would not need capital to cover unexpected credit losses. Credit losses would be perfectly covered by the amount of provisions because credit losses are no longer random.

Figure 8 shows in the limit, what would happen under an error free ECL model.

UL UNDER EL OR "PERFECT ECL" PROVISIONING SYSTEMS FIGURE 8



SOURCE: BIS and own elaboration.

In this case, all cyclicality effects would be captured via P&L but there would be no need to maintain a credit risk capital requirement[11].

Obviously, It can be argued that there is no such thing as an “error free model”. That is true, however, it can be also argued that a conditional EL model should be at least equal (or better) than an unconditional EL model so under IFRS9, credit risk capital requirements should be lower than under an unconditional EL model for provisioning[12].

As a summary, under IFRS9 paradigm:

– Provisions are equal to ECL where ECL is basically a conditional expected loss (with different time horizons depending on the “stage”).

– If we consider that capital requirement should cover “loss surprises”, then capital requirement should be calculated as the difference between the real loss and the ECL (instead being calculated as the difference between the real loss and the unconditional expected loss).

– If ECL is better forecast for futures real losses (than incurred losses or unconditional expected losses), the level of “loss surprises” should decrease and, consequently, the level of capital requirement should also decrease.

– As results of previous points, from a theoretical point of view, changing provision rules from incurred losses to conditional expected losses should affect the Basel II capital formula itself.

– Additionally, the asymmetric adjustment included in the Basel II capital formula, that takes into account the difference between provisions and Capital EL, causes, on the one hand, additional cyclical effects and, on the other hand,

11 Obviously, there are other risks not covered by ECL that can generate unexpected losses that would require a capital buffer (business risk, model risk, market risk, operational risk…).

12 Perhaps, a IFRS9 backtesting exercise would be a useful tool in order to determine the ECL forecast capacity. The higher the ECL forecast capacity, the lower the capital requirement.

increases, in average, capital requirements if we compare the previous provisioning model (incurred losses).

9 Some words about modelling and management challenges

In order to estimate different parameters needed for ECL or Capital EL calculation (principally conditional or unconditional PD's, LGD's) Financial Institutions face some common challenges. Most of them relate to historical data, mostly lack of historical data or historical data biased:

- The historical databases used to estimate PD's are composed of loans that have been approved by the Entity's risk policies (bias).
- A similar issue appears when estimating LGD's, all the defaulted loans have passed the Entity's workout process (bias).
- Risk policies are not static, they evolve in time, introducing additional bias. A historical change in risk policies can affect the validity of the database.
- Also regulation evolves, affecting risk parameters (for example bankruptcy laws, definition of default…)
- In summary: Risk parameters (PD's, LGD's, CCF's) are estimated based on historical information obtained from changing portfolios, policies, practices, rules, laws...

Previous issues also difficult models backtesting and, if that weren't enough, historical data is additionally affected by economic cycles making backtesting even more difficult.

A classic claim of supervisors is about the use of this credit models also for management purposes. Clearly, If a provisioning or a capital model is also used for management purposes, that adds an additional comfort layer to the supervisors.

There are different uses of these type of models for managements, among them:

- Loan approval: Are the PD's and LGD's used in order to decide loan approval?
- Loan pricing: Are expected losses took into account in order to decide the loan price (credit spread)?
- Workout strategies: Do workout strategies take into account expected LGD in order to define processes, priorities, workflows…?
- Capital planning: When deciding the capital ratio target, does the entity take into account portfolio's risk parameters?
- Stress test: How is stress test built? Is the stress test taking into account conditional expected losses in a consistent way and aligned with other conditional expected loss models like ECL?

All this questions are clearly relevant for both, supervisors and supervised entities.

However there are several practical problems for using this type of models in management.

As we have seen, capital models and provision models are different, so the first question is which one should we use?

On the other hand, and specially dealing with capital models, these models are subject to a very detailed set of conditions, including conservative (or prudential if you prefer) adjustments that makes difficult their use for managing purposes. Should Financial Entities use those "conservative" parameters defined by the supervisor for management? If the answer to this question is yes, how financial entities should adapt their management models in order to include those conservative parameters?

Finally, management practices can evolve very quickly, for example new scoring models based on big data analysis. However, capital models need the supervisor's prior approval.

What happens when the supervisor is deciding the approval of a model for capital purposes but, at the same time the entity is already using that model for loan approval/pricing?

Or even worse, what happens when the supervisor does not approve a model capital calculation but that model is used for management?

Can management models and supervisory models be different? How to align both worlds?

These are critical questions with no easy answers that already are generating frictions among supervisors and financial entities.

10 Conclusions

Recently accounting regulation about provisions have changed deeply replacing the "old" incurred loss model by a "new" expected credit loss (ECL model), however, at the same time, capital regulation[13] has basically remained unchanged.

This article shows some of the interactions between prudential and accounting regulations, bringing to light some inconsistencies derived from changing provisions rules but at the same time, maintaining the original capital requirement framework.

The ideas and examples presented in this article should question the impact of IFRS9 on capital requirements, at least in two lines:

a) The asymmetric characteristic of the capital requirement formula combined with the higher cyclicality over the capital EL implies that in average, capital requirements probably will increase.

b) The additional cyclicality of IFRS9 will also probably increases capital requirements procyclicality.

This article does not expect to demonstrate previous two points with no doubt; however, it offers some hints that could be useful for futures empirical papers.

One interesting line of future empirical research could be to analyze if under IFRS9 the unexpected losses have been reduced (when comparing with incurred losses framework). If it is true that ECL is a better predictor than the previous provisions mechanism, supervisors and regulators should conclude that a review of the capital requirement

13 Capital requirement formulas remain unchanged from the introduction of internal models.

framework is necessary in order to include this reduction in unexpected losses in the capital requirement calculation.

If, on the other hand, ECL happens to be worse as a predictor for real losses than the previous provisions methodology, accounting regulators should probably rethink the ECL concept.

What, from a theoretical point of view sounds strange, it is to maintain two models that seems to present inconsistencies between them. The capital model, assuming that the best prediction for credit losses is the unconditional expected loss and, the accounting model, that considers it is possible to better estimate credit losses based on conditional expectations.

Undoubtedly, the debate about the prociclicality of IFRS9 will continue, much focused on the direct effect of IFRS9 on P&L, but there is also an additional debate about how capital requirement rules should be affected by the new provisions paradigm.

REFERENCES

ABAD, J., and J. SUÁREZ (2017). *Assessing the cyclical implications of IFRS 9 – a recursive model,* Occasional Paper Series, No. 12, European Systemic Risk Board, July.

BARRIOS, P., and P. PAPP (2017). "FRS 9: A new model for expected loss provisions for credit risk", *SEFO - Spanish Economic and Financial Outlook,* Vol. 6, January.
http://www.sefofuncas.com/pdf/Barrios%206-1.pdf

BASEL COMMITTEE ON BANKING SUPERVISION (2005). "An Explanatory Note on the Basel II IRB Risk Weight Functions", July.

CAPITAL REQUIREMENTS REGULATION (EU) No. 575/2013.

COHEN, B. H., and G. A. EDWARDS, JR. (2017). "The new era of expected credit loss provisioning", *BIS Quarterly Review,* March.

DOMIKOWSKY, Ch., S. BORNEMANN, K. DÜLLMANN, Ph. GRÜBER and A. PFINGSTEN (2017). "Financial stability implications of IFRS 9", European Systemic Risk Board, July.

— (2017). *Expected Losses and Managerial Discretion as Drivers of Countercyclical Loan Loss Provisioning,* EBA Working Papers, December.
https://eba.europa.eu/documents/10180/1813140/Session+3+-+Expected+Losses+and+Managerial+Discretion+as+Drivers+of+Countercyclical+-+A.+Pfingsten+et+al.pdf.

— (2019). "Expected credit loss approaches in Europe and the United States: differences from a financial stability perspective", European Systemic Risk Board, January.
https://www.esrb.europa.eu/pub/pdf/reports/esrb.report190116_expectedcreditlossapproachesEuropeUS.en.pdf?f4060d0c09869c364ddfa328595c3f7a.

HUIZINGA, H., and L. LAEVEN (2018). "The Procyclicality of Banking: Evidence from the Euro Area", May.
https://www.tilburguniversity.edu/upload/e47d6b15-0108-4c2d-9c16-88fe8d77465d_Huizinga_Laeven_Procyclicalit%20def%2006062018.pdf.

PWC. "IFRS 9, Financial Instruments. Understanding the basics".

— (2017). "IFRS 9 and expected loss provisioning", Executive Summary, FSI Descriptive, December.

— (2017). "In depth IFRS 9 impairment: significant increase in credit risk", December.

SÁNCHEZ SERRANO, A. (2018). "Financial stability consequences of the expected credit loss model in IFRS 9". *Revista de Estabilidad Financiera,* n.º 34.