

Wahrenburg, Mark

**Working Paper**

## Provisioning policies for non-performing loans: How to best ensure a "clean balance sheet"?

SAFE White Paper, No. 51

**Provided in Cooperation with:**

Leibniz Institute for Financial Research SAFE

*Suggested Citation:* Wahrenburg, Mark (2017) : Provisioning policies for non-performing loans: How to best ensure a "clean balance sheet"?, SAFE White Paper, No. 51, ISBN 978-92-846-2015-9, Goethe University Frankfurt, SAFE - Sustainable Architecture for Finance in Europe, Frankfurt a. M., <https://doi.org/10.2861/750162>

This Version is available at:

<https://hdl.handle.net/10419/171930>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Provisioning policies for non-performing loans: How to best ensure a “clean balance sheet”?

---

Banking Union Scrutiny

External author:

Mark Wahrenburg  
*Goethe University  
Frankfurt am Main*



DIRECTORATE-GENERAL FOR INTERNAL POLICIES OF THE UNION  
ECONOMIC GOVERNANCE SUPPORT UNIT

## Provisioning policies for non-performing loans: How to best ensure a “clean balance sheet”?

---

### Abstract

The paper explains the accounting mechanics regarding loan loss provisions (LLP) and introduces the three most important models for loan loss provisioning: the incurred loss model (ILM), the expected credit loss model (ECL) and the counter-cyclical buffer model (CBM).

The paper investigates the preferred method to calculate loan loss provisions that from the viewpoint of financial accounting needs (information needs of financial statement readers) and prudential regulation (micro and macro prudential supervision). Based on economic reasoning the expected loss model is shown to be the preferred model for both purposes. The new IFRS 9 accounting standard is a mixture between the current incurred loss model and the expected credit risk model while the American standard setter FASB has introduced a pure version of the expected credit loss concept in the United States. The paper urges a convergence of IFRS 9 towards the FASB model.

The paper investigates the key differences between the LLP concepts as they are currently used and applied in accounting and prudential supervision. It argues that both financial accounting and banking supervision should be based on a harmonized concept for LLP calculation in the future.

The proposed transition rules of the EU commission should be adapted in order to prevent unwarranted increases of regulatory capital.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.



## **AUTHORS**

Mark WAHRENBURG

## **RESPONSIBLE ADMINISTRATOR**

Marcel MAGNUS

## **LINGUISTIC VERSIONS**

Original: EN

## **ABOUT THE EDITOR**

The Economic Governance Support Unit provides in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact Economic Governance Support Unit or to subscribe to its newsletter please write to:  
Economic Governance Support Unit  
European Parliament  
B-1047 Brussels  
E-mail: [egov@ep.europa.eu](mailto:egov@ep.europa.eu)

Manuscript completed in October 2017  
© European Union, 2017

Other studies are available at:  
<http://www.europarl.europa.eu/supporting-analyses>

## **DISCLAIMER**

The opinions expressed in this document are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.

## CONTENTS

<b>LIST OF TABLES</b>	<b>3</b>
<b>LIST OF ABBREVIATIONS</b>	<b>4</b>
<b>EXECUTIVE SUMMARY</b>	<b>5</b>
<b>1. INTRODUCTION</b>	<b>6</b>
<b>2. KEY STAKE HOLDERS AND THEIR INTERESTS</b>	<b>7</b>
2.1 Capital market investors	7
2.2 The banking industry	8
2.3 Bank supervisors	8
<b>3. LOAN ACCOUNTING CONCEPTS AND TERMINOLOGY</b>	<b>8</b>
<b>4. LOAN LOSS PROVISIONING MODELS - OVERVIEW</b>	<b>9</b>
4.1 The incurred loss model (ILM)	9
4.2 The expected credit loss model (ECL)	10
4.3 The countercyclical buffer model (CBM)	12
<b>5. ADVANTAGES AND DISADVANTAGES OF INTRODUCING THE ECL MODEL</b>	<b>13</b>
<b>6. WHAT LLP CONCEPT SHOULD BE USED FOR PRUDENTIAL REGULATION?</b>	<b>15</b>
<b>7. REGULATION OF CAPITAL ADEQUACY DURING THE TRANSITION PERIOD</b>	<b>17</b>
<b>8. CONCLUSIONS</b>	<b>18</b>
<b>REFERENCES</b>	<b>19</b>

## LIST OF TABLES

<b>Table 1:</b> Expected credit loss measurement under IFRS 9 (“IASB”) and FASB	<b>11</b>
---	-----------

## LIST OF ABBREVIATIONS

<b>BCBS</b>	Basel Committee on Banking Supervision
<b>CBM</b>	Counter-cyclical buffer model
<b>CET1</b>	Common Equity Tier-1
<b>ECL</b>	Expected credit losses
<b>FASB</b>	Financial Accounting Standards Board
<b>IAS</b>	International Accounting Standards
<b>IFRS</b>	International Financial Reporting Standards
<b>ILM</b>	Incurred loss model
<b>IRB</b>	Internal Ratings Based Approach (Basel Capital Adequacy Regulation)
<b>LLA</b>	Loan loss allowance
<b>LLP</b>	Loan loss provision
<b>SSM</b>	Single Supervisory Mechanism
<b>PD</b>	Probability of default
<b>LGD</b>	Loss given default
<b>SA</b>	Standardized Approach (Basel Capital Adequacy Regulation)

## EXECUTIVE SUMMARY

Banks have to cope with increasing loan loss provisions (LLPs) that simultaneously come from three different sources: a high number of borrower defaults due to the financial crisis, the introduction of new accounting standards (IFRS 9), and the increased scrutiny of banking supervisors. The ECB's Asset Quality Review caused many banks to increase their LLPs. Nonetheless, supervisors sometimes base their capital requirements on even higher “prudential LLPs” when they find accounting LLPs to be insufficient for prudential purposes

The paper explains the accounting mechanics regarding loan loss provisions (LLP) and introduces the three most important models for loan loss provisioning: the incurred loss model (ILM), the expected credit loss model (ECL) and the counter-cyclical buffer model (CBM).

The paper investigates the preferred method to calculate loan loss provisions that addresses both the information needs of financial statement readers and the needs of banking supervisors. Based on economic arguments, ECM is found to be the preferred model for both financial accounting and prudential purposes. The new IFRS 9 accounting standard is a mixture of the ILM and the ECL model while the American standard setter FASB has introduced a pure ECL concept in the United States. The paper urges a convergence of IFRS 9 towards the FASB model.

The paper investigates the key differences between the LLP concepts used in accounting and banking supervision. It argues that both financial accounting and banking supervision should be based on a harmonized concept for LLP calculation.

The EU commission proposes transitory regulation in order to smooth the negative one-time effect on regulatory equity from the introduction of IFRS 9 by spreading the effect over multiple years. The corresponding rules proposed by the EU commission are ill designed and have to the unintended consequence that regulatory equity in some circumstances may rise. The commission should change the transition rules in order to prevent such unwarranted effects.

Bank supervisors play an important role for the financial accounting of banks by supporting a homogenous and effective enforcement of accounting rules. This increases comparability of financial statements across banks, increases their information content and ultimately supports the regulatory goal of establishing market discipline.

## 1. INTRODUCTION

Accounting rules require banks to build loan loss provisions (LLP) for incurred and/or future expected credit losses. An increase in loan loss provisions reduces the bank's earning and reduces the amount of available book equity. As a consequence of the financial crisis, banks currently suffer from historically high levels of borrower defaults and corresponding high LLPs. Nonetheless, two events force banks to increase the level of LLPs still higher:

1. The financial crisis led politicians and regulators to pressure for a reform of accounting standards from the pre-crisis incurred loss model (IAS 39) towards an expected cash flow model (IFRS 9).<sup>1</sup> This regime shift will lead to a one time increase of loan loss provisions, causing a reduction of available equity for banks. Further, banks fear that the regime shift will make future provisions more volatile and forces them to hold more equity in order to cope with these fluctuations.
2. With the start of the single supervisory mechanism SSM the ECB investigated the loan loss provisioning practices of banks within its "Asset Quality Review" and found many differences in the application of accounting rules regarding impaired assets across countries. Allegedly, the AQR and related supervisory activities by ECB and EBA caused banks to change their financial accounting policies and increase their LLP levels.

As a result, various issues are currently debated:

- What is the proper role of bank supervisors in financial accounting for LLPs?  
Historically, accounting used to be outside the scope of bank supervision and was a matter of accounting standard setters and the accounting industry only. A strong role of supervisors in financial accounting may have a positive effect on the quality of accounting information by harmonizing accounting practices. It may also have negative side effects when supervisors shape accounting rules towards their own needs at the cost of the needs of other users of financial accounting information.
- What is the appropriate supervisory reaction when supervisors find that financial accounting LLPs are insufficient from a prudential perspective?

In principle, two approaches are possible: (1) supervisors might mandate banks to change the accounting figures and increase LLPs in their financial statement. (2) Supervisors may leave accounting figures unaffected but ask banks to adjust their capital adequacy calculation in order to reflect the higher "prudential LLPs". In particular, banks are asked to use higher "prudential LLPs" instead of "accounting LLPs" in the calculation of available regulatory equity ("own funds"). Both approaches ensure the objective of prudential capital regulation: banks are forced to hold sufficient equity capital. Both approaches differ greatly in terms of public disclosure: In the first approach, banks are forced to disclose different (worse) accounting figures. In the second approach, the LLP adjustments are made "behind the scenes" and are not visible to the reader of financial statements.

While approach (2) is common practice and its legal foundation is undisputed, the extent to which approach (1) is applied and the extent to which it is backed by law is currently disputed. The increasingly stringent supervisory guidance on loan loss provisioning by ECB and EBA seems to cause a gradual shift from the established approach (2) towards approach (1). The precise extent to which supervisors indeed affect disclosed accounting figures however is unknown.

---

<sup>1</sup> See Gaston and Song (2014), p. 4.



The current legal foundation of approach (1) (a direct role for supervisors in financial accounting) is at least doubtful. The EU Commission argues that „existing [supervisory] powers include the possibility for the competent authority to influence a bank's provisioning level within the limits of the applicable accounting framework and to apply the necessary adjustments (deductions and similar treatments) in case, for example, accounting provisioning is not sufficient from a supervisory perspective.”<sup>2</sup> In the footnote, the EU commission refers to Article 16(2)(d) of the SSM Regulation<sup>3</sup>, which among other things allows supervisors ‘to require institutions to apply a specific provisioning policy or treatment of assets in terms of own funds requirements’. In the view of the author, the interpretation by the EU Commission is likely to be a misinterpretation of Article 16(2)(d). The wording “provisioning policy...**in terms of own funds requirements**” in the view of the author clearly refers to approach (2): supervisors have the power to mandate the use of “prudential LLP” instead of “accounting LLPs” in the calculation of regulatory equity capital (“own funds”). Because approach (2) is sufficient to establish the desired prudential requirements, it is doubtful whether a more extensive direct role of supervisors in financial accounting (approach (1)) is covered by Article 16(2)(d). It may be argued that supervisors do not need a direct impact on financial accounting figures because approach (2) suffices to establish the desired level of own funds from Article 16(2)(d).<sup>4</sup>

- What is the preferred method to calculate loan loss provisions that addresses both the information needs of financial statement readers and the needs of banking supervisors?
- When and how quickly should changes be implemented?

European banks are still struggling with the aftermath of the financial crisis and European Sovereign debt crisis. Many banks urge for a postponement of changes until they are in an economically stronger position to cope with these changes.

## 2. KEY STAKE HOLDERS AND THEIR INTERESTS

### 2.1 Capital market investors

LLPs are part of financial accounting. The main objective of financial accounting is to disclose meaningful information that helps capital market investors, shareholders and other stakeholders to value their investment in a financial institution. A large part of the current banking reforms are built around the concept that investors exercise capital market discipline by driving up the costs of doing business for weak banks. The successful implementation of this concept requires well informed capital market investors.

Surveys among investors show a clear picture regarding their preferences.<sup>5</sup> Investors want banks to build provisions that in a forward looking and unbiased way reflect expected future loan losses. Investors also want rules that either leave little discretion for management or that are well enforced to obtain a maximum degree of comparability across banks. Particularly since the financial crisis investors are on the one hand cognizant of a large degree of discretion by bank managers to window dress accounting statements and on the other hand sceptical about the accounting

---

<sup>2</sup> EU Commission (2017), p. 13 f.

<sup>3</sup> Identical to Article 104(1)(d) of the CRD.

<sup>4</sup> In the view of the author, the need for a direct involvement of supervisors in financial accounting should be based on the regulatory requirement to establish capital market discipline, which in turn requires well informed capital market investors.

<sup>5</sup> See CFA (2013).

profession's ability to serve as a credible mechanism to ensure unbiased figures. For this reason, investors are likely to welcome banking supervisors' efforts to implement consistent LLP rules and practices in the banking industry.

## 2.2 The banking industry

Bank managers usually prefer to disclose stable earnings as any bad surprise may threaten the bank due to the fragility of bank's businesses. At least in crisis times, when bank equity is scarce, they naturally prefer to establish LLPs that are as low as possible to boost profitability and available equity. If permitted by accounting rules, bank managers make use of the discretion regarding the accounting of LLPs as it allows them to use LLPs to smoothen earnings over time by reducing earnings in good times and increasing earnings in bad times. This behaviour has detrimental effects on risk-taking.<sup>6</sup>

## 2.3 Bank supervisors

Bank supervisors are concerned with potential creditor and taxpayer losses if a bank should fail and need to be resolved. In a resolution, bank assets may need to be sold at distressed market prices. In order to prevent potential losses, supervisors want banks to build high LLPs (or equivalently low asset valuations on the balance sheet). Bank supervisors also care about the impact of financial crises on the macro-economy. They therefore prefer banks to have strong balance sheets in good times (high LLP and strong equity position). In a severe banking crisis, they aim to prevent a credit crunch and stimulate banks to continue lending. They can do so by allowing banks to reduce their LLPs and as a result improve their regulatory capital ratio.

## 3. LOAN ACCOUNTING CONCEPTS AND TERMINOLOGY

Before discussing different LLP models, some basic terminology needs to be explained.<sup>7</sup> When a bank makes a loan of 100 € to a borrower the loan enters the bank's balance sheet as an asset. The value on the balance sheet is called "*book value*" or "*carrying value*". Under current IAS 39 accounting rules, the initial carrying value is simply the loans's notional value (in this case 100 €).

Depending on the specific accounting rules, the carrying value may need to be reduced when the loan has defaulted, when the loan has deteriorated in credit quality, or when the bank expects the loan to produce credit losses in the future. This reduction will affect both the balance sheet and the bank's income statement. The reduction of the carrying value on the balance sheet is called "*loan loss allowance*" or "*impairment*". The corresponding entry in the income statement is called "*loan loss provision*". Loan loss provisions are thus equivalent to the (annual) change in the carrying value of loans on the balance sheet.<sup>8</sup>

Should the bank determine that no further cash flows are likely to be received from an impaired loan, the bank "*writes-off*" or "*charges-off*" the loan with the result of a carrying value of zero. The change in value is to be reported in the income statement as a loan loss provision.<sup>9</sup> Write-offs can thus be thought of as a special case of LLPs (when carrying value is written down to zero).

---

<sup>6</sup> Bushman, Williams (2012).

<sup>7</sup> In order to simplify matters, the paper disregards the specific issue of "general loan loss provisions" and also the details of implementing provisions for portfolios of non-significant exposures (portfolio loan loss provisions).

<sup>8</sup> LLPs are annual changes. One particular loan may result in different LLPs that are made in different years over the lifetime of the loan. The carrying value (and thus the LLA) then reflect the cumulative effect of the different LLPs.

<sup>9</sup> The position in the income statement may have other names such as write-downs or valuation allowances.

In a nutshell, loan loss provisions reflect losses from realized and/or expected future loan defaults which are reported in the bank’s annual income statement. On the balance sheet, the LLPs cause a decline of the carrying value of the loans and (due to balance sheet identity) a corresponding decline of the bank’s equity.

A shift to more conservative (higher) loan loss provisioning has different short term and long term effects on the bank’s financial statement: In the short run, higher LLPs negatively affect the bank’s reported income and at the same time reduces asset and equity value on the balance sheet. In the case of a default, the conservative LLP policy leads to lower reported losses at the time of default because the loans’ carrying value was already reduced earlier. A conservative LLP policy thus contributes to the survival of banks in a recession when many loans default. Once the loan is repaid in full and does not default, the loan loss allowance is dissolved and the bank reports a corresponding higher income.

## 4. LOAN LOSS PROVISIONING MODELS - OVERVIEW

There exist three main models for loan loss provisioning: the incurred loss model (ILM), the expected credit loss model (ECL) and the countercyclical buffer model (CBM).<sup>10</sup> Financial accounting rules prescribe what model a bank must apply. The implementation is monitored and enforced by external auditors and in the case of the banking industry also by banking supervisors. Currently, large European banks (with securities traded on organized markets) must apply IAS 39 which is basically identical to the ILM. Small banks apply national accounting rules which differ from country to country and are outside the scope of this paper. In the future, banks will need to introduce the ECL model. European banks will have to apply the IFRS 9 variant of the model while US banks will have to apply a substantially different ECL model version as stipulated by the FASB.

### 4.1 The incurred loss model (ILM)

The current accounting rules for large banks (IAS 39) stipulate that banks have to use the ILM. IAS 39 distinguishes two cases: non impaired loans and impaired loans. As long as there is no evidence for an impairment, the carrying value of a loan is identical to the notional value and no LLP is made. The carrying value remains unchanged until there is a credit event, i.e. a piece of evidence indicating that the loan is unlikely to be repaid in full. Typical credit events are the initiation of bankruptcy proceedings or payments by the customer which are more than 90 days overdue. After the credit event, the loan is considered to be “impaired” and the bank needs to estimate the economic value of the impaired loan. The carrying value is reduced to the economic value and an equivalent LLP is entered in the income statement. Different methods may be used to derive economic value, such as:

- a) the present value of expected future loan cash flows, or
- b) the loan's observable market price (if a secondary market exists), or
- c) the fair value of the collateral if the loan is secured by collateral.

Proponents of this approach consider the incurred loss model superior because it is least affected by managerial discretion and therefore provides reliable and comparable information to investors.<sup>11</sup>

---

<sup>10</sup> Wall and Koch (2000).

<sup>11</sup> Hooogervorst (2014), Gaston and Song (2014).

Critics argue that the ILM produces LLPs that are “too low – too late”.<sup>12</sup> They argue that the model results in exaggerated asset values and overly optimistic earnings in times when the creditworthiness of borrowers has deteriorated but only few defaults have yet occurred. If many borrowers experience a significant deterioration of their creditworthiness, the deteriorated economic situation is not reflected on the balance sheet or the income statement because LLPs are built only after credit events already have materialized - and not earlier when a deteriorated economic environment already signals upcoming problems. Since the ILM does not make any use of forward-looking judgemental factors it does not lead to a build-up of provisions early in the credit cycle which may later help the bank to survive defaults in the later stages of a credit cycle.<sup>13</sup>

The fact that the market value of bank equity is often below the book value of equity is at least partly due to the fact that current accounting rules cause book values of loans to exceed their economic value in cases where these loans have deteriorated in quality but do not qualify as impaired under accounting rules.

#### **4.2 The expected credit loss model (ECL)**

Most economists and bank regulators favour the expected loss model. According to this model, the carrying value of loans on the balance sheet should at any point of time reflect the amount of credit losses that are to be expected over the lifetime of the loans. The estimate of expected losses should reflect an entity’s unbiased assessment of current conditions and reasonable and supportable forecasts about the future. For example, if a bank extends a loan of 100 € and (at loan initiation) expects that there is only a 90% probability that the loan will be repaid, the carrying value would be reduced to 90 € by immediately building an appropriate loan loss reserves (and allowances). From year to year, the creditworthiness may change and thus the carrying value of the loan and the LLP may change accordingly.

The ECL is closely related to fair value accounting. The value of loans can generally change as a result of two things: changes in the creditworthiness of the borrower (= expected credit losses) and changes in the level of interest rates since they are used as to value a loan based on the discounted expected cash flows from the loan. Fair value accounting reflects value changes from both effects in the balance sheet, but the ECL reflects only changes due to changes in creditworthiness. When banks hedge interest rate risk, the interest rate effect becomes very small and both models effectively coincide. For this reason, many experts consider the expected loss model to be closely related to fair value accounting.

Comparing the ILM and the ECL, we recognize that impaired loans are treated identically under both models. The difference stems from the treatment of performing (not impaired) loans: A deterioration of creditworthiness of borrowers becomes visible under the expected loss model and result in reduced earnings and increased loan loss provisions. No such effect happens under the incurred loss model.

The expected credit loss model will replace the current incurred loss model and will become effective from 2018 on. It is mainly the result of pressure from governments and regulators who requested financial accounting standard setters to change the provisioning rules. Although an internationally common implementation was initially sought, the United States standard setters and their European counterparts could not agree and as a result the future LLP implementation will differ between Europe and the United States:

---

<sup>12</sup> For example Cohen and Edwards (2017).

<sup>13</sup> See for example Dougan (2009).

**European (IFRS 9) variant of the ECL model.**

IFRS 9 implements a reduced form version of the ECL model. The rules prescribe a differential treatment for three stages of a loan:

- Stage 1 loans: When a new loan is granted, banks have to take an initial provision charge. This charge equals the expected loss of the loan over the following 12 months. It is calculated as the probability of default (PD) of the loan in the next 12 months multiplied by how much the bank stands to lose in the case of a default (the loss given default, or LGD). The charge is updated at every reporting date.<sup>14</sup>
- Stage 2 loans: If and only if a loan experiences a “significant deterioration” of credit quality, the carrying value of the loan is reduced to its economic value which reflects its updated probability of default and its expected losses over the remaining life of the loan. Banks need to book an appropriate LLP that reflects the new valuation.
- Stage 3 loans: Defaulted loans (typically with payments that are more than 90 days past due date) are categorised as stage 3. The valuation concept is similar to stage 2 loans with the difference that the probability of default no longer plays a role because default has occurred. The IFRS 9 framework for these loans is similar to the current IAS 39 framework.

**FASB (US) version of the ECL model and its differences to IFRS 9:**

The US has chosen to implement the ECL model in its pure form. At every reporting date, the allowance for expected credit losses reflects management’s estimate of all credit losses to be expected over the complete remaining lifetime of the loan. This implies that banks build a reserve equal to the expected lifetime credit losses both at initiation of the loan and at every reporting day during the lifetime of the loan.

The Basel Committee for Banking Supervision (BCBS) summarizes the most important differences between both approaches in the following table:

**Table 1:** Expected credit loss measurement under IFRS 9 (“IASB”) and FASB

	Performing assets	Underperforming assets (assets with a significant increase in credit risk)	Impaired assets
IASB	<b>“Stage 1” 12 months ECL</b>	<b>“Stage 2” Lifetime ECL</b>	<b>“Stage 3” Lifetime ECL</b>
FASB	<b>Lifetime ECL</b>		

Source: BCBS (2016a)

Compared to the IFRS 9 implementation, two major differences reduce the LLPs of European banks reporting IFRS 9 as compared to their US counterparts:

- At loan initiation the LLP under IFRS 9 reflects only losses over 12 month as compared to lifetime expected losses under FASB.

<sup>14</sup> EBA requires banks to update this estimate even when no significant deterioration took place, see EBA (2016), p 37.

- IFRS 9 banks do not build additional LLP unless there is a significant deterioration of creditworthiness. US banks must recognize a LLP for all changes in credit worthiness and not only for significant ones.

The IFRS 9 framework can be seen as a compromise between the current IAS 39 regulation and the full ECL model as implemented by FASB. The big question is: Is IFRS 9 a substantial step towards the ECL model and is thus close to FASB model? The answer depends on how many loans in a bank's book are "significantly deteriorated" and thus hinges on the meaning and definition of this term. Unfortunately, regulators and supervisors provide little guidance regarding the precise meaning of "significantly deteriorated".<sup>15</sup> For example, the recent ECB guidelines on non-performing loans state: "For the purpose of assessing the significance of an increase in credit risk, banks should have a clear policy including well-developed criteria...."<sup>16</sup>.

The FASB reckons that IFRS 9 is no significant departure from IAS 39 and in particular suspects that the "significant deterioration" trigger under IFRS 9 may not differ materially from the incurred loss recognition trigger under IAS 39.<sup>17</sup>

As a counter-argument, one may hint to the IFRS 9 impact studies that estimate the effect of introducing IFRS 9. Earlier studies warned of a large increase of LLPs as a result of IFRS 9. Recently, these estimates have been strongly reduced.<sup>18</sup> One should be very cautious with these estimates as they are likely to be affected by the interests of the reporting banks. The experience from earlier similar impact studies indicates that these studies may be heavily biased.<sup>19</sup> Summing up, there are good reasons to believe that loan loss provisioning practices in Europe will lag significantly behind US practices even after the introduction of IFRS 9.

### 4.3 The countercyclical buffer model (CBM)

The countercyclical buffer model of loan loss accounting views loan loss provisions as a buffer or "reserve" that is built up in good times in order to absorb credit related losses during bad times. In good times, high LLPs reduce asset values and thus book equity. According to the CBM model, the LLPs may then be diminished in a recession and help the bank to compensate the losses from writing-off defaulted loans. Bank managers prefer this model because it helps smoothing earnings by reducing profitability in good years and increasing earnings in bad years. Before the introduction of the current accounting regime IAS 39, banks enjoyed much more discretion to build and/or reduce LLPs and used this discretion for smoothing earnings.

By decreasing (book) equity in good times, the CBM incentivizes banks to reduce lending in good times (compared to the current ILM). In bad times, the reverse is true. CBM proponents argue that the model thus helps to smoothen the business cycle by curbing "excessive" lending in the boom and stimulating lending in the bust period.<sup>20</sup> The CBM for this reason should be considered as an

---

<sup>15</sup> Chawla et al (2016).

<sup>16</sup> EBA gives no additional guidance by requiring banks to "provide an explanation of significant changes to the estimation of ECL from period to period". EBA (2016).

<sup>17</sup> FASB (2013).

<sup>18</sup> A recent survey by EY found effects on the tier-1 capital ratio between zero and 25 basis points. An earlier EBA survey expected an average of 45 basis points. See EBA (2017) and EY (2017).

<sup>19</sup> As an example, the impact studies of the introduction of internal risk models are well known to have generally underestimated the benefits of these models for banks.

<sup>20</sup> Supporting evidence for the dampening role in good times has been found by Jayaman et al. (2017), Amel-Zahed (2017), Jimenez et al. (2012) and Lopez et al. (2014).

instrument for macro-prudential banking regulation as compared to traditional micro-prudential supervision.

When we compare the ECL model and the CBM, both seem very similar at first sight: as both force banks to increase provisions (“build up reserves”) in good years. For this reason, both models are sometimes used interchangeably, stating that the ECL model is considered to introduce a kind of countercyclical buffer into banks’ balance sheets. But both models may diverge strongly in bad years: In an economic crisis situation, many borrowers tend to deteriorate in credit worthiness and are considered to be “significantly deteriorated” according to the IFRS 9 rules. The ECL (the IFRS 9) model then forces banks to increase LLPs even further. In stark contrast, the CBM will reduce LLPs and help banks to reduce losses from defaulting loans. Proponents of the ECL model argue that the ECL model is reducing pro-cyclicality of lending.<sup>21</sup> We do not believe that this argument is convincing. Although higher LLPs in good times result in lower profitability and may dampen “excessive” lending during boom times, the reverse is not necessarily true for bad times. In a severe recession, high LLP requirements from deteriorated loans are likely to reduce lending capacity instead of the intended stimulation of new lending. The ECL model is therefore likely to aggravate pro-cyclicality<sup>22</sup> instead of dampening it. In our view, only the CBM has the potential to smoothen the business cycle because it allows banks to decrease the stock of reserves in bad times.

Moreover, the CBM has stronger capability to act anti-cyclical and restrict lending in boom times. When the economy is performing very strongly, both banks and bank supervisors may be overly optimistic about the future and the ECL model is likely to produce only modest LLPs.<sup>23</sup> History suggests that crises come surprising - not only for banks but also for banking supervisors. If one truly believes that there is excessive lending in boom times, the ECL model may not be sufficient to restrict loan growth and the CBM may be better suited to smoothen business cycles.<sup>24</sup>

## 5. ADVANTAGES AND DISADVANTAGES OF INTRODUCING THE ECL MODEL

Compared to the current ILM, the ECL model has a number of advantages:

- Better information of investors.  
The main purpose of accounting is to provide relevant information to investors and other stakeholders. Surveys among capital market investors show a strong preference of investors for the ECL because it reflects the true economic value of assets better and provides superior information for the valuation of financial securities.<sup>25</sup> The ECL model provides more relevant information because it is more forward looking and has better predictive ability for future credit losses.<sup>26</sup>
- Consistency of accounting requirements with prudential requirements.  
The Basel capital adequacy regulation aims at preventing losses to debtholders when banks fail and need to be resolved. In a bank resolution, the bank’s assets are sold at market prices.

---

<sup>21</sup> For example Dugan (2009).

<sup>22</sup> Barclays (2017) makes a similar argument by noting that the “recency bias” is likely to result in provisions that are too low in good times and too high in bad times.

<sup>23</sup> Hoogervorst (2014).

<sup>24</sup> See Barclays 2017.

<sup>25</sup> See CFA (2013).

<sup>26</sup> See Gebhard and Novotny-Farkas (2017).

Capital adequacy regulation shall ensure that there is sufficient equity such that there is only a very small probability that the assets value drops more than the bank's equity capital (its loss absorption capacity). Since market values of assets matter in the case of resolution, the market value of assets lies at the heart of the Basel models to quantify capital requirements of banks. Since bank regulation is based to a large extent on accounting figures, prudential regulation has a natural preference for accounting concepts that are close to market values or economic values. Among the three LLP models discussed, the ECL model is the model that is most consistent with the prudential perspective. As explained above, IFRS 9 should be regarded as an intermediate step between the current incurred loss model and the fully implemented ECL model. Banking regulators have a natural interest in closing the gap and moving IFRS 9 closer to the FASB approach. In order to reduce complexity and operating costs, the same LLP model should be used for accounting purposes and for prudential purposes. The fact that investors and supervisors prefer the ECL approach is a strong argument in favour of the ECL model.

- Early building up of "reserves".  
Compared to the current incurred loss approach, ECL leads to an earlier recognition of LLPs and thus is superior from prudential point of view as the effect of loan defaults on the solvency of banks is alleviated.

Critics of the expected loss model point out various disadvantages:

- Negative effects on lending volume.  
The introduction of the ECL model increases equity requirements for banks at a time when many other reforms like Basel III already put a lot of pressure on bank's equity capitalization. When banks find it difficult to raise new equity they will likely restrict lending as a consequence.
- Increased operational costs.  
The calculation of expected credit losses under IFRS 9 requires substantial efforts and increases operational costs both in the implementation phase and afterwards.
- High volatility of earnings.  
The ECL model allegedly leads to a higher volatility of reported earnings and in turn to higher equity buffers to cope with this volatility. The effect of ECL on earnings volatility is unclear. Volatility may go up or down and there has not yet emerged a consensus on which is the dominating effect.<sup>27</sup> The volatility may go up because migrations in the credit worthiness of loan customers introduce a new and volatile component to earnings. The volatility may also go down because ECL (compared to ILM) tend to reduce earnings in good years (higher LLP) and increase earnings in bad years (lower losses from defaulted loans).
- Cliff effect from "significantly deteriorated loans".  
When the credit quality of loans deteriorates, the effect on LLPs is small as long as the loans stays in stage 1. When they deteriorate further and migrate to stage 2 a large loss may result because LLPs now jump to lifetime expected losses.<sup>28</sup> This "cliff effect" may further increase earnings volatility, cause negative earnings shocks in a recession and add to pro-cyclicality.

<sup>27</sup> An academic simulation study by Gruenberger (2015) found slightly increased earnings volatility.

<sup>28</sup> Barclays (2017).



- Pro-cyclicality.  
The ECL may reinforce pro-cyclicality if it causes a further decline of bank lending in recessions. As argued above, we expect that LLP increase substantially in a recession as a result of many “significantly deteriorated” loans and increased expected credit losses for all non-impaired loans.
- Reduced information content of financial reports because of managerial discretion.  
Investors and other users of financial accounting information prefer a consistent implementation of accounting rules across banks and a low level of managerial discretion in order to enhance comparability of financial statement across different banks. The ECL approach incorporates expectations about the future and naturally tends to leave more room for interpretation and managerial discretion. In the absence of strong enforcement, managers may prefer to misuse this discretion in order to pursue other goals rather than disclose the true and unbiased value of expected future credit losses. The efforts of banking supervisors to strengthen and harmonize accounting enforcement tend to decrease discretion and are generally welcomed by investors. However, a major concern of investors regarding IFRS 9 is the absence of a clear definition of “significantly deteriorated” loans and this ambiguity may cause substantial heterogeneity across banks. Supervisors did not yet issue further guidance on this important issue and thus concerns remain that IFRS 9 may reduce the comparability of bank financial statements.<sup>29</sup>

## 6. WHAT LLP CONCEPT SHOULD BE USED FOR PRUDENTIAL REGULATION?

We argued in the preceding chapter that the ECL model is consistent with both accounting and prudential requirements. When ECL is fully implemented and effectively enforced, the book value of loans is close to their economic value and close to the value which might be realized in a resolution if the bank should fail. This is precisely the definition of equity that prudential regulation should use. Thus, under the ECL model, regulatory equity and book equity coincide and greatly simplify the complex situation that prevails today. The following section explains in more detail the current situation and how the ECL model would fit into.

As explained above, IFRS 9 introduces only a “light version” of the ECL model and in particular uses the concept of “12 month EL” instead of lifetime EL for calculating the LLPs of stage 1 loans. Banks that apply the internal rating based model also have to calculate “regulatory expected losses” over 12 months for the derivation of regulatory capital.<sup>30</sup> Since both concepts basically coincide, banks should be able to use the same calculation method for both purposes. Detail differences between the two EL calculation methods may force banks to maintain two different estimation models and bear the associated extra burden.<sup>31</sup> The most important differences between the two EL estimations techniques are 1) the default definition (the circumstances that constitutes a default) and 2) different PD concepts (through-the-cycle PD for capital adequacy regulation versus point-in-time PD for accounting purposes).<sup>32</sup> Both differences do not constitute valid arguments to maintain different

---

<sup>29</sup> See chapter 4.2.

<sup>30</sup> Deloitte (2016), Novotny-Farkas (2015), Gaston and Song (2014).

<sup>31</sup> Novotny-Farkas (2015).

<sup>32</sup> Details are explored in Novotny-Farkas (2015).

calculations in the future. Banks should thus be allowed to use one uniform calculation for both purposes. The reasons are: First, the differences in the definition of default affects only the input numbers but not the outcome. EL is the product of PD and LGD. Different definitions of default affect both PD and LGD but leave unaffected the resulting EL. Differences in the definition of default are thus not a valid reason to force banks to maintain two estimation systems. We additionally expect that the (yet evolving) IFRS 9 definition of default will soon converge to the (established) Basel definition used for prudential purposes and let fade away any substantial differences. Second, there is no theoretical argument that accounting and prudential regulation should use different PD concepts (through-the-cycle versus point-in-time). Prudential regulation initially started with the concept of point-in-time PDs out of economic arguments, then decided to allow both concepts and only later switched to through-the-cycle PDs in order to reduce volatility in the capital adequacy numbers and in order establish comparability across banks. Exactly the same reasons that lead regulators to shift from point-in-time PD toward through-the-cycle PDs are also valid for financial accounting. It is likely that accounting will also switch in the future from point-in-time to through-the-cycle PD estimation because the resulting LLPs have less volatility and are preferred by some for exactly the same reasons that were valid for prudential regulation. Summing up, there are good reasons for and against both PD concepts but there is no convincing argument why accounting and prudential regulation should use two different systems and thus cause unwarranted complexity.<sup>33,34</sup>

Current prudential regulation distinguishes banks that use the internal ratings based approach (IRB-banks) and banks that use the standardized approach (SA-banks). For IRB-banks, accounting LLPs are effectively replaced by prudential LLPs in the derivation of regulatory capital.<sup>35</sup> Prudential LLPs are defined as 12 month expected loss (EL) and are calculated from internal rating models. After the introduction of IFRS 9, this “replacement” is no longer needed since prudential and accounting LLPs coincide. Prudential regulation thus becomes less complex and can be directly based on accounting equity.<sup>36</sup> SA-banks which use the standardized approach are currently allowed to use the specific LLPs instead of prudential LLPs because forcing them to calculate 12 month expected loss for capital adequacy would imply an unduly high burden. In the future, at least a fraction of these banks (those banks that apply IFRS 9) will need to calculate 12 month expected losses for accounting reasons. These banks should clearly be treated in the same way as IRB-banks because there is no longer a reason for the special treatment.

### **The treatment of general provisions**

Current prudential rules stipulate SA-banks to differently treat specific LLPs and general LLPs. As explained above, specific LLPs are treated like liabilities and deplete equity. General LLPs are treated like reserves and count as equity capital. This leads to the question whether future IFRS 9 LLPs should be treated as liabilities or as reserves. Banks lobby for a treating at least a part of IFRS 9 LLPs as a

---

<sup>33</sup> It should be noted that IRB banks have little extra effort to calculate EL under both concepts. Operational costs to produce both figures are only marginally higher compared to producing figures for one PD concept only.

<sup>34</sup> A related similar argument can be made for another difference between IFRS 9 PDs and prudential PDs that is not explicitly discussed here: IFRS 9 PDs shall be probability weighted and be based on different macroeconomic scenarios while prudential PDs are not. There are good arguments for both approaches but there does not exist a good argument why different approaches should be used for accounting and prudential supervision.

<sup>35</sup> The implementation details are a bit more complex. Depending on whether prudential provisions are larger or smaller than accounting provisions, the allocation of equity between Tier-1 and Tier-2 equity is affected. See BCBS “Regulatory treatment of accounting provisions” (2016a).

<sup>36</sup> The prudential treatment of banks that use national accounting standards only is outside the scope of this paper. The solution should obviously not deviate strongly from the treatment of IFRS 9 banks.

reserve. The typical line of argument is: “Reserves are a buffer for future losses and IFRS 9 LLPs are forward looking provisions that serve to absorb future losses”. While this argument seems reasonable at first sight, it is inconsistent with the economic principles of prudential regulation and must be dismissed. As argued in the last chapter, regulatory equity should reflect the (current) economic value of assets. LLPs from the ECL model bridge the gap between notional loan value and economic value and thus make sure that the carrying value of loans matches economic value. Provisions should be treated as reserves only if they result in carrying values below economic value. This is not the case for LLPs in the ECL model. Only if future regulation should move towards the counter-cyclical buffer model CBM and if regulators enforce LLPs that are larger than expected losses, the excess of CBM-LLPs over expected losses would constitute a reserve and should be treated in the same way than general provisions for SA-banks today.

## 7. REGULATION OF CAPITAL ADEQUACY DURING THE TRANSITION PERIOD

The introduction of IFRS 9 leads to a reduction of a bank’s book equity. Since book equity is the starting point of capital adequacy calculations, it will also have a detrimental effect on the available regulatory capital. This effect is intended and fully in line with the philosophy of prudential capital regulation. The Basel capital adequacy model is based on the core idea that equity capital serves to cover unexpected credit losses (and does not cover expected credit losses) – as a consequence, expected credit losses need to be provisioned for and thus should decrease the amount of available equity.<sup>37</sup>

Because the introduction of IFRS 9 may have a significant one-time effect on CET1 capital, the EU commission plans to prevent a negative shock on capital and to smoothen the effects of IFRS 9 by spreading the consequences over a period of 5 years.<sup>38</sup> EBA welcomes the general idea but points to certain shortcomings in the specific approach as proposed by the EU Commission. EBA argues that the approach is more complex than necessary and (more importantly) that it in some cases has consequences that are opposite to the intended effects: Instead of dampening the (negative) effect of IFRS 9 on Core Tier-1 capital, the proposed adjustment indeed allows some banks to improve (!) their regulatory capital. This is clearly not an intended consequence<sup>39</sup>, violating the principles of Basel regulations and must be prevented. Transitional arrangements intend to spread the detrimental effects of a new regulation over a certain number of years and obviously should not lead to a situation where the opposite of the intended effect is the result.

EBA proposes an easy and straightforward way to fix the problem. This solution is in line with the original proposals by the BCBS:<sup>40</sup> banks calculate the one-time effect of introducing IFRS 9 on CET1 capital and are allowed during the transition period stipulated 0% of this effect becomes effective in year 1, 20% in year 2 and so on until the effect is fully recognized after 5 years.<sup>41</sup> The unintended effect of the current proposal is thus easy to prevent.

---

<sup>37</sup> Theory would recommend to deduct LLP for all expected lifetime credit losses, i.e. advocates the FASB model. By incorporating only a part of expected credit losses, IFRS 9 lags behind this objective.

<sup>38</sup> EU Commission (2016), Article 473a.

<sup>39</sup> The intention is to prevent a (negative) shock on Tier-1 capital, see BCBS (2016b).

<sup>40</sup> BCBS (2016b).

<sup>41</sup> The proposal of the EU Commission seems to intend that only a part of the IFRS 9 introduction effects are “neutralized”: the introduction of the 12 months expected loss provision for stage 1 loan. No neutralization for the effect of introducing the new category “significantly deteriorated loans” is part of the proposal. It remains

## 8. CONCLUSIONS

Weighting advantages and disadvantages of the ECL model, most economists including the author tend to prefer the ECL model over the ILM. In the end, this is based on the belief that the model provides the most relevant information to investors, if implemented with rigor and consistency. If one accepts the superiority of the ECL approach, no tension between accounting provisions and prudential provisions prevails and one may hope that a strengthened prudential supervision may further increase the information content and thus the advantages of using the ECL approach.

As explained above, most economists consider the FASB version as the only true ECL model. The IFRS 9 version suffers from various shortcomings as discussed above and should over time converge closer towards the FASB version of the ECL model.

One major drawback of the ECL model is its potential contribution to pro-cyclicality. Although some experts hope that the ECL model helps to alleviate cyclicality as compared to the current ILM, their arguments do not seem very convincing, because LLPs are likely to go up significantly in a deep recession as has been argued above. The CBM promises to address pro-cyclicality and may be superior in this respect. Nonetheless, there are strong arguments to favour the ECL model also in comparison to the CBM:

- The main instrument to address pro-cyclicality is the newly introduced counter-cyclical capital buffer. If this buffer is used properly, it should alleviate cyclicality concerns and make an additional counter-cyclical buffer in the loan loss provisions superfluous.
- Macro-prudential banking regulation and supervision is still in its infancy. Great uncertainty prevails regarding the effects of macro-prudential instruments such as the CBM. At the time being, we believe that the advantages and disadvantages of this instrument need to be understood much better before its implementation should be considered.
- Financial accounting primarily serves investors. Their information needs have first priority when public disclosure rules are shaped. Even if supervisors agree that banking regulation should become more counter-cyclical, they should not change financial accounting and decrease the information content of financial statements.

---

unclear why the proposal is not aiming to (partly) neutralize the complete IFRS 9 introduction effect as proposed by BCBS (2016b).

## REFERENCES

- Amel-Zahed, A., Barth, M. E., Landsman, W. R., “The contribution of bank regulation and fair value accounting to procyclical leverage”, *Review of Accounting Studies* (2017) Vol. 22 :1423–1454.
- Barclays, “IFRS9 – Bigger than Basel IV”, Equity Research, 9 January 2017.
- BCBS 2016a, Basel Committee on Banking Supervision, “Regulatory treatment of accounting provisions”, 2016.
- BCBS 2016b, Basel Committee on Banking Supervision, “Regulatory treatment of accounting provisions – interim approach and transitional arrangements”, 2016.
- Bushman, R. M., Williams, C. D., “Accounting discretion, loan loss provisioning, and the discipline of Banks’ risk-taking”, *Journal of Accounting and Economics* 54, 1 (2013): 1 – 18.
- CFA Institute, “Credit Loss And Impairment Survey”, August 2013, Available at [www.cfainstitute.org/Survey/credit\\_loss\\_survey\\_report.pdf](http://www.cfainstitute.org/Survey/credit_loss_survey_report.pdf).
- Chawla, G., Forest L. Jr, Aguais, S.. “Some options for evaluating significant deterioration under IFRS 9”, *Journal of Risk Model Validation*, Vol. 10, No. 3 (Sept 2016), 69-89.
- Deloitte, IFRS 9 and regulatory capital – double trouble, 17 october 2016
- Dugan, J., “Loan Loss Provisioning and Pro-cyclicality.”, Remarks Before the Institute of International Bankers, March 2, 2009, Available at <https://www.occ.gov/news-issuances/speeches/2009/pub-speech-2009-16.pdf>.
- EBA, “On results from the EBA impact assessment of IFRS 9”, 2016, Available at <https://www.eba.europa.eu/documents/10180/1360107/EBA+Report+on+impact+assessment+of+IFRS9>.
- EBA, “Eba Report On Results From The Second Eba Impact Assessment Of Ifrs 9”, 13. July 2017.
- ECB, Draft guidance to banks on non-performing loans, September 2016.
- EU Commission, Proposal for a Regulation Of The European Parliament And Of The Council amending Regulation (EU) No 575/2013 and amending Regulation (EU) No 648/2012., 2016.
- EU Commisison, Report From The Commission To The European Parliament And The Council on the Single Supervisory Mechanism established pursuant to Regulation No 1024/2013, October 2017.
- EY, “EY IFRS Banking Impairment Survey”, August 2017.
- FASB, “Proposed Accounting Standards Update, Financial Instruments—Credit Losses (Subtopic 825-15)”, Frequently Asked Questions March 25, 2013, Available at [http://www.fasb.org/cs/ContentServer?c=Document\\_C&pagename=FASB%2FDocument\\_C%2FDocumentPage&cid=1176162305167](http://www.fasb.org/cs/ContentServer?c=Document_C&pagename=FASB%2FDocument_C%2FDocumentPage&cid=1176162305167).
- Gaston, E. and M. Song, “Supervisory roles in loan loss provisioning in countries implementing IFRS”, IMF working papers 14/170, 2014.
- Gebhard, G. and Novotny-Farkas, Z., “Comparability and predictive ability of loan loss provisions – The role of accounting regulation versus bank supervision”, working paper, 2017.
- Goldstein, I. and Sapra, H., “Should Banks’ Stress Test Results Be Disclosed? An Analysis of the Costs and Benefits.” *Foundations and Trends in Finance* 8 (2014): 1–54.

Grünberger, D., "On expected credit loss accounting", paper presented at SAFE workshop December 2015, <http://safe-frankfurt.de/de/news-media/alle-news/einzelansicht/on-expected-credit-loss-accounting.html>.

Holmström, B., "Understanding the Role of Debt in the Financial System.", Working paper No. 479, Bank for International Settlements, 2015.

Jayaraman, S., Schonberger, B., Shuang Wu, J., "Good Buffer, Bad Buffer", Working paper, March 2017.

Jimenez, G., Ongena, S., Peydro, J., Saurina, J., "Macroprudential Policy, Countercyclical Bank Capital Buffers and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments." National Bank of Belgium Working paper no. 231, 2012.

Laeven, L. and Majnoni, G., "Loan Loss Provisioning and Economic Slowdowns: Too Much, Too Late?" *Journal of Financial Intermediation* 12 (2003): 178–97.

López, M., Tenjo F., Zárata H., "Credit Cycles, Credit Risk and Countercyclical Loan Provisions", BIS Working paper, 2014.

Novotny-Farkas, Z., "The Significance of IFRS 9 for Financial Stability and Supervisory Rules", Study for the ECON Committee, 2015.

Wall, L. D. and Koch T. W., "Bank loan-loss accounting: A review of theoretical and empirical evidence", *Economic Review*, Federal Reserve Bank of Atlanta; Vol. 85.2, 2000: 1-19.

---

This document was provided by the Economic Governance Support Unit at the request of the ECON Committee.

---

## **DISCLAIMER**

The opinions expressed in this document are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.

---

PE 602.105

Print ISBN 978-92-846-2014-2 | doi:10.2861/389373 | QA-04-17-890-EN-C

PDF ISBN 978-92-846-2015-9 | doi:10.2861/750162 | QA-04-17-890-EN-N