A proposed Framework to audit of Expected credit loss "ECL" Estimate Uncertainty

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Abstract:

The objective of this paper is to construct a framework that proposes how to use Audit data analytics "ADA" in the audit of Expected Credit loss "ECL" uncertainty level as a Key Audit Matter "KAM" that aims to develop the role External Auditor to enhance auditing ECL. The framework will present the Methodology used to audit ECL **(i.e. KAM)** , this stage will focus the main steps performed during the audit of ECL uncertainty **(i.e. KAM)**, the paper illustrate how ADA predictive approach use to project the degree of ECL uncertainty. ADA tools used to audit ECL to verify and valid the accuracy of the model used by management to set those estimates (i.e. ECL estimates in order to stand on the elements of uncertainty which are the objective element (precision rare) and subjective element (management bias).

Key Words:

Audit data analytics ,Expected credit loss ,Key audit matter, Descriptive approach ,Predictive approach, Probability of default, Loss Given default ,Exposure at default, Precision rate, Bias rate, Objective element of Uncertainty, Subjective element of uncertainty, Ratio analysis, linear Regression ,logistic regression, Classification tree, process mining, text analysis.

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Section 1: Introduction

The International Auditing and Assurance Standards Board has released a publication describing some of the audit issues arising from the shift to Expected Credit Loss models when accounting for loan losses under new accounting standards. **(Michael, 2016)** ECL models are now required, or will soon be required, by some financial reporting frameworks, including the International Accounting Standards Board's IFRS 9, Financial Instruments, which will take effect Jan. 1, 2018. The Financial Accounting Standards Board is expected to release its own version of the financial instruments accounting standard this year for loan losses under U.S. GAAP, taking a somewhat different approach to expected credit losses than the IASB's version for International Financial Reporting Standards. **(Michael, 2016)**

The adoption and implementation of ECL models will, in many cases, bring significant challenges for auditors, management, those charged with governance (e.g., audit committees), supervisors, and users," said IAASB Chairman Prof. Arnold Schilder. "Auditors need to be aware of the changes related to ECL and the implications for audits. Auditors will need to be actively engaged in 2016 and 2017, in particular to understanding how an entity is planning for the adoption and implementation of its ECL models". **(Michael, 2016)**

The IAASB operates under the auspices of the International Federation of Accountants. The IAASB publication 2016 [5] summarizes the audit challenges identified with respect to ECL and describes some of the initial thinking on how these challenges may be addressed under the current International Standards on Auditing, particularly for auditors of financial institutions. The publication was developed by a task force of IAASB members and

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[5] *This publication has been prepared by the ISA 540 Task Force (the Task Force) of the International Auditing and Assurance Standards Board (IAASB) In December 2015 the IAASB approved the commencement of a standard-setting project to revise ISA 540, Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures. This project is intended to address auditing challenges that have arisen as a result of new accounting standards, as well as issues identified by regulators, auditors and others. The Task Force has begun initial exploration of the issues identified to date, with an initial emphasis on those anticipated to arise in the adoption of ECL models.*

technical advisors, representatives from the Basel Committee on Banking Supervision, the International Association of Insurance Supervisors, bank auditors, and an observer from the U.S. Public Company Accounting Oversight Board. **(Michael, 2016).**

The publication discusses how the IAASB's new standard-setting project to revise ISA 540, Auditing Accounting Estimates, Including Fair Value Accounting Estimates, and Related Disclosures, will further address these and other challenges in terms of auditing accounting estimates, particularly for audits of financial institutions. **(Michael, 2016).**

As the introduction of Big Data analytics in the audit domain is new and it enables auditors to use sophisticated tools which are the process of using structured and unstructured data through various analytical techniques, such as statistical and quantitative models, to provide useful information for decision makers. Furthermore, data analytics have changed and will continue to change the way that the auditors use information to infer, predict, and assure their tasks, predict future accounting estimates for testing of their reasonableness, detect fraudulent financial reporting, and identify risky transactions. As ADA techniques utilizing varied sources of big data, this could be used to arrive at a quantitative score for the audit opinion, as opposed to the current pass/fail opinion. Thus, currently mandated pass/fail opinion format does not reflect the nuances and details of the auditor's work – the culmination of much laborious examination and careful judgment by the auditor. With more advanced ADA techniques and reliable evidence, it is probable that this process and resulting opinion could be quantified with prescriptive analytics.

The objective of this paper is to construct a framework that proposes how to use Audit data analytics "ADA" in the audit of Expected Credit loss "ECL" as a Key Audit Matter "KAM" that aims to develop the role External Auditor to enhance auditing ECL .The remaining of the paper will be organized into the following sections: ***Section 2*** Relevance & importance for emergence of the new loss impairment model, ***Section3*** address the Audit challenges arising from the adoption of new loss impairment model, ***Section 4*** address Audit of the estimation uncertainty of Expected credit loss "ECL" provision, ***Section 5*** address the Conclusion.

Section.2: Relevance & importance for emergence of the new loss impairment model

Following the financial crisis, global accounting standard setters were asked to work towards the objective of creating a single set of high-quality global standards addressing the accounting for financial instruments. The initial converged impairment model proposed that the recognition of the full "lifetime" expected credit loss (ECL) would be delayed until there was a significant deterioration in credit risk. However, based on US constituent feedback, the FASB rejected this approach in favor of the current expected credit losses (CECL) model, which generally requires immediate recognition of "lifetime" expected credit losses at inception. **(PWC,2017a,p1).**

In IAS 39, impairment allowances are recognized based on the "Incurred Loss Model". In this model, banks record loss allowances only at the existence of an "***objective evidence***" (e.g. borrower's significant financial difficulty, decrease in collateral values, risk of bankruptcy). In other words, they are not allowed to do it until the real occurrence of an impairment or the existence of a probability of default that is close or equal to 100%This practice has therefore been highly criticized for deferring the recognition of credit losses until too late.**(Sultanoğlu,2018,p.479)**

Another critic was about its being backward-looking and rule-based approach. The reporting entities were allowed to consider only the past and current conditions when assessing the quality of such risky financial assets even if the management has intuitively available information about probable future losses. This is because it will require considerable level of managerial judgment which IAS 39 did not embody such a principle. **(Sultanoğlu, 2018, p.479)**

Furthermore, from a financial stability perspective, procyclicality was another important concern addressed under the incurred loss approach. During upswings, the level of loss allowances will be low which results in excessive lending and at the same time, overstated earnings, dividend distributions and regulatory capital whereas in a downturn, banks will experience sharp rise in expected losses which this time hits both profit and loss and also capital, and hence will choose the way of reducing lending instead of raising new capital or cutting dividend payments to maintain minimum regulatory capital requirements. Numerous studies have been done about the issue that the incurred loss approach increases

procyclicality whereas expected credit loss model reduces it or at least keeps it natural. **(Sultanoğlu, 2018, p.479)**

As a consequence, those failing issues prevailing in IAS 39 became evident in the global financial crisis period and G20 leaders, investors, regulatory authorities, standard setters have called on the IASB to take action. Finally, IASB revised the rule-based incurred loss application of impairment model and shifted to a forward-looking, principle-based approach, called Expected Credit Loss Model. **(Sultanoğlu, 2018, p.479)**

The new impairment model in IFRS 9 aims to recognize the provision for expected credit losses before they happen and update them at each reporting period to reflect the changes in credit risks since initial recognition. Thus, it will ensure the timely recognition of credit losses and therefore will lead to more accurate and transparent information for the financial statement users. On the other hand, it may rocket the credit loss allowances and result in volatile profit or loss due to changes in the state of economy such as high level of allowances during unfavorable and low level of allowances during favorable economic conditions. Particularly, the banks are expected to be the most affected group since they hold a significant portfolio of loans in their financial statements. **(Sultanoğlu, 2018, p.478).**

So the relevance & importance of the new impairment model appear in its forward looking concept which offer a big change compared to the old IAS 39 incurred loss model that recognized only losses that had arisen from past events, and was criticized for resulting in too little and too late loss provisions. Value adjustments under IAS 39 could only be triggered by the objective facts. The new IFRS 9 impairment model is oriented more towards possible losses in future and therefore an entity should consider much more information in determination of such expectations of future credit losses. It involves anticipatory Expected Credit Losses model that is expected to lead to the creation of much bigger risk provisions without fulfilling's the objective impairment triggers of IAS 39.The new impairment model should be activated on the booking date 1 January 2018 in the transition process for the financial assets ***AC (Amortized costs) and FVOCI (Fair Value through Other Comprehensive Income)***.[6] (Volarevi &Varovi,

[6] *IFRS 9 has single impairment model for all the financial assets, but only for those classified as AC or FVOCI. Financial assets classified as FVTPL(Fair Value through Profit and Loss) do not need to be impaired in this way because they are already "marked to market" with financial assets effect presented in the P&L*

2018, p273)The following figure (1) illustrate the time line for IFRS9:

Timeline – IFRS 9

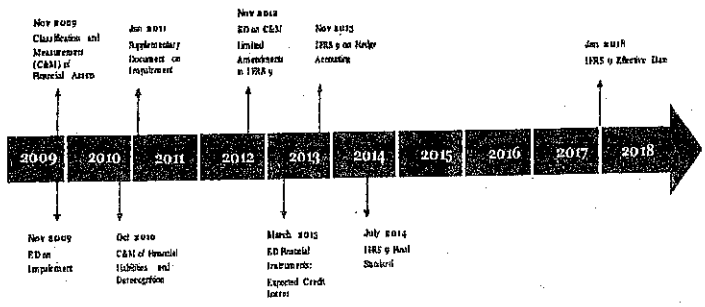

Figure (1) illustrate the time line for IFRS9 (PWC, 2014, p2)

Section3: Audit challenges arising from the adoption of new loss impairment model

The Task Force of the International Auditing and Assurance Standards Board identified the audit challenges relating to ECL models. Alternatively, auditors will need to be actively monitoring the entity's adoption and implementation of its ECL models. This is because of (a) the significance of the ECL models and (b) the fact that the models are likely to have a significant impact on the auditor's risk assessment and audit approach for financial statements of entities with many financial instruments subject to ECL. Those audit challenges were identified as a result of the Task Force's outreach to regulators, auditors, preparers (including those charged with governance), and users. It also includes the Task Force's views on how these audit challenges may be addressed under the current ISAs. **(IAASB project revise ISA 540, 2016,p12)**

Those audit challenges related to ECL models that discussed by The Task Force of the International Auditing and Assurance Standards as stating point to determine auditor responsibilities to the new loss impairment model for IFRS9 are illustrated as follows:

3.1 Challenges with Data and Assumptions issue:

3.1.1 Data and assumptions from outside the traditional accounting systems: (IAASB project revise ISA 540, 2016, p13):

Use of an ECL model may require an entity to bring together data and assumptions from systems that may be developed by different functions of the entity, including systems that may not be part of traditional accounting systems, such as risk management or credit management systems. Data from outside of the entity may also be needed, which cover matters such as economic forecasts and loss statistics from credit bureaus or government agencies. For example, certain entities may have a simple loan portfolio and use simpler processes and procedures – such as using data from a third party credit rating agency to assist in determining whether a significant increase in credit risk has taken place. For other entities, including larger financial institutions, the control environment is likely to be more complex and involve different departments of the entity.

These systems, and the data obtained from outside the entity, may be the responsibility of departments that have not been historically subject to audit procedures (as the information from these departments was not directly used for financial reporting) and, therefore, may not have the necessary controls in place, or there may be a lack of documentation regarding such controls. As the ECL model may draw on data and assumptions, including forward looking and historical data, from these

Systems, it will be a challenge for auditors to determine how to address such systems and data in the audit.

3.1.2 Forward-looking data and assumptions: (IAASB project revise ISA 540, 2016, p14):

Entities and, as a consequence, auditors may find the use of forward-looking data and assumptions to be a particular challenge when implementing ECL models due to the significance of those data and assumptions to the measurement of the ECL, and the degree to which forward-looking data and assumptions is obtained from outside the entity. Unlike previous incurred loss models, the IFRS 9 ECL model requires an entity to estimate future expected losses and requires the use forward-looking data and assumptions that are not directly related to the entity such as forward-looking macroeconomic information related to external events. The increased required use of forward-looking data and assumptions under certain accounting standards may raise considerations regarding:

- How many and which scenarios should be taken into account and how auditors should be challenging the appropriateness of different scenarios.
- The probability and related weight for each scenario, including how this is determined.
- Where to obtain the information.
- How forward-looking data and assumptions can be aggregated and linked to credit quality.
- How to match the forward-looking data and assumptions with the maturity of the financial instruments subject to ECL.

The Task Force's discussion of this issue "***Data and Assumptions issue***" noted that, for most *financial institutions*, the complexity of, and interactions between, the systems that will feed into the ECL models, the need for controls over the data, and the high volume of financial instruments subject to ECL may lead to specific challenges to the audit that need to be addressed in the planning phase. **These challenges may include:**

(a) *Identifying and understanding key data sources and assumptions*: There may be a large number of discrete data sources and assumptions relevant to credit quality, some of which may be correlated with each other. By obtaining an understanding of the data and assumptions on

Which the estimate is based, the auditor may be able to target the data that is most important to the ECL model's output and to concentrate audit procedures on those data sources.

(b) *Controls and governance over data*: Obtaining an understanding of the controls over and governance of, data is important at an early phase of the audit.

(c)*Consideration of alternative data sources and assumptions*: The Task Force notes that it may be helpful for the auditor to inquire of management about possible alternative data sources and assumptions, and why the particular data source(s) or assumption(s) were chosen. The Task

Force also notes that a factor for consideration is whether the data source contains an inherent bias.

(d) *Determining the level of work effort*: The Task Force's discussions noted professional judgment is key to determining the nature and extent of audit procedures to apply to data sources and assumptions in response to the assessed risk of material misstatement. The Task Force also notes that judgment may be needed to determine what information can be used as audit evidence when considering forward-looking data and assumptions, including whether there is evidence that the forward-looking data is linked to actual economic conditions.

(e) *Data analytics*: The Task Force notes that use of new data analytics tools may be valuable in dealing with large data sources that feed into the ECL process.

(f) *System interactions*: Data may move between systems within the entity, there may be more

Opportunities for intentional or unintentional manipulation or changes to the data. The Task Force notes that information technology risk is also relevant when considering how data is generated and moves through the organization.

(g) *Data from outside of the entity*: Data obtained from outside of the entity may bring particular challenges to the audit. Some forward-looking data for the ECL model may be obtained from sources such as central banks or regulatory authorities, while other data may come from private

Sources. For some third-party data sources, it may be difficult to determine how the data was prepared and whether there were appropriate controls and governance over that data. The Task Force notes that judgment will be needed to determine the nature and extent of audit procedures, if any, needed on data obtained from outside the entity.

(h) *Addressing emerging and "one-off" events*: Some events may cause a particular challenge, such as major changes in financial markets due to currency devaluations, sovereign debt crises, changes in the real estate markets, and political events. The Task Force notes that entities may find obtaining reasonable and supportable data difficult in such circumstances.

3.2 Identification of Significant Risks of Material Misstatements Related to an ECL Model Issue:

The ECL model calculation requires management to make judgments about inputs to the model, assumptions, segmentation of the portfolio into pools, individual exposures, and, under some financial reporting frameworks, may include whether significant increase in credit risk has occurred since initial recognition. Accordingly, the ECL provision is likely to have high estimation uncertainty in all but the simplest loan portfolios and may, therefore, give rise to one or more significant risks of material misstatement (hereafter referred to as "significant risks"). ECL provisions may also be complex, and have a high degree of subjectivity, both of which are indicators of the existence of one or more significant risks[7]. **(IAASB project revise ISA 540, 2016, p17)**

[7] *That's why this makes ECL to be considered as CAM.*

3.3 Audit Procedures on Models: Understanding and Assessing Models and Controls Thereon Issue:

The risk assessment and consideration of the appropriateness of management's method of measuring the ECL will be important for the audit of the financial statements of entities with a material portfolio of financial instruments subject to ECL. For many entities, particularly financial institutions, these accounting estimates occur in a complex data environment, are the result of extensive systems containing many processes and controls, and may involve bespoke models. **(IAASB project revise ISA 540, 2016, p19)**

While some entities may choose to use a third-party model for their ECL models with appropriate enhancements for the entity, many entities, particularly larger financial institutions, will develop their own models. These models may be subject to significant management judgment and are complex, and the auditor may need access to specific skills in order to perform the audit. . **(IAASB project revise ISA 540, 2016, p20)**

The Task Force discussed different challenges auditors may face in obtaining an understanding the model used in making an ECL measurement. The following sections summarize the Task Force's discussions on: **(IAASB project revise ISA 540, 2016, p21-23)**

3.3.1 The Auditor's Approach to the Entity's Model development and validation:

ISA 540 requires the auditor to obtain an understanding of the model, if any, used in making an accounting estimate. To aid auditors in understanding complex models, paragraph 49 of IAPN 1000 [8] explains matters that an entity may address when establishing or validating a model, whether management's own model or a third-party model. While this guidance is written in the context of fair value accounting estimates, many of the matters are equally relevant to financial instruments subject to ECL. The Task Force's discussions of the application of paragraph 49 of IAPN 1000 to financial instruments subject to ECL focused on the following matters that may vary depending on the circumstances:

- The model is validated prior to usage, with periodic reviews to ensure it is still suitable for its intended use. The entity's validation process may include evaluation of:

[8] *IAASB, INTERNATIONAL AUDITING PRACTICE NOTE 1000: Special Considerations in Auditing Financial Instruments,2011.*

- The methodology's theoretical soundness and mathematical integrity, including the appropriateness of parameters and sensitivities.
- The consistency and completeness of the model's inputs with market practices, and whether the appropriate inputs are available for use in the model.
- Back testing of the model using existing historical data.

➢ There are appropriate change control policies, procedures and security controls over the model as minor changes to the model can produce significant changes in the outcome of the model.

➢ Whether the model has controls to mitigate the risk of historical bias in the data, such as when the historical data does not include events that would have an impact on the ECL, even if the probability of the event is remote.

➢ The model is periodically calibrated, reviewed and tested for validity by a separate and objective function, possibly including back testing.

➢ The model is adequately documented; including the model's intended applications and limitations and its key parameters, required data, results of any validation analysis performed and any adjustments made to the output of the model.

➢ When management has used a third-party model[9], whether the design of the model and the assumptions used is reasonable in light of the facts and circumstances of the entity.

The Task Force notes that performance of risk assessment procedures and related activities early in the audit, including at the model development and validation stage, will aid auditors in focusing on those areas of the models of ECL at a portfolio or jurisdiction level that have the most significant impact on the model's output, and which drive the identification of the risks of material misstatement. The early performance of risk assessment procedures and related activities also enables professional skepticism to be applied at this early stage, as well as throughout the audit. The Task Force also notes that engagement with management and those charged with governance early in the process may assist in addressing some of the audit challenges that arise during the development process of the models. Guidance issued by regulators may be useful to the auditor in understanding the entity's environment and may assist in performing these risk assessments.

[9] *External credit rating agencies or financial experts*

3.3.2 Responding to the assessed risks of material misstatement in models:

In responding to the assessed risks of material misstatement, as required by ISA 330, the auditor shall undertake one or more of the following, taking account of the nature of the accounting estimate:

(a) Determine whether events occurring up to the date of the auditor's report provide audit evidence regarding the accounting estimate.

(b) Test how management made the accounting estimate and the data on which it is based. In doing so, the auditor shall evaluate whether:

(i) The method of measurement used is appropriate in the circumstances.

(ii) The assumptions used by management are reasonable in light of the measurement objectives of the applicable financial reporting framework.

(c) Test the operating effectiveness of the controls over how management made the accounting estimate, together with appropriate substantive procedures.

(d) Develop a point estimate or a range to evaluate management's point estimate. For this purpose:

(i) If the auditor uses assumptions or methods that differ from management's, the auditor shall obtain an understanding of management's assumptions or methods sufficient to establish that the auditor's point estimate or range takes into account relevant variables and to evaluate any significant differences from management's point estimate.

(ii) If the auditor concludes that it is appropriate to use a range, the auditor shall narrow the range, based on audit evidence available, until all outcomes within the range are considered reasonable.

The Task Force noted that auditors may have difficulties in developing a point estimate or range of the overall complex ECL calculation. This is because the requirements for systems and data feeds may be difficult or impractical for the auditor to replicate. However, the Task Force noted that the auditor may be able to use management's model to test alternative data or assumptions, or develop their own model over part of the ECL calculation. The Task Force also notes that Reperforming or recalculating parts of management's model may also provide audit evidence.

As a way of approaching management's model with independence of mind and demonstrating professional skepticism, another approach discussed by the Task Force is for the auditor to use their knowledge of the market to develop their own assumptions (or

engage an expert to do so) prior to evaluating management's assumptions. This may not be possible or practicable for all assumptions, but may be helpful for certain assumptions such as discount rates and inflation rates.

3.4 Governance and Controls over Models and Data Issue:

The extent of an entity's use of financial instruments and the degree of complexity of the instruments, are important determinants of the necessary level of sophistication of the entity's internal control environment. For example, certain entities may have a simple loan portfolio and use simpler processes and procedures such as data from a third-party credit rating agency as a check on management's assessment of whether significant increase in credit risk has taken place. For other entities, including large financial institutions, the control environment is likely to be more complex and may involve different departments of the entity. For ECL models, there is expected to be governance and controls over both the model itself and the data that feeds into the model. **(IAASB project revise ISA 540, 2016, p24)**

The Task Force discussed the factors of an effective internal control over ECL. The discussion focused on the auditor's assessment of the entity's risk management process, including the challenges posed for preparers of different sizes and whose operations have varying degrees of complexity. It was noted that: **(IAASB project revise ISA 540, 2016, p24-25)**

- Governance and controls over models become more challenging when the entity has a bespoke model.
- Data and assumptions obtained from third parties may be subject to controls to ensure their suitability for the entity's circumstances.
- ECL models will require data from departments that are not part of the traditional accounting system. In this circumstance, the nature and extent of controls over information drawn from the general and subsidiary ledgers may not be present in those other departments, or may only be newly implemented.
- Some financial reporting frameworks require the recognition of lifetime ECL for financial instruments that have experienced a significant increase in credit risk and this judgment is likely to have a material effect on the financial statements. The Task Force notes that assessing whether a significant increase in credit risk has taken place may be subjective and professional judgment and professional skepticism may be needed to evaluate management's

approach. Obtaining data to determine whether a significant increase in credit risk has taken place, and controls around that determination, may be a particular challenge.

- There is likely to be a need for appropriate levels of challenge and skepticism within the entity including, for example, robust discussions between risk management, lending, and finance departments in relation to assumptions and forward-looking information.

For large financial institutions, the Task Force noted the complexity and interactions between the systems used in an ECL model, the controls likely to be in place, and that the high volume of financial instruments subject to ECL may lead to specific challenges to the audit. The Task Force noted that, for large financial institutions, auditors may more commonly have an expectation that controls are operating effectively, and therefore controls testing may be an effective means of obtaining audit evidence. The Task Force noted that, due to the reliance financial institutions place on automated processes to manage the data flows, and the related internal control, substantive tests alone may not provide sufficient appropriate audit evidence. **(IAASB project revise ISA 540, 2016, p25)**

3.5 Management's and Auditor's Experts Issue:

As management's process to measure the ECL may involve sophisticated, extensive, and bespoke processes, management and the auditor often make extensive use, in different ways, of experts on valuations, credit risk, modeling and other areas of expertise. **(IAASB project revise ISA 540, 2016, p26)**

Management may have internal experts in these area (for example, a model development or credit risk management function), or may use external experts. **(IAASB project revise ISA 540, 2016, p26)**

For the auditor, there may be a challenge in obtaining access to the skills and expertise needed to perform an audit of estimates involving complex ECL models. **(IAASB project revise ISA 540, 2016, p26)**

The Task Force's discussions focused on the importance of the auditor having access to the right skills and expertise, including access to internal or external experts as needed, as well as being able to adequately supervise or evaluate their work. The Task Force noted the need for such experts may depend on how sophisticated, extensive, and bespoke management's process is for measuring the ECL. The Task Force also noted that an inability to access the requisite skills and experience would be detrimental to audit quality, and may prevent the auditor from accepting the engagement. (IAASB project revise ISA 540, 2016, p27)

The Task Force's discussions also focused on the challenges around accessing the right skills and expertise for an audit involving financial instruments subject to ECL, including the following areas: **(IAASB project revise ISA 540, 2016, p27)**

(a) Understanding of the legal and regulatory environment including, if appropriate, laws and regulations specific to financial institutions, such as Capital requirements.

(b) Modeling of ECL.

(c) Governance and controls over models, data and assumptions, including data obtained from outside the traditional accounting system or outside the entity.

(d) Credit risk analysis, using credit risk data obtained in-house or from third-parties.

(e) Interactions between systems controlled by different parts of the business (i.e. trading, risk management, finance).

3.6 Addressing the Estimation Uncertainty Implicit In ECL Models Issue:

It may be possible for the auditor to generate a point estimate or a range by, for example, varying the assumptions in management's model, using other reasonable assumptions, and comparing the output with that obtained using management's assumptions or using an expert. **(IAASB project revise ISA 540, 2016, p27)**

Given the complexity and uncertainty implicit in an ECL model, and the significant level of judgment that is involved in measuring the ECL, it is possible that the auditor's range, or the difference between management's estimate and the auditor's point estimate, may be multiples of performance materiality. This may be because: **(IAASB project revise ISA 540, 2016, p28)**

- ✓ The level of judgment required could be greater than for other accounting estimates. For example, the assessment of whether a given financial instrument subject to ECL has experienced a significant increase in credit risk may be highly judgmental in some cases.
- ✓ The number and sensitivity of assumptions may be greater than for other accounting estimates;
- ✓ The length of the forecasted period may be longer than for other accounting estimates.
- ✓ An entity may need to consider information from external sources that may pose challenges for the audit. For example, the financial reporting framework may require that all reasonable and supportable information that is available without undue cost or effort at the reporting date about past events, current conditions and forecast of future economic conditions.

For financial institutions, such large ranges can result from only minor differences in assumptions due to the size of the exposures and the sensitivity of the output to changes in the assumptions. **(IAASB project revise ISA 540, 2016, p28)**

ISA 540 requires that an auditor-developed range encompass all "reasonable Outcomes a range that has been narrowed to be equal to or less than performance materiality is adequate for the purposes of evaluating the reasonableness of management's point estimate. However, particularly in certain industries, it may not be possible to narrow the range to below such an amount. This does not necessarily preclude recognition of the accounting estimate. It may indicate, however, that the estimation uncertainty associated with the accounting estimate is such that it gives rise to a significant risk. ISA 540 notes that the range may be narrowed by: **(IAASB project revise ISA 540, 2016, p28-29)**

- Eliminating from the range those outcomes at the extremities of the range judged by the auditor to be unlikely to occur.
- Continuing to narrow the range, based on audit evidence available, until the auditor concludes that all outcomes within the range are considered reasonable. In some rare cases, the auditor may be able to narrow the range until the audit evidence indicates a point estimate.

The Task Force notes that an inability to narrow the range below performance materiality may be an indication that the estimation uncertainty associated with the ECL model is such that it gives rise to one or more significant risks. **(IAASB project revise ISA 540, 2016, p29)**

The Task Force's discussion on how auditors might deal with such wide ranges noted that audit procedures are unable to reduce estimation uncertainty that is a result of the application of an accounting treatment mandated by an applicable financial reporting framework. When the estimation uncertainty associated with ECL gives rise to a significant risk, the Task Force noted that focusing on the disclosures about the estimation uncertainty of the ECL model in the financial statements is Required by paragraph 20 of ISA 540 and is likely to be most helpful to users in understanding the level of estimation uncertainty. The Task Force also noted that the matter may be discussed with those charged with governance or a financial institution's supervisor. The Task Force also noted that there is also a need for management to adequately document judgments and other activities. **(IAASB project revise ISA 540, 2016, p29)**

In addition to disclosures, the Task Force notes that revised Auditor Reporting standards requires auditors of listed entities to

communicate key audit matters in the auditor's report. **(IAASB project revise ISA 540, 2016, p29)**

In the context of ECL models, the Task Force's discussions about how the auditor may be able to evaluate the reasonableness of assumptions used by management focused on the following matters: **(IAASB project revise ISA 540, 2016, p29-30)**

- Whether the auditor's dialogue with financial institution supervisors, and associated benchmarking inside and outside the entity, provides indications that the assumptions are not inconsistent with the supervisor's or the auditor understands of the circumstances. The Task Force noted that the supervisors may have different objectives (for example, stability and capital adequacy objectives) that may explain differences in views.
- Whether the auditor's retrospective review of management judgments and assumptions related to prior period significant accounting estimates provides an indication of a possible bias on the part of management.

3.7 Management Bias Issue:

In the context of an entity's use of an ECL model, there are many judgments and decisions that may be subject to management bias, whether intentional or unintentional. Indicators of management bias may include: **(IAASB project revise ISA 540, 2016, p30)**

(a) Changes in model methodologies, data, or assumptions that are unreasonable.

(b) Management decisions that have the effect of moving the ECL estimate within the auditor's range estimate from year to year, for example from a more conservative ECL estimate to a less conservative estimate, when this move is not supported by a valid business reason.

Management bias may also be unconscious such as when a modeling technique or data source has an implicit bias which should be adjusted for as necessary. For example, economic forecasts may over estimate or underestimate economic outcomes depending on when the forecast is made in the Economic cycle. Management may have various processes to identify and adjust for these biases, some of which will be done through the modeling process and some outside of the modeling process. *Management overlays, which are outside of the modeling process, adjust for the bias by, for example, increasing the ECL provision when the historical data source chosen includes a particularly favorable set of economic circumstances that is unlikely to be repeated.* **(IAASB project revise ISA 540, 2016, p30-31)**

In the context of ECL, the Task Force notes that the following circumstances may be examples of management bias, whether

intentional or unintentional: **(IAASB project revise ISA 540, 2016, p31)**

(a) Override of controls over data, assumptions, and processes.

(b) Selecting data sources to present a biased view of the ECL. As noted, historical data may not include events or scenarios that would be required to be addressed in the forecasts meaning the data is biased.

(c) Choosing scenarios, and assigning probabilities to those scenarios (when required by the applicable financial reporting framework), that are not in compliance with the applicable financial reporting framework.

(d) Changing from one data source or assumption to another data source or assumption.

(e) When management overlays are overstated or understated.

ISA 540 states that "the auditor shall review the judgments and decisions made by management in the making of accounting estimates to identify whether there are indicators of possible management bias." As noted in paragraph A9 of ISA 540, for continuing audits, indicators of possible management bias identified during the audit of the preceding periods influence the planning and risk identification and assessment activities of the auditor in the current period. **(IAASB project revise ISA 540, 2016, p31)**

ISA 240 contains requirements and application and other explanatory material regarding the auditor's responsibilities relating to fraud in an audit of financial statements. The Task Force notes that the auditor is required to review accounting estimates for bias and evaluate whether the circumstances producing the bias, if any, represent a risk of material misstatement due to fraud. **(IAASB project revise ISA 540, 2016, p31)**

Difficult financial market conditions may give rise to increased incentives for management or employees to engage in fraudulent financial reporting: to protect personal bonuses, to hide employee or management fraud or error, to avoid breaching regulatory, liquidity or borrowing limits or to avoid reporting losses. For example, in a favorable economic climate there may be incentives for management to build up an excessive provision to draw upon in challenging economic times. **(IAASB project revise ISA 540, 2016, p31)**

The Task Force notes that there may be controls and governance arrangements that are able to reduce the risk of management bias. For example, appropriate levels of challenge and skepticism between different functions within the entity (such as risk

management, lending, and finance departments) may reduce the risk of management bias in some cases. The Task Force also notes that auditors may discuss the risk of management bias with those charged with governance and financial institutions' supervisors, particularly when considering the implementation of new systems or controls relevant to the ECL model. **(IAASB project revise ISA 540, 2016, p31)**

3.8 Implications for Reporting Issue:

ISA 701 requires the communication of key audit matters in the auditor's report for listed entities, when the auditor otherwise decides to communicate key audit matters in the auditor's report, or when the auditor is required to do so by law or regulation. In the context of an audit of a listed entity when ECL gives rise to one or more significant risks, the auditor's evaluation of the ECL may be a key audit matter. **(IAASB project revise ISA 540, 2016, p32)**
The Task Force's discussions focused on how the new Auditor's Report, including the disclosure of key audit matters, gives the auditor greater scope to communicate directly with users about matters relating to the ECL. The Task Force noted that the following information may be helpful to users: **(IAASB project revise ISA 540, 2016, p32)**

- A qualitative or quantitative description of the level or degree of estimation uncertainty of the ECL.
- A description of what matters were most significant to the auditor with regards to the ECL.
- How the audit addressed the ECL, including the choice of procedures made under paragraph 13 of ISA 540, or how experts were used.
- If the auditor's range was greater than materiality, or when the auditor's point estimate was materially different to management's accounting estimate, what additional audit procedures were performed to address this?
- How the auditor addressed the risk of management bias.

Section 4 Audit of the estimation uncertainty of Expected credit loss "ECL" provision

Developing an independent expectation of an accounting estimate involves the auditor using some or all of the auditor's own methods, data, and assumptions to develop the expectation for comparison with the company's estimate. The auditor is also required to take into account the requirements of the applicable financial reporting framework and the auditor understands of the

company's process, including the significant assumptions used by the company, so that the auditor's expectation considers the factors relevant to the estimate. **(PACOB, 2019, p8).**

Not all accounting estimates have the same degree of estimation uncertainty. These changes in relation to the nature and reliability of information that is available to the management to make the estimate. This is referred to as inherent lack of precision of an estimate, and is an objective element of uncertainty. In addition, an estimate may be imprecise because of management bias, that is, lack of neutrality. This is a subjective element of uncertainty, which is not inherent in the estimate itself. The greater the objective element, the lower the space to apply management bias. The higher the degree of estimation uncertainty, the higher the risk of material misstatement of the estimate **(Bellandi, 2018, p254).**the following figure(8) summarizes the two elements that measure the level of uncertainty for any accounting estimates that will result risk of material of estimates.

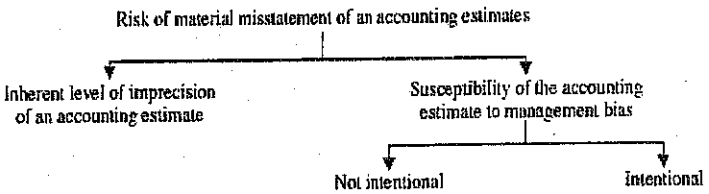

Figure (2) Risk of material misstatement of an accounting estimate (Bellandi, 2018, p254)

If an auditor has determined the appropriate range of an estimate, a management's estimate outside this interval would be a misstatement. Conversely, if auditor concludes for a point estimate, any different amount determined by the management would result in a misstatement. If the management estimates differ from the estimates made by the auditor, the auditor must discuss with management assumption and methods **(Bellandi, 2018, p256)** Thus, the ECL calculation model should calculate an unbiased and probability weighted amount to be presented as impairment to book value of financial asset in Balance sheet. **(Volareic &Varoic, 2018, p277)**

Speaking mathematically, Expected Credit Losses that need to be computed and presented as value adjustments are the product of three variables. The first variable is Exposure at Default (EAD), the second variable is Loss Given Default (LGD) and the third, and

the most sensitive variable to determine is Probability of Default (PD) (**KPMG, 2017, p 32**).

4.1 Perform audit procedures for determining the degree of precision of ECL estimate / the objective element of uncertainty:

The auditor can apply the audit data analytics methodology on estimating the value of ECL by relying on regression line and financial ratio techniques. ***A regression line*** summarizes the relationship between two variables but only in a specific setting—that is to say, one of the variables helps explain or predict the other. Thus, regression describes a relationship between an explanatory or independent variable and a response or dependent variable. Regression analysis is used to estimate the effect that a movement in one variable (the independent variable) causes a movement in the other variable (dependent variable). Regression analysis can thus assist the auditor in understanding and quantifying data interrelationships. Unusual variations between expectations and recorded values may be noted for further investigation. ***Ratio analysis*** assumes a given proportional relationship between two numbers and is normally used for comparisons over time. A more advanced form of ratio analysis attempts to quantify the interrelationship in order to facilitate predictions in a regression analysis. (**Casarino, 2017, p92**).

The previous two techniques could be used along with the instruction issued by ***Egyptian central bank for the application of IFRS9 2019*** in order to provide the external auditor a basis for developing an independent estimate of ECL and comparing it with the management to measure the degree of precision of estimate to measure the objective element of the uncertainty of estimate.

4.1.1 Probability of Default:

This could be done by using ***The Egyptian central bank proposed indicators*** to measure the ***Probability of Default (PD sn %)***[10] which is the first variable to estimate ECL which some of its indicators depend on the accounting data from the financial statements, i.e. from the past, in and some other indicators that are more **"forward looking", e.g. Macroeconomic indicators** , these indicators are shown in the following table:

[10] *According to IFRS 9 & Egyptian central bank PD sn % should be have 3 values according 3 scenarios which are the "Basic, Worst & Best "*

Table (1) the Indicators of estimating PD *sn* %[11]

Accounting /Past Indicators	Macroeconomic/Forward-looking Indicators
Decline in levels of revenues	Employment
Operating profit	Unemployment
Increase in operating risks	Wage/Salary Growth
Negative operating cash flows	GDP Growth
Increase in interest rates	
Return on Assets	
Deficiency of Working capital	
Contingent liabilities	
Debt Ratio	
Receivable Turnover	
Decrease in operating leverage	
Decrease in current ratio	
Increase in financial leverage	

[11] *Those indicators should have 3 values according to the 3 scenarios as mentioned before*

The pervious indicators could be summarized in the following ratios shown as follows in the following table:

Table (2) Ratios & Coefficients regression for estimating PD

***sn* %**

Indicator	Ratio	Coefficient in regression Model to estimate PD%
Decline in levels of revenues	Sales margin	SM
Operating profit	Profit margin	PM
Increase in operating risks	Market share	MS
Negative operating cash flows	Operating cash flow ratio	OCF
Increase in interest rates	Interest rate by E.C.B	IR
Return on Assets	Return on asset	ROA
Deficiency of Working capital	Working Capital ratio	WCR
Contingent liabilities	Contingent liabilities ratio to total liabilities	CLR
Debt Ratio	Debt ratio	DR
Receivable Turnover	Receivable Turnover	RTO
Decrease in operating leverage	Operating leverage	OL
Decrease in current ratio	Current ratio	CR
Increase in financial leverage	Financial Leverage	FL
Unemployment	Unemployment Rate	UNER
Wage/Salary Growth	Salary Growth Rate	SGR
GDP	GDP Growth Rate	GDP

Therefore, the following linear regression model based on the previous ratios in order to develop an estimate for ***PD sn %*** by the auditor is as follows[12]:

$$PD\ sn\ \% = \beta 0 + \beta 1\ SM + \beta 2\ PM + \beta 3\ MS + \beta 4\ OCF + \beta 5\ IR + \beta 6\ ROA + \beta 7\ WCR + \beta 8\ CLR + \beta 9\ DR + \beta 10\ RTO + \beta 11\ OL + \beta 12\ CR + \beta 13\ FL + \beta 14\ UNER + \beta 15\ SGR + \beta 16\ GDP.$$

For the other two variables of ECL which is the ***Loss Given Default (LGD %)*** and ***Exposure at Default (EAD)*** could be calculated as follows:

4.1.2 Loss Given Default (LGDs):

According to instruction issued by ***Egyptian central bank for the application of IFRS9 2019*** *stated that at least when calculating LGD% should be equal to (45%) or Calculated by the following formula for each of previously mentioned scenarios:*

$$LGD\ sn = 1 - (CR\ sn\ [13])$$

Where: CR *sn*

$$= \frac{PV\ of\ Expected\ Future\ CashFlows\ of\ Loan\&Debts\ \&Collateral}{Total\ Value\ of\ Loans\ \&Debts\ \&Collateral}$$

4.1.3Exposure at Default (EAD): According to instruction issued by ***Egyptian central bank for the application of IFRS9 2019*** stated that:

- Loans given – EAD consists of the principle plus accrued interest up to thereporting date.
- Deposits placed – EAD consists of the principle plus accrued interest up to the reporting date.
- Debt securities purchased with discount (discounted securities) – EAD is an amortized value plus accrued interest up to the reporting date. Amortized value of a discounted security is its nominal value minus the remaining (unamortized) portion of the discount.
- Debt securities purchased with premium – EAD is an amortized value plus accrued interest up to the reporting date. Amortized value is its nominal value plus unamortized portion of premium.
- Trade receivables – EAD amount is the nominal value of our receivables from counterparties (customers).

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[12] for each scenario of the 3 scenarios, thus model will be applied 3 times in order to figure out 3 values of PD% according to each scenario.

[13] Callable Rate of Loans and Debts &Collateral for each scenario.

So the *Egyptian central bank proposed equation to calculate the EAD based on forward looking assumption as follows:*

=The Balance of Financial Asset at The Balance Sheet Date
+(The Undrawn Balance) **X** *(Credit Conversion Factor "CCF [14]")*
+ (The Balance of Collateral) **X***(Credit Conversion Factor "CCF")*
+Accrued Return of the Financial Asset at The Balance Sheet Date

After that the auditor Can develop his independent point estimate related to ECL depending on his predictions on PDs% values for each scenario based on the regression model along together with the other variables of ECL which are LGDs using minimum rate or by calculating 3 values based on the same previously scenarios of PDs% with EAD value.

As such the auditor could develop 3 independent points estimate related to *"ECL sn"* based on the 3 scenarios by using the following Multi- linear regression model:

$$ECL\ sn = \beta 0 + \beta 1\ PD\ sn\ \% + \beta 2\ LGD\ sn + \beta 3\ EAD$$

It should also be mentioned that the predicted ECL is Weighted Average of 3 values ***weighted by the likely hood of the occurrence of each scenario***, so the final predicted value of ECL could be calculated as follows:

$$ECLWA = \sum ECL\ sn \times Sn\%$$

Finally, the auditor compares his point estimate with the management to determine the degree of precision of estimate in order to measure the objective element of the uncertainty of ***ECL estimate*** by using ratio analysis technique through following formula:

[14] *The Basel II Accord implies the use of a credit conversion factor (CCF) for revolving lines of credit, which is the ratio of the estimated additional drawn amount during the period up to 12 months before default over the undrawn amount at the time of estimation. Example: Debit. Current account "Over Draft" & Discounting Bills &Letter of guarantee as those are future contracts between the bank and customer were bank cannot cancel those contracts so the balance of those items should be subject to EAD by multiplying by CCF factor. Assume you are allowed to draw a credit of 1000 Euros of which you already got 200 Euros from your bank last month. In other words, you can still obtain 800 Euros in the current month. If you today get another credit of 500 Euros, the CCF is 500 Euros divided by 800 Euros, which evaluates to 62.5 %. (Source Wikipedia).*

Precision Rate of ECL estimate/Objective element of ECL

$$\text{Uncertainty} = \frac{ECL\ mgt - ECLauditor}{Ecl\ mgt} X100\%(1)$$

As the value of this formula approches to 100% mean the estimate is more precisie and therefore the more objective element of uncertainty of the estimated.

4.2 Perform audit procedures for determining the degree management bias of ECL estimates/subjective element of uncertainty:

Financial reporting frameworks often call for neutrality, that is, freedom from bias. Estimation uncertainty gives rise to subjectivity in making an accounting estimate. The presence of subjectivity gives rise to the need for judgment by management and the susceptibility to unintentional or intentional management bias (for example, as a result of motivation to achieve a desired profit target or capital ratio). The susceptibility of an accounting estimate to management bias increases with the extent to which there is subjectivity in making the accounting estimate. **(ISA 540, 2018, p16-17)**

Management bias is a defining element of neutrality. Management bias may be unintentional or intentional. The likelihood of the former increases with the inherent uncertainty of estimation **(Bellandi, 2018, p258)**

The auditor shall evaluate whether judgments and decisions made by management in making the accounting estimates included in the financial statements, even if they are individually reasonable, are ***indicators of possible management bias***. When indicators of possible management bias are identified, the auditor shall evaluate the implications for the audit. Where there is intention to mislead, management bias is fraudulent in nature. **(ISA 540, 2018, p16-17)**

These indicators could be summarized as follows:

1- The Value of point ECL estimate favorable for management objectives.
2- Number of misstatement in the financial statement in the previous audits related to ECL especially if it arises from fraudulent financial Reporting.
3- Variation of the value of ECL point estimate in the interim reporting compared with the annual one.
4- Variation of the Quantity of the related disclousres of the ECL point estimate in the interim reporting compared with the annual one.

After the auditor had determine the indicators that measure level of management bias. The auditor could use one of effective audit data analytics techniques which is the logistic regression model[15].these indicators could be summarized in variables in the model as show in the following table:

Table (3) show the variables to measure Bias of ECL

Indicator of Management Bias	**Variable of Management Bias logistic regression model**	**How to Measure indicator**
Favorable ECL point estimate	FECL	Decrease of the Value of ECL compared to benchmark or the Peers
Fraudulent Misstatement from pervious audit	FMISST	Ratio of fraudulent misstatements found in previous audit **(ratio of fraudulent misstatements to total misstatements)**
Variation of the value of ECL point estimate during the year	VECL	Number of altering the value of ECL during the quarters of the year
Variation of the Quantity of the related disclousres of the ECL point estimate during the year	VDECL	Number of altering the level of disclosures related to ECL **(change quantitative disclosures during years quarters)**

[15] In statistics, the logistic model (or logit model) is used to model the probability of a certain class or event existing such as pass/fail, win/lose, alive/dead or healthy/sick. Probability between 0 and 1(Wikipedia source)

This model provides a linear combination of independent variables that makes it possible to estimate the likelihood of management bias (not bias/ bias).

The model could be constructed as follows:

Mgt. Bias Rate/Subjective element of ECL Uncertainty = log [P/1-P] $*= \beta 0 + \beta 1\ FECL + \beta 2\ FMISST + \beta 3\ VECL + \beta 4\ VDECL$ **(2)**

log [P/1-P]** this is calculated **Odds** which mean **Probability of occurring** (bias of management marked as P) ***divided by **Probability of not occurring** (Unbiased management marked as (1-P)). ***In this study I assume equal probability of happening 2 situations so I give P=0.5***

So if the value of the model range between 0 &1 which mean varies from no bias estimate to a very subjective estimate with a full mangement bias.

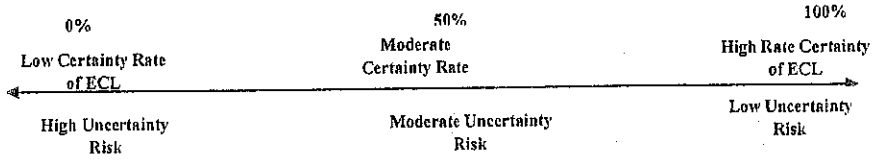
4.3 Calculating level of Uncertainty of ECL:

The final step the auditor will identify the level of uncertainty of ECL estimates by calculating Certainty Rate of ECL estimate based on the previous two elements of the Certainty discussed earlier which are the Precession Element and Subjective Element, then after that Calculating Uncertainty Risk as follows:

$$Certainty\ Rate = Precession\ Rate \times Mgt\ Bias\ Rate \quad (3)$$

$$Uncertainty\ Risk = 1 - Certainty\ Rate \quad (4)$$

After the calculation of Certainty Rate for ECL estimation and related uncertainty risk of estimation, the auditor can plot this Rate on a graduated scale as follows:



Finally, the auditor makes his recommendation for further investigation of certain accounts or disclosures that related to ECL estimate for detecting Risk of misstatement in the related account or omitting related disclosure.

Section 5: Conclusion

The paper aim of this paper is to construct a framework that proposes how to use Audit data analytics "ADA" in the audit of Expected Credit loss "ECL" uncertainty level as a Key Audit Matter "KAM" that aims to develop the role External Auditor to enhance auditing ECL. The framework will present the Methodology used to audit ECL **(i.e. KAM)** , this stage will focus the main steps performed during the audit of ECL uncertainty **(i.e. KAM)**, the paper illustrate how ADA predictive approach use to project the degree of ECL uncertainty. ADA tools used to audit ECL to verify and valid the accuracy of the model used by management to set those estimates (i.e. ECL estimates in order to stand on the elements of uncertainty which are the objective element (precision rare) and subjective element (management bias).

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