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Exploring different methods to calculate Risk Adjustment following IFRS 17 guidelines

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Dissertation report presented as a requirement for obtaining the Master's degree in Statistics and Information Management with Specialization in Risk Analysis and Management

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by

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RESUMO

Nas últimas décadas, as seguradoras têm enfrentado uma série de mudanças nos seus sistemas regulatórios e de supervisão, às quais precisam constantemente de se adaptar dentro de prazos explícitos, a fim de cumprir as modificações necessárias. Os requisitos mais significativos, em mais de 20 anos, para moldar a maneira como as divulgações financeiras de uma seguradora são realizadas são dados no IFRS 17 (International Financial Reporting Standard 17), lançado em maio de 2017 pelo International Accounting Standards Board (IASB). Um elemento importante desta norma introduz e discute os cálculos para ajuste de risco de riscos não financeiros. Este aspecto específico da norma é de certa forma interessante devido à possibilidade de as seguradoras implementarem a sua própria abordagem para este cálculo, desde que atenda às condições mínimas impostas pela IFRS 17. Este trabalho visa explorar duas principais abordagens fortemente sugeridas por especialistas da indústria, a fim de determinar, através de extensa revisão da literatura e análise de resultados, a mais adequada. Um contexto apropriado é dado em termos de outros requisitos regulatórios relevantes que, sem dúvida, devem ser integrados à IFRS 17, juntamente com as definições necessárias que são cruciais para o entendimento completo deste estudo. No geral, este documento chegará a uma conclusão destacando os benefícios e os desafios da adoção de cada método além de compará-los.

PALAVRAS-CHAVE

Ajuste ao risco; Riscos não financeiros; Declarações financeiras; Seguro; IFRS 17

ABSTRACT

For the last decades, insurers have faced several changes in their regulatory and supervisory systems, to which they have to consistently adapt in explicit time frames to comply with any necessary modifications. The most significant requirements released in over 20 years to shape the way insurers' financial disclosures are done appear in the IFRS 17 (International Financial Reporting Standard 17), released in May 2017 by the International Accounting Standards Board (IASB). One important element of this standard introduces and discusses the calculations for risk adjustment of non-financial risks. This specific aspect of this standard is somewhat interesting due to the possibility for insurers to implement their approach for this calculation as long as it satisfies the minimum conditions imposed by the IFRS 17. This paper aims to explore two main different approaches strongly suggested by specialists in the industry, to determine, through extensive literature review and analysis of results, the most adequate one. Appropriate context is given in terms of other relevant regulatory requirements which should be undoubtedly integrated with the IFRS 17, along with any necessary definitions which are crucial to the full understanding of this study. Overall, this paper concludes by highlighting the benefits and challenges of adopting each method and comparing them.

KEYWORDS

Risk adjustment; Non-financial risks; Financial statements; Insurance; IFRS 17

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LIST OF ABBREVIATIONS AND ACRONYMS

BBA	Building Block Approach
CoC	Cost-of-Capital
CTE	Conditional Tail Expectation
DPF	Discretionary Participation Features
EBA	European Banking Authority
EIOPA	European Insurance and Occupational Pension Authority
ESMA	European Securities and Market Authority
FCF	Fulfilment Cash Flows
GMM	General Measurement Model
IASB	International Accounting Standards Board
ICS	International Capital Standard
IFRS 4	International Financial Reporting Standard 4
IFRS 17	International Financial Reporting Standard 17
LIC	Liability for Incurred Claims
LRC	Liability for Remaining Coverage
PAA	Premium Allocation Approach
RA	Risk Adjustment
VaR	Value-at-Risk
VFA	Variable Fee Approach

1. INTRODUCTION

The impact of the insurance industry on the global economy has gained major importance over the last decades, causing an unprecedented necessity for regulation and reporting bodies to focus on the effective supervision of related institutions to ensure financial stability. Essential and specific requirements are constantly released to the public which demand to be meticulously followed by relevant insurance companies to safeguard their practices. It is every insuring entity's sole responsibility to follow the diverse regulations released by each authority while effectively integrating all of them.

In May 2017, after nearly 20 years of discussion, the International Accounting Standards Board (IASB) published the IFRS 17 (International Financial Reporting Standard 17), which will be fully effective in January 2023. Insurers across the globe reporting under IFRS are required to follow a set of detailed and extensive guidelines regarding all aspects of accounting and financial disclosures of their contracts. The IFRS 17 aims to replace the IFRS 4 to improve its lack of comparability by expanding the overall consistency of its framework. The updated estimates and assumptions that any company issuing insurance contracts now have to adopt will eventually lead to more transparent reporting in the industry and guarantee a more accurate visual of an insurer´s financial position and risk. Although this standard is currently still in the implementation phase, it is an area of significant focus across all affected entities.

The IFRS 17 is being globally recognized as the biggest shift seen in insurance reporting standards in the last decades (HOOK, 2018) and affects any company that writes insurance contracts. The IFRS Standards Fact Sheet (2017) states that, in 2015 alone, the total assets of insurers using IFRS Standards was 13$ trillion dollars. This number demonstrates the immense dimension and proportion the IFRS 17 may have in the economy as a whole. McCarthy, Gaffney and Regan (2019) describe IASB's main objectives with this new project as an attempt to develop a more common standard whose higher quality would improve not only the presentation and disclosure of insurance contracts but also unify and decrease conversions in the financial comparison for insurance contracts of entities. Ultimately, IFRS 17 aims to replace the IFRS 4 Insurance Contracts and the flaws in its components.

There is great market relevance embedded in the comprehension of all the modifications brought to the surface with the IFRS 17. This is because it specifically depicts the way these companies have to develop and report their financial disclosures in a more transparent way. Insurers will have to allocate numerous resources, people, and capital to fully meet the requirements with minimal exposure; and this is time-consuming. Planning is currently a must-do for all companies affected and failure to meet the new guidelines could lead to falling into a non-compliance category. Not meeting the deadline will potentially harm a company in comparison to its competitors and at an overall industry-level. Simultaneous to this obligatory compliance, insurers must seize the opportunity to explore and outstand their competitors where deemed possible by the standards.

Amongst these changes, one aspect that has opened space for a more "autonomous" financial re-adaptation for insurers is in the risk adjustment for non-financial risks. This aspect is considered to be

more “autonomous” than any other because it offers certain freedom for the approaches used to calculate this risk adjustment as long as they minimally satisfy the main conditions imposed by the IFRS 17. Numerous potential methods arise from the possibility of exploring the way risk adjustment calculations are made for each institution. This paper will predominantly focus on two: Cost-of-Capital (CoC) approach and Value-at-Risk (VaR) approach.

The analysis done to technically discuss these two chosen methods is based on the definitions of their variables through extensive explanation of their qualitative context and identifying crucial research gaps. A critical analysis was made in order to achieve a tangible and realistic distinction between the advantages and disadvantages of using any of these calculation methods to comply with the IFRS 17’s risk adjustment guidelines. Nevertheless, attempting to simply adapt any existing systems and methodologies will not be enough for full compliance; thus, coherently meeting the requirements will not be an easy task for insurers. Furthermore, assistance and support are extremely pertinent for insurers at this point, and providing aid to this is the main objective of this paper.

The possibilities of approaches for calculating risk adjustment of non-financial risks are not limited to the ones presented in this paper, since insurers are free to select the most appropriate according to their specific risk and financial profiles. Other methods, such as the Margins for Adverse Deviation (using specified adjustment margins on all assumptions used in the calculation), Scenario VaR (adopting a combination of frequent simultaneously-changed assumptions to perform stress tests and study correlations between them) and Conditional Tail Expectation [CTE] (measuring the expected loss on a portfolio over a specified confidence level) approaches are all well-known IFRS 17 risk adjustment methodology possibilities (Hannibal, 2020; Jiang, 2020) which are, however, not in the scope of this study in particular.

Overall, this paper aims to contribute not only to acquiring a deeper knowledge of the composition of the IFRS 17, but to specifically address the part that consists of the specific risk-adjustment approach of non-financial risks. The purpose will be to dissect, in-depth, two different approaches that could be potentially adopted, made possible by the “exploration zone” permitted by the IASB in the IFRS 17 guidelines. Insurers with the right mindset can be one step ahead of competitors because, along with adequate planning, understanding the current importance of this new standard at an early stage will most definitely bring them closer to benefitting in abundance from the new guidelines whilst having the time required to efficiently allocate resources for the other requirements stated in the standard.

2. THE IFRS 17 NORM: SCOPE, KEY FEATURES AND HISTORICAL BACKGROUND

2.1. IFRS 17

In the years upcoming the release of the IFRS 17, various experts' studies (from insurance professionals, auditors, regulators, etc) about the positive and negative impacts of the IFRS 4 in the market were fundamental for the feedback the IASB acquired before the changes made to the IFRS 4 standard. Such was the importance of all these documents for the IFRS 17 that they are all cited and available directly in the standard's project history.

Although the main purpose of the IFRS 17 is to replace the IFRS 4, understanding the effects that the IFRS 4 has had on insurers since its release is essential for the full comprehension of why the IFRS 17 was released in the first place. Mignolet (2016) explains that the IASB was finally able to recognize that the main issue with the IFRS 4 is that it does not provide sufficiently transparent information of the full effect of insurance contracts in financial statements, which creates long-term issues with comparative assessments across entities and jurisdictions. Barth and Schipper (2008) define transparency in financial statements as the quantitative and qualitative amount in which financial statements divulge entities' underlying finances in a way that is comprehensible by those reading the financial reports.

According to the IASB reports, roughly under 450 entities will be directly impacted by the IFRS 17. Dufrasne (2020) states that in Europe specifically, every company (issuing insurance contracts) listed on a member's market and ruled by the law of a member state will be affected. It will be the sole responsibility of affected entities to invest in well-trained professionals and to gather new data to effectively implement the standard on time. The three European supervisory authorities, European Banking Authority (EBA), European Insurance and Occupational Pensions Authority (EIOPA) and European Securities and Market Authority (ESMA) will all be involved in the endorsement of the IFRS 17 for listed companies. There are, however, unlisted companies that will also be affected. In these specific cases, there are a few jurisdictions that will either require the mandatory or optional application of such standards. For instance, countries like Australia, Canada, Iran, Malaysia, New Zealand, Portugal, Saudi Arabia, South Africa, South Korea, Turkey, United Arab Emirates and Venezuela will require all unlisted insurers to apply the standard.

The companies listed are, in the majority, part of (but not limited to) the insurance sector. The banking and investment industry for instance can potentially be affected depending on the type of contracts being emitted by them. In general, the IFRS 17 applies to:

- Insurance and reinsurance contracts issued;
- Reinsurance contracts held by an entity; and
- Investment contracts with discretionary participation features[1] (DPF) it issues, provided it also issues insurance contracts.

[1] IFRS 4 defines a discretionary participation feature as (IFRS 17, B101):

In this context, the definition of an insurance contract is a contract in which an insurer agrees to mitigate the risk of a policyholder by eventual compensation in the case of the uncertain future event being insured were to happen and consequently affects the policyholder in question. Reinsurance contracts differ from insurance contracts in the IFRS 17 according to Dufrasne (2020) because reinsurers do not require to be exposed to the possibility of loss if the contract manages to transfer all insurance risk emerging from underlying insurance contracts.

Wong *et al* (2018) argue that reinsurers will deal differently to insurers with the IFRS 17 because reinsurers write fewer and more material contracts that answer to more particular client needs whereas insurers write an increasingly high volume of similar features contracts. Investment contracts with DPF's involve contracts in which an investor will receive an additional amount based on the financial result of the contract.

Concerning the contents in the IFRS 17, the new guidelines require a much higher level of information granularity than any other standard issued (including the IFRS 4 and Solvency II) according to Winkler and Kasal (2020). For instance, portfolios must now be split by type of business, expected profitability, and respective underwriting year; and this split must be maintained until the date of expiry. This ultimately means that companies will require to have the appropriate systems to support such heavy data, while simultaneously dealing with unforeseen variables that might impact the granularity of their contracts.

Two models compose the overview of the new accounting models adopted in the IFRS 17; the general model or a simplified version of it called the Premium Allocation Approach (PPA), applied to contracts of an expiry date up to one year. The general model could be defined such that at initial recognition, an entity shall measure a group of contracts at the total of:

a. the amount of fulfillment cash flows (FCF), which are made of probability-weighted estimates of future cash flows, plus an adjustment to reflect the time value of money (TVM) and the financial risks associated with those future cash flows and a risk adjustment for non-financial risk (the latter being the main purpose of this paper and further explored in section 3.2); and

b. the contractual service margin (CSM).

According to Winkler and Kasal (2020), the CSM serves as a type of profit reserves that intends to be a buffer for interest rate movements and reduce profit volatility. However, despite the CSM, IFRS 17 is expected to produce more volatile results than any other standard. The carrying amount of a group of contracts at the end of every reporting year is supposed to be the total of liabilities for remaining coverage in the contract plus the liability of incurred claims. The liability for remaining coverage is measured by the FCF in relation to future services and CSM of the group of contracts, whereas the

A contractual right to receive, as a supplement to guaranteed benefits, additional benefits:
(a) that are likely to be a significant portion of the total contractual benefits;
(b) whose amount or timing is contractually at the discretion of the issuer; and
(c) that are contractually based on:
(i) the performance of a specified pool of insurance contracts or a specified type of insurance contract;
(ii) realised and/or unrealised investment returns on a specified pool of assets held by the issuer; or (iii) the profit or loss of the company, fund or other entity that issues the contract.

liability of incurred claims is calculated as the FCF in relation to past services. (McCarthy, Gaffney, Regan, 2017) Regardless, Winkler and Kasal (2020) state that if all future cash flows are based on initial expectations, the financial results will be entirely driven by the CSM and Risk Adjustment, which partially explains the importance of accurately calculating these variables.

Other main aspects of the IFRS 17 which have a direct connection with the calculation of risk adjustment of non-financial risks are the level of aggregation and diversification. (Hannibal, 2019) The IFRS 17 requires insurers to not only separate insurance contracts by lines of business, but also by similar risks involved, to guarantee that these are managed together (McCarthy, Gaffney, Regan, 2017). Chng, Cheung, Lee and Chan (2019) add to this by identifying that grouping contracts in this way ensures the transparency required of an entity's financial disclosures and performance. The IFRS 17, therefore, concludes that each portfolio of insurance contracts must be divided into a minimum of three groups:

- A group of contracts that are onerous[2] at initial recognition, if any;
- A group of contracts that at initial recognition have no significant possibility of becoming onerous subsequently, if any; and
- A group of the remaining contracts in the portfolio, if any.

Mccarthy, Gaffney and Regan (2017) contribute with their study by adding that the IFRS 17 is strict about not permitting to include contracts issued more than a year apart in the same group. Moreover, if it were the case in which a portfolio would fall into different groups it would only be justified by law or regulation that limits the entity's ability to set different prices for policyholders' contracts with different characteristics. The focus on onerous contracts derives from the fact that the IASB decided that contracts that fall into this category should be public and accessible. In addition, their respective losses should be adequately and explicitly accounted for. Reinsurance contracts cannot be onerous and therefore do not follow these guidelines directly.

In terms of diversification, Hannibal (2020) discusses the upbringing issue of diversification when calculating risk adjustment for a group of insurance contracts instead of one individual insurance contract. As an example, annuities and term insurances contracts might be allocated together but carry longevity and mortality risks, respectively. As such, entities will have to decide how to tackle the "problem" of diversification internally while considering risk adjustment. Moreover, the IFRS 17 allows diversification by stating in paragraph B88 of the IFRS 17 that:

> *"(…) because the risk adjustment for non-financial risks reflects the compensation the entity would require for bearing the non-financial risk arising from the uncertain amount and timing of cash-flows, the risk adjustment for non-financial risks also reflects:*
>
> *a. the degree of diversification benefits the entity includes when determining the compensation it requires for bearing that risk, and*

[2] An insurance contract is onerous at the date of initial recognition if the fulfilment cash flows (FCF) allocated at the contract, any previously recognized insurance acquisition cash flows and any cash flow arising from the contract at the date of initial recognition in total are a net outflow. (CHNG, CHEUNG, LEE & CHAN, 2019)

b. both favorable and unfavorable outcomes, in a way that reflects the entity's degree of risk aversion."

This, therefore, shows that the entity must be able to identify the category in which their risk appetite falls. Eventually, diversification can occur because of interaction between risks and collections of contracts, contracts groups, portfolios, etc (Hannibal, 2020). In fact, Hannibal proceeds to describe the likeliness of an appropriate risk adjustment calculation for a collection of contract groups as lower than the sum of the risk adjustments for every individual group. This is reflected by the now-low diversification level contained in every group because of the new guidelines in IFRS 17 to separate them not only by business line but also by risks involved. Diversification is lowered by this since it is directly derived from the interaction between two or more risks. This approach can also be applied to the risk management of non-financial risks. It can be assumed that within the IFRS 17 insurers will now group contracts with similar non-financial risks and so the treatment against diversification will not be as complex as before.

With higher levels of aggregation of contracts with different product types, the output is not as clear and malleable as small amounts of contracts within groups (Hannibal, 2020). This simply is because aggregation results in a higher pool of outlier risks which if unaccounted for, create more damage than the main ones. Alternatively, Hannibal (2020) explains that therefore the risk adjustment for non-financial risks at a consolidated group level (with high aggregation) can be the same as the risk adjustment at the individual entity level. This is where the VaR approach for risk adjustment comes in place for example. By using correlation and stress-testing, the calculation for risk adjustment can be used by testing different approaches and assumptions. Afterward, the main differences found in these tests can be used in a correlation matrix for aggregation.

Despite the individual challenges that may arise within the implementation phase of the IFRS 17 in general, exploring the different methods of calculation for risk adjustment of non-financial risks will not only imply an innovation boost in the market but will also contribute to the advance of adopting all guidelines issued in the standard, guaranteeing a considerable approximation to minimally fulfilling the expected requirements until January of 2023. However, insurers must be aware that a macro vision must be adopted to fully comply with the requirements. This means that these entities must avoid focusing solely on the new guidelines the standards themselves bring and include components of previous standards as well.

2.2. IFRS 4

Published in 2004 by the IASB, the IFRS 4 had two predominant characteristics incorporated into it. Mignolet (2016) describes the first one as an allowance for companies to continue with their individual accounting practices and the second as a focus on enhanced disclosure of future cash-flows of insurance contracts. These two characteristics initially had the main objective of harmonizing the accounting policies for insurers but were unsuccessful in achieving this (Rajala, 2020). Mignolet justifies this with the argument that because the IFRS 4 was so vague and in a way unrestricted, numerous different accounting models were eventually developed with the main focus on individual jurisdiction regulations and not necessarily on the standard's guidelines itself.

Mignolet (2016) proceeds to state that the limited regulations embedded in the IFRS 4 eventually led to incomplete financial statements which consequently created ambiguity in reporting and difficulted any effective decision-making in the insurance sector. On the other hand, a valid justification given by Rajala (2020) is that before the IFRS 4 there were no other standards specifically issued for insurance contracts, and therefore it was doomed to have unpredictable flaws which would need repairing later. The financial statements, according to the IFRS 4, were required to disclose the timing and uncertainty (this is where risk adjustment comes in) of cashflows in insurance contracts including their risk management and terms (Rajala, 2020). There was, however, no emphasis on preventing a potential mismatch between assets and liabilities, and therefore an issue most insurers did not account for in the upcoming years (Mignolet, 2016).

Dufrasne (2020) adds to the two main problems presented above with an additional third one: when a company issuing insurance contracts presented its financial statement, it was not required by the IFRS 4 for these statements to be relevant economically wise. The reports contained uneven financial numbers of their predicted cash-flows with the real cash-flows, and so real results were not presented at all, only the company's predictions. This ultimately means that unpredictable economic, market, and other variables' impacts were not accounted for, consequently deepening the impossibility of accurate internal and external comparability between statements. Entities under IFRS 17 will be obliged to recognize their profits only upon their delivery, which would successfully address the uneven predictions-versus-real results problem insurers have been undergoing until now (Rajala, 2020).

The main differences between IFRS 4 and IFRS 17 according to IASB (2020) are summarized below in Table 1 and Table 2. As aforementioned, two key aspects that IFRS 17 aims to improve are transparency and comparability of financial statements. Thus, it is important to examine the differences between IFRS 17 and its predecessor IFRS 4 in terms of transparency and comparability. Most considerable improvements have been made in valuing insurance contracts, in the comparability of insurance contract valuations, and overall information provided by insurance contracts in financial statements.

IFRS 4 – little transparent or useful information	IFRS 17 – more transparent and useful information
Information about the value of insurance obligations	
Some companies measure insurance contracts using out-of-date information.	Some companies will measure insurance contracts at current value.
Some companies do not consider the time value of money when measuring liabilities for claims.	Companies will reflect the time value of money estimated payments to settled incurred claims.
Some companies measure insurance contracts based on the value of their investment portfolios.	Companies will measure their insurance contracts based only on the obligations created by these contracts.
Information about profitability	
Some companies do not provide consistent information about the sources of profit recognised from insurnace contracts	Companies will provide consistent information about components of current and future profits from insurance contracts.
Many companies provide alternative performance measures – non-GAAP measures - to supllment IFRS4 information, such as embedded value information.	Companies and users of financial statements will use fewer non-GAAP measures; supplementary information will enable more meaningful comparisons.

Table 1: Differences between IFRS 4 and IFRS 17 in terms of providing transparent information (IASB, 2020, p. 2), by Author

IFRS 4 – a lack of comparability	IFRS 17 – a consistent framework
Comparability among companies across countries	
Accounting for insurance contracts varies significantly between companies operating in different countries.	Companies will apply consistent accounting for all insurance contracts.
Comparability among insurance contracts	
Some multinational companies consolidate their subsidiaries using different accounting policies for the same type of insurance contracts when in different countries.	A multinational company will measure insurance contracts consistently within the group, making it easier to compare results by product and geographical area.
Comparability among industries	
Some companies present cash or deposits received as revenue. This differs from accounting practice in other industries, in particular, banking and investment management.	Revenue will reflect the insurance coverage provided, excluding deposit components, as it would in any other industry.

Table 2: Differences between IFRS 4 and IFRS 17 in terms of providing comparable information (IASB, 2020, p. 3), by Author

Overall, all the key aspects of change between both standards are listed in the tables above. However, it does not mention more detailed differences such as that portfolios must now be split (until expiry) into lines of business, expected profitability, and respective underwriting year (Winkler & Kansal, 2020).

Dufrasne (2020) also brings attention to the fact that there is no mention of aggregation whatsoever in IFRS 4, which ultimately means that it does not include information or guidance in regard of the separation of onerous contracts. This could potentially lead to contracts being grouped together that may offset each other, and this is one of the main points IFRS 17 aims to avoid.

2.3. SOLVENCY II

Solvency II was released on the 1st of January of 2016, and, according to Coughlan, Normand & Vickery (2017), a considerable number of insurers completed their first applied annual cycle required by Solvency II just as the IFRS 17 was published in May of 2017. Moreover, exploring the similarities and/or differences between both resulted in beneficial efficiency in meeting both standards' guidelines. The focus of the Solvency II reporting as a prudential regulatory regime is on an insurer's financial strength during the year rather than its performance (IFRS 17). Hence, the comparable factors of both standards are in a way more technical than theoretical. This ultimately implies that the definition and scope of one standard differ from the other. However, the methods in which they achieve their objectives are similar, since, according to the European Financial Reporting Advisory Group (EFRAG) (2020) both adopt a current-value measurement basis.

Solvency II dictates a specific and consistent valuation approach to all types of contracts issued by insurers (pwc, 2017). The IFRS 17 however, considers contracts which do not carry significant insurance risk to be categorized as financial instruments and therefore are not accounted for. In addition, every insurance contract has potentially a different measurement model than the others. For the sake of this paper, we will focus primarily on risk adjustment and how this variable is dictated in both standards. Coughlan, Normand & Vickery (2017) state that the concept of risk adjustment is fundamental in both. In Solvency II, the "allowance" for risk is based on the Cost-of-Capital Approach and has a prescribed calibration integrated to it. On the other hand, the IFRS 17 risk adjustment is based on own judgment and must obey specific principles portrayed through guidelines. In addition, differently from Solvency II, the IFRS 17 requires distinct and separate risk adjustments for gross liabilities/assets and reinsurance. The differences are summarized in table 3 below:

Topic	Solvency II	IFRS 17
Approach	"Transfer value" - prescribed (e.g. Cost of capital at 6%, 99.5% risk allowance,etc.)	Compensation for bearing the uncertainty about the amount and timing of the cash flows that arises from non-financial risk
Scope of risks	Prescribed set of risks	Narrower than Solvency II
Calibration of risks	Standard formula or internal model (where approved)	Not prescribed (principle-based)
Diversification	Entity level	Not prescribed (principle-based)
Impact of reinsurance	Single net of reinsurance risk margin	Separate risk allowance for insurnace and reinsurance held
Unit of account	Line of business	Group of contracts (for CSM purposes notably)
Tax	Impact of loss adsorbing capacity of deferred tax (LADCT) not permitted	No prescribed approach to LADCT
Disclosure of confidence level	No	Yes

Table 3: Summary of differences between Solvency II and IFRS 17 allowances for risk, by Author (Source: pwc, 2017, p. 10)

The EFRAG (2020) proceeds to explain that Solvency II and IFRS 17 both apply a balance sheet approach focused on measuring liabilities at a specific point in time, with the main difference that the IFRS 17 includes guidelines and requirements for the accounting of any changes either in the balance sheets (in the form of risk adjustment) or in profit & loss statements. Both regimes focus on the uncertain future cash flows that might surge from entities' insurance contracts. EFRAG Secretariat identifies other similarities between these two standards. For instance:

> *"(…) all contracts with significant insurance risk that are legally regulated as insurance activities represent the common scope of application of the two regimes. These two different formal scoping approaches capture a large common area and will translate in practice in differences only for those contracts legally regulated as insurance activities that do not have significant insurance risk." [p.4, 22 (a)]*

Regarding risk adjustment specifically, they deepen their analysis by stating that:

> *"(…) for Solvency II, this adjustment is determined and fixed in legislation. IFRS 17 requires judgement, both in respect of the estimation technique as well as for the parameters that serve as input. At the same time, it should be noted that the Solvency II cost-of-capital technique is an accepted technique under IFRS 17, that it could be suitable for certain portfolios." [p.5, 22 (j)]*

The statement above fully proves the importance of mentioning Solvency II in this paper. It is fundamental to recognize that understanding the junction of both could be beneficial for an entity that falls under both regimes and to which the Cost-of-Capital approach for its risk adjustment deems appropriate. EFRAG (2020) asserts that the risk margin's principles and processes defined in Solvency II, if properly adapted, can be considered for the practical implementation of IFRS 17. However, because the IFRS 17 requires contracts' risk adjustment to be calculated at the entry-point view while Solvency II required it to be calculated at the exit-point view, it is most likely that while many portfolios may potentially have similar risk adjustments, most will not.

In general, EFRAG (2020) concludes that while the possibility of synergy between both standards exists, the proportion in which this can potentially be achieved will vary between insurers. The highest potential for synergy lies in areas that are common under both frameworks, such as cash flow projections and actuarial models to measure insurance liabilities. However, it will also depend on how advanced an insurer is in the implementation phase of Solvency II in general plus the willingness and effort to adapt existing actuarial systems.

Coughlan, Normand and Vickery (2017) explore the importance of relating the IFRS 17 to other standards. Solvency II can have a much greater impact than expected on the entities affected by IFRS 17 and, by merging the similarities between both, can facilitate the process of implementation. Even though the primary focus of Solvency II is to increase the financial strength of the insurer as opposed to its performance, its inclusion in the Premium Allocation Approach (PAA), further explored in section 3.2, stated in the IFRS 17 is crucial because it recognizes that insurers can adapt an internal model for risk adjustment.

2.4. ANALYSIS

The sections above outline the necessity for a new updated IFRS 4 standard, hence the IFRS 17. Clearly there were numerous gaps within the IFRS 4 which were studied and accumulated throughout the years, mostly through trial and error, and which are aimed to be repaired with the IFRS 17. However, regardless of the supposed improvement to it, understanding the nature of the regulatory context leading up to releasing IFRS 17 shows how important it is for entities to consider other standards internally. The discussion and developments implemented in the new standard may have lasted almost 20 years, but the changes made were based on historic events seen within the market and its entities and there is no way of assuming there will not be further changes needed or that all of the gaps gathered from IFRS 4 were (or will be) solved with the IFRS 17.

As mentioned before, the regulatory changes to the insurance market have been more and more abundant and complex for the last few years and if entities do not act fast to keep up, there will be long term consequences not only in their accounting models (such as dictated by the IFRS) but also to their solvency (i.e. Solvency II). Investing time and resources in internal (or outsourced) implementation is crucial and this does not include solely comparing one standard to another and understanding their differences and similarities. The possibilities of risk adjustment calculation and this whole study in itself is simply one small detail within the whole scope of IFRS 17 and the regulatory market itself – but it is also an example of pre-strategy and anticipation future changes.

3. THEORETICAL BACKGROUND AND ESTIMATION TECHNIQUES FOR RISK ADJUSTMENT OF NON-FINANCIAL RISKS IN IFRS 17

3.1. DEFINING RISK ADJUSMENT AND NON-FINANCIAL RISKS

In the IFRS 17, risk adjustment is defined as "*the compensation an entity requires for bearing the uncertainty about the amount and timing of the cash flows that arise from non-financial risks as the entity fulfills insurance contracts*". IASB (2017) deep dives into this definition by stating that the risk adjustment for the non-financial risks in insurance contracts measures the compensation that the insurer would require to be indifferent between:

- Fulfilling a liability that has a range of possible outcomes arising from non-financial risk; and
- Fulfilling a liability that will generate fixed cash flows with the same expected present value as the insurance contracts

In essence, there is not much more specific explanation and/or fixed requirements set out in the IFRS 17, but the IASB (2017) does require the characteristics below to be followed when adopting a model:

- risks with low frequency and high severity will result in higher risk adjustments for non-financial risk than risks with high frequency and low severity;
- for similar risks, contracts with a longer duration will result in higher risk adjustments for non-financial risk than contracts with a shorter duration;
- risks with a wider probability distribution will result in higher risk adjustments for non-financial risk than risks with a narrower distribution;
- the less that is known about the current estimate and its trend, the higher will be the risk adjustment for non-financial risk; and
- when emerging experience reduces uncertainty about the amount and timing of cash flows, risk adjustments for non-financial risk will decrease and vice versa.

In addition, it is now required to provide disclosure of the methodology adopted in the calculation method of an entity, including a reconciliation of opening and closing risk adjustment balances in the cash flows. In Solvency II, a risk margin is defined as the notional amount required by a market participant to be able to capture a group of contracts to guarantee the full payment of liabilities. In IFRS 17 the risk adjustment calculation is specific to the entity while the risk margin is dependent on market perception but in the end, they both tend towards the same output.

The risk adjustment for non-financial risks is justified in IFRS 17 by the concept in which the expected future cash flows can be affected literally by risks that are not financial. IFRS 17 does not specify a list of the risks that are considered to be non-financial. However, IFRS 17's Appendix A defines a financial risk as "*the risk of a possible future change in one or more of a specified interest rate, financial instrument price, commodity price, currency exchange rate, index of prices or rates, credit rating or*

credit index or other variable". Therefore, depending on the insurance product, contracts can be exposed to different non-financial risks.

Understanding and identifying these types of risk are essential when calculating risk adjustment because they are necessary when deciding how to aggregate policy level risks to the entity's level like it is prescribed in Solvency II for example (see table 3 above) (Jiang, 2020). This is necessary because, under IFRS 17, the level of aggregation applied to contracts requires them to be grouped separately by profitability and business line – which implies different non-financial risks involved in one same risk adjustment calculation. For example, Jiang (2020) questions what approach an entity should adopt in the eventual case that one contract has a positive mortality rate and another within the same group has a negative mortality risk. Entities could face two approaches to the calculation; either offsetting these contrary rates or applying a correlation matrix (also for measuring diversification) not only between the variance in mortality risks but also with the other non-financial risks involved.

3.1.1. Longevity risk

Longevity risk can be defined by the exposure an insurer has to unexpected decreases in mortality, normally due to increases in life expectancy (Crawford, Haan & RuncheyY, 2008; Blake et al., 2019). Longevity risk decomposes into a systematic, non-diversifiable component, and an idiosyncratic volatility element which can be eliminated by proper mutualization techniques (Bravo & El Mekkaoui, 2018; Bravo et al., 2021; Bravo, 2019, 2020, 2021). The Organization for Economic Co-operation and Development (OECD), defines life expectancy as the average number of years that people of a particular age could expect to live if they experienced the age- and sex-specific mortality rates prevalent in a given country in a particular year (OECD, 2019).

Life expectancy can be measured using a period approach or using a (more appropriate) birth cohort approach, incorporating expected longevity developments (Ayuso et al., 2021a,b; Bravo & Ayuso, 2020, 2021). The consistent advances in medicine, decrease in child mortality rates, improved demographic factors, technology innovation are all factors that might explain the increase in life expectancy (Roser, Ospina & Ritchie, 2013). A higher lifespan creates a necessary adjustment of the expected future cash flows because it creates unpredictable outcomes, and this is where the calculation of risk adjustment is necessary and hence introduced in IFRS 17.

The increasing use of longevity markers in public policy and private practice led to a growing interest in the development of mortality and longevity forecasting methods. In the actuarial, financial, and demographic literature, the traditional approach to age-specific mortality forecasting is to pursue an empirical identification strategy by which, given some criteria (e.g., BIC information criteria) a unique discrete-time or continuous-time parametric or non-parametric stochastic mortality model is selected from a limited number of methods (see, e.g., Lee & Carter (1992), Bravo & Nunes (2021) and references therein). Empirical studies show, however, that there is no single universal mortality forecasting method that performs consistently better across populations. Because of that, and to account for model uncertainty, a recent competing research line recommends the use of model combinations (e.g., Bayesian Model Ensembles) of heterogeneous models (Bravo et al., 2021; Ashofteh & Bravo, 2021; Bravo & Ayuso, 2020, 2021a,b). An emerging modelling approach is to use machine learning and deep learning methods to predict age-specific mortality rates (Deprez et al., 2017; Bravo, 2021c,d).

3.1.2. Mortality risk

Mortality risk can be considered as the contrary of longevity risk. Cox, Lin and Pedersen (2009) describe mortality risk as "*the risk of more deaths than expected, or the risk that observed death probabilities are higher than expected*". For life insurance products for example, in the eventuality that greater death claims are incurred than expected (due to pandemics, catastrophes, or other external and unpredictable factors), the insurer may face solvency issues as it tries to mitigate the additional expenses caused (which connects with the next risk identified). The insurer needs to have a margin that considers this risk as it can create financial issues for the insurer and is unmeasurable even on a historical data basis.

3.1.3. Expense risk

Chapter 6 of the Life Insurance Capital Adequacy Test by the Canadian Office of Superintendent of Financial Institutions defines expense risk as "*the risk associated with the unfavourable variability of expenses incurred in servicing insurance or reinsurance contracts*". This variability origin due to the variation of policies, excess claims, lapses, decreases in new business, and other variables that could impact the entity's overall expenses.

3.2. UNDERSTANDING THE NATURE OF THE CALCULATION

The method of calculating an entity will opt for will depend to what extent they can meet the below criteria set out in IFRS 17 (Easson & Boucher, 2019):

- consistency with how the insurer assesses risk from a fulfillment perspective;
- the practicality of implementation and ongoing re-measurement; and
- translation of risk adjustment for disclosure of an equivalent confidence level measure.

Insurers have to ensure that the value found for risk adjustment portrays how much uncertainty it is willing to accept of the timing and amount of cash-flows deriving from non-financial risks. It is then this compensation that will determine the confidence level to set the risk adjustment to. The discount rate that adjusts future cash-flows is to the entity's rightful "judgment" at the moment of choosing an appropriate method of calculation for their business so that it is consistently used regardless of the reporting period. In essence, the calculation for expected future cash flow should be probability-weighted estimates of future cash outflows minus the future cash inflows at the fulfilment of contracts. Once you have this value and it is discounted at present time and adjusted for non-financial risks, the concept of Fulfilment Cash Flows (FCF) is introduced.

The discount rate needs to be predicted so that it reflects the main characteristics of the cashflows. Adequate benchmarking of economic market prices must be applied to reduce as much as possible any discrepancies between the entity's liabilities for a given group of contracts. This includes implications of external factors exclusion that may affect market prices bu not the contract' obligations (Oliveira, 2020). This way, the classical present value (PV) formula is used:

$$PV = \sum_{t-1}^{T} \frac{CF_t}{(1 + r_t)^t} \quad (1)$$

Where:

CF_t represents expected cash flows at time *t;*

r_t represents the discount rate at time *t;* and

T represents the maturity of the contract liabilities.

IFRS 17 allows for probability-weighted estimates of CF_t to be based on a higher level of aggregation, like for example in each individual Line of Business (LoB) and then aggrupated into individual groups of contracts (Oliveira, 2020).

The discount rate, r_t, will therefore adjust CF_t to reflect the time value of money and the underlying financial risks and can be assumed to be within the period $[\boldsymbol{t} - \mathbf{1}, \boldsymbol{t}\ [$, which allows for the assumption that $r_t = 1, \dots, T$, where T is defined as the maturity of the contracts liabilities (Oliveira, 2020).

Furthermore, merging this with the concepts described in IFRS 17 and mentioned above, we reach the formula in which, at initial recognition, the FCFs of a group of contracts equals the present value of expected future cash flows plus the risk adjustment of the financial risks that are unaccounted for in the expected cash flows. Giving us the simplified formula:

$$FCF = PV + RA \quad (2)$$

The confidence level to be used in the calculation is also not specified in IFRS 17. Jiang (2020) suggests using 70th to 80th percentiles considering the "industry-wide consensus" in other regimes such as Solvency II and International Capital Standard (ICS). If an entity decides to adopt the VaR approach (which will be explained further in this paper), using the same confidence level as the one used in these frameworks facilitates the risk adjustment calculation under IFRS17.

When calculating RA, it is also very important to consider at which level it will be calculated: policy level? Company level? This is necessary because of the level of aggregation dictated in the norm which requires contracts with different levels of profitability to be categorized into different groups (onerous and non-onerous). Alongside the aggregation, as mentioned before, IFRS 17 focuses a considerable amount on maximum diversification between risks. Therefore Jiang (2020) suggests that companies might need to calculate the RA at a higher level, and therefore determine how to allocate it back to the group of contracts level.

If there is expected profitability in a given contract then after estimating the FCFs an entity will need to set the CSM. It is eventually the FCFs and the CSM together that will determine the value of an insurance contract. Therefore, given that the CSM can never equal to zero, at initial recognition it must be set symmetrically to the FCFs such that:

$$CSM = -Min\{FCF, 0\} \quad (3)$$

The negative sign is included in this formula because of the assumption that there will only be a CSM when FCFs are less than 0 (in other words, when there is expected profit). If the FCFs are positive,

there will be no CSM and the group of contracts will be considered as onerous (loss component) and immediately identified in the Profit & Loss. This is summarized in figures 1 & 2 below:

Figure 1: Profitable insurance contract value at initial recognition, by Author

Figure 4: Onerous insurance contract value at initial recognition, by Author

In the longer term, as both the RA and CSM require constant recalculation, it becomes clear how the RA measure can impact the CSM through the changes in future services, given that the past and current changes are released in the P&L (Oliveira, 2020). Hence, the calculation of RA impacts the financial performance of any given group of contracts during their life cycle. Either through this release or CSM adjustments at each recalculation period, proving the importance of appropriate estimation techniques for their overall financial results.

In order to identify in what type of liability contract the RA shall be applied in, the insurer must be able to appropriately measure its liabilities. The base for this measurement in IFRS 17 is on three different models. The first one is General Measurement Model (GMM), or the Building Block Approach (BBA), and can be applied for most types of contracts with exception of the ones with discretionary participation features. In this case the Variable Fee Approach (VFA) is used instead. They are both very similar in their essence since they both separate their liabilities in Liability for Remaining Coverage (LRC) and Liability for Incurred Claims (LIC) but calculate the CSM in different way. IFRS 17 describes the LRC as an insurer's obligations in regards to events related to the unexpired batch of the coverage period, while the LIC is defined as the obligations involved in investigating and paying claims that have already occurred (which also includes claims that have already occurred but have not been reported).

The third and last model introduced in the IFRS 17 is the Premium Allocation Approach (PAA), which is the model that should be adopted for contracts with a less-than-a-year maturity. In fact, this is the closest to the reserving model contained in IFRS 4 and is considered to be "less operationally complex" (Oliveira, 2020) because it allows an entity to hold unearned premium as LRC (while the LIC is constructed as in the GMM approach).

A summary of IFRS 17's three liability measurement models and their components can be found in Figure 3 below:

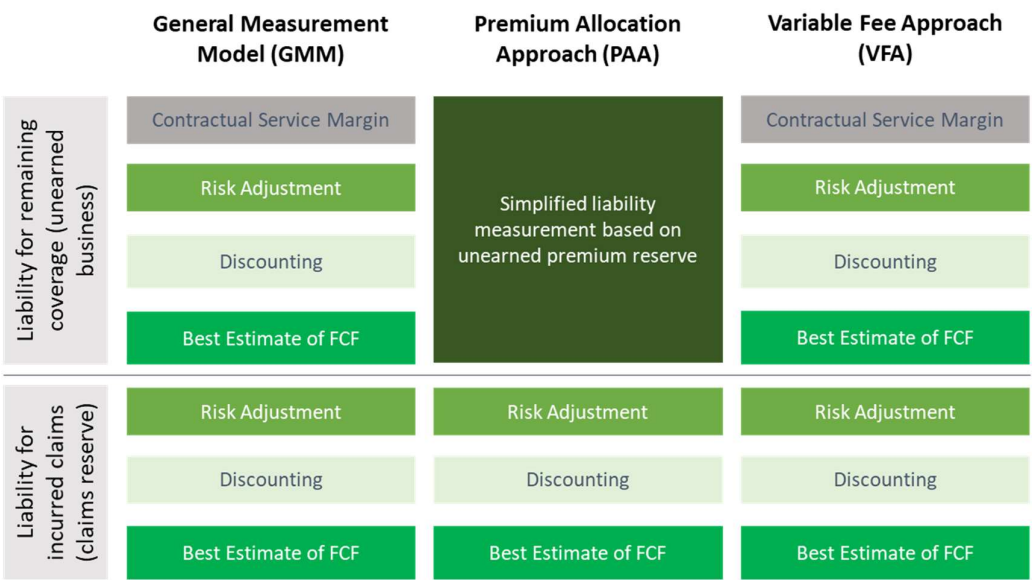

Figure 3: Liability Measurement Models, by Author (Source: Oliveira, 2020, p.16, f.3)

4. APPROACHES FOR CALCULATING THE RISK ADJUSTMENT

4.1. VALUE-AT-RISK (VAR) APPROACH

There are two phases to adopting the VaR approach for calculating risk adjustment. Firstly, the entity will need to define a risk profile by generating a probability distribution of the discounted FCFs. Afterwards, the entity will need to choose their risk measure of preference. The company can create this probability distribution by choosing from a wide variety of simulation techniques, such as using the bootstrap method, Monte Carlo simulation or Markov Chain Monte Carlo simulation (Oliveira, 2020). Once they have obtained this probability distribution the risk measure can be chosen for a given confidence level, and the RA will therefore be the difference between the value resulting from the measure and the probability's distribution mean.

Usually insurers are more familiar with the bootstrap method, which consists in using historical information to generate stochastic scenarios. The main characteristic of this method is that it used historical observations to predict future observations. As far as big samples go, this could be a advantageous method to adopt considering it can provide good approximations to the real probability distribution (meaning that it might not be as beneficial to small samples. Oliveira (2020) summarizes the process of generating a probability distribution through the bootstrap method of a given random variable X into 4 main steps:

1. Construct a model for X that depends on variables Y, Z, …, where their distributions and dependencies are known;
2. For $i = 1, \dots, n$, generate pseudo-random values y_i, z_i, … , and then, using the same model from the first step, compute x_i;
3. The probability distribution function can then be approximated by $F_n(x)$, the empirical probability distribution based on the samples x_1, x_2, … , x_n;
4. Calculate mean, variance, probabilities (quantiles) using the empirical probability distribution function.

The Monte Carlo simulation on the other hand would consist in performing repetitive simulation processes for risk variables given an underlying distribution. In other words, random numbers would be generated and compared repeatedly to a specific risk variable to generate a probability distribution.

Regardless of the method chosen, once the probability distribution has been set the entity will then have to choose the most adequate risk measure. When considering the formula used in the VaR approach to define risk measures it becomes fundamentally important to use two main definitions. The first definition is in regard of a coherent risk measure by Artzner et al (1999):

(2) A statistical measure e f: $F \rightarrow \mathbb{R}$, where $F \in \Omega$ is the set of all risks, will be considered coherent if it satisfies the following conditions:

i. *Monotonicity*. For all X and $Y \in F$ with $X \leq Y$, $f(X) \leq f(Y)$;

ii. *Sub-additivity*. For all X and $Y \in F$, $f(X + Y) \leq f(X) + f(Y)$;

iii. *Positive homogeneity*. For all $\lambda > 0$ and all $X \in F$, $f(\lambda X) = \lambda f(X)$;

iv. *Translation invariance*. For all $X \in F$ and all $\alpha \in R$, $f(X + \alpha) = f(X) + \alpha$.

The VaR measure in this case is monotone, positively homogenous and cash-invariant. It is not however sub-additive, which prevents it from being a statistically coherent risk measure and therefore discourages risk diversification as guided by IFRS 17.

Secondly, we have the definition of a quantile:

(3)) The *p*-th quantile of a given random variable X (or its distribution function F_x) is represented as π_p such that

$$F_x(\pi_p^-) \leq p \leq F_x(\pi_p), 0 < p < 1 \quad (4)$$

The VaR definition can therefore be assumed as, given risk X and a probability level *p,* $VaR_p(X)$, is the *p*-th quantile of X. This way, the calculation of RA becomes:

$$RA = VaR(p) - \mu \quad (5)$$

Where:

μ is the mean of the probability distribution set out in the first phase of this adoption exercise.

The VaR approach is commonly used in the aforementioned standard formula under the Solvency Capital Requirement (SCR) calculation in Solvency II (Hannibal, 2018). In Solvency II the standard formula uses stress tests and correlations which are fully calibrated by EIOPA. The confidence level required is set at the 99.5th percentile over a one-year time horizon and covers all risks (financial and non-financial) that can be mitigated by capital.

Because the risk adjustment aims to tackle the uncertainty over the life of insurance contracts, using the VaR approach can create stresses that can be considered to be "too large" if the same percentile were to be used. The challenge for entities is to be able to properly choose and justify the appropriate percentile for their risk adjustment calculation. Regardless, most insurers have chosen to adopt this approach because it is easy to roll out and has a rather simple comprehension of its background. It provides consistent results and combines the Solvency II and IFRS 17 requirements, facilitating their individual future disclosures.

4.2. COST-OF-CAPITAL (COC) APPROACH

As an alternative to the VaR approach, and probably a commonly-adopted approach in the future as it is somewhat the same approach prescribed for risk margin in Solvency II, is the Cost-of-Capital (CoC) approach. This method is estimate-based and involves calculating the successive capital requirements of a contract's obligations during its lifecycle. In this case, the risk adjustment is the compensation required by the entity to reach its return target. (Oliveira, 2020) In other words, it projects the liabilities during the duration of the contract to set out future capital estimates. The CoC method also requires rates and discount rates to reflect the required compensation for acquiring the capital at risk and to bring the future required capital to a present value, respectively. Thus, by joining all of these variables together, the final formula for risk adjustment under the CoC approach is:

$$Risk\ Adjusment = \sum_{t \geq 0} \frac{r_t \text{ x } C_t}{(1 + d_t)^t} \quad (6)$$

Where:

C_t is the estimated capital amount for period t,

r_t is the CoC rate for period t and

d_t is the discount rate for period t.

To calculate the initial capital amount, simulation-based capital modeling is required to generate a shocked cash flow for given risks within a product. Eventually, the pattern observed in that simulation should be proportionally applied to previously constructed capital requirements to calculate future cashflows best estimates. The assumed CoC rate is the Weighted-Average Cost of Capital (WACC), reflecting the entity's risk appetite (or willingness to invest its capital in a risk x return ratio).

The applied discount rate is completely dependent on an individual entity's choice, its only requirement is that it is consistent with the rates used to calculate PV of future cash flows. The statement in itself is self-explanatory when it comes to outlining potential gaps and mistakes within the CoC approach. There is no obvious explanation in using the same discount rate across entities as their financial profiles and appetities vary, however making it solely the entity's choice may create great divergence in the market which could potentially lead to the same exact thing the IFRS 17 aims to improve from the IFRS 4 – impossibility of comparison between insurers.

This calculation is widely compared to the risk margin formula set out in Solvency II, which is as follows:

$$Risk\ Margin = \sum_{t \geq 0} \frac{6\% \text{ x } SCR_t^{reference\ entity}}{(1 + r_{t+1})^{t+1}} \quad (7)$$

Where:

SCR_t is the Solvency Capital Requirement.

In Solvency II, different from the risk adjustment calculation seen above, the 6% of the formula above represents a pre-determined CoC. The rate for period t is determined by EIOPA and the confidence level is set at the 99th percentile over a one-year horizon (Hannibal, 2018). Risk margin under Solvency II is described as the amount required for the value of technical provisions to match with the amount required by a secondary entity if it was to step in to meet the obligations during the duration of the insurance contracts of the primary entity. It commonly covers non-hedgeable risks which at the market level are most of the time considered to be non-financial risks.

Regardless of these differences, entities might find that using the CoC approach could be a way of recycling the resources already required for calculating the risk margin under Solvency II. Nonetheless, focusing on this recycling of resources might prove ineffective if the main differences are not taken into account, since it would mean that not all RA requirements could be met under IFRS 17. While the definitions of risk adjustment and risk margin can be considered to be elementally similar, Oliveira (2020) points out important gaps between both. For example, the risks in scope for the risk margin

solely filters non-hedgeable risks – which includes operational risks. Risk adjustment under IFRS 17 *specifically* excludes operational risk.

4.3. COMPARISON OF APPROACHES

The most important characteristics in the risk adjustment calculation paragraphs within the IFRS 17 is that they specifically outline guidance and minimum requirements, which is why studies like this one are made possible. The fact that entities may choose between the approaches that suit them and their financial profile best is what allows for a critical discussion between these calculation methods at market level. While this paper and specifically this section has predominantly focused on both, there are numerous other approaches that may (and will) be used across entities.

Regardless of these numerous options, considering the differences and similarities between both approaches discussed in this paper is fundamental to the critical analysis being carried out with this study. For instance, while the VaR method may seem very easy to comprehend and apply, an entity might choose the CoC method because it allows recycling of resources already used in implementing Solvency II. If an entity is able to recognize what should be different within the IFRS 17 risk adjustment and the risk margin under Solvency II, implementing the CoC approach might be more financially beneficial in the long-term and could allow for improved overall efficiency to regulatory compliance.

Taking this into consideration and assuming that most entities will choose the CoC methods for these reasons, being in accordance with the "most used risk adjustment calculation method" within entities can also be very beneficial in the long term, considering that this will allow for easier benchmarking across different insurers and improve the compliance level to the IFRS 17, considering one if its main objectives is to improve transparency and comparability within entities. Another reason entities might choose the CoC approach over the VaR approach is that it does not require a probability distribution which could potentially mean a less costly implementation and shift to comply to IFRS 17.

If the entity, however, disconsiders the cost-factor and wishes to focus on successful results and risk measures, then it might decide to go with the VaR approach. Regardless of an added level of complexity to the steps needed to use this calculation approach, it can provide more consistent results and facilitates disclosures considering that the confidence level is defined at outset. This could seem like a better strategy for many if the "bigger picture" is the focus of their implementation. The reason of this being that the calculation approach under IFRS 17 is only one detail under the new standard, and other details – such as improved disclosure of results – are also within the scope and in need of being considered.

5. CONCLUSION

As mentioned throughout this paper, the method chosen to calculate Risk Adjustment whilst simultaneously complying with IFRS 17's guidelines is solely up to the entity in question. By exploring the background and context of the guidelines set out for RA in the standard we have been able to break down two different possible methods, the VaR approach and the CoC approach. Regardless of their choice insurers need to understand that implementing IFRS 17 impacts much more than their own individual business, it impacts the insurance industry as a whole. The faster they recognize which method is suitable to them specifically, the better and efficiently they can prepare to disclose their information and focus on areas that require their attention. Entities should be aiming for a balance between regulating compliance and their risk appetite.

The VaR approach can be easy to understand and apply, allows consistency in simulated and shocked results and has facilitated disclosure since entities are allowed to define a confidence level at outset. On the other hand, it discourages diversification since it is technically a non-coherent risk and relies on the creation of a probability distribution. Alternatively, the CoC approach potentializes recycling resources/methods already needed under Solvency II, which as discussed earlier should be greatly taken into consideration by insurers as complying with all regulations (not only IFRS 17 individually) results in better performance for their business. Additionally, the CoC approach greatly increases comparability between companies (an essential focus area of the updated IFRS 17) and does not require a probability distribution. However, it demands an implied confidence level, externally defined rate of return and capital measure.

Estimating risk adjustment, in an industry where mitigating risks has become more and more fundamental to an entity's overall financial performance, will bring insurers one step closer to meeting their targets and long-term goals. The guidelines dictated in IFRS 17 for this calculation are mere catalysts for an entity's year-end results and guarantee consistent stability. In terms of practical applicability, the CoC approach seems like the most adequate for entities, assuming they can identify the main differences in Solvency II's risk margin and risk adjustment under IFRS 17. The fact that the IFRS 17 is a principle-based standard ultimately requires that an entity cautiously studies its individual computation abilities and flexibility in meeting the requirements.

Levitating the appropriate risk adjustment method discussion is necessary and with great market relevance. It is by providing this initial contextualization that the first step is given in preparing for IFRS 17's implementation. Risk adjustment is a very important component of the standard in general and there are many other approaches that could be adopted which have not been brought forward in this paper. Nonetheless, in the hope of contributing to the insurance regulatory industry, the two most widely-known approaches were introduced in this dissertation. This does, however, also mean that there are other methods in the market which could potentially be a better fit for any entity, which were not explored in this paper.

Furthermore, there was no practical application discussed in this paper which leads to a "proof" limitation – given that the technical theory derivated in this study was not embedded by a concrete statistical modelar example. Nevertheless, this paper emphasizes on the necessity of action from insurers in order to fully understand not only what the IFRS 17 wants in the future but what it changes

from the past. Considering the risk adjustment calculation proposals presented in this paper is not enough for full compliance and risk mitigation for an entity.

While the main objective of the IFRS 17 was to improve the “errors” seen with the release of IFRS 4, it is impossible to assume that the IFRS 17 will not lead to gaps and other “errors” such as the IFRS 4, leading eventually to the necessity of another so-called improvement to it. While it is important to understand its components and individually decide on a better risk adjustment calculation approach, this study lacks the ability to predict all negative characteristics which may (and probably will) arise in the future.

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