Research paper

Discount rate in accounting :

How practitioners depart the IFRS Maze

Towards the end of determinism in accounting

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Les propos exprimés n’engagent que leurs auteurs.

The present report has been produced with the financial support of the Autorité des Normes Comptables, Ministère des Finances, Paris.

The authors thank the ANC for making possible the collection of the enclosed fructuous data.

Of course, such qualitative surveys wouldn't benefit the research, and thereby the standard setters if the interviewees quoted in the present report didn't allow us some of their precious time.

We sincerely and deeply thank all our interviewees for the time they dedicated to us.

We feel honoured for the trust expressed while sharing their view.

Our colleagues and contacts who helped us in making connections and directing us to the interviewees also played an important role in making this report possible.

Some of the material that we have been able to observe being confidential, we will keep the name of our interviewees undisclosed as well as the name of their organisations.

Solvita Jancevska and Emmanuel Laffort have also contributed to the analysis and data collection. We thank them for their implication.

Acknowledgment: Only the authors produced the analysis carried in this report. In no circumstances does it express the ANC view.

To cite the present report:

BLUM V., THEROND P. (2019). Discount rates in accounting: How practitioners depart the IFRS Maze, Autorité des Normes Comptables

April 2019 version

In order to make correct capital expenditure decisions, corporate management needs at least three sets of information.

Estimates must be made of net capital outlays required and future cash earnings promised by each proposed project. This is a problem in engineering valuation and market forecasting.

Estimates must also be made of the availability and cost of capital to the company. This is a problem in financial analysis.

Finally, management needs a correct set of standards by which to select projects for execution so that long-run economic benefits to present owners will be maximized. This is a problem in logic and arithmetic.

Ezra Solomon (1956)

List of acronyms

ASC: Accounting Standards Codification
BU: Business Unit
CAPM: Capital Asset Pricing Model
CFO: Chief Financial Officer
CGU: Cash Generating unit
COE: Cost Of Equity
DCF: Discounted Cash Flows
EBIT: Earnings Before Interest and Taxes
EBITDA: Earnings Before Interest, Taxes, Depreciation and Amortisation
EV: Entreprise Value
FASB: Financial Accounting Standards Board
FV: Fair Value
FVA: Fair Value Accounting
GASB: Governmental Accounting Standards Board
HCA: Historical Cost Accounting
IASB: International Accounting Standards Board
IFRS: International Financial Reporting Standard
IBOXX: trademark of bond indices
ICOE: Implied Cost Of Equity
IRR: Internal Rate of Return
KPMG: Klynveld Peat Marwick Goerdeler
NPV: Net Present Value
RRA: Reserve Recognition Accounting (RRA),
S&P: Standard & Poors
SBF: Société des Bourses Françaises
SEC: Securities and Exchange Commission
SFAS: Statements of Financial Accounting Standards
TEC: Taux de l'Echéance Constante
WACC: Weighted Average Cost of Capital

Executive summary

Under international financial reporting standards, discount rates have become a component of value estimations. Originating from management control and capital budgeting techniques, the application of evaluation methodologies mobilizing discount rates have always faced the challenges of putting theories into practices. This difficulty may pursue when accounting values computation adopts methodologies borrowed from financial engineering. Consequently, we seek to understand whether bridging the gap between theories and practices remains a challenge to accounting practitioners. To do so, we collect data in order to understand how accounting practitioners react and act when discount rate computation matters.

From a user perspective, discount rates in accounting are providing with fair value information. Therefore, as a form of useful information, it is expected to comply with the self-defined by IASB conceptual framework. The revised conceptual framework currently postulates, in its chapter 2, that useful information should have qualitative characteristics of relevance and faithful representation. It also lists a few enhancing qualitative characteristics, which are: comparability, verifiability, timeliness and understandability. Finally, it identifies the following constraint: *the benefit of providing the information needs to justify the cost of providing and using the information*. In the discussion ending the present report, we analyse our findings in the framework of the seven dimensions of useful information as defined by IASB. In order to answer this research question, we have conducted 30 interviews and observed the strategies mobilized by professionals in their attempt to comply with accounting standards. Our findings shed light on the lack of tools and conventions allowing practitioners to provide with a fair representation of the needed by the market prospective values, for their complexity and multiple paths are difficult to grasp in a single value. In practitioners' view, methods and sense are still lacking. The future tools developments may focus on revealing the multiple values behind the unique one displayed or provide more guidance in order to disclose a currently meaningless to operations discount rates.

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Report outline

Part I: The dual non-monetary origin of discount rates

For definition purpose, we introduce discount rates through a short retrospective. Absent from international accounting standards, a definition of discount rates is likely helpful to whom is interested in grasping discount rates meanings and social roles. In that aim, we use a double lens and address both the early link between accounting and interest rates and the emergence of capital budgeting tools, which introduced the use of discount rates as required in level 3 Fair Value Accounting in IFRS.

Literature suggests that a social fact transformed in a relative valuation method during the last century, became an objective valuation method - when transposed in IAS/IFRS - about a decade ago.

Part II: Discount rates in IAS/IFRS: are they consistent?

In a second part, the transposition of valuation methods and thereby the emergence of discount rates in IAS/IFRS is recalled. Its mobilization is examined thanks to an attentive reading of all available standards at the time of our research (2017). We hand collected all references to discount rates, whether explicit or implicit, and summarised our findings in a series of tables. Our findings evidence the co-existence of a variety of discount rate definitions in IAS/IFRS, beyond its dual definition. Astonishingly, not all of them are consistent with finance theory. Nevertheless, the implementation of finance theories has always remained controversial with regards to discounting operations. An undisclosed part of our work also contains a state of the art of the existing controversies. Our Part 2 also includes a literature review on discount rates in accounting and testifies of the resonance of such controversies in accounting.

Part III: Our qualitative study: how do practitioners bridge the gap between theories and practices?

We employ a qualitative research methodology to collect data about the effective practices in diverse organisations: listed groups, smaller non-listed companies, first tier or second tier audit firms… Through our field research, we collect 30 case studies based on interviews and observations of practitioners in the process of conducting evaluations or revaluations.

Surveyed professionals are accountants, auditors, CFO or executives with significant financial functions linked to reporting and evaluation in their company or group, institutional investors, first tier and second tier auditors, local chartered accountants, innovation managers, management consultants, experts in evaluation. They are European: French, Belgian, Italian, Spanish, based in Switzerland or in a different European country than the one they originate from, and/or can also work for an organisation of a nationality different from theirs.

Our findings offer an original description of the conditions and effects of discount rates implementation in the daily challenges met by practitioners, in their attempt to comply with the international accounting standards. Our analysis supports the one previously formulated by Barker and Schulte (2017), observing that preparers challenged by evaluation issues either transfer the problem, narrow it, or find an expedient.

Part IV: Conclusion, the bridge over troubled water

Eventually, we discuss our findings and examine whether discount rates can possibly comply with the definition of useful information as per the revised Conceptual Framework by IASB.

Part V: Recommendations

We conclude that a discount rate as an assumption based on multiple assumptions may not reach the aim of a faithful representation. We find little relevance on the practitioners' side and therefore we recommend to further study its potential relevance to the market, under the communicated form in financial statements.

We also conclude that a discount rate as potential information rather than a description or the communication of an effectively non-mobilized tool, could be relevant. We however distinguish discount rates applied to financial instruments from discount rates applied to non-financial items. We also point to the limits of the deterministic models and suggest paths to circumvent such limits.

We assert that to insure comparability, verifiability, timeliness and understandability, and under the assumption that supplemental information is costless, guidance should be provided and the disclosure of potential outputs could be favoured against the current unity of outputs.

Introduction

In just a few years, discount rates have become a recurrent estimate in IFRS/IAS evaluation models. It is now mentioned in twelve international standards: IAS 17, 19, 26, 36, 37, 38, IFRS 4, 5, 9, 13, 15, 16, roughly 21% of IAS and 35% of IFRS. Among the accounting methods involving discount rates, one finds goodwill allocation, impairment tests and their reversal, evaluation and revaluation at Fair Value level 2 (L2) and level 3 (L3). Those applications share their reliance on prospective/forward-looking estimations and scenarios. For imagining the future reality, standard setters have identified several possible starting points. One example of a standard allowing various computations of the discount rate is IFRS 13. Concretely, this variety implies that there co-exists many alternative yet equivalent ways to approach an expected future reality, and thereby leaves a consequential discretionary space to the preparer.

In practice, the operational estimation of discount rates is left to the preparer. With IFRS being present in 138 jurisdictions, amongst those 125 making the standards mandatory (Danjou 2018)[1], the numbers of preparers is hardly commensurable. Therefore, in their attempt to comply with IFRS, preparers bear the responsibility of bridging the gap between the IASB theoretical starting points - dubbed theoretical approaches in the present report[2] - and practices. And this is where the challenges start. In theory, discount rates are expected to support the description of an economic reality. In reality, when mark-to-market or mark-to-model, they are in no circumstances observable and rely on a combination of a great number of free of guidance hypotheses. Actually, despite their conceptual attractiveness and straightforwardness, discount rates based models often appear puzzling to practitioners, both for their difficulty of implementation and for their lack of sense. Moreover, the resulting estimated values are highly sensitive to one of the model hypothesis: the discount rate, itself. Our research question follows: Are discount rates mentioned in IFRS/IAS conceptually consistent? Said another way: Are discount rate based models consistent with one another and with the aim they pursue?

This main question implies a thorough appropriation and confidence in the discount rate concept, an assumption which needs to be verified. If it is not verified, the discount rate implementation will be challenging. Therefore, we also surveyed the practices in order to understand how practitioners bridge the gap between theory and practices of discount rates.

We thereby seek to examine whether discount rates as currently defined by IASB meet the self-defined - in the revised conceptual framework - useful information requirements.

1 https://www.voxfi.fr/normes-comptables-pour-une-bonne-application-au-service-de-veritables-comparaisons-2e-partie/
2 Though for some of them, the scientific foundations are not clarified.

1 PART I - THE DUAL NON-MONETARY ORIGIN OF DISCOUNT RATES

I.1 The emergence of discount rates in accounting activities

I.1.1 The absence of scientific consensus on the early accounting and interest rates: two possible ontologies

Few accounting historians have dedicated their work to the history of finance, and even less have focused on the history, the meaning or the ontology of interest/discount rates. Although, the field of research is an interesting one, it remains unaddressed in the operational accounting framework and absent from normative texts.

In an accounting history perspective, to date, two schools of thoughts confront their interpretations of the emergence interest rates, a contemporaneous concept to early accounting, as Sumerian tablets testify.

The first and oldest school of thought pledges in favour of a *production* view: it takes for starting point the operation of credit of crops or cattle as advances enabling future production. This makes of the interest rate a component of a *financing cycle* and the result of a need for (natural) resources. In line with Böhm-Bawerk (1898) and Durkheim (1894), the interest payment relates to the allocation of the fruits of the production, which was made possible thanks to the advances.

The most prominent scholar in that school of thought is perhaps Homer who wrote *a History of Interest rates*, completed by Sylla in 2005. To Homer, the notion of capital emerged circa -5000 BC, when with sedentarisation, the accumulation of possessions allowed men to breed cattle and grow crops. In support to the pastoral interpretation of interest, authors often cite the linguistics closeness of agricultural activities and credit operations. (Homer and Sylla, 2005; Nitzan and Bishler, 2009). The parallel between the two activities has favoured the description of the concept of interest as that of the natural population growth, an interpretation supported by the American Monetary Institute[3].

The tenants of the second school of thoughts - which can be dubbed the disciplinary view - rather argue that credit in Sumerian times referred to arrears, such as the non-payment of taxes. The principle is the same but the generating fact differs. In the latter case, the interest payment acts as a disciplinary fee, with regards to citizenship obligations. Hudson (2000) critically describes the operation as one of extortion.

The ways interest payments relate to production differ in the two perspectives. In the first case - the production view -, authors assume that interest is equitably shared on post-production basis. It is an effective allocation of surplus, based on trust. In the second case - the disciplinary view -, the allocation may have been set ex-ante, with mistrust as a means of putting pressure, leaving the opportunity for real production not to meet the expected one. Such situation increased the potentiality of non-payments, in which case, insolvent debtors could pledge their livestock as collaterals, avoiding their sale and the loss ownership. Cattles were next leased back with the result of their production (natural growth) paid as an interest or as a portion of a simulated repurchase price. In support of that interpretation,

3 http://www.monetary.org/a-brief-history-of-interest/2010/12 (Zarlenga, 2000)

anthropologists observed such arrangements in many tribal economies, and commonly highlighted its unidirectional specificity: the livestock is transferred from the poor to the rich. Nevertheless, the credit operation could not be deemed universal; exceptions existed. For example, in Mesopotamia, a regulated state, the mechanism didn't apply to lands, for land rights were not freely alienable.

Arguably, the two interpretations - the production vs the disciplinary view - of discount/interest rates testify of two different ways of building society through (mis) trust relations.

I.1.2 Interest rates may not capture time but only arithmetic basis

But how was the level of interest defined in ancient times? To Hudson (2000), a pragmatic explanation can be advanced: it could simply be the consequence of a quest for simple calculation in different frameworks, and more specifically different arithmetical basis (see Table 1).

Table 1: Relation between rates and arithmetic systems

Location	Nominal rate of Interest	Arithmetical basis, system of numerical fractions	Link
Sumer (3000-1900 AJC)	33,33% on grain		20-25% on silver
Mesopotamia Babylonia 1900- 625	20% to 33 1/3 % (grain)	Sexagesimal system: 1/60th	1/60 per month (1 shekel per month per mina owed) = 20% per year 10-25 % on silver
Greece	10%	Decimal system: 1/10th	10% per year (dekate)
Rome	8 1/3 %	Duodecimal system: 1/12th	8,33% per year (uncia)
Byzantium Before Justinian	12%	1/100th (nomismata)	12% per year = 12*1%
Byzantium At Justinian	5 %	A siliqua per solidus	5%
Byzantium After Justinian	8 1/3 %	1/72 th, new nomismata	1/12 the per year = 6/72

In Babylonia, circa -1900 legal maxima appear (see Homer 2005 for more details). From ninth to seventh centuries, in Assyria (Mesopotomia), normal rates on grain are included between 30 & 50% and rates on silver are included between 20 & 40 %. In Persia, in the sixth century, rates were 40% on grain and silver.

Uncertain facts: nominal rates in Babylonia increase up to 40% during the fifth and fourth centuries.

It follows that different arithmetic basis translate in different perceptions of time and result in different time discretizations. This concretely implies that interest rates levels may have more depended on the technical equipment of the actors, rather than being proportional to a universal acceptance of time and passage of time perceptions. This interpretation is consistent with that of Godelier (1969) who brought forward similar arguments when describing Baruya's deliberate asymmetric relations with other tribes.

In line with the latter interpretation, interest rate regulation can be understood as a regulation of inter-individuals relations in order to structure the society. It is arguably in the idea of bringing peace that circa 1800 B.C., in ancient Babylonia, Hammurabi dictated the following decision of his code: *The maximum rate of interest was set at 331/3% per annum for loans of grain, repayable in kind, and at 20% per annum for loans of silver by weight (Homer and Sylla 2005).*

I.1.3 Interest rates, from a conceptual representation of an obligation to the capture of time value

For a long period of time, Christianity and Islam have commonly regarded the charge of interest for a loan as a sin. Interest rates were also outlawed in India, by Buddhist and Judaic texts (at least within community for the latter). According to Young (1977), the excess of interest rates had lead to the domination and reduction of peasants. The council of Nicea (now Iznik) is an example of decision to ban usury rates. It took place in 325.

It is only once interest rates became morally and socially acceptable, i.e. after the Vth Lateran Council and the Reformation (1512-1517), that a conceptual shift was possible. Fibonacci undertook this task in his ground-breaking work in the 13th century (Goetzmann 2004).

Fibonacci was the first to demonstrate the mathematics of multiple periods discounting, and the emergence of a new abstract concept known as the time value. But it is only during Renaissance (17th Century), and after the invention of probability and statistics, that the concept of time value, Present Value and Future Value could make some sense (Nitzan and Bishler 2009).

The development of the concept of discounting opened the path to the contemporaneous use of discount rate in capital budgeting operations and the quest for putting theory into practice. However, as we will read in the next section, discount rates will nevertheless need two more centuries, and the emergence of computational techniques, to become a recurrent tool in capital budgeting.

I.2 Bridging the gap between theory and practices: a never-ending race

I.2.1 Discount rates in financial engineering: from empirical tool to the assumption of universal laws

In a remarkably detailed article, Dulman traces back the epic of discount rates to the early hours of Discounted Cash Flows (DCF) methods in the early American industry, i.e. to the end of the 19th century. At that time, accounting based measures of performance prevailed and this remained true long after the advocated father of DCF, Arthur Wellington (Dulman 1989; Haka 2005), a railroad engineer, first used the PV *to select the most profitable project* in a management control perspective. The process transforms a series of deterministic projected cash flows, in reduced ones due to the effect of time. The result is conveniently geometrically interpretable when projected on a two-dimension plan (Figure 1). The Net Present Value (NPV) representing the created value is the sole end dot.

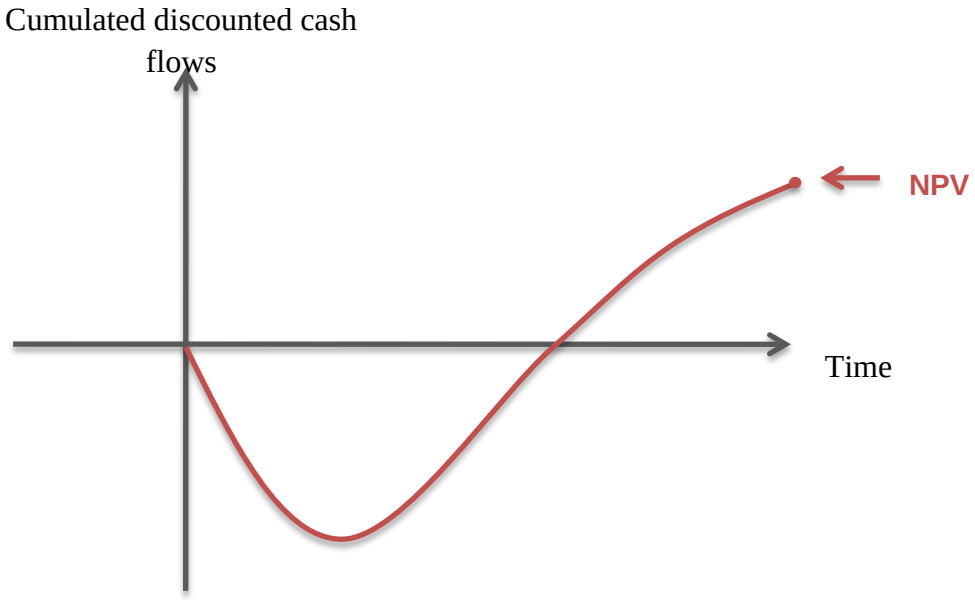


Figure 1: The NPV deterministic curve

Thanks to a long legitimation process, the method gained adopters. Legitimacy was first obtained thanks to lectures given to professional networks, such as the Engineering Society (where a presentation was made in 1914) or the American Management Association. Authors like Fish (1915) or Grant (1930) shortly after included the method in their management manuals and spread it.

It is likely that way that it reached Gregory, an engineer at Atlantic's Refining whom convinced his budget director, Horace Hill, of the usefulness of the methodology, for estimating the return on capital expenditures. It is Hill whom, simplifying the concept for his own understanding, first described the method as *the investor's method*.

Legitimacy was however not fully gained until the early 1950s, when the Court of Massachusetts decided to terminate outstanding leases on the basis of an NPV calculation.

The case, United Shoe Machinery Company vs. National Shoe Manufacturers Association, aimed at applying antitrust laws. Interestingly (see Dulman for details), it was ruled in 1953 *(4)* with a part of the court discussion including a bargaining on the discount rate to be applied. With its novel court legitimacy, the methodology was about to become the most used one in capital budgeting.

I.2.2 Capital budgeting practices: surveys testify of tools adoption, not of tools relevance

A decade later, starting with Stonehill and Nathanson (1966), academics will start to assess the level of adoption of the newly developed DCF methods, through regular surveys of practitioners' practices.

Surveys are interesting in many purposes. First, they provide with insights about the appropriation of theoretical concepts and the difficulties to implement those in the field. Second, data collected in such occasions both inventory mobilized solutions, and offer the possibility to learn about practices (and its creativity). Finally, surveys, when published, also provide an occasion for consulting academics to expand the scope of the methods by providing recommendations to a never up-to-date user.

It follows that the most extended the use of DCF methodologies, the most prominent the discount rate issue becomes. Recent results suggest a continuous trend of discount rate based methods adoption, as in 2003, 97% of U.S. responding firms (Jagannathan et al. 2016) declared using DCF methods.

Surveys usually tackle two issues: the definition of the numerator of the discounted value and the definition of the denominator, i.e. the discount rate. Wellington, our railroad engineer and first known user of DCF, approached the problem with his intuition and suggested that the discount rate should be the average loan rate. But unsure, he also included in the discount rate the growth rate of railroads (Dulman 1989). Later theoreticians approached the problem with models (such as Capital Asset Pricing Model (CAPM)) borrowed from the modern finance school. The proposed models aiming at estimating the cost of funds however experienced a difficult implementation and this raised some long lasting controversies mainly with regards to assumptions definition, specifications and calibrations. More recently, IFRS followed the still in development capital budgeting precepts but also brought up some new ones (see here after).

The additive rate controversy

DCF methods, and namely NPV, require a discount rate assumption. This is more often the cost of funds (see Graham and Harvey 2001 or any corporate finance manual). One key issue relates to the entity for which cost of funds must be estimated. On one side, some advocate that the cost of fund represent the decision-maker cost of opportunity, therefore the mother company's cost of funds. Others, in favour of an additive discount rate, pledge in favour of a specific discount rate adjustment to each *project*. Concretely, in business life and accounting matters the issue turns as follows: should one use the mother company WACC or the subsidies'?

Consistently with earlier findings (Graham and Harvey 2001), recent researches conducted by Krüger et al. (2011), and Krüger et al. (2015) illustrate the controversy and show that CFOs

4 https://law.justia.com/cases/federal/district-courts/FSupp/110/295/1878333/

still use company-wide discount rates for project evaluation. Krüger et al. see in those results irrational managers and coin the phenomenon the WACC fallacy. Indeed, unlike practitioners, Krüger et al. (2011, 2015) believe in the relevance of the additive discount rate, which supposedly correctly adjusts for the risk in valuation of single investment projects. Otherwise, the WACC fallacy leads to the overestimation of risky projects, while that of safer ones will be underestimated. The posture assumes that project with different risk levels can be compared on the basis of a single value (the NPV).

Findings also indicate that a costly WACC mistake (the division is large, the CEO has sizable ownership, the within-conglomerate diversity of costs of capital is high) leads the manager to acting in a more rational way. Therefore, the misuse of the discount rate for the project may not be caused by the lack of knowledge or understanding, as explain Graham and Harvey (2001), but rather be related to human factors. Interestingly, WACC fallacy doesn't allow for inside-firm diversification as it assumes a convergence to a same risk level for all business or activities (see here after).

In a different approach than that of the above-described surveys - the survey of the value taken in the discount rate assumption - Jagannathan et al. (2016) shed light on the measurement process of the subjective premium. They find that on average, when WACC is estimated at 8%, firms increase their DR up to 15%. The 7% premium is supposed to capture idiosyncratic risk. The survey of 127 CFOs identifies the cause of the premium: it appears not to be due to financial constraints but to operational (managerial or organisational) considerations. Interestingly, they show that lots of firms, which tend to use almost twice as high discount rates as their WACC, also maintain cash holdings. This testifies not of a limit to risk exposure but of a strategic behaviour: those firms desire to be able to grasp future investment opportunities. It follows that the discount rate used by a firm may be less relevant with regard to its degree of conservatism or risk profile than it is to its strategic decision. We further discuss (par. 2.4) the literature on risk capture in the discount rates.

I.2.3 What about the fashionable Implied Cost of Equity (ICOE)?

An emerging alternative to the discount rate calculation is the implied rate, described by Larocque et al. (2018) as reverse engineering of the cost of equity (COE) from stock price and analysts. The implied rate is also a DCF: it is indeed the Internal Rate of Return (IRR) of analysts' projections.

To estimate the implied cost of equity (ICOE), one needs three kinds of information:

- the forecasted earnings,
- the market price of the associated stock,
- and the more or less sophisticated DCF model.

ICOE appeared in the accounting and financial market literature with the turn of the millennium. Most publications were realised after 2001 (Botosan 1997; Claus and Thomas 2001; Gebhardt et al. 2001; Gode and Mohanram 2003; Easton Ohlson and Juettner-Narouth 2005; Dhaliwal et al. 2005, 2006, 2011; Botosan and Plumlee 2005; Hail and Leuz 2006; Boone et al. 2008; Attig et al. 2008; Boubakri et al. 2010; Aggarwal and Goodell 2011; Guay et al. 2011; Chu et al. 2014).

Asquith et al. (2005) advocate that analysts, by communicating recommendations with price

target and earnings forecasts, implicitly provide information about risk and cost of equity. This statement transferred a part of academics attention from analyst's forecasts to analyst's implied discount rate in their forecast. The rationale behind is simple: discounted forecast should equal current price. Cheng (2005) finds that analysts predict well one-year ahead earnings and explain very well book values but fail to capture the effects of economic rents, conservative accounting and transitory earnings.

More recently, Aggarwal et al. (2018) examine whether analysts value their own forecasts (i.e. earnings and earnings growth forecasts, which authors take for *largely dominated by near-term expectations and management guidance*), more than expected deviations in the firm's cost of equity. Findings support the already advanced idea (Jegadeesh et al. 2004; Palmon and Yezegel 2011) that analysts chase the market, and fail to provide fully forward-looking information, at least in a long-term perspective. This is in line with previous researches that highlighted that analysts' recommendations are most (positively) correlated to *momentum* variables, the latter being related to past performance.

Larocque et al. (2018), following (Easton & Monahan, 2005; Botosan et al. 2011), examine the implied cost of equity capital by comparing its estimation to realized returns, formed by 151 financial planning and analysis professionals from different companies, between 2006 and 2011. Authors confirm the wide adoption of CAPM to estimate the COEC, with 97% firms claiming its use. Authors regress the COEC estimated in year t to the realized return for a 12 months period, ending in September T+1. Results also suggest that managers rely on recent returns (recent stock performance) to formulate their estimations.

ICOEC estimates provided by managers thereby inform corporate treasury departments about how their peers price their cost of capital. Interestingly, in other matters, though often advertised as providing better results, the implied COEC estimates fail to do so. Concretely, analysts appear to focus more on recent past events than on long-term prospects. ICOE thereby would betray a suboptimal use of available information in forecasting.

I.2.4 Conclusions

Two definitions of discount rates co-exist

To end this retrospective, we borrow the definition of discount rates as suggested by Investopedia [5], which testifies of the actual lasting duality of discount rates:

Depending upon the context, discount rate has two different definitions and usages. First, the discount rate refers to the interest rate charged to the commercial banks and other financial institutions for the loans they take from the Federal Reserve Bank through the discount window loan process, and second, the discount rate refers to the interest rate used in Discounted Cash Flow (DCF) analysis to determine the present value of future cash flows.

The first is the result of an institutionalisation process of the intersubjective relations at the source of interindividual (social) contracts since antique times. For long depicted as interest rate, it has only in recent times, been designated as discount rate. Currently, it describes interbank short-term rate (24h or less facilities) as discount rates. Technically *the Fed's discount window actually lends at three rates; discount rate is shorthand for the primary rate*

5 https://www.investopedia.com/terms/d/discountrate.asp

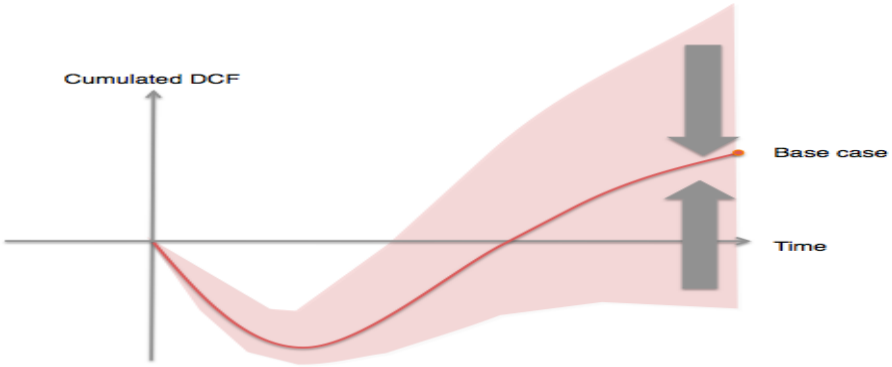
offered to the most financially sound institutions. This kind of *observed* rate can be a reference in level 2 Fair Value Measurement.

The second discount rate, originates in capital budgeting evaluation models employed in the operation of evaluation or revaluation of assets. This discount rate has a much shorter history and has been used for less than a century. In standard theory, the discount rate used to discount cash flows represent a cost of opportunity, and is more often described as the Cost of Capital, i.e. the weighted cost of funds used by the decision-maker. It is the kind of assessed rate that is used in Level 3 Fair Value Measurements.

Discount rate and the capture of risks

One convenient feature of the discount rate is its ability to capture any kind of supplemental risk, by adding point to its value in a non-bounded manner: the additive method relies on the subjective capture of risks in guesstimated premiums. Notably, this at the same time erases the potential opportunities as illustrated in figure 2. Project A (on the left) is less risky than project B (on the right), in that the volatility of the cash flows is smaller. The NPV base case is red the line, and the potential range of cash flows values is represented by the red shade. Best case (upper bound of the red shade) and worse case (lower bound) scenarios are closer to the base case for A. In such situation, following the additive principle, one should use a greater discount rate to compute B's NPV.

Figure 2: The additive discount rate, a normalization process



However, as Figure 2 suggests, when the volatility of cash flows increases, the application of a higher discount rate masks the risk and barely modifies the base case NPV estimation.

In short, a risky project (right hand) experiences a higher range of cash flows (up and down) but may converge to the same mean NPV, which hides both opportunities and threats.

Concretely, the application of an additive rate tends to normalize - in the sense of rectifying - the NPV and confuses normalization with comparability.

Graham and Harvey (2001) have identified a long list of risks that discount rates could possibly embed, including macroeconomic or momentum risks. They show that firms mainly care about exchange rates risks, business cycles risks, interest rate risks and inflation. Interestingly, as an evidence of the little confidence in the tool and its rationale, more than half of the companies chose not to adjust for risks, while more than a quarter of them adjusted their cash flows. Indeed, as most macro-economic issues can be easily incorporated in the

cash-flows (commodities prices, GDP growth, inflation and foreign exchange risks), its leaves the attribution of other categories of risks to the discount rate (interest rate, inflation). Those are indifferently mentioned in IAS/ IFRS as we will read hereafter.

However, literature also shows that the prominence of risks varies across firms: large firms identify foreign exchange risk as the primary category of risks, whereas interest rate risks prevail for small firms. Results indicate that subjective corrections and hurdle rates have always been practiced as a potential answer to risk capture.

I.2.5 The future of discount rates: Discount rates don't behave as expected and we know little about this

Theoreticians seem to always have been aware of the difficulties to apply discount rates in the field. Cochrane (2010), in his presidential address to the American Finance Association, after a technical retrospective on discount rates, has made a strong call for future research. He highlighted a too short-term focus of existing theories and the need for a long-term view:

Discount rates vary a lot more than we thought. Most of the puzzles and anomalies that we face amount to discount-rate variation we do not understand. Our theoretical controversies are about how discount rates are formed. We need to recognize and incorporate discount-rate variation in applied procedures. We are really only beginning these tasks. The facts about discount-rate variation need at least a dramatic consolidation. Theories are in their infancy. And most applications still implicitly assume i.i.d. returns and the CAPM, and therefore that price changes only reveal cash flow news. Throughout, I see hints that discount-rate variation may lead us to refocus analysis on prices and long-run payoff streams rather than one-period returns.

2 PART II - DISCOUNT RATES IN IAS/IFRS: ARE THEY CONSISTENT?

II.1 Discount rates in accounting standards

In this part, after recalling the emergence of discount rates in accounting standards, we list and summarize all references In IAS, IFRS and IFRIC. A literature review focused on discount rates in accounting illustrates the issues raised when it comes to put discount rates in practice in an accounting or financial reporting framework.

In just a few years, discount rates have become a recurrent estimate in IFRS/IAS evaluation models. It is now mentioned in twelve international standards: IAS 17, 19, 26, 36, 37, 38, IFRS 4, 5, 9, 13, 15, 16, roughly 21% of IAS and 35% of IFRS. Among the accounting methods involving discount rates, one finds goodwill allocation, impairment tests and their reversal, evaluation and revaluation at Fair Value level 2 (L2) and level 3 (L3). Those applications share their reliance on prospective / forward-looking estimations and scenarios. For imagining the future reality, standard setters have identified several possible starting points. For example, a standard allowing various computations of the discount rate is IFRS 13. Concretely, this variety implies that there co-exist many alternative yet equivalent ways to approach an expected future reality.

II.1.1 Early presence of discount rates in accounting disclosures: Reserve Recognition Accounting

The emergence of FV in accounting is not contingent to IAS/IFRS adoption (Magnan 2009, Richard 2016). Fair Value Accounting (FVA) was already practiced in the late 19th - early 20th centuries. However, in the 1930s, it became the cause of a paradigmatic shift that occurred because of *abusive valuation practices*. Following the change, historical cost accounting became the *dominant reporting practice*.

FVA re-appeared a few decades ago in the United States with the issuance of two evolution of the standard relative to oil and gas activities. Reserve Recognition Accounting (RRA), was to be applied by oil and gas companies in the turmoil following the first oil crisis (See Blum in Bensadon 2016). To increase the available information on useful resources, SEC had required the disclosure of discounted values of proven reserves. This fuelled an important debate amongst scholars about the relevancy of such information. As a result, SFAS N° 69 standard was the first one to introduce a remodelled RRA-like disclosure. It is now extended to all extractive activities under ASC 932. Notably, the 1982 version of SFAS N°69, in force until 2008, required an uniform 10% discount rate to all issuers, for making values comparable, yet highlighting the dispersion in volumes and extraction costs. On the contrary, the current ASC 932 allows an entity based discount rate to be adjusted, including to idiosyncratic hedging solutions.

Results - published in the 1980s and early 1990s - about FV disclosure relevance unfortunately remain controversial and often show little econometric quality[6], while the lack of theoretical concepts linking standard setting and valuation could reduce the reach of reliable conclusions (Holthausen and Watts 2001).

[6] For a more exhaustive reference to value-relevance, one can read Magnan *et al*. (2015), or the special issue on causality of *Accounting, Organizations and Society (Vol. 39, n°7, October 2014*).

A recent research on the topic (Patatoukas et al. 2015) supports the value-relevance of FVA. However, findings suffer external validation issues and can not be generalized as the examined sample was that of Royalty trusts, a kind of companies only existing in Canada and in the United States and aiming not at investing in extraction development or facilities but at insuring the Working Capital Requirement of a remaining (end of life and decreasing) extraction. Overall, what Patatoukas et al. prove is that FV is relevant to rent extractors betting on slow depletion, and having no will to industrially invest in a company.

II.1.2 Early presence of discount rates in accounting values: Financial Instruments and Fair Value

In 1993, a decade after the first RRA experience, in another field, SFAS N°115 Accounting for certain investments in debt and equity securities was issued. It is often recognized as the determining re-entrance of FVA. There is an important difference between the two standards mobilizing discount rates: SFAS N°69 had limited the FV measures to disclosures, whereas SFAS N°115 requires evaluation on the basis of FVA.

A decade later, in 2006, SFAS N°157 Fair Value measurement is issued and extends the scope of FVA to non-financial assets, and more precisely to revaluation and impairment tests. This inaugurates the entry of capital budgeting methods in the accounting realm. SFAS N°157 will impact the application modalities of SFAS N° 142 Goodwill and other intangible assets, formerly issued in 2001 which introduced the impairment test of business units through the assessment of their Fair Value. In 2008, SFAS N°133 relative to derivatives is also issued.

Revised in 2006, SFAS N°157 and IFRS 13 (2009) will bring the accounting theory (or conceptual framework) even further with the production of the FV hierarchy with three levels, differing by their inputs. The hierarchy is applicable to goodwill impairment tests and asset and liabilities revaluation. Table 2 describes the reference assets for evaluation, the reference market and the nature of the parameter that is specified in the accounting evaluation. Our comments point to the observability of the parameters.

Magnan et al. (2015) examine the effect of such discrepancies, in his demonstration that level 2 FVA allows an enhancement of analyst's prevision accuracy when level 3 FVA reduces the quality of public information. This justifies that level 3 FVA was once coined *marked to myth* (Kolev 2008). Finally, the recent standard on lease payments - IFRS 16 - also resorts to FVA when leases are transformed into asset values and liabilities.

Table 2: FV parameters according to levels

	Asset or Liability of reference	Reference market	Nature of the parameter	Comments
L1	Identical (more likely standardized)	Active market	Quoted price	The parameter is observable with precision
L2	Similar (sharing non standardized characteristics)	Active	Quoted price	The parameter is observable with a bias
	Similar or Identical	Non active	Quoted price	The parameter is observable with difficulty and bias
	Other (Yield curve, correlated price)	Active or non active	Transformed or estimated data	The parameter is observable with difficulty, bias and estimation error
L3	Customized	No market, the model is entity based	Assumptions reflecting a virtual transaction	The parameter is not observable

In summary, and accordingly with Magnan (2009) and the above mentioned facts, FVA legitimation has proceeded in three stages:

1) the presence of FV measures in footnotes or disclosures (SFAS 69, with a constant across firms discount rate),
2) the reduction of the historical cost accounting (HCA) scope (IFRS 13 & SFAS 157),
3) its institutionalisation through the conceptual framework and the emphasize of FVA over HCA.

This is how slightly *the move toward FVA constitutes a major shift in the basic tenets of financial reporting and raises many implementation issues because it changes how management and other stakeholders view the firm*. Indeed, FVA implementation doesn't immediately change the object but its representation and thereby its perception. Decisions are eventually influenced by the new perception (for more on the topic see Gumb et al. (2018), or Penman (2007) who compared the conceptual underpinnings of FVA and HCA).

II.2 Discount rates in IAS/IFRS

In this section, we examine the references to discount rates in all IAS/IFR, applying the following methodological approach:

To identify how discount rates are appraised in international accounting standards, three researchers attentively read every single standard. We collected all explicit or implicit references to either discount rates or present values. It appeared that:

- in some cases, discount rates were a result, an Internal Rate of Return (IRR), i.e. the implicit solution of a series of flows,
- in other cases, when the rate is a prospective parameter, discount rates are describing many different possible rates: it is either a market rate or a risk-free rate, it can capture different estimations of risks, the deadline of the rate is sometimes evoked, but not always.

The following tables summarize our findings about discount rates references. They show the diversity of discount rates definitions in IAS/IFRS and the extensive discretionary space left to preparers. They show a variety of possible approaches, sometimes because the evaluated object differs but sometimes because the standards allow a variety of approaches for evaluating the same object.

One illustration of IFRS inconsistency can be read in IAS 36 (see insert):

§ A17 As a starting point in making such an estimate, the entity might take into account the following rates: (a) the entity's weighted average cost of capital determined using techniques such as the Capital Asset Pricing Model; (b) the entity's incremental borrowing rate; and (c) other market borrowing rates.
§ A19 The discount rate is independent of the entity's capital structure and the way the entity financed the purchase of the asset, because the future cash flows expected to arise from an asset do not depend on the way in which the entity financed the purchase of the asset.

- par. A17 allows many methodologies with a) having theoretical foundations, b) having none, c) being nonsense;
- par. A19 by considering the discount rate as independent of the capital structure withdraws A17 a)

Table 3a - Discount rates as an implicit rate

Standard	Official text
IAS 17	§ 4 (…) the lease discounted at the interest **rate implicit** in the lease.
IAS 17	§ 4 **The interest rate implicit in the lease is the discount rate that, at the inception of the lease, causes the aggregate present value of (a) the minimum lease payments and (b) the unguaranteed residual value to be equal to the sum of (i) the fair value of the leased asset and (ii) any initial direct costs of the lessor.**
IAS 17	§ 20 At the commencement of the lease term, lessees shall recognise finance leases as assets and liabilities in their statement of financial positions at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments, each determined at the inception of the lease. The discount rate to be used in calculating the present value of the minimum lease payments is the interest rate implicit in the lease, if this is practicable to determine; if not, the lessee's incremental borrowing rate shall be used. Any initial direct costs of the lessee are added to the amount recognized as an asset.
IFRS 16	§ 26 **The lease payments shall be discounted using the interest rate implicit in the lease, if that rate can be readily determined. If that rate cannot be readily determined, the lessee shall use the lessee's incremental borrowing rate.**

Table 3b - Discount rates as market rate or risk-free rate

Description	Standard	Official text
DR reflects time value only	IAS 19	§84 One actuarial assumption that has a material effect is the discount rate. **The discount rate reflects the time value of money but not the actuarial or investment risk**. Furthermore, the discount rate **does not reflect the entity-specific credit risk borne by the entity's creditors**, nor does it reflect the risk that future experience may differ from actuarial assumptions.
Time value of money	IAS 36	IN 6 (…) the time value of money, represented by **the current market risk-free rate of interest**.
Risk free rate definition	IFRS 2	§B 37 Typically, **the risk-free interest rate is the implied yield currently available on zero-coupon government issues of the country in whose currency the exercise price is expressed, with a remaining term equal to the expected term of the option being valued** (based on the option's remaining contractual life and taking into account the effects of expected early exercise).
DR is a market yield at the end of the reporting period on high quality corporate bonds	IAS 19	§ IN6 (…) to determine the discount rate by reference to **market yields at the end of the reporting period on high quality corporate bonds** (or, for currencies in which there is no deep market in such high quality corporate bonds, government bonds denominated in that currency) of a currency and term consistent with the currency and term of the post-employment benefit obligations.
DR is a market yield at the end of the reporting period on high quality corporate bonds or government bonds	IAS 19	§83 The rate used to discount post-employment benefit obligations (both funded and unfunded) shall be determined by reference **to market yields at the end of the reporting period on high quality corporate bonds. For currencies for which there is no deep market** in such high quality corporate bonds, **the market yields (at the end of the reporting period) on government bonds denominated in that currency shall be used**.
DR is a current market discount rate	IFRS 4	§ 28 The insurer might make its financial statements more relevant and no less reliable by switching to a comprehensive investor-oriented basis of accounting that is widely used and involves: **d) a current market discount rate, even if that discount rate reflects the estimated return on the insurer's assets**.
DR is a current market discount rate	IFRS 9	§ 3.2.8 The computation and comparison are made using as the **discount rate an appropriate current market interest rate**. All reasonably possible variability in net cash flows is considered, with greater weight being given to those outcomes that are more likely to occur.
DR is a market rate of interest	IFRS 16	§ 71 (…) a) revenue being the fair value of the underlying asset, or, if lower, the present value of the lease payments accruing to the lessor, discounted using a market rate of interest.

Table 3c - Discount rates capturing risks

Description	Standard	Official text
DR reflects time-value and the risk specific to the asset	IAS 36	§ 55 The discount rate (rates) shall be **a pre-tax rate** (rates) that reflect(s) current market assessments of: (a**) the time value of money**; and (b**) the risks specific to the asset for which the future cash flow estimates have not been adjusted**.
DR excludes the risks captured in the Cash Flows	IAS 36	§ A15 Whichever approach an entity adopts for measuring the value in use of an asset, interest rates used to discount cash flows should not reflect risks for which the estimated cash flows have been adjusted. Otherwise, the effect of some assumptions will be double-counted.
DR adjusts for specific risk, country, currency and price risks	IAS 36	§ A18 However, these rates must be adjusted: (a) to reflect the way that the market would assess the specific risks associated with the asset's estimated cash flows; and (b) to exclude risks that are not relevant to the asset's estimated cash flows or for which the estimated cash flows have been adjusted. Consideration should be given to risks such as country risk, currency risk and price risk.
DR can be adjusted to include a risk premium	IFRS 13	§ B33 An entity can include a risk premium in the fair value measurement of a liability or an entity's own equity instrument that is not held by another party as an asset in one of the following ways: (a) by adjusting the cash flows (ie as an increase in the amount of cash outflows); or (b) by **adjusting the rate used to discount the future cash flows to their present values (ie as a reduction in the discount rate**).
DR can be a discretionary assumption (surrogate)	IAS 36	§ 57 When an asset-specific rate is not directly available from the market, **an entity uses surrogates to estimate the discount rate**.
DR is implicit, i.e. an IRR	IFRS 15	§ 64 To meet the objective in paragraph 61 when adjusting the promised amount of consideration for a significant financing component, (…) **An entity may be able to determine that rate by identifying the rate that discounts the nominal amount of the promised consideration to the price that the customer would pay in cash for the goods or services when (or as) they transfer to the customer**. After contract inception, an entity shall not update the discount rate for changes in interest rates or other circumstances (such as a change in the assessment of the customer's credit risk).

Table 3d - Examples of eligible discount rates

Description	Standard	Official text
DR is the WACC of a listed entity that has a single similar asset	IAS 36	§ 56 A rate that reflects current market assessments of the time value of money and the risks specific to the asset is the return that investors would require if they were to choose an investment that would generate cash flows of amounts, timing and risk profile equivalent to those that the entity expects to derive from the asset. **This rate is estimated from the rate implicit in current market transactions for similar assets or from the weighted average cost of capital of a listed entity that has a single asset (or a portfolio of assets) similar in terms of service potential and risks to the asset under review**. However, the discount rate(s) used to measure an asset's value in use shall not reflect risks for which the future cash flow estimates have been adjusted. Otherwise, the effect of some assumptions will be double-counted.
Multiple DR	IAS 36	§ A17 As a starting point in making such an estimate, the entity might take into account the following rates: **(a) the entity's weighted average cost of capital determined using techniques such as the Capital Asset Pricing Model; (b) the entity's incremental borrowing rate; and (c) other market borrowing rat**es.
DR is independent to capital structure	IAS 36	§ A19 The discount rate is independent of the entity's capital structure and the way the entity financed the purchase of the asset, because the future cash flows expected to arise from an asset do not depend on the way in which the entity financed the purchase of the asset.
DR is used to estimate a PV	IAS 19	§57 (…) a) ii discounting that benefit in order to determine the present value of the defined benefit obligation and the current service cost (see paragraphs 67–69 and 83–86).

Table 3e - Deadline and periodicity of discount rates

Description	Standard	Official text
Discounting can be applied over a short term period	IAS 19	§69 An entity discounts the whole of a post-employment benefit obligation, **even if part of the obligation is expected to be settled before twelve months** after the reporting period.
DR reflects the timing of the payment	IAS 19	§ 85 **The discount rate reflects the estimated timing of benefit payments**. In practice, an entity often achieves this by **applying a single weighted average discount rate** that reflects the estimated timing and amount of benefit payments and the currency in which the benefits are to be paid.
DR can be characterized by a longer maturity	IAS 19	§ 86 In some cases, **there may be no deep market in bonds with a sufficiently long maturity** to match the estimated maturity of all the benefit payments. In such cases, an entity uses current market rates of the appropriate term to discount shorter-term payments, **and estimates the discount rate for longer maturities by extrapolating current market rates along the yield curve**.
Multiple DR for future periods	IAS 36	§ A21 An entity normally uses a single discount rate for the estimate of an asset's value in use. However, an entity uses **separate discount rates for different future periods** where value in use is sensitive to a difference in risks for different periods or to the term structure of interest rates.
Definition of useful life	IAS 16 - IAS 38 - IFRS 16	Useful life is: (a) the period over which an asset is expected **to be available for use** by an entity; or (b) the number of production or similar units expected to be obtained from the asset **by an entity**.
Definition of economic life	IAS 17 - IFRS 16	Economic life is either: (a) the period over which an asset is expected **to be economically usable** by one or more users; or (b) the number of production or similar units expected to be obtained from the asset **by one or more users**.
IAS 17 contains both definitions	IAS 17	Useful life is the estimated remaining period, from the commencement of the lease term, without limitation by the lease term, over which the economic benefits embodied in the consumed by the entity.asset are expected to be.

II.3 A literature review on discount rates in accounting standards

While discount rates progressively re-entered accounting, the academic literature on the topic developed. Since 2005, 400 articles were published that can be grouped in different threads. One is focused on issues challenged in level 2 FV, such as term-structures of rates (Barth et al. 2018) or discretionary vs regulated rates (Andonov et al. 2017). Similar issues relate to decommissioning costs, for example addressing the alternative choice between hyperbolic and exponential discount rates (Ilg et al. 2017). Other threads deal with pensions funds determinants (Amlie 2012, Lafuente 2018) or the impact of relying on the application of discount rates standards application, such as IFRS 16 (Morales-Diaz et al. 2018).

II.3.1 Discount rates as FVA conceptual underpinnings in accounting

The use of discount rates in Fair Value Accounting is now extensive in international standards though the re-entering of capital techniques in the accounting field doesn't reach consensus. To Magnan (2009), the use of Fair Value Accounting (FVA) may have severely undermined the financial conditions of institutions because: several FVA co-exist, whether mark-to market or to-model,if the value relevance of FVA can be recognized, it doesn't follow that the societal optimality is thereby verified, because such issue is not included in the model, the principles of verifiability, conservatism and reliability are challenged,the application of FVA increases volatility, as compared to former existing or other possible methods.

Magnan (2009) cites Milburn (2008) as being at the origin of a misleading stance after observing that market efficiency is relevant in defining fair value and that *active, well regulated capital markets exhibit a reasonable level of efficiency*. Reasonable efficiency is indeed a non-existent concept with regards to Fama's Efficient Market Hypothesis.

With regards to conservatism, another principle remains unsatisfied according to Magnan (2009), (the author refers to Watts (2003)): there is a severe costs asymmetry induced by FVA because:

It is much costlier to make an excessive pay-out that cannot be recovered than to retain earnings and other resources one period too long.

In other words, the prudence principle avoids undue dividend distributions and a simultaneous reduction in treasury, which is more likely to hamper the company's health, whereas a freezing of assets (excess in treasury) doesn't.

This points to the limits of the efficient markets hypothesis, which with the rationale of Watt's description being similar to that of the prospective theory (Kanheman and Tversky 1971) and its famous motto *losses loom larger than gains*. Authors highlight a behavioural feature shared by managers as well as investors, which is the loss aversion. This feature is denied in standard economic theory, because it assumes a probabilistic view and equi-weighting of losses and gains. Notably, standard (mainstream) theory is also the starting point of market efficiency and of all formalized capital budgeting tools such as the DCF.

II.3.2 The impact of FVA implementation on organisations

Effects of FVA implementation or discount rates estimations are little observed at the organisational level. Sodan (2015) suggests that both firms and banks with increased exposure to FVA in financial reporting have lower level of aggregate earnings quality.

Shaffer (2011) in a report of the Federal Reserve Bank of Boston concludes that the implementation of fair value accounting *may not necessarily provide financial statement users with more transparent and useful reporting*. Moreover, beyond not reaching its goal, FVA may negatively impact financial stability. The causes of this relation are the interconnectedness of financial institutions, markets and the broader economy. Yet, the Fair Value controversy may not be over.

More directly linked to discount rates assessment is the possibility to consider an asset as financed independently from the rest of the company. This is indeed the interpretation of the incremental borrowing rate and of the random borrowing price, two possible starting points for discount rates estimations. Those are conceptually difficult to reconcile with finance theory, which favours the WACC as a description of the cost of funds.

But the models one can mobilize to assess the cost of funds are also subject to debate. Kvall (2007) and Husmann and Schmidt (2008) both agree in doubting the CAPM as a reliable model to estimate the cost of equity (a component of the cost of funds). They also both reject the vague *other market borrowing rates* as a discount rate candidate.

With regards to CAPM, Husmann and Schmidt (2008) suggest Ross' APT model as a substitute. Kvaal (2010) defends the consideration of the incremental borrowing rate, but more generally pledge in favour of loose guidance. Likely the disagreement could be a reasoning on either a homogeneity of risks, making of the incremental rate a good capture of

overall company's risk, or an heterogeneity in risks creating distance between the existing financing structure and the future one (Husmann and Schmidt 2011).

II.3.3 Discount rates compliance and organizational and individual behavioural adaptations

FVA produces earnings volatility

A thread of literature evaluates the impact of standards application related to FV calculations. One impact is the increase in volatility, as perceived by treasurers after the application of IAS 39 (Gumb et al. 2018), because the FV measure of hedging solutions, when classified as speculative, impacts the earnings and creates an undue volatility. It follows that treasurers sometimes renounced to some of the hedging combinations they used to practice. This drawback is also pointed by Barth (1994), Barth, Landsman and Whalen (1995), Landsman (2007), who deem fair-value based earnings as more volatile than historical cost based earnings. Laux and Leuz (2009) and Pozen (2009) also emphasize the dramatic impact on earnings that pro-cyclicity displays. This argument supports the idea that prospective theory would provide a more realistic framework with regard to society and behavioural features rather than standard economic theory. The cited works don't denounce the reliability of informativeness of FVA but intends to draw attention to the riskiness associated with its implementation. In short, FVA is a good idea but hard to implement.

Conceptually, such arguments anticipating the functional and financial effects of standards belong to the array of consequentialism a reasoning assessing the goodness of the decision on its efficacy with regards to the achievement of a desirable goal as opposed to deontologism (*a reasoning based on the inherent rightness or wrongness of an action or a decision, without considering its consequence*) (Himick et al. 2016). This is worth pointing to since Himick et al., with regards to a GASB due-process - related to pension - have on the contrary observed the prevalence of deontological arguments versus consequentialist ones, in indifference of whom had expressed them, i.e. experts or lay experts.

FVA modifies financial statement structures

Morales-Diaz & Zamora Ramirez (2018) in their recent work have gone one step further to assess the impact of IFRS 16 - issued in 2016 - on financial key ratios for 646 European firms. Their results are developed here below. As a reminder, IFRS 16 application requires the capitalization of most of the operating leases in a similar ways as financial leases used to be capitalized. The retreatment of financial statements in a comparable way considers leases similar to ownership. This practice has been subject to debate since the late 1940s in the US (Morais 2011).

A thread of literature starting with Imhoff Jr. and Lipe (1991, 1997) has through decades come to divergent results. For a synthesis of the literature one can refer to Morales-Diaz & Zamora Ramirez (2018). Generally, studies show an increase in liabilities, assets, EBITDA and leverage and a decrease in net earnings, ROE, EPS and ROA. In the latest one, strong impacts are expected on balance sheet; leverage and solvency ratio but the results on profitability ratios is mitigated. Their estimation of lease is aligned on IFRS guidance with regards to discount rate and the lease term. The authors find a larger impact than previous studies could expect.

In the same vein, Stallings (2017) compares unadjusted and adjusted earnings and assets. The author finds a 30% increase in NOPAT (Net Operating Profit After Tax) and Net Operating Profit Margin (NOPM), non operating assets are multiplied by 3, Net Non Operating Obligations (NNO) are multiplied by 9, Net Operating Asset Turnover (NOAT) is divided by 3. On the balance sheet, the intrinsic value, which corresponds to the sum of the market values of debt and equity, is more than doubled. But the more interesting feature highlighted by the case study is a 36 % decrease in the WACC: from 10,56% to 6,69%, a dramatic drop due to the importance of leased debt in the new balance sheet (almost 53% of the new intrinsic value).

Adaptation profiles: narrow, expedite or transfer

More recently, Barker and Schulte (2017), thanks to case studies, have identified three ways for accountants to comply with IFRS/IAS dispositions. The first is the transfer of the problem. The second is the narrowing of the problem and the third is the finding of an expedient solutions.

With regards to discount rates, the transfer of the problem consists for example in transferring the responsibility of the WACC assumptions to other actors, namely databases providers or experts. This has the collateral advantage to reduce the cost of discussion with auditors because it legitimizes the assessment. One drawback of this approach is the inconsistency between the assumptions and the difficulty to pick the most realistic WACC amongst all possible candidates. To illustrate the enlarged distance to comparability, Barker and Schulte display the average data from six investment banks and Bloomberg to show a substantial estimation difference with figures form single to double, from one provider to the other, with the impact on the goodwill being proportional. The same reasoning applies when the growth rates are at play.

The second is the narrowing of the problem, a solution that prioritizes tractability versus exhaustiveness for example. With respect to the WACC, an example relies in the choice of assumptions, all verifiable but likely not representing an exact reality. An illustration is the mobilization of the CAPM with a poor quality of adjustment or the choice of a biased index.

The third way to comply with IFRS dispositions is through finding of an expedient solution, which can for example occurs when IFRS requirements are subverted.

We find evidence of the three behaviours through our interviews, further described.

II.3.4 Literature about Impairment issues in accounting

Standards related to impairment are coined *new generation standards* by Kvaal (2007). This category includes SFAS 121 Accounting for the Impairment of Long-lived Assets and for Long-lived assets to be disposed of (SAFA 121 1995), and IAS 36 Impairment of Assets, issued in 1998 and revised in 2004, the latter being almost identical to the British Standard FRS 11. The two latter require pre-tax cash flows determination in order to compute a present value. However, after a conceptual demonstration, Kvall concludes that impairment should be conducted with post-tax cash flow and post-tax rates because of implementation easiness. The pre-tax rate if being informational could be derived from those results and disclosed. Kvaal also rejects the claim equating present values computed with post and pre-tax rate, and blames the latter for minimizing write-downs.

But the main thread of researches with regards to impairment is empirical and adopts various approaches. Carlin and Finch (2009) examine IAS 36 Impairment of Assets - by comparing the reported discount rates of 105 Australian firms in 2006 to discount rates generated by them. They found variances, which question T*he quality of reported earnings, the validity of valuations ascribed to goodwill and the status to be accorded to financial statements produced in conformity with the IFRS regime. This should be a matter of serious concern to policymakers, regulators, auditors and financial statement users alike.*

Compliance with required disclosures

With regards to information disclosures related to impairment, Paugam et al. (2013) have built scores combining 15 topics composed of the 55 items they have identified in the standard (par. 126 to 137: number of CGU, precision of discount rates calculation, number of discount rates, neutrality of financing structure, source of discount rate assumptions, detailed discount rates parameters, sensitivity analysis, variations explanations, flow of value, address of the consistency between the discount rate and the cash flows, extrapolation and terminal value application). Five items describe the model (explicit description, reference to tax treatment, calculation details and formula), eight items are linked to the multiplicity of rate (their explicit use and differentiation), three items qualify the source of discount rate (independent expert for test, or financial analysts), eight items describe the parameters of the discount rates, one item describes the consistency of the rate with the flows, and three items describe the terminal value with one check on the perpetual rent. Authors examined the disclosures published by SBF 120 companies between 2006 and 2008. Their score is built so to value the compliance to IAS dispositions: for example, it positively values the presence of multiple discount rates, and the usage of multiple growth rates in the terminal value computation. However, the score doesn't solely cover the discount rate, but rather the overall compliance level to IASB dispositions related to impairment.

Results don't provide details about the compliance level of each of the 15 topics. However, more generally, authors have found a leptokurtic and negatively skewed distribution of the computed score, which indicates a great variation in company's disclosures in their sample of 218 observations. Overall, findings testify of a poor level of disclosures for the reader whom desires to understand the basis of the assumptions. Results also indicate that estimation risk increases the cost of capital. More precisely, because a split in the score could distinguish prospective and descriptive data, it appears that prospective information reduces the required return by investors provided by the implied COE, whereas descriptive information is uncorrelated. Authors conclude that market welcomes prospective information and could favour recurrent disclosures in the matter.

If the decrease in cost of capital testifies of a decrease in investors fear or a raise in investors' confidence, there is no evidence about the drivers of that sentiment. Estimation risk theory advances that cost of capital increases when investors find difficulties in projecting cash flows. Therefore, on the one hand, one can argue that cost of capital decreases because investors believe that the information describes an economic reality, but on the other hand, another interpretation is possible. Results also could testify of a comforting view related to the existence of forward-looking (strategic) vision likely to define a suitable managerial direction. Finally, the work on the impact on implied cost of capital and compliance to discount rate

disclosure highlights a recursive loop: cost of capital is necessary to design more accurate projections while projections are necessary to define the required cost of capital.

In the same thread of literature, Mazzi et al. (2017) examine the link between the compliance with goodwill-related mandatory disclosure (IFRS 3 and IAS 36) requirements and the implied cost of equity capital. Their sample is different though similar from Paugam et al.'s, it is composed of 214 non-financial firms composing the S&P 350, analysed over a four-year period (2008-2011). As in the previous research, authors build a score, this time it is dual, of 51 or 54 items. Globally, the low level of disclosures is confirmed, testifying of reluctance to disclose proprietary information. A difference with the previous research relies in the use of relative scores. Findings nevertheless support theory when defending that an increase in corporate disclosure decreases the cost of equity capital, because it reduces the estimation risk.

In the professional area, KPMG produces an annual Mining reporting survey. The later one to date, published in 2017 observes the disclosures practices of 25 mining companies. Twenty of them disclose information about their discount rates. This includes all companies having an annual requirement for impairment testing. The way in which the twenty companies disclose is however very different discount rates ranged from 3 to 14,5% in 2016 (v. 4,3% to 18% in 2012). According to KPMG *the lower rate was applied to producing properties in a low risks jurisdiction. The higher rate applied to development properties in high-risk locations*, however the report provides no detail about the rates and their differences per entity or country.

Because the estimation of discount rate appears too uncertain, Johansonn et al. (2016) call for a remodelling of the impairment test. They argue that management opportunism has been demonstrated (Glaum et al. 2013; Ramanna & Watts 2012), and advocate that the cost of implementing impairment tests is not outweighed by the benefits of reflecting a value decline.

Authors show that there exists a buffer protecting accounting goodwill from impairment and reject the return to a dual approach (impairment and amortization) but pledge for the use of a similar measurement and recognition procedures at initial recognition and when conducting impairment tests, for the sake of consistency.

II.3.5 Discount rate behaviour over the long time horizon: environmental provisions and pension plans

To Doganova (2018) discounting is an economic tool that leaves an enduring imprint on the objects that it encounters and shapes the characteristics of the entities that compose our world. It is an instrument for governing behaviour that guides decision-making in a myriad of places and instances through discrete but no less consequential interventions. It problematizes the very separation of the present and the future by framing the debates that link our actions in the present to those who will endure their effects in the future.

The discounting in many cases remains an art of intuitive applications of theories in that are looking forward to adjust for real life, but real life from discounting perspective is all about expectations and anticipations, especially for longer time horizons.

Environmental provisions issues and public investment: back to capital budgeting basics

Environmental provisions are becoming a great concern to the whole society as digitalization and energy consumption are two pillars of our post-modern society and both rely on the

extraction of minerals and/or ores. The impact of extractive activities on the ground seems to deserve greater attention from the public, if not great concern.

Information related to the way organizations are also concerned with environmental impact can be expressed through the environmental provisions. This is one topic of IAS 37, which provision measurement relies on discount rates. Environmental provisions are (very) long-term provisions and this addresses some specific challenges already addressed by researchers.

Ilg et al. (2017) examine the decommissioning issue. Their work challenges different solutions available to store nuclear wastes. To tackle the pitfall of discounting as demonstrated by Zweibaum (2016 -see below-), they compare the alternative solution of hyperbolic vs the exponential rate as applied in DCF techniques. Hyperbolic discounting is a discounting method using simple interest rate methodology, i.e. a method that doesn't assume the capitalization of interest payments. When decommissioning matters, the hypothesis indeed better describes reality. Authors nevertheless confirm the heavy load of interest rates on the decommissioning costs and highlight that NPV of costs as hyperbolically discounted are higher than per exponential rates (see Appendix 1). However, consistently with early authors in capital budgeting, they underline that the aim of the evaluation is not the value per se but the ranking of the solutions, which remains invariable to a change in the calculated rate.

Zweibaum (2016) illustrates the value impact of interest rates in the long term by recalling the underlying assumption in the compounding/discounting method, i.e. the fact that the weight of interests significantly increases with time. She borrows an example from EDF, with environmental provisions of €42bn (actuarial value), whereas to the existing knowledge, the total costs were reaching €96bn (nominal value). The difference (non-provisioned) is due to the discounting process. Moreover, with no faithfulness to reality, it impacts the financial expense for a 1,6bn value. To Zweibaum, such recordings violate the nominalism rule, applicable for decades in French accounting. Nominalism is for example defined in the Civil Code (art. 1895) as the obligation resulting from a loan in money is always only the sum stated in the contract.

Zweibaum pledges in favour of a return to nominalism, a conventional way of recognizing provisions, or disclosing about. Her main concern lies in the fictional character of the debt, because no cash flow is observed before the purpose of the provision is realised. Indeed, in the absence of dedicated asset, she deems the provision similar to a commercial debt, the status being attributed by the accounting method. Studying the case of a decommissioning provision, the author examines the sensitivity of the financial expenses to an increase in 1% of the discount rate (from 4 to 5 %); this results in financial expenses respectively representing 32 and 38% of the end value of the provision. Such results are commonalities, Zweibaum doesn't point to an exception. She observes that not only does the change in discount rate change the allocation of costs, but also, does it put more pressure on early years.

Notably, changes in the discount rate have a direct but asymmetrical impact on the entity's cash flows: a decrease in the discount rate increases the allocation of dedicated assets simultaneously with the increase in the provision. However, in the case of an increase of the rate, and as above-mentioned, a decrease in the provision, there is no reduction of the dedicated asset. Thus, this can be justified by the avoidance of endowments linked to new disbursements; it shows that asymmetrical effects are sometimes accepted by international standard-setters.

Finally, she points to very long term provision (100 years) highlighting the fact that discounted provision are then worth nothing significant as compared to the business cycle. This loss of materiality is generalizable to all long-term provisions. To solve the issue, a proposal is made: the nominal value could be used together with a disbursement schedule. Arguably, this set of information would show more relevancy than a sum of discounted values. More precisely, the information should contain: the nominal amounts of provisions, an indication of the provision in constant euros of the year of exercise.

Critically considering her proposal, she advocates

Nominalism is certainly a simplification of economic reality, but a simplification designed to facilitate the production and reading of accounts. It can be conceived as a projection technique of a three-dimensional object (the reality of the enterprise) on a plane (accounts); the planned object differs from the object and the accountants are always aware of this reduction. In this sense the basic reference of accounting is understood as a reference to a faithful image and not as a reference to THE faithful image. The application of discounting to provisions, because it refutes nominalism, will create complexity in the accounts, complexity of which will be necessary to explain the consequences in the accounts.

Therefore with regards to the forthcoming revision of IAS 37, she advances that a caped discount rate is a minimum, and that no rate should include further risks or insolvency/bankruptcy issues.

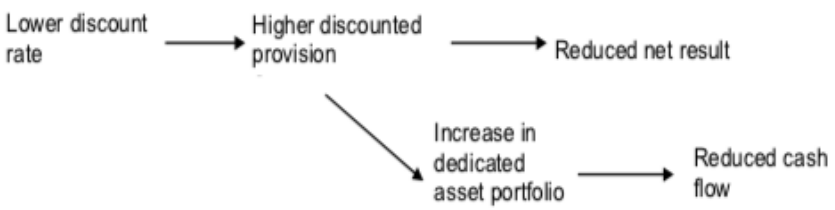
A thematic report issued by the French Cour des Comptes (2012) entitled *the cost of the nuclear power sector* aims at demonstrating that discount rates as estimated per CAPM do not apply to very long term issues such as environmental provisions. Authors recall that with regards to nuclear operators, the discount rates are regulated by Decree No. 2007-243 of 23 February 2007. They have to resort to TEC 30 (with a running 4 year average) plus an average spread according to rating levels (AAA and BBB), capped at TEC 30 + 1%. They also offer a recap of national practices in terms of rates fixations (Table 4).

Table 4: True discount rates in the European Union and their impact,
Cour des Comptes 2012

Country	Spain	United Kingdom	France	Hungary Lithuania	Sweden	Slovenia
True rates	1.5%	2.2% : NDA* 3% : NLF**	2.94%	3%	3.25%< 15 years 2.5% > 15 years	3.53%

Source: Wuppertal Institute, EU decommissioning funding methodologies

** NDA: Nuclear Decommissioning Authority; ** NLF: Nuclear Liabilities Fund*



From an academic perspective, Gollier (2012) applies a similar reasoning to that of the Cour des Comptes in order to recommend a discount rate included between 2,5 and 3,5 % for below 20 years deadlines, and equal to 1% for horizons from 21 to 100 years. According to Gollier

(2012) the use of NPV by state and institutions is a good choice because it is based on social optimum. However, a key issue is the discount rate assumption that should match three approaches in perfect markets settings. Indeed, when markets are perfect, a project IRR must be equal to risk free private equity returns, which at equilibrium is equal to market interest rate. The third approach is that of the individual preferences and supposes that a reduction in consumption could finance projects. Again, at equilibrium, this rate should be equal to the two others. It follows that to reach social optimum, it is sufficient to use market interest rates to discount future cash flows. Back to early practitioners, and namely Wellington (Dulman 1989), Gollier's basis of reasoning is the growth rate. However, differently from Wellington, he focuses on the GDP growth rather than the railroad growth rate. His stance diverges from those early adopted in the US when a debate on water management took place. US Office and Management and Budget then decided to fix a 10% discount rate as a compulsory discounting rate (The same rate to be applied in the first discounting value disclosed in SFAS N°69 in 1982). The rate was revised in 1992 and 2003, respectively to 7% and 3% to converge towards the sovereign bond rates (in fact, it was the average of the 10Y T Bonds from 1973 to 2003), thereby by trial and error, experience converged towards Gollier's rationale. Similar discussions take place at government level all across Europe. In Italy, Percoco (2008) contested the Italian Ministry of Economy decision - and the European commission - to set the discount rate for evaluation projects financed by structural funds. His recommendation was a 3,7 - 3,8% rate.

Benefits provisions and pension plans

Pension plan and defined-benefit obligations are very sensitive to discount rate as the Ogden tables change has recently illustrated. In the case of provision, any small variation in the discount rate can provoke a tremendous effect on the values to recover. Yet, the long cycles characterizing the activity are captured in short movements for the changes are immediately captured in the accounting figures.

Arrow et al. (2014) study the evaluation of public projects in France and the United Kingdom and use discount rate schedules in which the discount rate applied today to benefits and costs occurring in the future declines over time (HM Treasury 2003; Lebegue 2005). That is, the rate used today to discount benefits from year 200 to year 100 is lower than the rate used to discount benefits in year 100 to the present. In the United States, however, the Office of Management and Budget recommends that project costs and benefits be discounted at a constant exponential rate (which, other things equal, assigns a lower weight to future benefits and costs than a declining rate), although a lower constant rate may be used for projects that affect future generations.

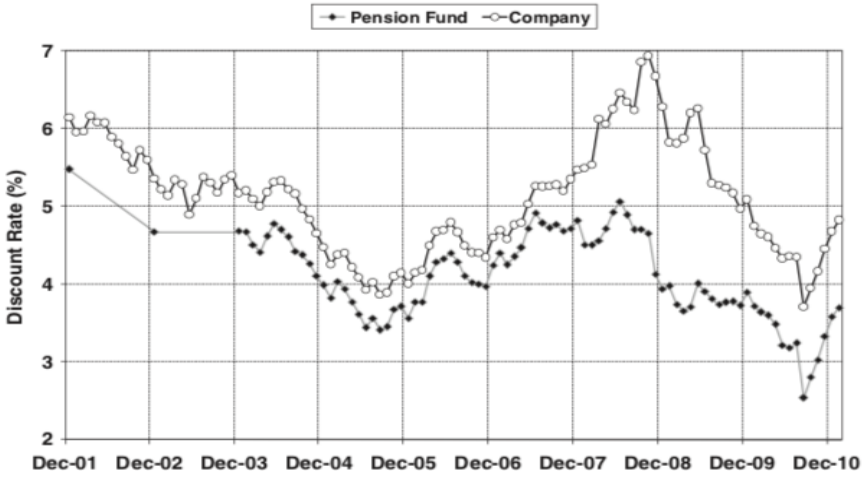
Bauman and Shaw (2014) study the disclosure accompanying the accounting for defined-benefit pension plans in the US. They seek for the determinants of firms' disclosures relative to the sensitivity of pension expenses to pension discount rates. Their results suggest that detailed disclosures about the discount rates are positively related to firm size, having a Big 4 auditor, the variability of pension plan funded status. These conflicting government approaches to discounting raise a familiar, but difficult, question: How should governments discount the costs and benefits of public projects, especially those that affect future generations?

Amlie (2012) shows that firms with higher pension obligations (in % to assets) are associated with increased discount rates, this was due to SFAS 158 Employers' Accounting for Defined

Benefit Pension and Other Postretirement Plans requirement and the discretion left over the assumptions manipulations. The rationale behind is simple: high discount rates tend to decrease the obligation.

Swinkels (2011) studies the impact of IAS 19 Employee benefits in the Netherlands. The author observes that pension liabilities are estimated at fair value marked-to-model (level 3), however the models used by companies (going concern basis) and pension funds (discontinuity model) differed. Therefore, discount rates estimation led to differences, which appear to be minor in favourable conditions but dramatic in less favourable circumstances (see Figure 3), with sometimes a 30% gap in pension estimation between companies and pension funds.

Figure 3: Pension discount rates for pension funds and companies in the Netherlands.



Hanton (2012) illustrates the sensitive effect of discount rate assumptions, borrowing figures from the UK office of National Statistics. The state pension obligation, estimated to be close to £5 trillion could increase by 31% by a reduction of 1% in discount rate (to read more on the topic, see Chandler 2017). For this reason, as Gollier (2010) shows, governments tend to favour higher discount rates. Elwin (2009a) pointed to a worse case when mentioning Aga. Aga Rangemaster was an iconic stove manufacturer, which pensions schemes doubled in 2015 because of a change in discount rate[7], and more specifically the rock bottom gilt yield[8]. This conducted the firm to an unavoidable takeover by Middleby, an American company. In November 2017, the restructuration ended with the closing of the historical 300 years foundry in Coalbrookdale[9]. Symbolically, the event is tremendous, as the factory is located in the industry birthplace. Another example is put forward by Elwin (2009b): British Airways market cap being £1.5bn with a £12bn of pension assets providing collateral for accounting liabilities of roughly the same amount. The situation gave birth to a running joke: *British Airways is a hedge fund with a sideline in air travel*. The author advocates that with corporate bond yields decline, IAS 19 pension liabilities will mechanically increase. Moreover, *in many cases (this will be) far outweighing any increase in pension asset values*. Concretely, IAS 19 deficits will increase. This is explained by the author as being due to the poor quality of data provided by the companies, leaving room for speculation about the cash flow position, and

7 https://www.fool.co.uk/investing/2015/03/09/should-you-worry-about-pension-payments-at-bt-group-plc-aga-rangemaster-group-plc-thorntons-plc/
8 https://www.wsj.com/articles/low-yields-go-lower-in-europe-1465333371
9 http://www.dailymail.co.uk/news/article-5122765/Coalbrookedale-Aga-foundry-300-year-history-close.html

subsequently volatility in share prices because of a market reaction to the only available information: the increase in IAS 19 deficits. To Elwin (2009b), the projected dramatic situation could be resolved with the publication of the following scheme information: scheme accounts, triennial actuarial valuation reports and annual scheme funding statements, schedules of contributions, membership data, expected scheme cash flows, income and expenditure.

Elwin (2009a) also mentions the IBOXX AA as the reference rate - advocating that neither the risk fee rate nor any other rate may be right. In 2009, he estimated that a change in 200 base points above the government rate would result in a 40 % shrink in the liability.

According to Hann et al. (2007), discretionary components of actuarial assumptions (discount and groth rates) add value-relevance to the non-discretionary components. Therefore, authors conclude that imposing uniform conventions would alter the communication of value-relevant information. Interviewee 6 (see here after) suggests another more radical alternative: do not discount pension or other very long-term liabilities. Several arguments support an alternative solution: the weight of financial expenses is tremendous and highly sensitive as British examples illustrate, the differences in balance sheet generate an undue volatility with regards to the long cycles, financial expenses distort the true EBITDA and EBIT.

II.3.6 Discount rates and cost of capital disclosures, gap spotting, path for further researches/ further steps

The list of publications testing the relevance of informational items on cost of capital, as one possible discount rate, is too important to be summarized here. The association studies adopt the following interpretation: th expected cost of capital supposedly represents the actual cost of funds. Alternative stances assume that increases in cost of capital also translate in a fear premium or a short-termist behaviour from shareholders.

From a theoretical pointof view, borrowing from Beyer et al. (2010), Paugam et al. (2013) identify two threads of literature relating financial communication and cost of capital. The first one addresses the effect of the reduction of estimation risk on the investor's expected profitability. This thread dates from the late 1970s and addresses the uncertainty characterizing distribution of cash flows from the valuation model, accepting that investors ignore the underlying parameters and the processes generating the cash flows. The second thread addresses information quality and liquidity and dates from the early 2000s: it relates the attractiveness of the stock to the quantity and precision of financial communication. The measure of quality most likely relies on the construction of indexes, whether ad-hoc or standardized. According to Lang & Maffet (2011), future liquidity uncertainty (its variability) can be reduced thanks to financial communication transparency, because it enhances the certainty about the fundamentals.

Despite a large scope o accounting literature on discount rates applications in compliance with accounting standards, none has to date neither surveyed the convergence of the expected cost of capital, nor the practitioners in process of facing the task of discount estimation. The latter is the topic of the remaining report. How do practitioners address the

challenge? What solution do they resort to? What are the conceptual difficulties they meet? We address those questions in the following part of the present report.

3 PART III OUR QUALITATIVE STUDY: HOW DO PRACTITIONERS BRIDGE THE GAP BETWEEN THEORIES AND PRACTICE?

III.1The challenges met by practitioners and their pragmatic solutions

III.1.1 The top-down recommendations for good practices in Discount Rate evaluation

With the will to comply with IAS/IFRS evaluation processes, accountants and practitioners have little specific (accounting oriented) material to rely on. For understanding and applying the different standards dispositions, they can turn to experts in valuation methodologies and corporate finance or market finance textbooks recommendations. It follows that in many cases, guidance addresses evaluation issues in the framework of financial analysis or consultancy. Most available guidance in France - for example - originates from the societies of experts in evaluation. It is not the aim of the present report to publish an exhaustive review of all experts and professionals recommendations with regards to discount rates. Here are however a few recent examples:

- The June 2018 issue of la Revue Fiduciaire Comptable and its dedicated booklet to DCF evaluation, questioning the possible improvement of guidance.
- Two special issues on discount rates published by La Compagnie des Conseils et Experts Financiers (CCEF) in January 2017 and January 2018
- A note on discount rates released in September 2013[10] by La Société Française des Evaluateurs.
- Special booklets on evaluation from the Conseil Supérieur de l'Ordre des Experts-Comptables.

Interestingly, there is no global consensus; the different sources may diverge with respect to their recommendations.

For example, some actors recommend the addition of a subjective premium to capture all supplemental risks. Others prefer to enlarge the time frame of cash flow definitions in order to augment the cash flow precisions. It follows that the critical view on the perpetual rent as recommended by IFRS can differ.

III.1.2 Research on practices in the field: our methodological approach

Practitioners when having to assess discount rates have at their disposal IAS/IFRS guidance and the support of professional networks; but is that sufficient? In order to understand the needs of professionals and their approach in model-based evaluations, we have surveyed a sample of accountants, preparers, auditors, or experts in valuations.

10 http://www.sfev.org/offres/doc_inline_src/789/Groupe%2Bde%2Btravail%2BSFEV%2B%2BTaux%2Bd5C27actualisation%2BSept%2B2013.pdf

Some of them practice in French or European companies, on the European continent or in the U.K. Others are Spanish, Italian, Austrian or Belgian. One of them is currently located in the US; two of them are employed by American groups, but operate in European subsidies.

Because the topic is of a very large scope, and because precise or focused questions could have made exchanges fall short, we chose to conduct free and exploratory interviews in French and English. The language bias can be granted as low considering the technical level of the discussion.

Our first question dealt with the scope of discount rate application. Though the answers were not expected to be exhaustive (we had booked about one hour for each interview), this allowed grasping the prominent issues related to discount rates in the interviewees' opinion. Concretely, our first question, though open, could let the interviewee develop on the topic of his/her choice.

Table 5 summarizes the profile of our interviewees and the main content of our exchanges. Interviewees can be categorised in 12 different profiles, but a few of them could be qualified under a same profile (with a mode on profile 12), and 3 of them can be described with profile 11 (Business Unit CFO). Moreover, some interviews grouped two or three members of the same team. Also, in a close observation case, two auditors were involved, but one only exchanged at distance. Altogether, interviews result from exchanges with 30 people, yet only the main interlocutor's function is described. Twenty-eight exchanges were face to face, 2 were distanced. 21 interviewees were males, 9 were females.

Interviewees were contacted through the researchers' professional networks, and alumni networks, either the researchers' alumni or alumni from the school they taught in. People were contacted because their function let supposed that they had to deal with IFRS and evaluation matters.

Table 5: Interviewees profiles

Interviewee Number	Function	Main topic discussed
1.	Auditor, co-auditor with a 1st tier auditor	Business units impairment
2.	CFO of an energy company	Financial reporting and FVA in general
3.	Consultant specialized in evaluation	Concessions and tax rates
4.	Auditor and consulting specialized in evaluation	Processes, reference rates
5.	Chartered accountant	Processes
6.	Head of competence centre	Transfer pricing
7.	Institutional Investor	Leases
8.	Lawyer	IP, risks
9.	CFO of technological company	Monitoring
10.	Strategic Director of semi-conductor company	Update of tools
11.	Business Unit CFO	Revenue Recognition
12.	Evaluation executives in charge of intangibles evaluation (transfer-pricing, royalties, M&As…)	Diverse topics, all of the above.

Interviewees belong to the following companies: Accuracy, AF2i, Axa, Bayer, CEA, ENI, Filmfonds Wien, HP, Leonardo, Nestlé, SATT-CHU de Lille, Rhône Poulenc, Soitec, Solvay, Thalès. Some interviewees wished to remain anonymous, they are: Biotech start-ups, experts in intellectual property, a chemical group, second tier and first tier auditors,

The data collection was operationalized as follows: we either took notes or recorded the interviews when all participants agreed. The collection of data started in March 2017 and ended in August 2018. Half of the meetings were unique, and the other half was followed by email exchanges.

The taped interviews were several times listened to and transcribed. Interviewees didn't read our notes, such process is not part of the usual protocol, however, some asked not to be named. Also, we don't associate the used quotations to a particular interviewee, in order to avoid any recognition. Once the material was available, it was possible to identify numerous concerns and needs that we next expose.

III.2 Our findings: transfer, narrow, or find an expedient to the problem, reject or approve

As mentioned above, since our interviews were exploratory, they covered a variety of topics that we attempted to classify in the next sections. Very fast in the process, making a link with Barker and Schulte's work (2017) was possible: our findings were at least partially supporting their conclusion about management adaptations with regard to Fair Value compliance: *(…) transferring the problem elsewhere, narrowing the problem to make it more tractable, or finding an expedient solution by subverting the requirements of IFRS 13*.

However, we also found two other behaviours here after developed: some true commitment in discount rates application, this mainly when interviewees had worked or currently work for Northern American companies operating in Europe, or true opposition linked to the conceptual issues with forthcoming standards, namely IFRS 15 and 16. We develop those issues in the next paragraphs.

The expedient solution to an unresolved assessment

A co-auditor shared his concern when conducting the impairment test of 50 business units (Interview 1). This raised many issues but the most intense debate related to the calibration of the discount rate: each participant in the evaluation process suggested different references for the market premium and the reference (risk free) rate. Three people were involved: the two auditors and their correspondent in the group, responsible for the BU's impairment. The change in discount rate was at play for the new impairment round. After studying all the possibilities to set one or multiple discount rates: current financing structures supposed constant, current financing structures with an evolution similar to long term rates available on the Banque de France site, one WACC per business, comparable betas… it was clear that multiple combinations were available for estimating the discount rate, all of them being acceptable assumptions, i.e. valid.

For example, a market premium could be estimated from historical returns, implied method returns or surveys. Experts in finance usually estimate a risk premium between 7 and 8% with the forward-looking implied methodology which is often abusively called *consensus*, whereas academics' estimations most likely fall around 5% for they use historical data (Les Echos 2013[11]). This is exactly what happened in the observed case: experts' premium was 7,4% whereas academic reference (Damodaran's) was 5,65%. Notably, a difference in the risk premium generates a twofold increase in the WACC. Risk free rate was also an issue even

11 http://archives.lesechos.fr/archives/cercle/2013/01/03/cercle_62127.htm

though currently low. Estimations ranged between 0,7% and 0,84%, i.e. a 20% change, yet with much less impact on the WACC result.

The companies to impair not being listed, one could only resort to comparable in order to determine the beta, under the condition of primarily using market references [12]. Notably, some practitioners have mentioned the accounting beta as an option. The estimations of beta ranged from 1,08 to 2 for the same entity. Those two extreme betas have of course completely different meanings in terms of risks associated to the financial asset. However the following question remained unanswered: is the use of the mother company's discount rate more accurate than that of the subsidy?

In that situation, the most recommended method (see here before) didn't make sense. Accounting for each BU specific was counter-theoretical and counter-intuitive since diversification in BUs of different natures aimed at reducing the global risk. The question was raised: *why then re-injecting risk in financial statements*?

Overall, once all parameters were estimated, auditors ended up with a set of possible hypothesis going from single to double for the cost of equity estimation and resulting into a lowest expected cost of equity of 7,45% to a highest possibility of 15,2%.

But WACC calculation also requires an estimation of the cost of debt; much discretion is also possible there. With regards to debts, unexpected results were even more significant. The same risk class estimation, including the spread of comparable reached 1,8 %. However, a hypothesis of similar financing structure in the future could also be supposed, with an invariable spread to government bonds expected returns. Estimations of multiple rates reached up to 3,9 above government bonds. With only those two different starting points, the cost of debts range varied from single to double. But more surprisingly, according to the company, historical weighted effective cost of debt generated a 0,9 % cost of debt, before tax.

In the end, time was running out, auditors couldn't rank the quality of the estimations (all of them are right, all of them are wrong) and eventually agreed on aligning their WACC estimation to the one of the last closing *because it had been formerly accepted*.

Finally, the terminal value was at play. One subsidiary had attracted the attention of auditors, convinced that it was showing signs of value loss. The business had been tested for impairment the year before and both co-auditors had a very good knowledge of the potential of each business unit. However, once the process of impairment applied, requiring the estimation of 5 years cash flows and a perpetual rent for the rest of its infinite life, the need for impairment was not confirmed. In that illustration, the level of the terminal value appeared counter-intuitive to auditors and hampered any possible impairment.

The process of cash flow evaluation differs from former practices. Here below (Figure 4), is an illustration given in a seminar by a Big 4, in 2007. The topic was Business Valuation. The Cash Flows are projected over a 3 periods of time: the first one - lasting 3 years - displays a detailed cash flows statement projected accordingly with expectations, the second one - 3 following years - supposes that growth is set with reference to sectorial indicators, multiples are deemed converging to target indicators, the last 3 years are assuming a convergence of the growth rate to the long term inflation rate. Eventually, a terminal value is computed, but notably, a sectorial comparable (EV (Entreprise value)/EBITDA, here 12,5) is preferred to the

12 Of course, an accounting beta was also possible, but then should it be a global company beta, a specific one for each organization?

perpetual rent approach. The discounted terminal value represents 44% of the total value of the company.

Figure 4: Discounted Cash Flows illustration, source: Big 4 2007

▪ Actualisation des Flux de Trésorerie :

Valeur d'Entreprise En ' 000 Euros	Réalisé 2 005	Plan d'Affaires 2 006	 2 007	 2 008	Projections Moyen Term. 2 009	 2 010	 2 011	Projections à Long Term. 2 012	 2 013	 2 014	Term. 2 015
Flux de Trésorerie		**1 683**	**1 548**	**1 784**	**2 041**	**2 102**	**2 165**	**2 433**	**2 533**	**2 630**	**2 670**
Multiple de Val. Terminale											x 12,5
Valeur Terminale (VT)										**33 370**	
Taux / Fact. d'Actualisation	9,5%	0,91	0,83	0,76	0,70	0,64	0,58	0,53	0,48	0,44	
Valeur actualisée des Flux		1 537	1 291	1 359	1 420	1 335	1 256	1 289	1 226	1 162	
Valeur actualisée de la VT										14 745	
Valeur d'Entreprise	**26 618**	**27 465**	**28 526**	**29 452**	**30 209**	**30 977**	**31 754**	**32 338**	**32 877**	**33 370**	
Plus Value en %		3,2%	3,9%	3,2%	2,6%	2,5%	2,5%	1,8%	1,7%	1,5%	
Revenu en %		6,3%	5,6%	6,3%	6,9%	7,0%	7,0%	7,7%	7,8%	8,0%	
Rendement en %		9,5%	9,5%	9,5%	9,5%	9,5%	9,5%	9,5%	9,5%	9,5%	
Multiple VU / EBITDA (N+1)	x 5,5	x 5,3	x 5,1	x 5,1	x 5,0	x 5,0	x 5,0	x 5,1	x 5,1	x 5,1	
Multiple VU / EBIT (N+1)	x 8,5	x 7,9	x 7,6	x 7,4	x 7,3	x 7,3	x 7,3	x 7,3	x 7,3	x 7,3	
Goodwill	7 718	7 998	8 183	8 295	8 417	8 531	8 636	8 757	8 883	9 017	
Capitaux Employés	18 900	19 467	20 343	21 157	21 791	22 445	23 119	23 581	23 994	24 353	
Valeur d'Entreprise	**26 618**	**27 465**	**28 526**	**29 452**	**30 209**	**30 977**	**31 754**	**32 338**	**32 877**	**33 370**	

Notably, the quest for convergence is still a discussed parameter, for example Holland (2018) suggests the use of a fade rate to value the effect of profitability attenuation[13].

In the above-described example (the impairment test of the 50 Business units), practitioners could have impaired the problematic BU:

- would the deadline be specific to each BU,
- would the cash flow explicit horizon be longer,
- would the terminal value be non deterministic.

Such solutions imply that methodological impairment specifications may be diverse across BUs (1), could express the initial strategic horizon of the combination (2), and allow for a more realistic capture of uncertainties (3). Alternatively, a provision would have been considered.

One expert commentator added that: 1) the specific BU discount rate could have been estimated in order to accelerate the depreciation, but as mentioned earlier, such solution lacks sense-making to the participants because it ignores the diversification role played by the BU; 2) a negative growth rate could have been introduced in order to diminish the terminal value weight. The latter estimation remains however problematic in terms of reliability.

The above example illustrates the difficult choices practitioners have to face: impair with a possible impact on the stock price, or delay the impairment (as often observed) because of a conflict between methodologies and reality representations.The adopted solution also illustrates the possible flexibility and thereby the possible use of the discretionary space

13 The June issue of La Revue Fiduciaire illustrates the same mechanism: by extending the business plan from 3 to 5 years, the explicit period (the projected cash flow of the first period) moves from 34% to 49 % of the total explanation, the terminal value weight conversely diminishes.

allowed by discount rate computation. To our knowledge, no research addresses the range of this flexibility as compared to earnings management of provisions.

Another case, which came to our knowledge, was that of a transportation concession having lost value, this supposed the impairment of an intangible asset. Yet, part of the concession being financed by subsidies, it made sense to apply local rules and reduce - in the same proportion - the subsidy and differed taxes, thereby loosing real payments' traceability. In the latter case, the impairment calculation relied on the company's own forecasts and their WACC. In other words, it wasn't challenged but as often in annual reports, purely declarative.

Interviewee 5, marking his specificity with regards to the WACC calculation, described how his consultancy firm separated the debt and the COE calculation. The former, for it is predictable and certain, is included in the Cash Flow calculation while the latter being subject to estimation is captured in the discount rate. The application of such method implies that cash flows can be adjusted for predictable variations and remain more reliable. It follows that all estimations are concentrated in the discount rate, the sensitivity of which can next be examined. Interviewee 6, who discounts using an opportunity cost, also practices the method.

The so called method is the Adjusted Present value and proceeds in two steps:

1) the value of he activity (yet to clarify) is supposed to be financed by equity only and discounted at the opportunity cost of capital (yet to define);
2) the tax credits - including on debt interest payments - are next identified and discounted at the appropriate rate (yet to define). The main advantage of the method is that it confronts the definition of the cost of assets and that of the existence of tax credits (which are otherwise systematically assumed).

Finally, with regards to finding an expedient solution, the most surprising testimony was that of Interviewee 2: while complying with IASB demand to disclose discount rates, the so calculated rates didn't match the company's practices. Concretely, the way in which the discount rate is computed in the company doesn't correspond to any of the IASB candidates. In consequence, the decision was made to keep the *effectively used discount* rates undisclosed but rather to disclose information in compliance with IASB expectations, i.e., discount rates obeying to the additive proposal (WACC + mentioned by IASB risks). The published discount rate is in that case different from the effective discount rates used for capital budgeting decisions.

Transferring the problem, an easy job, or not

The cost of capital being unobservable, sometimes practitioners prefer transferring the assumption issue because, conveniently, the transfer legitimates the input.

For example, Interviewee 4 declared referring to the database called IBOXX, like several interviewees did, as a reference for risk free rates. This happened to be opportune, in local audit firms, for the question of evaluation is seldom and there is no recurrent evaluation practice. To avoid the issue of risk free setting, many of them resort to financial partners and look for external data. However, interestingly, the source being pointed to by another legitimate partner, none of them was aware of the information characteristics: i.e. its source, its computation method and the status of the producer.

IBOXX is indeed a product of IHS Markit, a British - formerly US - company resulting from a tax inversion operation when the American IHS acquired the British Markit. One issue with

IHS IBOXX tackles its computation could result from a non-transparent algorithm. Some information is though provided, for example, the European benchmark design outlines is available at the following address:https://cdn.ihs.com/www/pdf/MKT-iBoxx-EUR-Benchmark-Indices-factsheet.pdf

The question of the algorithm structure is not novel but maybe on the way to become urging. Barker and Schulte (2017) also pointed to the lack of transparency characterizing the production of transformed information, when they illustrated the variety of betas provided by competing financial information providers.

Narrowing the problem (with WAAC or CAPM result as Cost of Capital)

Almost all interviewees have shown concerns with regards to the always-dubbed unobservable WACC computation. We have here before detailed the one debate that was possible to witness. Bottom-line, preparers or auditors, all feel uncomfortable with a meaningless COE. It follows that the compliance to the standard is associated to a significant level of wariness.

To Interviewee 3, the main WACC limit resides in the fact that the beta only integrates the systematic risk as defined by Markowitz, i.e. the risk that cannot be eliminated by diversification. It follows that specific risks should be integrated in the Cash Flows to form certainty equivalents. Subsequently, it is possible to discount with the risk free rate. However, one issue remains similarly to the capture of risks in the discount rate: how can cash flows absorb all risks without masking the true opportunities/threats and risk profile? Interviewee 6 states *WACC's answer brings comfort: it is simple and required parameters are available, but in the end it is oversimplifying and inaccurate*.

It may be useful to mention that the implied discount rate, which has become fashionable, provides external views. Those are likely less informed about the company's long term strategic intentions, and therefore, it may be biased the estimation (see par. I.2.3 of the present report). With regards to accounting practices, management forecasts and historical financing structure may be more accurate to predict the *real* financing structure, with regards to IFRS conceptual framework definition of useful information.

The advantages and limits of short term discounting

Little mentioned in the present report, IFRS 15 also requires the discounting of revenues, on a shorter-term basis. Two interviewees expressed their concerns with regards to the short-term discount. To one of them, it raised undue complications and good sense was lacking (Interviewee 11). To the other (Interviewee 9), who indeed practices in a European subsidy of an American company and applies the equivalent US GAAP, it was seen as a way to hamper fraudulent common behaviours. One example was the manipulations of end of year revenues in order to reach the quarter targets, which she qualified as commonly, attempted by middle management whose advancement and mobility depends on such realizations.

Business evaluations

In line with Pezet's (1998) statement of an impossible control of the investment process, because of the impossible control of indicators construction and despite the continuous attempt to sophisticate those, a CEO and R&D officer in industrial companies shared the feeling of an impossible control of investment instrument and estimation.

Both advocated that part of their work, and mainly through the capex committee, is to demine the content of the competing projects projections (Interview 10). Those tackled accounting issues as some projects involved business combinations. They underline that if NPV may for its convenience be a recurrent argument in capital budgeting decisions, it is however not a weighting argument. Qualitative arguments and strategic ones systematically win over the NPVs. To those, strategy is better captured in decision trees and simulations. One proof of the little importance of the NPV per se as a criterion is its disappearance after the project implementation. Would NPV be a target, it would be monitored with regard to its volatility.

However, a Business unit director (Interview 11a) from the same company insisted on a positive collateral effect: the contribution that DCF had brought to investment analysis (capital budgeting) versus the formerly applied Accounting Rate of Return method. Interestingly, such behaviour is unusual and contradicts the surveys findings here before exposed which more likely testify of the total disappearance of ARR for a couple of decades.

Leases: the disconnection form reality?

With IFRS 16, leases appear as comparable to properties, i.e. they will be subject to a systematic retreatment that most analysts used to make when examining the financial health of companies. The standard requires a single lessee accounting model, with lessees having to recognise assets and liabilities for all - more than one year long - leases and with an exception when the underlying asset has a low value. Lessors will continue to classify leases as operating or finance leases, similarly to the former standard dispositions, IAS 17. The new rationale considers leases as purchases financed by debt, and supports the comparability of companies having the same activity. However, as Interviewee 7 points to, the business models are not so comparable: there is in a lease contract no right to build, maybe no right to sub rent, likely there are less rights to transform and there is absolutely no right to sell. Would all those rights be priced, a combination of options could increase value, as they can be sources of revenues. According to the revised definition of an asset (Chapter 4 of the revised conceptual framework), *an asset is a present economic resource controlled by the entity as a result of past events. An economic resource is a right that has the potential to produce economic benefits*, rights are dubbed producing monetary values. This implies that the absence of rights should be captured in a degraded value, a practice that is not yet in place but such corrections are already in sight. For example, long-term renters, who used to expense the price of their fleet, will now resort to fleet managers (fleeter). This suggests that the standard has an impact on the corporate behaviour since companies applying IFRS 16 are expected to come back to ownership solutions. Interestingly, it is indeed expected that the two solutions are not operationally comparable since the lease will now require an implicit rate calculation that is costly to estimate because it comprises information such as: the date of commissioning, the duration of the contract in months, the estimated end date, the pre-tax rent as well as the financial rents, tires, maintenance, assistance (Le Monde, 2018). It follows that conceptually; the lease contract should be less valuable than the ownership. On the one had, the bundle of rights associated to an ownership is different from that associated to the lease, i.e. the usage right conferred to the lessee. The strategic potential of an owned asset doesn't compare and is superior to the strategic potential of a lease. On the other hand, the operational (accounting) cost of managing the owned asset becomes significantly lower than that of the rent. Subsequently, according to Interview 7 *the ignorance of the difference in the business model due to the application of a similar evaluation model is in consequence a flaw*. Finally, in

terms of capital budgeting, there is another conceptual flaw: the ownership sets the operation in the long term, whereas the possibility to affect a renewal probability to the lease contract implies that the contract may not be renewed. In capital budgeting terms, this comes to comparing two projects with different deadlines, an issue that is not addressed by the standard.

4 PART IV- CONCLUSION, THE BRIDGE OVER TROUBLED WATER

IV.1 Summary of our research and contributions

Conceptual and historical background

The issue of discount rate in accounting is not novel. Interest rates and the long-term relation they describe are indeed constitutive of accounting, for they are the reason why accounting writings and alphabet exist. Initially social facts, they transformed to measurement methods with the emergence of more sophisticated exchange systems and money, but also with the help of mathematical abstraction and engineering economics. Despite their imperfection, discount rates, as value components, have pursued their legitimacy process, penetrating new social activities, and re-entered accounting, not as a subject of narration but as tool for narration. Nowadays, two main discount rates co-exist: the short-term interbank rate and the assumption used in capital budgeting DCF methods.

Context

One recurrent challenge during the past decades has been to transform the theory based conjectures in an undisputable proof of truth. For decades, scientists have attempted to bridge the gap between theories and practices, knowing that the framework was that of relative assessment. With discount rates entering accounting, two issues arouse: the first is the transformation of a tool dedicated to a relative measure into a tool objectifying the measured time. The second is the remaining gap that is yet to be bridged.

Contributions

Managerial and regulator contributions

The present work relates the challenges met by practitioners during their reporting operations. To do so, we conducted thirty exploratory and free interviews. The result is unmistakable: none of the interviewees felt comfortable with setting discount rates in an accounting framework. We identify several reasons for that.

The absence of sense behind the calculation because of the counterintuitive effects of discounts rates and their distance to reality.

Contribution to the literature

Our findings shed light and possibly bring explanations to the weak level of disclosures reported in the academic literature, with regards to discount rate information compliance. We also confirm the adaptive behaviours observed by Barker and Schulte (2017): practitioners transfer the problem, narrow it, look for an expedient solution, but could also observe firm rejections.

In such conditions, it seems not yet possible for practitioners to bridge the gap between theories and practices of discount rates in a comparable way. The exercise of discount rate

estimation remains a bridge over troubled water, both for its complexity and its low meaning. The next sections discuss the consistency of discount rates information as described during our survey and the definition of useful information in the *revised* (not public) conceptual framework. We draw lessons from the testimonies we collected and finally, the last part of the present report suggests possible ways forward.

IV.2 Does the information relative to discount rate meet the revised conceptual framework requirements?

In this section, we proceed as follows: we recall the characteristics of information as defined in the revised conceptual framework (CF) as of May 2018 (https://www.ifrs.org/-/media/project/conceptual-framework/fact-sheet-project-summary-and-feedback-statement/conceptual-framework-project-summary.pdf) and since publicly available information only displays the outlines, we assume - in line with Deloitte's iasplus website (https://www.iasplus.com/en/news/2018/03/cf) - only limited changes.

Relevance

According to the 2018 version of the CF:

- Information is relevant if it is capable of making a difference to the decisions made by users
- Financial information is capable of making a difference in decisions if it has predictive value or confirmatory value

> *(Conceptual Framework 2018)*
> *2.6 Relevant financial information is capable of making a difference in the decisions made by users. Information may be capable of making a difference in a decision even if some users choose not to take advantage of it or are already aware of it from other sources.*
> *2.7 Financial information is capable of making a difference in decisions if it has predictive value, confirmatory value or both.*
> *2.8 Financial information has predictive value if it can be used as an input to processes employed by users to predict future outcomes. Financial information need not be a prediction or forecast to have predictive value. Financial information with predictive value is employed by users in making their own predictions.*
>
> *2.9 Financial information has confirmatory value if it provides feedback about (confirms or changes) previous evaluations.*
>
> *2.10 The predictive value and confirmatory value of financial information are interrelated. Information that has predictive value often also has confirmatory value. For example, revenue information for the current year, which can be used as the basis for predicting revenues in future years, can also be compared with revenue predictions for the current year that were made in past years. The results of those comparisons can help a user to correct and improve the processes that were used to make those previous predictions.*

By employing discount rate-based measures and objects, IASB intends to provide users with better information for decision-making. This implies that the interest rate used at the company level is relevant to investors' decision.

We believe that this conjecture still deserves proofs that future research may seek for. So far, prospective values may have shown being useful to rent takers rather than to investors. It will however be a challenge to split the two categories. Analysts may be less concerned as they provide their own implicit discount rates.

One issue not yet tackled by IASB but highlighted by our findings is the following: can information that has no predictive value and no confirmatory power to the managers but that is relevant to users exist?

Notably, our research has not surveyed users and there exists little literature on the value relevance of discount rates in accounting. The latter is more often an explained variable in the academic literature. Further researches could address the issue of users' relevancy of discount rates information, and of estimation model relevancy such as the WACC. Also, the convergence of users' and managers' perception of relevancy remains an unexplored issue.

Faithful representation

According to the revised conceptual framework, *information must faithfully represent the substance of what it purports to represent. A faithful representation is, to the maximum extent possible, complete, neutral and free from error. A faithful representation is affected by level of measurement uncertainty*.

There is a change in the apprehension of faithful representation. *New (in CF 2018) is also a clarification that faithful representation means representation of the substance of an economic phenomenon instead of representation of its legal form only.* (https://www.iasplus.com/en/news/2018/03/cf).

Likely, it is now expected that information based on discount rates carry a specific form of substance that no other information carries. The terms substance, complete and neutral are in the above undefined and subject to interpretations.

The reader has noticed the trade-off between *free from error* and *uncertainty* if one accepts that an uncertain measure is necessarily wrong or imprecise.

Interestingly, a faithful representation implies a possible appraisal of the represented object and the ability to distinguish a faithful representation from a non-faithful one. Both constraints can be easily violated when discount rate is at play. Firstly, the cost of capital is not observable; therefore any representation is a result or a perception. Secondly, as our most developed case study proves: the fact that discount rates range from single to double forbids the distinction between the faithful and the unfaithful representation. The discretionary space highlighted in the present report and its effective use, render the hypothesis of completeness and neutrality impossible to verify, if not to apply.

One favourable trade-off is the ease to accept the vagueness of estimation.

(Conceptual framework 2018)
2.12 Financial reports represent economic phenomea in words and numbers. To be useful, financial information muts not onlu represent relevant phenomena, but it must also faithfully represent the substance of the phenomena that it purports to represent. In many circunstances, the bustance of the phenomena and its legal form are the same. Il they are not the same, providing information only about the legal form would not faithfully represent the economic phenomennon.
2.13 To be a perfectly faithful representation, a depiction would have three characteristics. It would be complete, neutral and free from error. Of course, perfection is seldom, if ever, achievable. The Board's objective is to maximise those qualities to the extent possible.
2.14 A complete depiction includes all information necessary for a user to understand the phenomenon being depicted, including all necessary descriptions and explanations. For example, a complete depiction of a group of assets would include, at a minimum, a description of the nature of the assets in the group, a numerical depiction of all of the assets in the group, and a description of what the numerical depiction represents (for example, original cost, adjusted cost or fair value). For some items, a complete depiction may also entail explanations of significant facts about the quality and nature of the items, factors and circumstances that might affect their quality and nature, and the process used to determine the numerical depiction.
2.15 A neutral depiction is without bias in the selection or presentation of financial information. A neutral depiction is not slanted, weighted, emphasised, de-emphasised or otherwise manipulated to increase the probability that financial information will be received favourably or unfavourably by users. Neutral information does not mean information with no purpose or no influence on behaviour. On the contrary, relevant financial information is, by definition, capable of making a difference in users' decisions.
2.16 Neutrality is supported by the exercise of prudence. Prudence is the exercise of caution when making judgements under conditions of uncertainty. The exercise of prudence means that assets and income are not overstated and liabilities and expenses are not understated.6 Equally, the exercise of prudence does not allow for the understatement of assets or income or the overstatement of liabilities or expenses. Such misstatements can lead to the overstatement or understatement of income or expenses in future periods.
*2.17 * The exercise of prudence does not imply a need for asymmetry, for example, a systematic need for more persuasive evidence to support the recognition of assets or income than the recognition of liabilities or expenses. Such asymmetry is not a qualitative characteristic of useful financial information. Nevertheless, particular Standards may contain asymmetric requirements if this is a consequence of decisions intended to select the most relevant information that faithfully represents what it purports to represent.*
2.18 Faithful representation does not mean accurate in all respects. Free from error means there are no errors or omissions in the description of the phenomenon, and the process used to produce the reported information has been selected and applied with no errors in the process. In this context, free from error does not mean perfectly accurate in all respects. For example, an estimate of an unobservable price or value cannot be determined to be accurate or inaccurate. However, a representation of that estimate can be faithful if the amount is described clearly and accurately as being an estimate, the nature and limitations of the estimating process are explained, and no errors have been made in selecting and applying an appropriate process for developing the estimate.
2.19 When monetary amounts in financial reports cannot be observed directly and must instead be estimated, measurement uncertainty arises. The use of reasonable estimates is an essential part of the preparation of financial information and does not undermine the usefulness of the information if the estimates are clearly and accurately described and explained. Even a high level of measurement uncertainty does not necessarily prevent such an estimate from providing useful information.*

Complementary characteristics

We now turn to the fundamental qualitative characteristics of useful information.

> *(Conceptual Framework 2018)*
> *2.20 Information must both be relevant and provide a faithful representation of what it purports to represent if it is to be useful. Neither a faithful representation of an irrelevant phenomenon nor an unfaithful representation of a relevant phenomenon helps users make good decisions.*
> *2.21 The most efficient and effective process for applying the fundamental qualitative characteristics would usually be as follows (subject to the effects of enhancing characteristics and the cost constraint, which are not considered in this example). First, identify an economic phenomenon, information about which is capable of being useful to users of the reporting entity's financial information. Second, identify the type of information about that phenomenon that would be most relevant. Third, determine whether that information is available and whether it can provide a faithful representation of the economic phenomenon. If so, the process of satisfying the fundamental qualitative characteristics ends at that point. If not, the process is repeated with the next most relevant type of information.*
> *2.22 In some cases, a trade-off between the fundamental qualitative characteristics may need to be made in order to meet the objective of financial reporting, which is to provide useful information about economic phenomena. For example, the most relevant information about a phenomenon may be a highly uncertain estimate. In some cases, the level of measurement uncertainty involved in making that estimate may be so high that it may be questionable whether the estimate would provide a sufficiently faithful representation of that phenomenon. In some such cases, the most useful information may be the highly uncertain estimate, accompanied by a description of the estimate and an explanation of the uncertainties that affect it. In other such cases, if that information would not provide a sufficiently faithful representation of that phenomenon, the most useful information may include an estimate of another type that is slightly less relevant but is subject to lower measurement uncertainty. In limited circumstances, there may be no estimate that provides useful information. In those limited circumstances, it may be necessary to provide information that does not rely on an estimate.*

Enhancing qualitative characteristics

2.23 Comparability, verifiability, timeliness and understandability are qualitative characteristics that enhance the usefulness of information that both is relevant and provides a faithful representation of what it purports to represent. The enhancing qualitative characteristics may also help determine which of two ways should be used to depict a phenomenon if both are considered to provide equally relevant information and an equally faithful representation of that phenomenon.

Comparability

> *Conceptual Framework 2018)*
> *2.24 Users' decisions involve choosing between alternatives, for example, selling or holding an investment, or investing in one reporting entity or another. Consequently, information about a reporting entity is more useful if it can be compared with similar information about other entities and with similar information about the same entity for another period or another date.*
> *2.25 Comparability is the qualitative characteristic that enables users to identify and understand similarities in, and differences among, items. Unlike the other qualitative characteristics, comparability does not relate to a single item. A comparison requires at least two items.*
> *2.26 Consistency, although related to comparability, is not the same. Consistency refers to the use of the same methods for the same items, either from period to period within a reporting entity or in a single period across entities. Comparability is the goal; consistency helps to achieve that goal.*
> *2.27 Comparability is not uniformity. For information to be comparable, like things must look alike and different things must look different. Comparability of financial information is not enhanced by making unlike things look alike any more than it is enhanced by making like things look different.*
> *2.28 Some degree of comparability is likely to be attained by satisfying the fundamental qualitative characteristics. A faithful representation of a relevant economic phenomenon should naturally possess some degree of comparability with a faithful representation of a similar relevant economic phenomenon by another reporting entity.*
> *2.29 Although a single economic phenomenon can be faithfully represented in multiple ways, permitting alternative accounting methods for the same economic phenomenon diminishes comparability.*

With regards to discount rates and as expressed here above on QC 25, the variety of available methodologies in similar contexts (cost of capital or participant's cost of debt) and their diverging results at best hamper but more likely forbid the aim of identifying and understanding comparability. For example, with regards to leases, we have seen that the evaluation process aims at making comparable two business models, which differ in nature. More worrying could be the lack of consistency in discount rates estimation that can hamper historical comparability.

This is also true for level 2 assessments when multiple sources exist or level 3 when practitioners rely on external not yet converging estimations.

Verifiability

> *(Conceptual Framework 2018)*
> *2.30 Verifiability helps assure users that information faithfully represents the economic phenomena it purports to represent. Verifiability means that different knowledgeable and independent observers could reach consensus, although not necessarily complete agreement, that a particular depiction is a faithful representation. Quantified information need not be a single point estimate to be verifiable. A range of possible amounts and the related probabilities can also be verified.*
> *2.31 Verification can be direct or indirect. Direct verification means verifying an amount or other representation through direct observation, for example, by counting cash. Indirect verification means checking the inputs to a model, formula or other technique and recalculating the outputs using the same methodology. An example is verifying the carrying amount of inventory by checking the inputs (quantities and costs) and recalculating the ending inventory using the same cost flow assumption (for example, using the first-in, first-out method).*
> *2.32 It may not be possible to verify some explanations and forward-looking financial information until a future period, if at all. To help users decide whether they want to use that information, it would normally be necessary to disclose the underlying assumptions, the methods of compiling the information and other factors and circumstances that support the information.*

We have highlighted the diversity of discount rates or the use of average discount rates, and the use of multiple estimation providers, themselves using non-transparent methods to produce their assessments. Such practices hamper the verifiability of the disclosed information to and by external users.

Indeed, the issue with regards to the multiple rates is not their specificities, as one-by-one discount rate is verifiable, but rather the verifiability of all possible discount rates estimations. Concretely, different results can be admitted for the same discount rates. Moreover, in the absence of observability, discount rates could never be verifiable.

A question however follows: if many rates are acceptable and verifiable, is any of them the true one?

Timeliness

> *(Conceptual Framework 2018)*
> *2.33 Timeliness means having information available to decision-makers in time to be capable of influencing their decisions. Generally, the older the information is the less useful it is. However, some information may continue to be timely long after the end of a reporting period because, for example, some users may need to identify and assess trends.*

With regards to discount rate, this characteristic may be easy to fulfil. However in some cases, when verifiability wins over timeliness, *because it was validated last year*, this characteristic may be at risk.

Understandability

> *(Conceptual Framework 2018)*
> *2.34 Classifying, characterising and presenting information clearly and concisely makes it understandable.*
> *2.35 Some phenomena are inherently complex and cannot be made easy to understand. Excluding information about those phenomena from financial reports might make the information in those financial reports easier to understand. However, those reports would be incomplete and therefore potentially misleading.*
> *2.36 Financial reports are prepared for users who have a reasonable knowledge of business and economic activities and who review and analyse the information diligently. At times, even well-informed and diligent users may need to seek the aid of an adviser to understand information about complex economic phenomena.*

This may be the most striking result of our research: many interviewees claim their little understanding of discount rates; this means that they can rarely extract sense in its estimation and disclosure. This comment particularly applies to level 3 fair value computations. It follows that an understanding by users is even less probable.

Regarding discount rates for measuring financial instruments, or level 1 and level 2 FVA, practitioners express fewer concerns with regards to understandability but more concerns with regards to comparability.

Applying the enhancing qualitative characteristics

> *(Conceptual Framework 2018)*
> *2.37 Enhancing qualitative characteristics should be maximised to the extent possible. However, the enhancing qualitative characteristics, either individually or as a group, cannot make information useful if that information is irrelevant or does not provide a faithful representation of what it purports to represent.*
> *2.38 Applying the enhancing qualitative characteristics is an iterative process that does not follow a prescribed order. Sometimes, one enhancing qualitative characteristic may have to be diminished to maximise another qualitative characteristic. For example, a temporary reduction in comparability as a result of prospectively applying a new Standard may be worthwhile to improve relevance or faithful representation in the longer term. Appropriate disclosures may partially compensate for non-comparability.*

IV.3 Lessons from our survey

Ontology shift from intersubjective trust to an objective (mistrustful) reality

Discount rates have accessed the accounting information with the re-entrance of Fair Value Accounting and the emergence of Value in Use accounting. Discount rates are applied to Financial Instruments, assets or liabilities associated flows in order, most of the time to estimate a present value. Such operation requires that flows are projected, over several periods, and are further extended to undefined/ unlimited horizons.

The meaning of the discount rate originates on the one hand, in the idea that interest rates capture time value and on the second hand, in Corporate Finance *engineering* practices. In the latter case, it is theoretically describing the cost of funds, a difficult to assess element requiring models and lacking observability.

Alternatives to models are suggested by the standard setters (the marginal cost of debt, the market participant's rate…) yet, they fail to properly and satisfactorily (to practitioners) assess the cost of capital. Despite all possible alternatives and the multiple variations relating to risk capture, practitioners surveyed in the framework of the present research have testified of their difficulties in bridging the gap between theories and practices. And if one needs to chunk those in one single category, it may be the loss of meaning in the operation. This has left a global sentiment of dissatisfaction, and a lack of understanding often expressed by interviewees. Another and more significant risk is the risk of disinformation generated by the compliance with the standard. This disinformation can either take the form of disinformation (a voluntary desire to hide or modify information) or misinformation (a genuine mistake), both with possibly a high level of impact.

We suggest that the loss of meaning expressed by practitioners may lie in the change of perspective that the discount rate has lately undergone. Used since ancient times in a symbolic perspective as a description of inter-individual relations or power plays, the rate - whether compounded or discounted - may have never pretended to become a knowledgeable objective description of reality but only to remain an intersubjective awareness of trust resistance. Likely, the introduction of discount rate in contemporaneous accounting has shifted a seven millennia old perspective from a symbolic one to a modern one, thereby redefining a new ontology: that of objectivism versus subjectivism. An ontology shift in humankind history can be a brutal revision process causing at worse rejections, at best wariness, and in between, adaptive behaviour, some of them being nothing but emergency exits. Our findings testify of all such behavioural consequences.

Determinism: the ultimate answer to post-modern uncertainty

DCF models employing discount rates narrate the future; they do so by describing perpetual sets of Cash Flows in a deterministic manner. This supports the unique objectivity of the organizations as a properly designed and monitored system of (already made) decisions in a predictable *real* world. Whereas, to the practitioners surveyed in the framework of the present research, organizations are continually constructed and deconstructed, active and reactive.

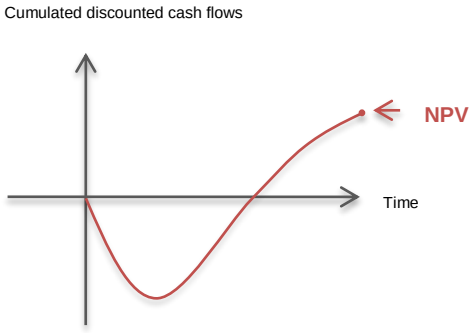
Thanks to interactions between members, reality is co-constructed and always different from planning.

To those, DCF methods provide a way to narrate, a framework to rationalize, and opportunities to formalize common objectives. The perspective and the ontological reinterpretation (objectification) inaugurate a novel mind gap between the standard setter expectations and the practitioners' perception.

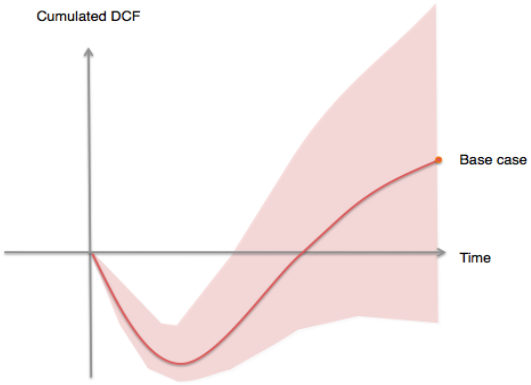
Accepting that this ontological revision may be the most likely explanation of the lack of quality in discount rate disclosures, we survey the possible answers to the current unwished situation. Is there a way to resolve or reduce the gap between the standard-setter and the practitioners' perspective? Could the reinjection of more subjectivism allow some steps back to interpretivism, consistently with practitioner's practices?

We suggest a visualisation of the possible highlighted discrepancies.

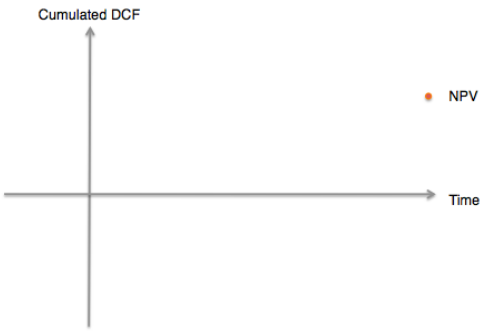
Figure 5: Forward-looking information possible representations



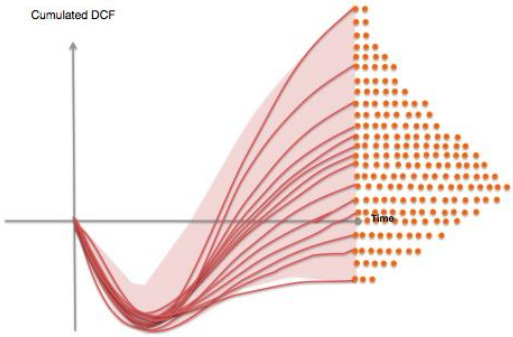
The future story that is told (one way)



The range managers have in mind



Its IFRS representation (one dot)



The distribution managers have in mind

And the mark, users may desire to compare with invested costs: all possible futures, and a sign of which is the most likely

Possible ways forward

With regards to prospective values in accounting, as for estimating the loss of value - whether through depreciation test or provisions, there exists some combinable paths to depart from determinism. This is achievable if standard setters associate newly objectified figures with their fuzziness. Concretely, the multiple outcomes of a prospective evaluation can be recognised, in the avoidance of a summary in one single value.

Thereby, the pitfall of the recognition of a deterministic future is circumvented, and that there is no possible way to define more than mid-term prospective cash flows, issuers don't take the risks of promising expressed-under-compliance future streams of revenues that the companies will never be able to provide. The effect of such situation is foreseeable: it can cause excessive, unwished and undue market reactions.

With regards to market benchmarks, reference rates could be named and consistently listed. Also, the standard setter may provide with such information in order to reduce access costs to those in needs. We list here some possible, non exhaustive, paths:

With regards to DCF values calculation, practical adjustments could include the abandon of the indefinite future value. This could mean its cancelling or its transformation into a finite life terminal value, assuming a growing rate or a degrowth rate in the last projected cash flow, in line with the strategic horizon.

Another possibility, yet, not mutually exclusive, is the introduction of possible ranges in both the assumptions making the DCF model and the results. On our former figures, the produced values bound the shade. This, in line with (Hellman et al. 2016), would immediately allow the recognition of an amplitude of possible outcomes rather than a promised best case or average one, that has almost no probability of occurrence. The range of possibilities would then serve as a new form of assessment prism, both to the market and to the company itself when depreciation tests matter. Arguably, this will concentrate a greater risk capture on the cash flows, with the benefit to minimize the embedded subjectivity in the additive discount rate, and thereby a substantial proportion of the double risk counting.

A more sophisticated possibility would be to run simulations. Artificial Intelligence and blockchain technology will soon be able to support the collection of data, the identification of

parameters specifications and calibration and thereby to produce distribution of possible cash flows.

Notably, such cash flows can be discounted, or not. It may be possible to circumvent the discount rate assumption and pitfalls.

Finally, this would need further investigation, but possibly, the users are expecting to situate their chances of seeing their investment being profitable. This could be completed by either statistical analysis or by scoring qualitative data to be available in a more global corporate report.

With regards to risks and additivity of discount rates, such approach could better signal the associate risk to each assessed unit (whether assets or business units). Opportunistically, the reader, investor, analysts could grasp a global of the risk mitigation within the company rather than the representation of a normalized behaviour.

Of course, such evolution is not without limit and further instrumentalization is possible. Also, technological risks are possible. The cost versus the benefits of such reconstruction of subjective ontology is a path for future research.

5 PART V - RECOMMENDATIONS, ELEMENTS FOR A POSSIBLE GUIDANCE

Our closing identifies a few axis of improvement in the disclosures, beyond the end of determinism in accounting.

SENSE GIVING

Participants expressed their lack of understanding of the objectives in discount rates mobilization, whether those are difficulties with understanding the concept of the discount rate, the meaning of the measurement or the objectives and rationales behind the operation

Recommendation n°1: IFRS could provide more insights on the dispositions, by explaining objectives and concepts.

The objective of the standards, operations and measurement relying on discount rates could be better explained. The way such information can be analysed or interpreted could be illustrated. The meaning of the discount rate could be pedagogically expressed. Concepts underlying the estimation object could be clarified. We note that the discount rate is used to describe time value and has been lately detailed in IFRS 17 as time value of money. Such definition makes little sense to practitioners. A complete definition could refer to time value of money at a given instant and for a given time horizon. This for example can lead to the use of interest rates term structure. Notably, the concept of the discount rate differs accordingly with the analysed object.

Recommendation n°2: A more precise vocabulary should be employed.

Anytime it is possible the term discount rate should be replaced by the proxy or variable used: cost of funds, risk-free interest rate. The provision of an algorithm of useful and valid discount rates according to the analysed object and the identification their reliable sources could be useful. Moreover, the provision of market data could be insured by IASB.

Recommendation n°3: IASB may identify and hierarchize the information sources.

This is in line with the previous remark but is an extension to al other sources of information. Example: the identification of (a) reliable provider(s) of sectorial information. Guidance could also exist on the way managers are expected to reconcile non converging externally estimated or formulated assumptions.

Financial assets:

Recommendation n°4: IASB should allow the term structure of interest rate and its information source.

With regards to financial instruments evaluation, we recommend that IASB identifies, for non-financial institutions, a universal source of information and allow interest rates term structure usage.

Non Financial Assets:

The discount rate aims at providing estimations. If it is mark-to-market, above conditions can apply. In the case of an entity-based model, i.e. level 3 estimation, more guidance is expected.

There exists an issue about how to compute the cost of total funds. Accordingly with finance theory, the cost of funds should describe that of the targeted structure, during the asset or liability life. This leads to the provision of one discount rate per deadline. The future cost of funds being prospective, the discount rate computation leaves a discretionary space likely to increase informational asymmetry. Theoretical models have been proposed to approach the cost of equity computation. Empirical tests show that the models explain about 50% of the adjustment, i.e. 50% of the description is missing.

One approach to address the above issue is to take account of a discount rate change or as described above, to focus on non-discounted cash flows distributions.

Recommendation n°5: The concepts of cost of equity and cost of capital should be clarified, when it is needed.

Possible improvements are: IASB could first define the concept behind the discount rate in an evaluation exercise, in line - or not but the reference framework could be precised - with evaluation theories.

The notion of cost of equity - which poses problems - must be defined. Whatever the model chosen, IASB should provide some guidance on how to apply the model, specify the parameters, find the data, select the relevant data and compute the variables: the risk-free rate.

Recommendation n°6: Risks could be better captured in the cash flows, thereby withdrawing the additive rate.

The capture of risks in the discount rate leaves a great room for manoeuvre and discretion. It is also a subjective adjustment that hampers comparability, no work has never scientifically demonstrated that such adjustment are reliable. Alternatively, cash flows could capture all potential risks, limiting the risk premium to a residual premium and if possible making it inexistent.

Recommendation n°7: Risks could be better captured in the cash flows, in a non-deterministic manner.

One way to solve this issue and reduce the discretionary space present in additive rates is to capture all risks in the cash-flows. In such case, assumptions about the cash flows could also be formalized. Each single parameter influencing the cash flows value could be the object of

specification in simulation. Again, the development of Artificial Intelligence and block chain technologies can support such process, making them auditable.

It is possible to replace deterministic value with a range of possible values, to be obtained through simulation methods.

There exists literature on point vs range analysis and more experimentations or surveys could be conducted in the specific accounting area in order to better understand the implications of such ranges.

Recommendation n°8: The use of prospective evaluation should be better guided.

Despite the radical path, which consists in eliminating all discount rates based values from financial statements for non-financial assets, and to destine those to extra-financial statements, more possible ways can be examined in further inquiries, already pointed to in the previous chapter:

1) The use of DCF methods, in the case of value loss measurements (provisions or impairment tests) shouldn't be limited to one reductive single value, but should consider the possible the possible range/distribution of values. It follows that impairment rules could be inspired from the underlying logics of VaR analysis.

2) DCF could be disclosed in full details in order to allow analysts and users to play with numbers. Models (with or without figures) could be made available to users in order to allow them to test the sensitiveness of variables and run their own simulations.

3) Alternatively, sensitivity analysis should be systematic; it is now present in the case of impairment tests, yet not all issuers are compliant. The process could be extended to all DCF value usage or cash flows distribution. We recall that the discount rate is always a parameter the disclosed or recognized value is the most highly sensitive to. This both lacks business sense and leaves discretionary space.

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Appendix 1: A confrontation of hyperbolic rates and exponential rates (Ilg et al. 2017)

Table VI. Summary of the Expected Net Present Value of Total Costs (Million Euro) for Different Discounting Scenarios

			Do-Nothing	Backfilling	Relocation	Retrieval
No discounting		C_I	0	801	875	4,610
		C_D	12,600	9,548	9,190	6,274
		Total	12,600	10,350	10,065	10,885
Exponential discounting	1%	C_I	0	775	792	4,065
		C_D	2,059	1,284	1,742	1,698
		Total	2,059	2,059	2,534	5,763
	3%	C_I	0	725	662	3,250
		C_D	759	509	752	753
		Total	759	1,234	1,415	4,003
Hyperbolic discounting	$k = 0.01$	C_I	0	775	798	4,104
		C_D	3,302	2,227	2,609	2,267
		Total	3,302	3,002	3,407	6,372
	$k = 0.03$	C_I	0	729	689	3,444
		C_D	1,461	1,012	1,281	1,207
		Total	1,461	1,741	1,970	4,651

Note: Differences between the totals and the sum of its components are due to rounding. Gray-shaded figures indicate the minimum cost strategy.
Source: Own calculations.