FAIRNESS FINANCE

Brand new tools to calculate the cost of capital

June 15, 2019 – Session 5C – 9 AM

agn EUROPE, MIDDLE EAST & AFRICA

Summary

1. Fairness Finance Overview

- **Fairness Finance** is a website for valuation experts, investors and portfolio managers
- It provides calculation tools of the cost of capital, designed and tested by business valuators
- *Fairness Finance* was created by former members of Détroyat Associés, an independent research bureau, and was taken over by BM&A in January 2016
- The models of *Fairness Finance* are the result of nearly 20 years of work on the calculation of the risk premium
- The financial support of BM&A has allowed the development of latest generation models, which have been endorsed by the French and international academic world:
  - Philippe Raimbourg (Paris I University) co-signed a fairness opinion with Fairness Finance in May 2017
  - Laurent Germain and Hervé Boco (Toulouse Business School) audited Fairness Finance's models in December 2017
  - One article of fundamental research accepted in the Journal of International Financial Management & Accounting (Wiley publisher)
  - Two articles of fundamental research were selected by the IRMC* co-chaired by **Edward Altman** (inventor of the "Z-score" in credit analysis), during the conference held in Paris on June 7 and 8, 2018

2. Eugene Fama's testament about 60 years of research in finance

- Since the invention of the CAPM in the 60's, no model has been really satisfactory as recalled by the Nobel economist Eugene Fama:

« after a half-century of research and refinements, most asset-pricing models have failed empirically. Estimating something as apparently simple as the cost of capital remains fraught with difficulty. He dismisses betas for individual stocks as "garbage," and even industry betas are said to be unstable, "too dynamic through time." What's more, the wide range of estimates for the market risk premium — anywhere from 2% to 10% — casts doubt on their reliability and practical usefulness. »*

- The ambition of the Fairness Finance project is to follow an empirical and pragmatic approach to reconcile practitioners and theoreticians though:
  - efficient and practical cost of capital calculation tools, "all terrain"
  - a statistical model that streamlines risk premiums differences mentioned by Eugene Fama and far beyond

* Fama, Eugene F. and Stern, Joel M., "A Look Back at Modern Finance: Accomplishments and Limitations" (Fall 2016). Journal of Applied Corporate Finance, Vol. 28, Issue 4, pp. 10-16, 2016. Available at SSRN: https://ssrn.com/abstract=2902370

3. The basic CAPM and its practical failure

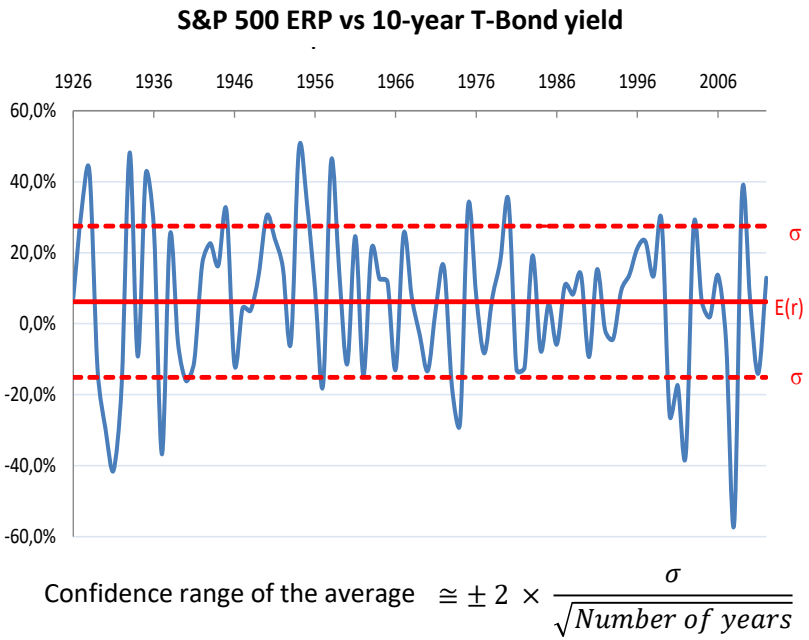
- In its original form the CAPM is supposed to give the cost of capital of a company in a very simple way knowing ❶ the **beta** of its action, ❷ the **market risk premium** and ❸ the **risk-free rate** corresponding to the duration of the investment:

$$k_{e.i} = \beta_{L.i} \times \Pi_R + r_f \quad \text{CAPM}$$

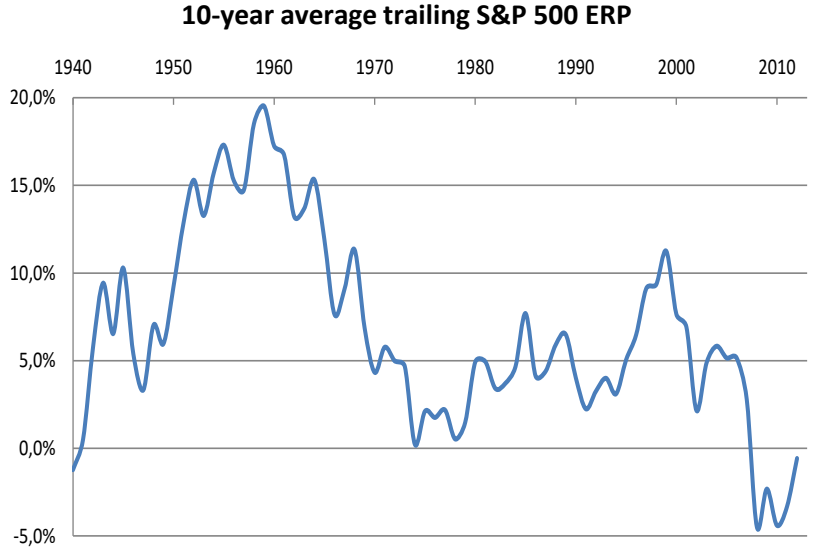
- Unfortunately this approach does not work most of the time and it deals with barely only 10% of the cases of companies to evaluate:
  - The market premium required at time "t" is ***NOT*** a stationary amount that can be estimated from the average of past returns
  - This approach (as long as the beta is estimated with caution) allows only the valuation of ***Large Companies***

3.1 The basic CAPM and its practical failure: the "ex-post" ERP

- To use the law of large numbers, the historical equity risk premium embeds the effects of two world wars and postwar economic booms
- The assumption of fast return to the secular average of the risk premium does not provide any information on the level required at the time of the evaluation ...



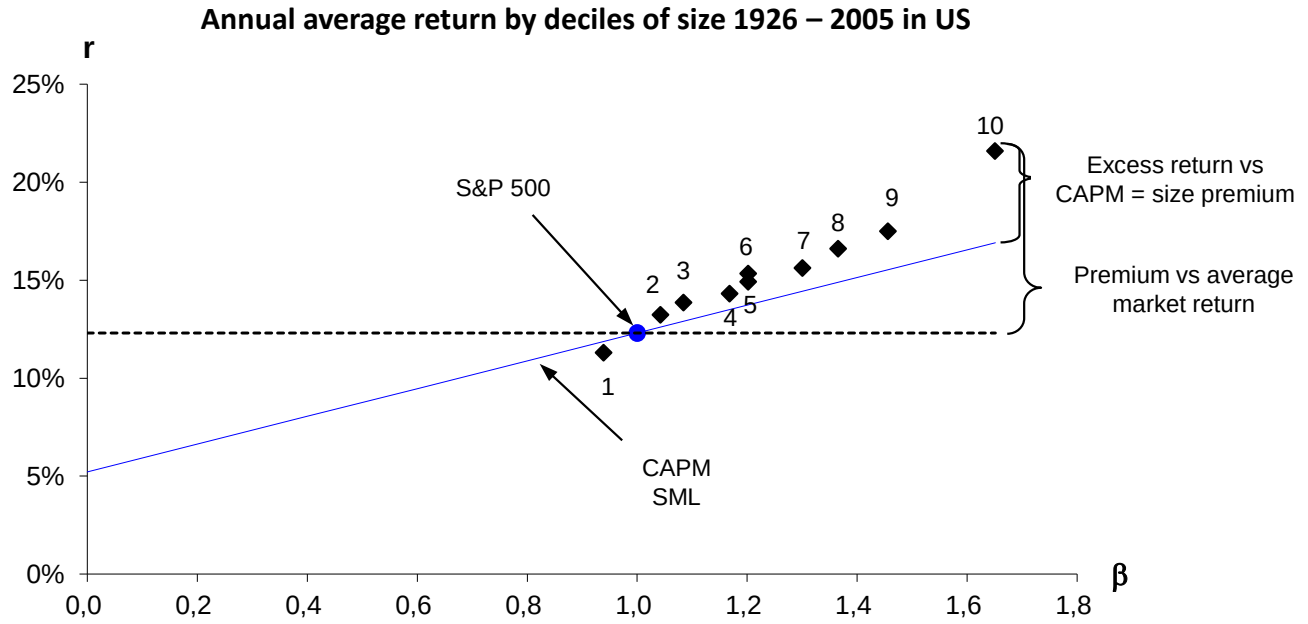
Confidence range of the average $\cong \pm 2 \times \frac{\sigma}{\sqrt{Number\ of\ years}}$



- **Historical risk premiums are like broken clocks that give exact time twice a day**

3.2 The basic CAPM and its practical failure: the size premium

The CAPM did not expect investors to demand more profitability from smaller companies than the weighted average of the market, i.e. 90% of listed companies:



- Just as - all else unchanged - a Small Cap does not borrow at the same rate as a Large Cap, for the return of the shares it is required a size premium
- **As for the market premium, the size premium varies and its historical average is not of practical use**

4. A practical solution: the "prospective" or "implicit" model

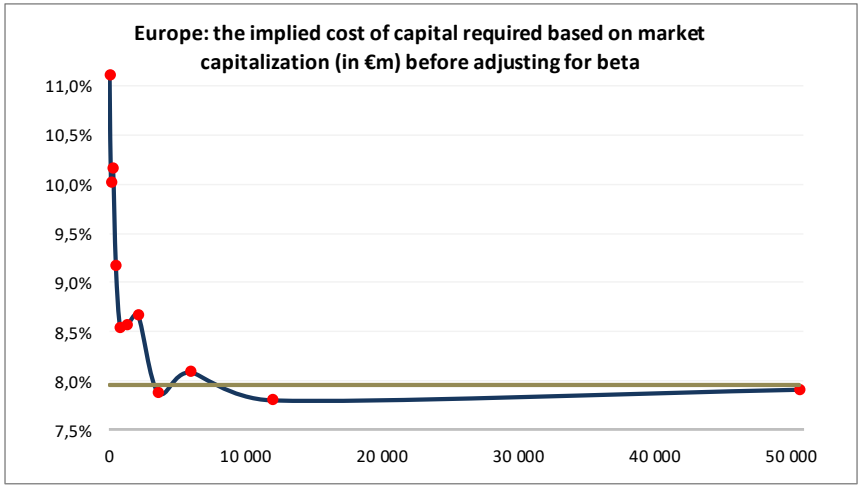
- To be "at the market price", the idea has come to calculate companies IRR based on consensus forecasts:

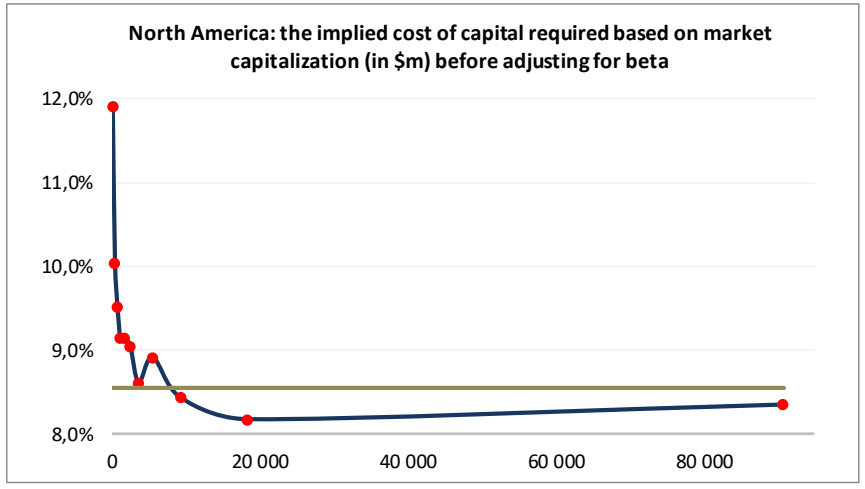
$$IRR = \frac{Cash\ flow}{Capi} + g$$ *

- Rather than using the law of large numbers over a hundred historical variations, here it is based on the IRRs of thousands of companies listed on the same date

- This market average IRR is called the "Implied Cost of Capital"

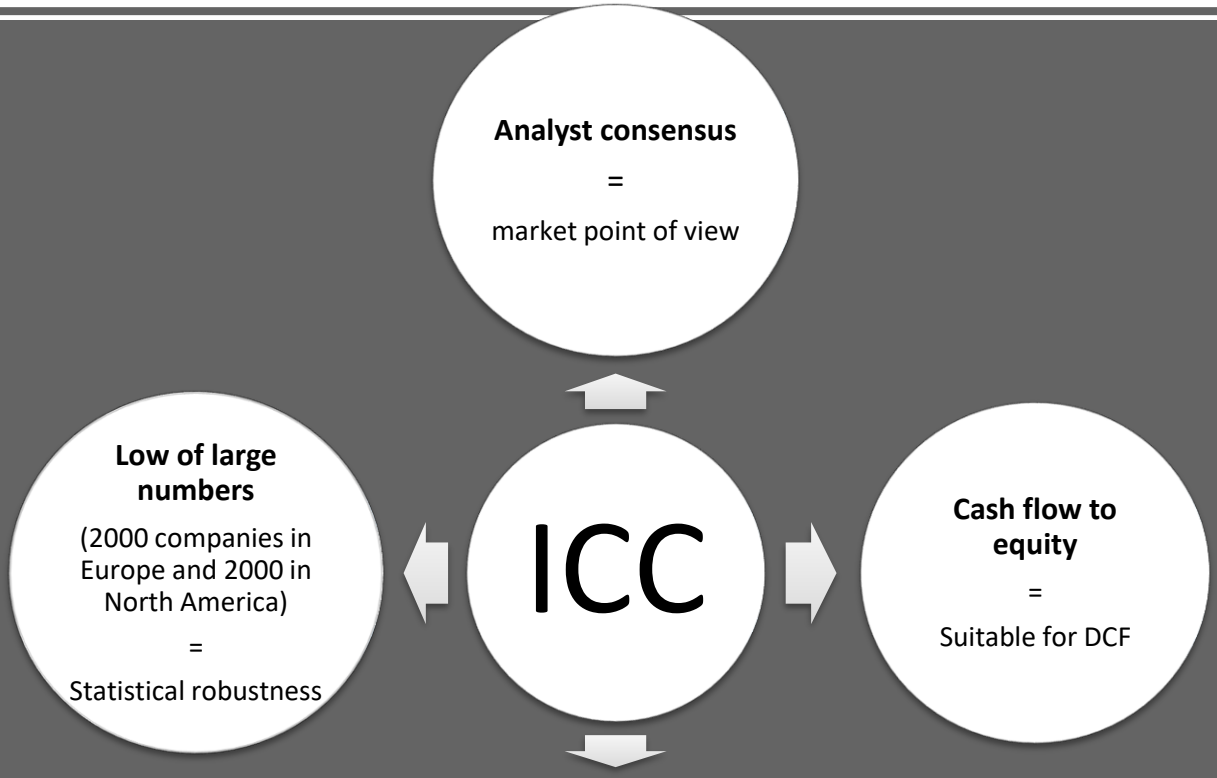
- **As expected, this IRR is a function of firm size (Fairness Finance year end 2016):**





* *The Fairness Finance model is based on 5 years of cash flow forecasts*

5. The specificities of the ICC provided by Fairness Finance

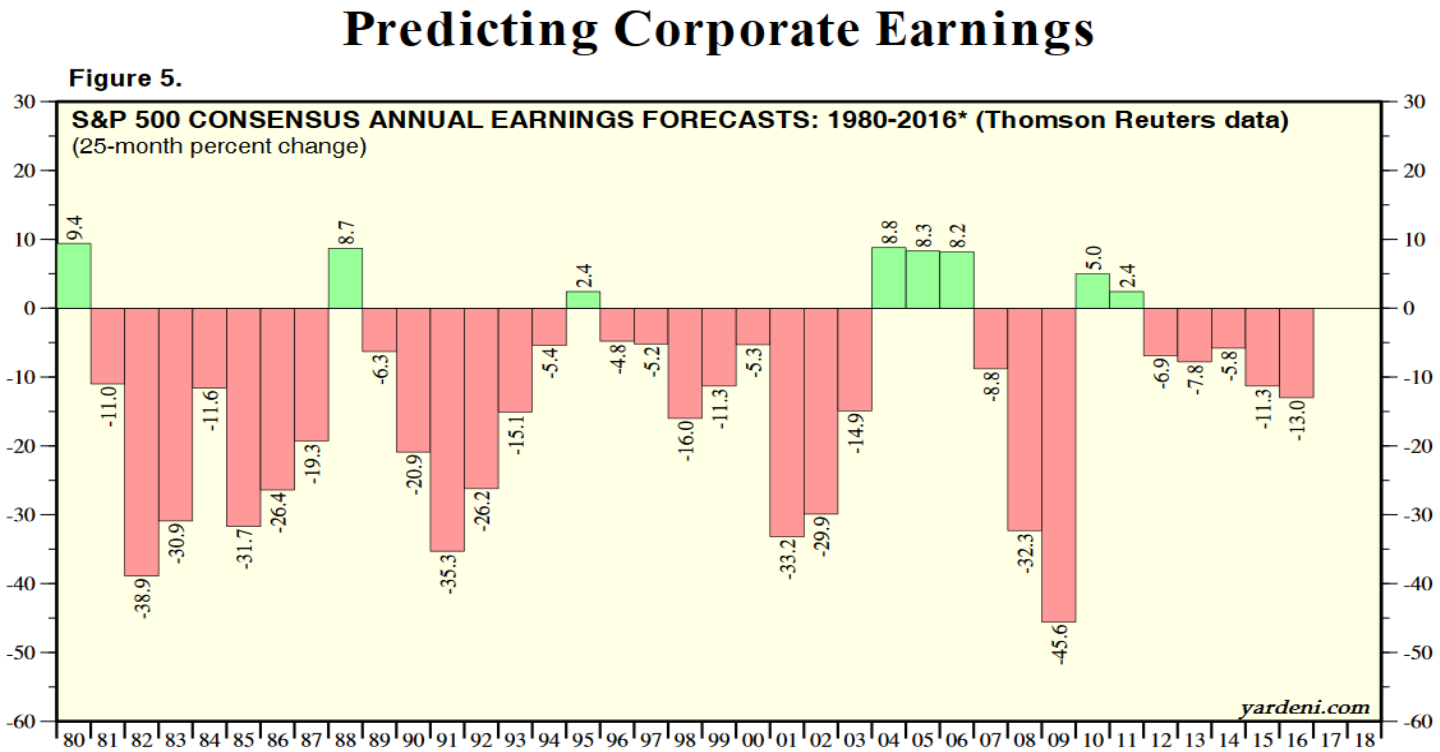


"ICC": Implied Cost of Capital

The ICC is substantially higher than the market's expectation of return.
We provide:

- ***a discount rate for evaluators***
- ***The market expected return for fund managers and investors***

6. Illustration of the optimistic forecast bias



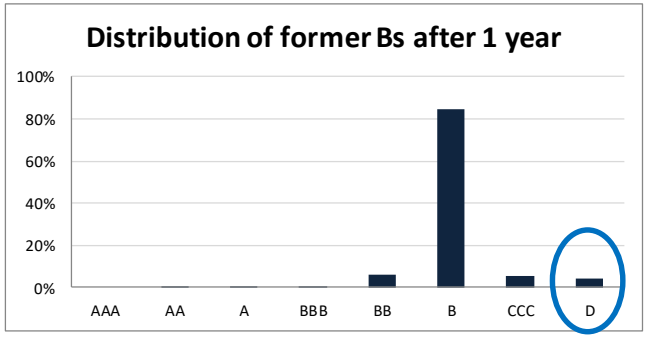
(source: Edward Yardeni, "Predicting the markets: a professional autobiography", yardenibook.com)

In 72% of cases, the 2-year forecast was overestimated (18% on average), and in 28% under-estimated (7% on average)

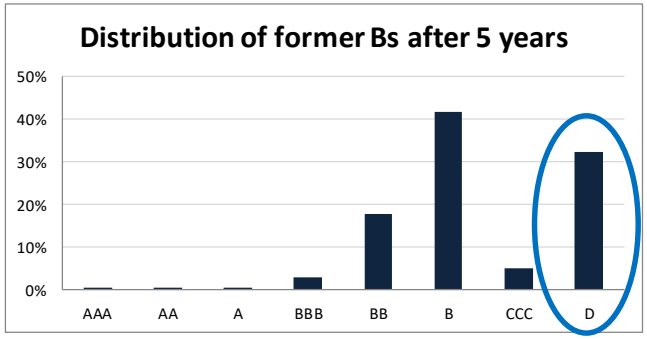
7. Default Risk: transition matrices observed for different ratings

Starting from an initial credit rating (left column), same row, the rating distribution after 1 year and 5 years (source S&P*): *the probability to go bankrupt within 5 years can not be neglected for non investment grades*

1 year	AAA	AA	A	BBB	BB	B	CCC	D
AAA	89,91%	9,33%	0,55%	0,05%	0,08%	0,03%	0,05%	-
AA	0,54%	90,43%	8,33%	0,53%	0,05%	0,07%	0,02%	0,02%
A	0,03%	1,85%	91,97%	5,58%	0,34%	0,14%	0,02%	0,06%
BBB	0,01%	0,11%	3,73%	91,26%	4,03%	0,54%	0,13%	0,19%
BB	0,01%	0,03%	0,13%	5,50%	85,19%	7,66%	0,68%	0,80%
B	-	0,03%	0,10%	0,22%	5,86%	84,44%	5,07%	4,28%
CCC	-	-	0,15%	0,22%	0,74%	15,26%	51,97%	31,65%
D	-	-	-	-	-	-	-	100,00%



5 years	AAA	AA	A	BBB	BB	B	CCC	D
AAA	58,71%	33,59%	5,75%	0,96%	0,28%	0,19%	0,09%	0,41%
AA	1,82%	61,54%	30,43%	4,54%	0,72%	0,48%	0,05%	0,42%
A	0,10%	6,61%	69,58%	19,16%	2,72%	0,90%	0,20%	0,72%
BBB	0,04%	0,63%	14,14%	68,64%	10,33%	3,08%	0,54%	2,60%
BB	0,02%	0,12%	1,63%	19,59%	47,47%	17,06%	2,03%	12,07%
B	0,02%	0,05%	0,47%	2,74%	17,71%	41,68%	5,02%	32,31%
CCC	-	-	0,18%	1,13%	4,55%	18,59%	3,86%	71,68%
D	-	-	-	-	-	-	-	100,00%



* Source S&P 1981-2016, industrial, all zones, «through the cycle», corrected of rating withdrawals

8. Our "Basic" model for mainstream purpose*

In the **"basic"** subscription, the data provided make it possible to evaluate ≅ 80% of the companies by taking into account the **average market** parameters:

$$k_{e.i} = \beta_{L.i} \times \Pi_R + \Delta_{\Pi} + \overline{\Pi_{T.i}} + r_f \qquad \#1$$

- The betas, $\boldsymbol{\beta}$, of 24 GICS Level 2 sectors, with and without leverage
- The ERP in the sense of the CAPM , "$\boldsymbol{\Pi_R}$ ", to which the beta applies
- The Large Caps risk premium "$\Delta_{\boldsymbol{\Pi}}$" for forecasting bias (excess of optimism and non-probabilization for risk of default)
- The size premium "$\overline{\boldsymbol{\Pi_{T.i}}}$ " based on the equity value assessed by DCF (calculator on the site)
- The risk free rate, "$\boldsymbol{r_f}$", or the fixed-rate yield to maturity of a basket of Government bonds rated at least AA in the euro zone or the 10-year T-Bond yield for North America du Nord

*** Data updated every month, available on the website.**

9. Our " Advanced " model for the cost of equity*

With the "**Advanced**" subscription, the data provided makes it possible to evaluate nearly 100% of companies by avoiding the average market parameters if the specific risk profile of the company deviates significantly from them:

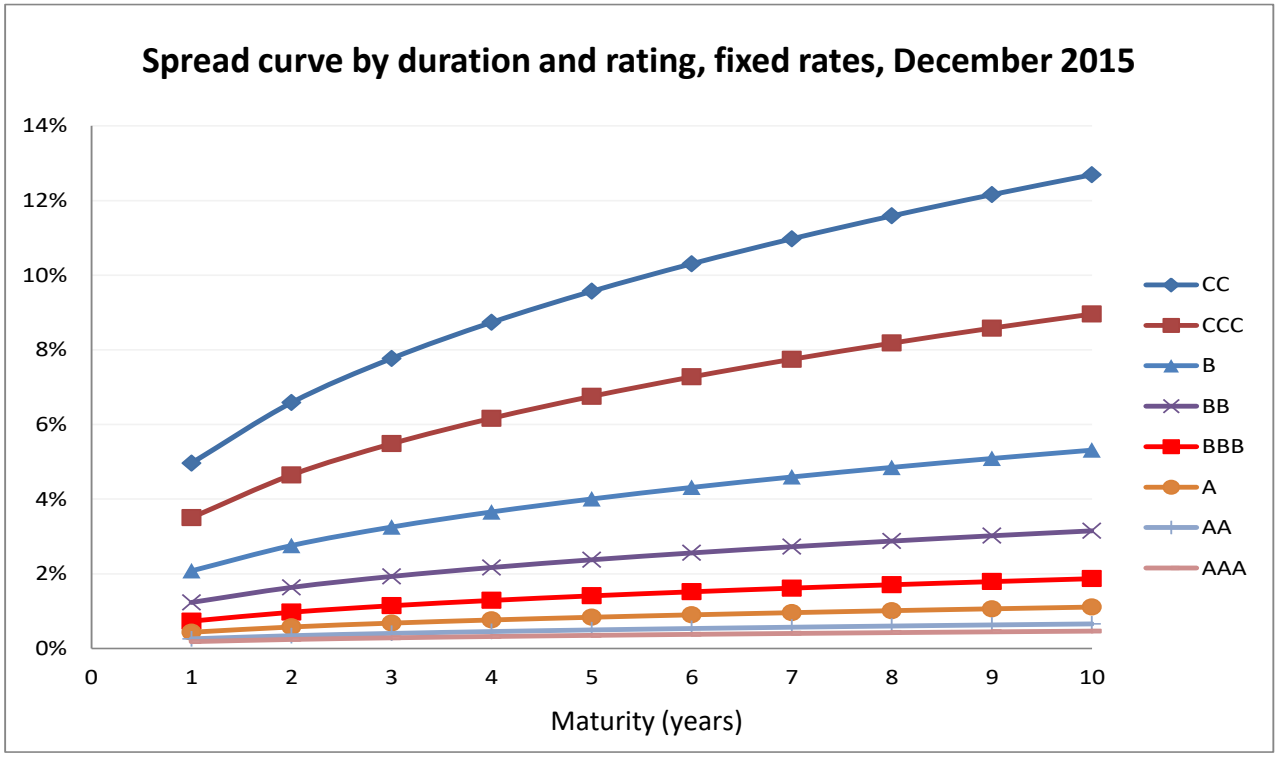
$$k_{e.i} = \beta_{L.i} \times \Pi_R + \Pi_{d.i} + \Pi_{O.i} + \overline{\Pi_{L.i}} + r_f \qquad \#2$$

- The betas, $\boldsymbol{\beta}$, of 68 GICS Level 3 sectors, with and without leverage (instead of 24 in the basic subscription)
- The specific Company premium for risk of default, "$\boldsymbol{\Pi_{d.i}}$", added to the discount rate if forecasts are not adjusted for this risk
- The premium for risk of optimism bias "$\boldsymbol{\Pi_{O.i}}$". It can be deduced, for example, from the average difference between the forecasts of past business plans and the actual performance of the company
- The liquidity premium, "$\overline{\boldsymbol{\Pi_{L.i}}}$", corresponds to the residual difference in the implicit cost of capital, which can not be explained by the small caps' increased risk of default.

*** These data are reportable in monthly shipments as XLS files and viewable under Power BI**

10. Our " Advanced " model for the cost of debt

The "Advanced" subscription also provides fixed-rate bond spreads based on: ❶ the currency (€, $ or £), ❷ duration of the bond ❸ size ❹ credit rating (before collateral)



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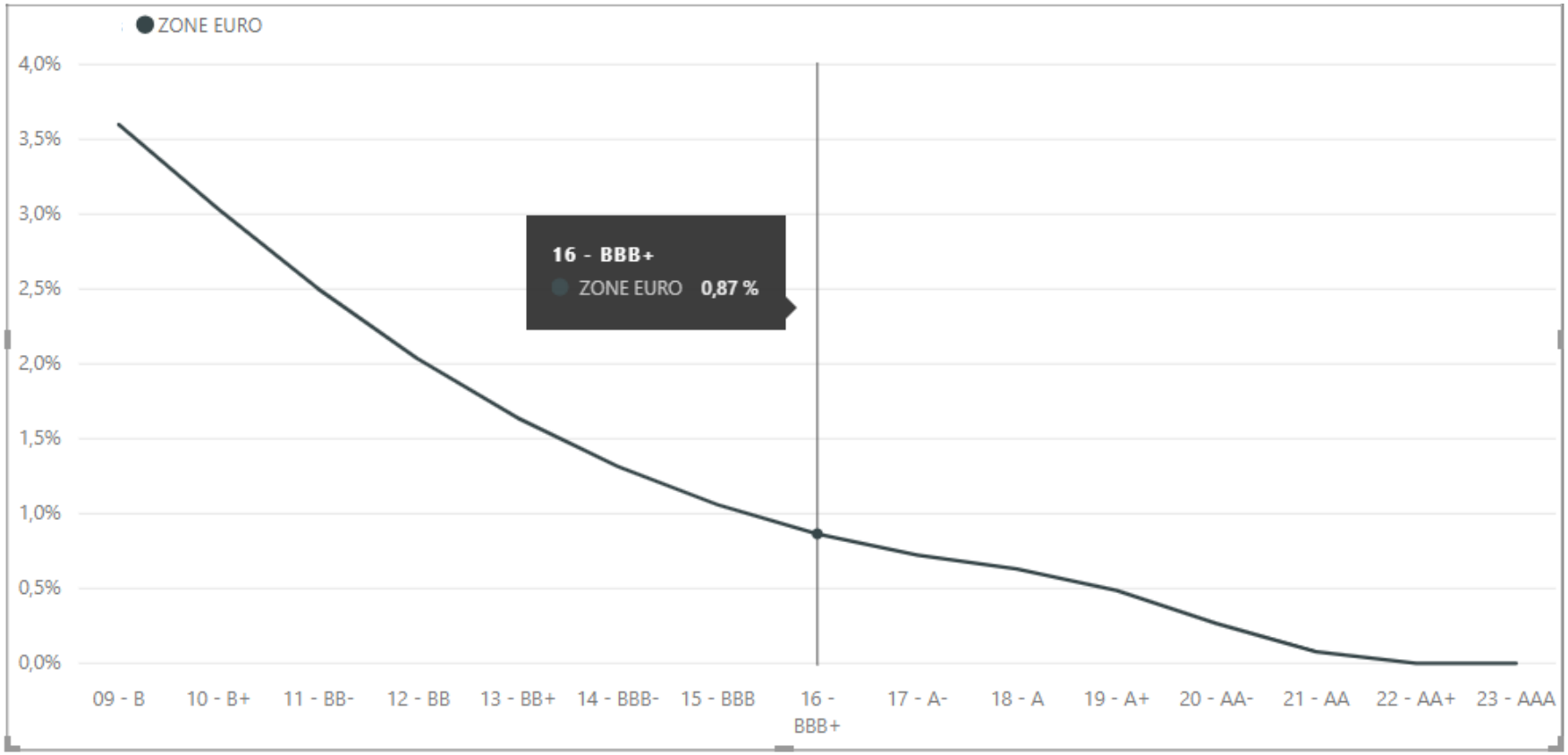
11. Our " Advanced " model for the default risk premium curve

- Business plans are established in case of survival (conditional forecasts)
- The **risk of default** must be taken into account in the flows (probabilized) or in the rate through **an equity risk premium**:



Source : Fairness Finance (end 2018)

12. Our " Advanced " model for credit rating

Fairness Finance credit risk rating model is calibrated from the scorings of the rating agencies

Here, 2 sectoral examples: from the left column, Fairness Finance long term companies ratings, to the left, same row, the scorings distribution the rating agencies give to the same companies:

Services

from \ to	CCC	B	BB	BBB	AA	Total	% correct
CCC	**12**	1	-	-	-	13	92%
B	9	**49**	21	1	1	81	60%
BB	-	13	**61**	20	4	98	62%
BBB	-	2	13	**46**	14	75	61%
AA	-	-	-	3	**21**	24	88%
Total	21	65	95	70	40	291	65%

% located within one class of that assumed: ***97%***

Industrials

from \ to	CCC	B	BB	BBB	AA	Total	% correct
CCC	**11**	-	-	-	-	11	100%
B	4	**35**	16	-	1	56	63%
BB	2	9	**56**	17	2	86	65%
BBB	-	2	11	**48**	8	69	70%
AA	-	1	1	9	**48**	59	81%
Total	17	47	84	74	59	281	70%

% located within one class of that assumed: ***97%***

13. Summary of the Fairness Finance offer: Level 1 (open access)

CMPC

$$Cost_{Equity} = \Pi_E + r_f$$

This model covers:

- some Large Caps
- whose beta is close to 1
- rated BBB+

The undifferentiated total equity risk premium Π_E integrates by definition:

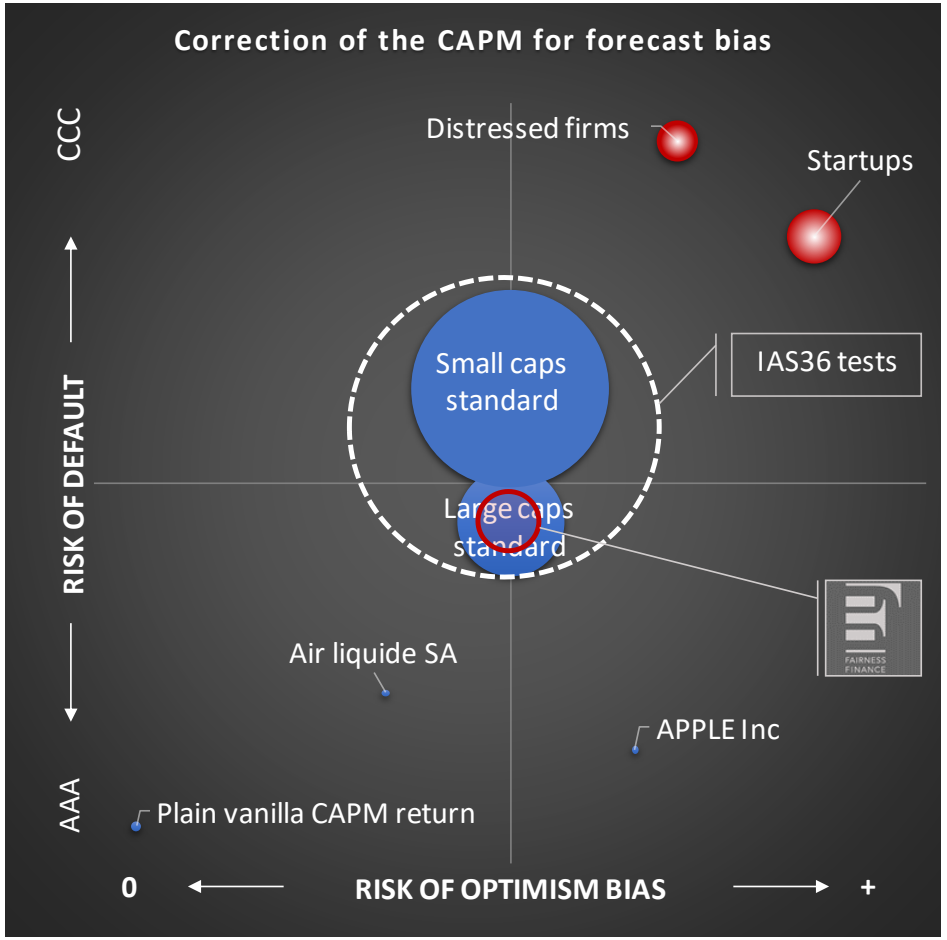
- The CAPM premium
- The market average default risk
- The market average bias for optimism

⇒ beta does not apply to this total risk premium

⇒ this model does ***not*** apprehend the "small size" effect

⇒ **it assesses less than 10% of companies**

$Cost_{debt}$ not provided



14. Summary of the Fairness Finance offer: Level 2 (*by subscription*)

CMPC

$$Cost_{Equity} = \beta \times \Pi_R + \Delta_\pi + \Pi_T + r_f$$

This model covers:

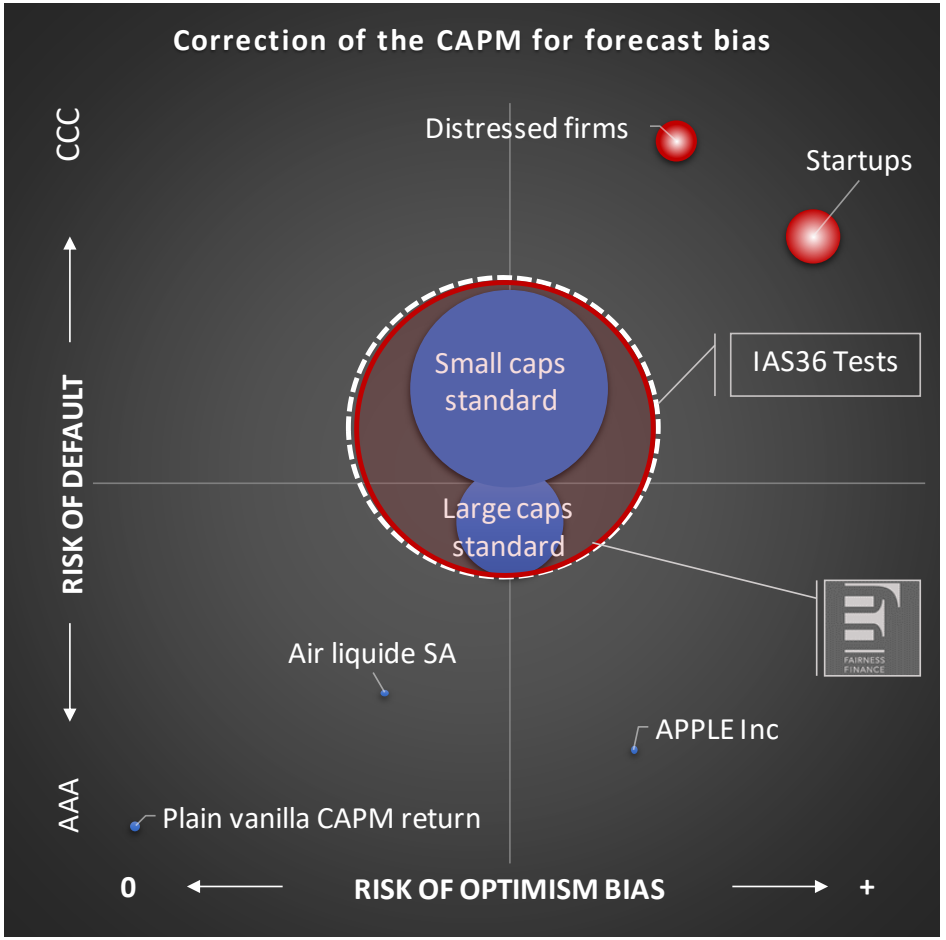
- the size effect to SMEs
- all companies, regardless of their β
  - ➢ with a credit risk in the standard for their size
  - ➢ with a bias of optimism in the norm

The rate separates:

- the CAPM systematic risk (non-diversifiable)
- The average premium for forecasting bias of Large Cap business plans (optimism + default)
- The size premium of Mid & Small Caps

⇒ **Allows to deal with ≅ 80% of evaluations, "mainstream" targets**

$Cost_{debt}$ not provided



15. Summary of the Fairness Finance offer: Level 3 "*Advanced*"*

CMPC

$$Cost_{Eq} = \beta \times \Pi_R + \Pi_d + \Pi_o + \Pi_L + r_f$$

This model covers:

- the size effect to SMEs
- all companies, regardless of their *b*
- all credit risks
- all forecasting bias

The rate separates:

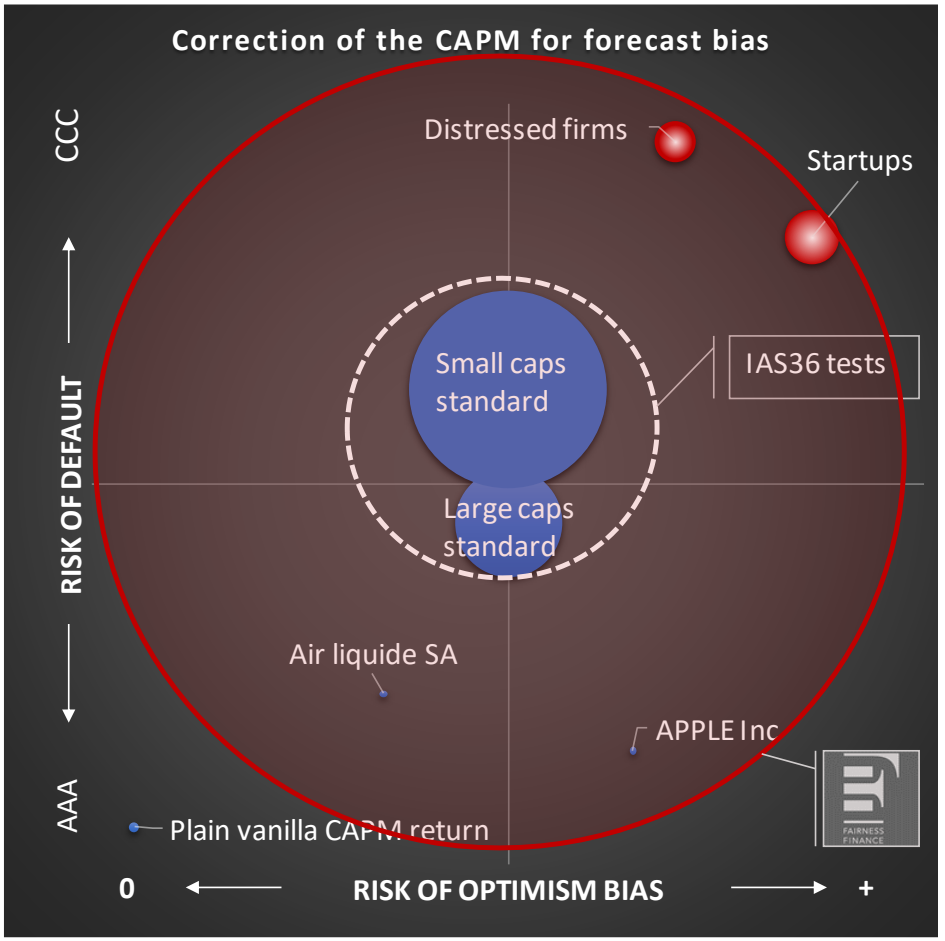
- the CAPM systematic risk (non-diversifiable)
- Corrective premium for default risk **of the company**
- Corrective premium for optimistic bias **of the business plan**
- The residual Liquidity / size premium (non CAPM)

⇒ **Allows to account for the risks of the business plan in the discount rate**

⇒ **The appraiser "takes control" and is no longer limited to applying average market parameters**

$$Cost_{debt} = f(\text{rating}, \text{size}, \text{duration})$$

Based on Fixed rate yields to maturity observed on samples of thousands of industrial corporate bonds listed and rated (€ , $ et £)



*** These data are currently communicated by monthly shipments as files and viewable under Power BI**

Visit our website: http://www.fairness-finance.com

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