Practitioner's guide to cost of capital & WACC calculation

EY Switzerland valuation best practice

February 2020

MRP — We have updated the applicable market risk premium for Switzerland to 6.5%

IFRS 16 — We have included an update on the anticipated IFRS 16 (leasing) impact

EY

Building a better working world

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Team overview

1 Team overview

EY Switzerland – Valuation, Modeling & Economics (VME)

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Zurich

**A team of 30 VME professionals
in Zurich and Geneva**

Genf

VME solutions portfolio

Valuation Services

► Tax-related valuations (business and intangible assets)
► Transactional business valuations
► Expert opinions
► "Regulatory" valuations

► Start-up / venture valuations
► Purchase Price Allocations IFRS 3 / ASC 805
► Impairment Testing IAS 36 / ASC 350
► Share based payement valuations IFRS 2 / ASC 718
► Disputes and arbitration services

Decision modeling

► Integrated financial (3-statement) models
► Forecasting & planning
► Strategic option modeling
► Financing and LBO modeling

► Net working capital models
► Liquidity and cash flow modeling
► Carve-out models (auditable)
► Financial model review

Data analytics and visualizations

► Descriptive / Diagnostic / Predictive / Prescriptive
► Deals analytics
► Operational efficiency optimization

► Commercial analytics (e.g. pricing, promotion, products lunch, inventory)
► Network optimization

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Introduction

2 Introduction
Key decision criterion in transactions, (regulatory) valuation and value based management

Application in valuation

► Cost of capital has several applications

► Cost of capital is a key value driver in all valuations

► Cost of capital as a general term refers to the risk-adjusted cost rate that investors ask as return for their investment

► In entity based valuations (covering debt and equity, i.e. total invested capital / enterprise value), the most commonly used application is the weighted average cost of capital (WACC)

► The WACC is derived via the liability side using observable market data for cost of debt, cost of equity and capital structure

Areas of application
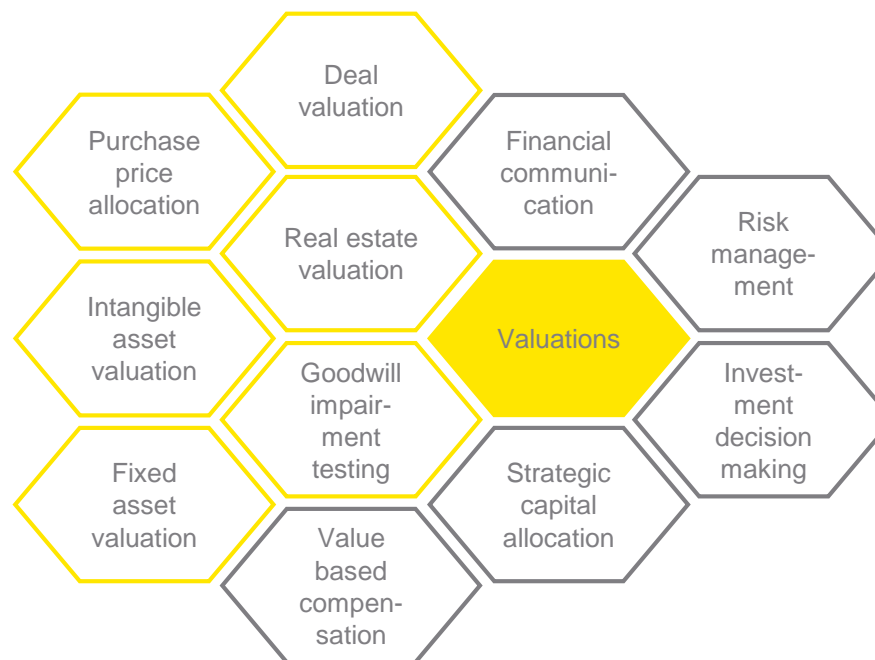
2 Introduction
Theory

Cost of capital and risk

► Risk can either be accounted for in the cash flows or in the discount rate

► Consistency is key: only consider risks in cost of capital that are not reflected in cash flows and the other way round

Risk — Consistency is key! Avoid double counting!

Items (typically) covered in cost of capital

► Unsystematic risks can also be reflected in the discount rate, but we advise to do this with caution / good reason only, as e.g. for the size premium or hurdle rate approach in start-up valuations
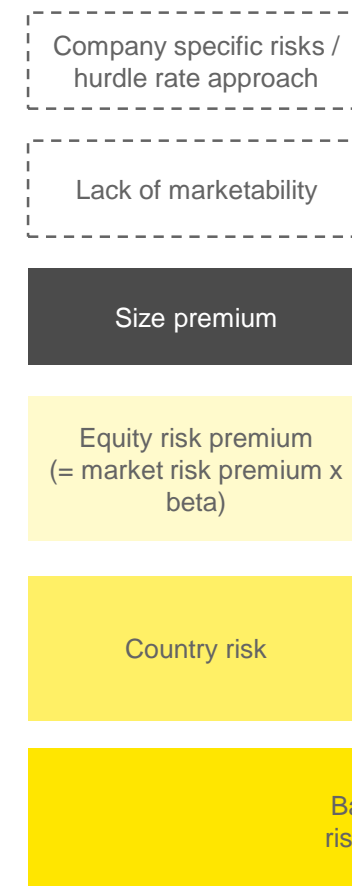
► Systematic risk of the assets
► Financial leverage (gearing)
► Counterparty risk of debt

► Political risks
► Governmental risks (supply, demand, price risks etc.)

► Time value of money
► Inflation
► Real growth

Cost of equity

Company specific risks / hurdle rate approach

Lack of marketability

Size premium

Equity risk premium (= market risk premium x beta)

Country risk

Base rate / risk free rate

Cost of debt

Company specific risks / hurdle rate approach

Credit spread

Country risk

Base rate / risk free rate

2 Introduction
WACC approach

Basic formula

▶ The weighted average cost of capital (WACC) is determined by the cost of equity and debt, weighted by the market value of their share in total capital:

$$\text{WACC} = c_e \times \frac{E}{D+E} + c_d \times (1-t) \times \frac{D}{D+E}$$

Where

▶ c_e = Cost of equity

▶ c_d = Cost of debt

▶ D = Market value of debt

▶ E = Market value of equity

▶ t = Corporate income tax rate

EY Switzerland best practice

▶ Our **base rate** is based on sales or EBIT(DA) weighted government bond rates in local currency, reflecting adequate country risk as well as nominal growth / inflation expectations

▶ We apply the capital asset pricing model (CAPM) incl. a size premium to determine the **cost of equity**

▶ We determine the **cost of debt** by adding a credit spread according to a corporate bond reference index with adequate geographic focus and a respective rating to the base rate

▶ We determine the **target capital structure** based on the median capital structure of a meaningful peer group of ideally 5+ listed companies (incl. the target company, if listed), based on market values

Illustrative example for earth moving equipment (small-sized company, CHF based)

Weighted average cost of capital			Comments (source)
Base rate / "risk free" rate	- %	a	Implied yield on 10y gov. bond of Switzerland in local currency, 5y historic average (Capital IQ); floor at 0.0%
Market risk premium	6.50%	b	Market risk premium (market studies)
Adjusted unlevered beta	0.881x	c	Derived from peer group median value (Capital IQ), adjustment according to Blume
Adjusted relevered beta	1.387x	d	According to Practitioners' Method: Beta (relevered) = beta (unlevered) * (1 + D/E)
Size premium	3.39%	e	Size premium for Micro-cap (Duff & Phelps, Valuation Handbook 2019)
Cost of equity	**12.41%**	**g**	**= a + b x d + e**
Base rate / "risk free" rate	- %	h	Implied yield on 10y gov. bond of Switzerland in local currency, 5y historic average (Capital IQ); floor at 0.0%
Credit spread	1.19%	i	Credit Spread from Barclays Europe Aggregate Index - BBB
Cost of debt	**1.19%**	**k**	**= h + i**
Equity ratio	63.47%	l	Capital structure derived from peer group median value (Capital IQ)
Debt ratio	36.53%	m	Capital structure derived from peer group median value (Capital IQ)
Corporate income tax rate	18.00%	n	Corporate income tax rate (EY Worldwide Corporate Tax Guide)
WACC (rounded)	**8.2%**		**= g x l + k x m x (1 - n)**

Source: see comments
Valuation date: 31 December 2019

3

Cost of equity

3 Cost of equity
Overview

Basic formula

► Application of the capital asset pricing model (CAPM) to determine the cost of equity:

$$c_e = r_f + \beta \times MRP$$

Where

► c_e = Cost of equity

► r_f = Risk free rate

► β = Beta (correlation measure of equity with market returns)

► MRP = Market risk premium (expected market return less risk free rate)

EY Switzerland best practice

► We apply the capital asset pricing model (CAPM) to determine the cost of equity

► We extend the basic CAPM formula with the size premium, if advisable

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Source: see comments
Valuation date: 31 December 2019

3 Cost of equity
# Risk free rate / base rate

Key points to consider

- ► In theory, the risk free rate represents the return an investor expects from an "absolutely" risk free investment over a specified period of time (i.e. the time value of money)

- ► In reality, there is no such "absolutely" risk free asset and hence no "pure" risk free rate exists. Therefore, we often refer to the "base rate" as some other items are covered in the rate we use as the base rate, i.e. time value of money, inflation (consistent with cash flows), certain real growth (of economy) and country risk (as reflected in the counterparty risk of the government)

EY Switzerland best practice

- ► 10-year generic government bond in local currency from Capital IQ / Bloomberg / Reuters / www.investing.com etc.

- ► Choice of the 10-year bond due to consistent availability for most countries / currencies and market liquidity, even though for USA and Switzerland also 20 or 30 year generic government bonds exist

- ► Use of 20 or 30 year government bonds also considered appropriate

- ► Use of the monthly 5-year historical average of yields of respective government bond to smoothen historical volatility and the currently extremely low interest rate environment

- ► Judgement to be applied based on individual government rate development

- ► Alternative approach: If no local government bond is available use CHF / USD / EUR bond + inflation differential for a given currency + country risk for a given country

Implied yield to maturity on a 10-year government bond in local currency
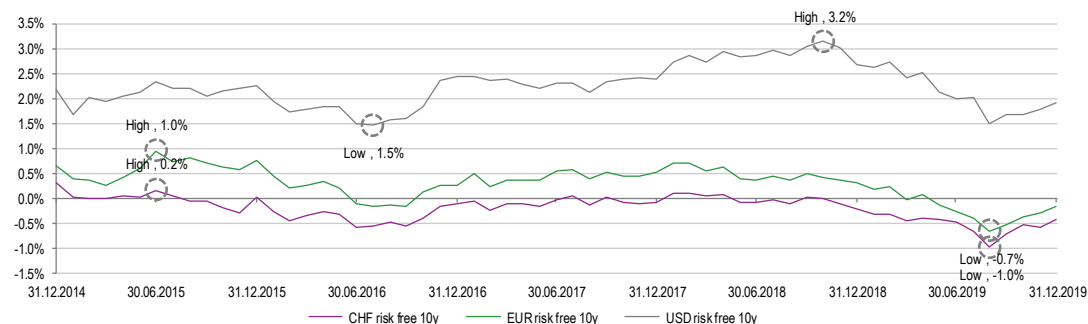
Source: Capital IQ
Valuation date: 31 December 2019

Assumption, that country risk is generally reflected in local government bond rate; however, in case of excessive counter party risk (e.g. for Greece / Italy / Argentina / Spain during debt crisis) the local government bond rate might overestimate the country risk and a separate assessment is necessary to obtain a long term view

3 Cost of equity
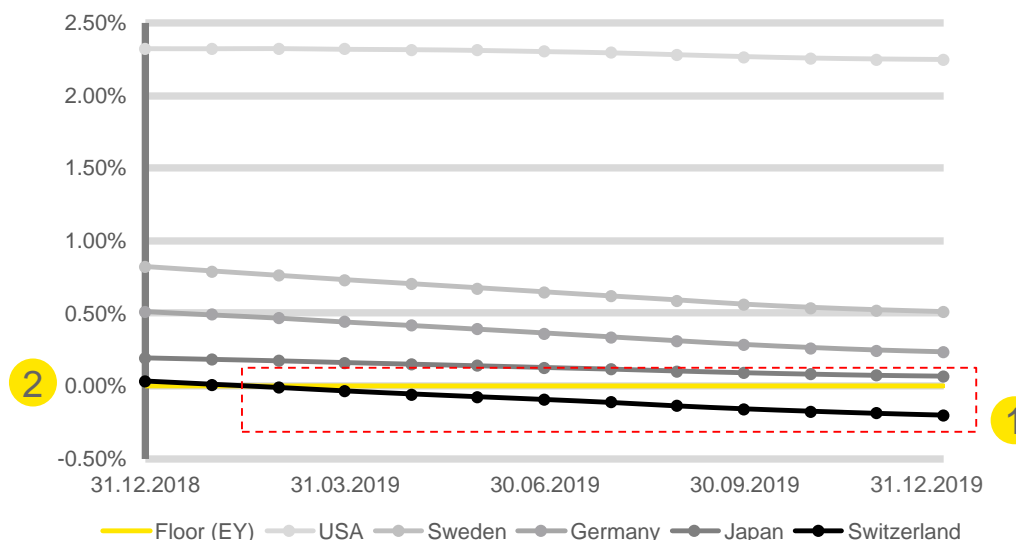## Challenge: How to deal with constantly negative interest rates?

Key points to consider

► Base rate must also reflect long-term growth expectations e.g., as applied in terminal value calculations

► Base rate and market risk premium (MRP) must be applied consistently (see next page)

EY Switzerland best practice

► Due to persistently low interest rates in certain developed economies (e.g., Germany, Sweden, Japan and Switzerland) even 5-year historical averages of 10y government bond yields may result in exceptionally low or even negative estimates (see below)

1 Switzerland: 5-year moving average has recently turned negative. In our view, this is no longer in line with long-term expected growth for the Swiss economy

2 EY Switzerland applies a floor of 0.0% for WACCs used in DCF valuations to also reflect long-term growth expectations. Negative base rates might be applied only, if a company or asset is clearly exposed to negative interest rates (e.g., wind parks or infrastructure investments) over a defined period of time

5-year moving average of implied yield to maturity on a 10-year government bond in local currency

Source: Capital IQ

1 Team overview
2 Introduction
3 Cost of equity
4 Cost of debt
5 Further parameters

3 Cost of equity
Market risk premium

Basic formula

► The MRP is the extra return that is required by investors for shifting their money from a risk free investment to a diversified equity portfolio

► The unsystematic risk of a single investment is eliminated

► The MRP can be derived via historical or prospective models

► Implied (forward-looking) MRPs are based on dividend discount models, calculating the expected market return by comparing the index value with the estimated dividend streams (analyst estimates)

► Implied MRPs are available e.g. on Bloomberg

$$MRP = (\text{expected market return} - r_f)$$

Where

   ► MRP = Market risk premium

   ► r_f = Risk free rate

MRP

We have updated the applicable market risk premium for Switzerland to 6.5%

EY Switzerland best practice

► EY Switzerland assumes a "historical" MRP of 6.5% along with the use of a 5-year historical average of the respective risk free rate

► In conjunction with the floor of 0.0% applied to the risk free rate (see above), EY Switzerland has increased the applicable MRP from 6.0% to 6.5% in November 2019. This reflects a compromise between a relatively constant MRP implied by observed investor expectations as well as exceptionally low interest rate levels

► The MRP is based on own research on the Swiss stock market but also considers international developments and consensus estimates

Market risk premiums
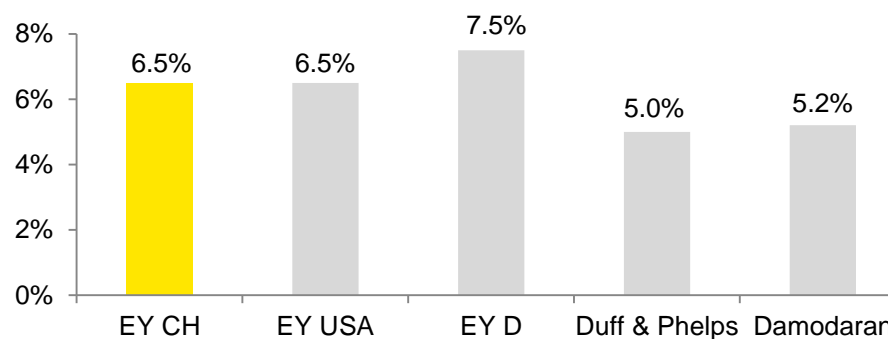
Source: EY, IDW, Duff & Phelps – Valuation Handbook and Damodaran online database

Notes to the graph

► IDW, the standard setter in Germany, suggests a range between 6.0 and 8.0%

► Duff & Phelps recommends the use of the 5.0% for valuation dates as of December 31, 2019 or later in conjunction with a normalized base rate of 3.0% in USD

3 Cost of equity
Beta calculations (cont'd)

Basic formula

► The beta is a correlation measure of equity returns with market returns. The beta represents the systematic risk of a security or a portfolio in comparison to the market as a whole

► Historical beta is usually determined applying OLS regression

$$\beta = \frac{Cov(R_Z, R_M)}{Var(R_M)}$$

Where

► R_z = Ln-returns of equity of valuation target

► R_M = Ln-returns of the market

Historical beta versus future beta

► The CAPM theory is based on market participants' expectations of the future

► Therefore, in theory, future betas should be used

Company beta versus peer group beta

► If a valuation target is quoted on a stock exchange, one could take the company's beta instead of a peer group

Appropriate reference index

► CAPM is based on an "all-comprising" market index, but such an index does not exist in practice

► National versus supranational index (e.g. MSCI World)

► Performance versus price index

► Currency of the index versus currency of the stock

EY Switzerland best practice

► Since no standardized and widely accepted sources exist for future betas, we rely on historical betas

► N.B. Barra Beta as one source for future betas

EY Switzerland best practice

► For fair market valuations, we usually rely on an unlevered peer group beta as this is required by IFRS / US GAAP

► Sometimes we rely on the company beta, if observable, liquid and statistically significant

EY Switzerland best practice

► Use the broadest local index of a stock exchange where a company is listed (to avoid currency conversion)

► Use MSCI World (attention: adjust for FX effects) as a comparison

► Use price return indices instead of performance indices to avoid dividend correction

3 Cost of equity
Beta calculations (cont'd)

Appropriate time horizon

► Depending on the time horizon and periodicity of beta estimation, the beta might vary significantly

► 5 years monthly / 2 years weekly / daily price observations

EY Switzerland best practice

► We apply 5 years monthly data (i.e. 60 observations)

► Monthly to exclude positive and negative market exaggerations

Raw beta versus adjusted beta

► The raw beta is the beta based on an OLS regression

► The adjusted beta is an average (2/3 raw beta + 1/3 times the market beta of 1) accounting for mean reversion. This is known as Blume adjustment

EY Switzerland best practice

► For industrial companies, we apply the adjusted beta, since mean reversion seems to be an observable phenomenon

► For financial services companies like banks we apply the levered raw equity beta

Un- and relevering formulas

► Based on the implied assumption on the sustainability of cash flows and tax shields as well as a relatively or absolutely constant capital structure, there are different options of un- and relevering

EY Switzerland best practice

► Due to practicality, we apply the Practitioner's method, assuming a relatively constant capital structure and a debt beta of 0

► Unlevered beta = beta levered / (1 + D / E)

3 Cost of equity
Beta calculations (cont'd)

1 Identification / selection of comparable companies (long list, short list)

- ► Industry / sector
- ► Size
- ► Profitability / growth
- ► Markets / segments
- ► Risk profiles

2 Collection / analysis of historical and prospective financial information of peers, which serve as a basis for the determination of the capital structure

3 Determination of the raw beta by the use of regression techniques

Based on empirical analysis, betas tend to 1 over time, therefore the betas are often adjusted according to Blume (see formula)

$$Adjusted\ beta = \frac{2}{3} * unadjusted\ beta\ (raw) + \frac{1}{3} * 1$$

4 Due to a lack of comparability of the equity betas because of the different capital structures of the peers, the respective equity betas are transformed by unlevering, i.e. neutralizing the individual capital structure, in order to get the unlevered beta (asset beta, i.e. beta if the assets are fully equity financed)

Companies	Ticker	Country	Currency	Filing date	Market cap in CHF	Minority interests	Total debt	Debt / total capital most recent	Adjusted beta	Unlevered beta	Unadjusted beta (raw)	Number of points	Ref. Index
BAUER Aktiengesellschaft	XTRA:B5A	Germany	EUR	09/2019	259	6	392	59.71%	1.320	0.532	1.480	60	Cdax Index
Caterpillar Inc.	NYSE:CAT	United States	JPY	09/2019	81,617	41	38,607	32.10%	1.338	0.909	1.508	60	S&P 500 Index
CNH Industrial N.V.	NYSE:CNHI	United Kingdom	EUR	09/2019	14,851	73	24,345	61.99%	1.246	0.474	1.370	60	S&P 500 Index
Kato Works Co.,Ltd.	TSE:6390	Japan	USD	09/2019	19,287	1,041	40,508	66.59%	1.374	0.459	1.561	60	Nikkei 225 Index
Komatsu Ltd.	TSE:6301	Japan	EUR	09/2019	2,495,061	82,417	1,000,665	27.97%	1.278	0.920	1.416	60	Nikkei 225 Index
Tadano Ltd.	TSE:6395	Japan	JPY	09/2019	126,757	1,044	69,123	35.10%	1.585	1.029	1.878	60	Nikkei 225 Index
Terex Corporation	NYSE:TEX	United States	JPY	09/2019	2,123	-	1,303	38.02%	1.513	0.938	1.769	60	S&P 500 Index
The Manitowoc Company, Inc.	NYSE:MTW	United States	USD	09/2019	619	-	356	36.53%	1.387	0.881	1.581	60	S&P 500 Index
Wacker Neuson SE	XTRA:WAC	Germany	EUR	09/2019	1,196	-	618	34.08%	1.253	0.826	1.379	60	Cdax Index
Low								27.97%	1.246	0.459			
Average								43.57%	1.366	0.774			
Median								36.53%	1.338	0.881			
High								66.59%	1.585	1.029			

Source: Capital IQ
Valuation date: 31 December 2019

3 Cost of equity
Small size premium or size premium

Extended formula

► Empirically, on average, smaller companies achieve higher risk-adjusted returns. In the long run, higher returns are related with higher risk

► The additional return of smaller companies is not fully reflected in the CAPM (i.e. beta is underestimated)

► To reflect the additional risk of smaller companies more adequately, the cost of equity derived from the CAPM is adjusted with a size premium
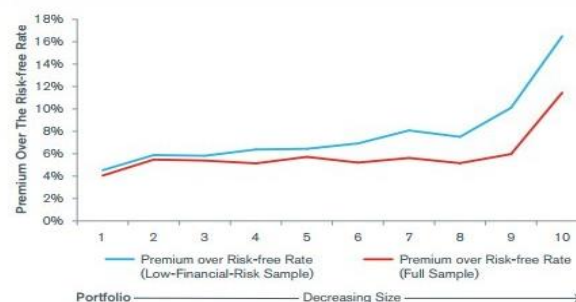
$$c_e = r_f + \beta \times MRP + SP$$

Where

► c_e = Cost of equity

► r_f = Risk free rate

► β = Beta (correlation measure of equity with market returns)

► MRP = Expected market return less risk free rate)

► SP = Size premium

EY Switzerland best practice

► EY Switzerland applies the size premium derived from a study published in Duff & Phelps - Valuation Handbook. The smaller a company's market capitalization, the higher the size premium

► According to standard Anglo-Saxon valuation literature, systematic risk is considered in the cost of capital (i.e. the WACC), whereas unsystematic is accounted for in the cash flows or with discounts on the asset / company value. We recommend including only the small size premium in the WACC. Other unsystematic risks should be accounted for in the cash flows (e.g., with scenario analysis) or with general discounts on the asset / company value (with the exception of start-up / venture valuation, where we suggest to apply hurdle rates, next to the probability of success approach)

Size premium over the risk free rate by size portfolio

Source: Duff & Phelps – 2014 European size study

Small size premium by company size category
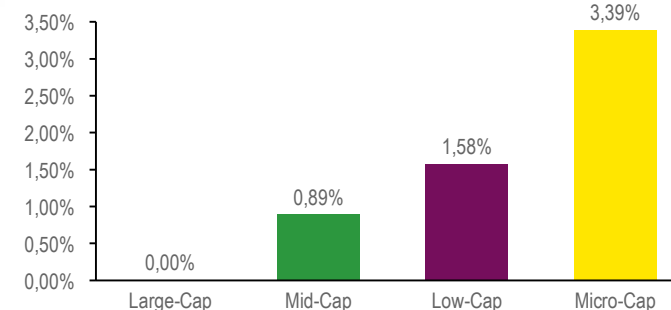
Source: Duff & Phelps, 2019

► Examples of size "risks":

  ► Less flexible access to capital market + financing

  ► Lower liquidity

  ► Lower transparency e.g., in reporting

  ► Lower stability in times of crisis

  ► Higher dependency on key management or key customers

Note: "US bias": please note that the size premia are based on studies on the US capital markets. Hence, application shall be scrutinized for other jurisdictions

► It is important to avoid double-counting of risks e.g., extra liquidity premiums in WACC etc.

4

Cost of debt

4 Cost of debt

Overview

Basic formula

► Cost of debt is determined by a company's:

► debt capacity (FCF, leverage, interest rate coverage, debt / EBITDA multiple etc.);

► the overall market condition; and

► the company's access to financing.

$$c_d = rf + \text{credit spread}$$

Where

► c_d = Cost of debt

► r_f = Risk free rate

EY Switzerland best practice

► Cost of debt as an input to the WACC is typically calculated on an after tax basis to reflect the tax deductibility of debt (tax shield on interest) if taxes in the cash flow calculation are based on EBIT *times* tax rate (i.e. notional taxes)

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WACC (rounded)	**8.2%**		**= g x l + k x m x (1 - n)**

Source: Capital IQ
Valuation date: 31 December 2019

4 Cost of debt
Credit spread

Key points to consider

- ▶ Companies have to compensate its creditors for the risk of a potential default. The credit spread represents the expected compensation of creditors of investments of a specific risk category compared to a risk free investment

- ▶ The credit spread should reflect the assumed target leverage and debt capacity

- ▶ The derivation of the credit spread should be consistent with the applied base rate

EY Switzerland best practice

- ▶ Application of credit spread according to a corporate bond reference index with adequate geographic focus and a respective rating

Credit spread – Barclays Europe Aggregate
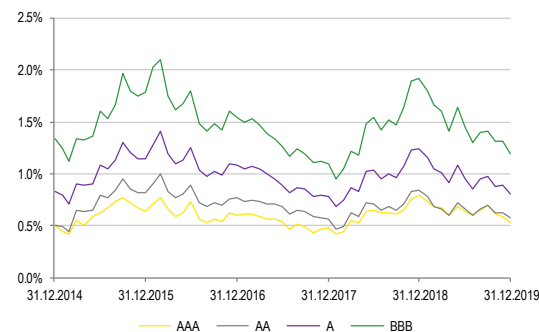
Source: Capital IQ

- ▶ Alternative sources based on the average rating of the peer group (and its capital structure) are credit spread tables from Reuters

Credit rating of peer group companies

Companies	Ticker	Effective date	Rating	Outlook
BAUER Aktiengesellschaft	XTRA:B5A	01/ 2020	NR	NR
Caterpillar Inc.	NYSE:CAT	01/ 2020	A	Stable
CNH Industrial N.V.	NYSE:CNHI	01/ 2020	BBB	Stable
Kato Works Co.,Ltd.	TSE:6390	01/ 2020	n/a	n/a
Komatsu Ltd.	TSE:6301	01/ 2020	A	Stables
Tadano Ltd.	TSE:6395	01/ 2020	n/a	n/a
Terex Corporation	NYSE:TEX	01/ 2020	BB	Stables
The Manitowoc Company, Inc.	NYSE:MTW	01/ 2020	B	Stable
Wacker Neuson SE	XTRA:WAC	01/ 2020	n/a	n/a

Source: Capital IQ
Valuation date: 31 December 2019

5

Further parameters

5 Further parameters
Determination of debt and equity

Debt or equity?

► Determination of capital structure requires further clarification

► Certain balance sheet items may not obviously be classified as debt or equity

  ► Minority interests

  ► Preferred equity

  ► (Over)/underfunded pensions

EY Switzerland best practice

► Minority interests and preferred equity are classified as equity **(1)**

► (Over)/underfunded pensions are only considered if they reflect a "true" financial liability (which is e.g. not the case for Swiss IAS19 liabilities) or consistently reported by peer group companies **(2)**

► Balance sheet items which are classified as debt and interest bearing (to be separately analyzed under IFRS, US GAAP, Swiss GAAP FER etc.) are considered in the debt portion **(3)**

► Cash and cash equivalents are not considered, i.e. total debt = gross debt (as opposed to net debt), assuming that the cash a company holds is "on average" required to run the operations **(4)**

Companies	Currency	Minority interests	Preferred equity	(Over)/Underfunded pensions	Short-term liabilities	Long-term liabilities	Current Portion of Long-Term Debt	Current Portion of Leases	Leases	Finance Div. Debt Current	Finance Div. Debt Non-Current	Cash and equivalents	Total debt
BAUER Aktiengesellschaft	EUR	6	-	n/c	-	392	-	-	-	-	-	n/c	392
Caterpillar Inc.	USD	41	-	n/c	-	9'134	25	178	462	12,354	16,454	n/c	38,607
CNH Industrial N.V.	USD	73	-	n/c	-	5'556	44	34	361	-	18,350	n/c	24,345.
Kato Works Co.,Ltd.	JPY	1'041	-	n/c	8'152	24'558	7'798	-	-	-	-	n/c	40,508
Komatsu Ltd.	JPY	82'417	-	n/c	427'797	407'748	117'031	14'115	33'974	-	-	n/c	1,000,665
Tadano Ltd.	JPY	1'044	-	n/c	46'114	19'634	-	913	2'462	-	-	n/c	69,123
Terex Corporation	USD	-	-	n/c	-	1'167	9	25	102	-	-	n/c	1,303
The Manitowoc Company, Inc.	USD	-	-	n/c	-	309	4	10	33	-	-	n/c	356
Wacker Neuson SE	EUR	-	-	n/c	164	372	0	26	56	-	-	n/c	618

(1) All values are in millions
Source: Capital IQ
Valuation date: 31 December 2019

5 Further parameters
Impacts of IFRS 16 | Consideration of lease liability as debt

Key points to consider

► Adoption of IFRS 16 lease accounting does not change underlying cash flows to equity of the firm, i.e., in theory, market value of equity is assumed to be constant, all else equal

► Capital structure implicit in WACC shall be consistent to the reflection of lease cash flows and liabilities in company valuations

► All else equal, lease liability increases debt ratio applied for WACC derivation

$$Debt\ ratio = \frac{D}{D+E} < \frac{D + Leasing}{D + Leasing + E}$$

► Lease liability is valued with asset-specific discount rate (e.g., incremental borrowing rate, IBR)

IFRS 16

Consistency between cash flow derivation (CAPEX, EBITDA etc.), EV-equity bridge (debt definition) as well as the capital structure (debt definition) and cost of debt (IBR etc.) in the WACC calculation **is key!**

EY Switzerland best practice*

► Scenario 1 "new world": Lease liability is considered as financial debt

  ► DCF cash flows to the firm include IFRS 16 effects (i.e., no contractually committed lease cash out-flows; long term CAPEX need to be adjusted for leases fading out over time)
  ► Lease liability is deducted from DCF entity value to derive DCF equity value of the firm
  ► WACC is derived including lease liability as debt in capital structure and is lower, all else equal, than in scenario 2

► Scenario 2 "old world": Lease liability is not considered as financial debt

  ► DCF cash flows to the firm include lease cash out-flows and CAPEX reflect "true" CAPEX only
  ► Lease liability is not deducted from DCF entity value to derive DCF equity value of the firm
  ► WACC is derived excluding lease liability as debt in capital structure

► In both scenarios, the capital structure of peers shall be scrutinized accordingly for consistency and for different accounting standards such as Swiss GAAP FER, IFRS or US GAAP

Company valuation (DCF)

Entity value — Lease liability — Fin. liab. — Equity value
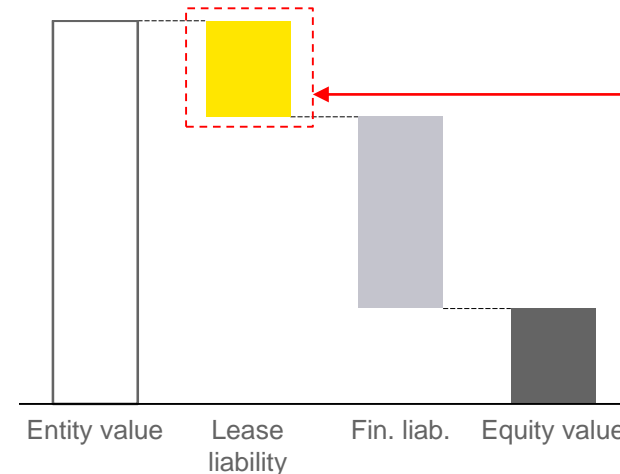
Capital structure (Market values)

Assets	Liabilities
Right-of-Use asset	Lease liability
Other Assets	Financial liabilities (D)
	Equity (E)

*Some clarification is needed over the next couple of months

5 Further parameters

Currencies

Key points to consider

► The currency of the base rate should be consistent with the currency in which the free cash flows are denominated

► The base rate should be determined by where a company generates its free cash flows and not (per se) where it is legally domiciled

► The company value should remain constant when considering different currencies (to avoid company under- or overvaluation)

► Interest rate parity theory (covered): Interest rate differential between two countries is equal to the differential between the forward exchange rate and the spot exchange rate

► Forward rates are not available for all currencies

► Long-term forward rates are generally difficult to come by

EY Switzerland best practice

Swiss company (Reporting currency: CHF)

► **Case 1 | Free cash flows: 100% CHF**

  ► Cash flows are subject to 100% CHF related risks

  ► Swiss government bond as base rate

► **Case 2 | Free cash flows: 50% CHF and 50% USD. Local USD business plan converted into CHF using forward rates**

  ► Due to the conversion with forward rates, free cash flows are subject to CHF related risks only

  ► Swiss government bond as base rate

► **Case 3 | Free cash flows: 50% CHF and 50% USD. Local USD business plan converted into CHF using spot rate**

  ► Due to the conversion with a spot rate, USD free cash flows are subject to USD currency risks

  ► Weighting of USD and CHF government bonds according to sales / EBITDA / free cash flow split

5 Further parameters
Country risk premium

"Damodaran approach"

Base rate (US / EUR / CH)

+ Inflation differential

+ [Market risk premium incl. 0.18 x CRP] x Beta

+ Size premium

+ 0.82 x CRP

= Cost of equity

Base rate (US / EUR / CH)

+ Inflation differential

+ adj. default spread

+ Credit spread

= Cost of debt

Where:

► CRP = Country risk premium

► 0.82 = 1 divided by 1.22

Note

Visit the Damodaran homepage via:
http://pages.stern.nyu.edu/~adamodar/

EY Switzerland best practice

► Use of a local government bond rate which reflects (to a certain extent) specific country risk, if possible:

  ► Requires availability of adequate financial information for appropriate base rate (i.e. monthly average of 10-year government bond over 5 years on Capital IQ)

  ► No integration of specific country risk premium required, as it is already reflected in the respective base rate

  ► Can lead to inflated discount rates in case of excessive credit risk, e.g. in the case of Spain, Italy, Portugal, Greece during debt crisis

► Alternative approach:

  ► Alternatively use Damodaran's country risk premiums on top of a USD, EUR or CHF base rate (adjusted for the inflation differential between the respective countries)

  ► Country risk premium (CRP) = Country rating-based default spread x 1.22 (factor of 1.22 to adjust for the additional volatility of equity markets as compared to bond markets)

Weighted average cost of capital			Comments (source)
Base rate / "risk free" rate	1.87%	a	Implied yield on 10-y gov. bond of Switzerland in local currency (Capital IQ) with floor at 0.0% incl. inflation differential (Oxford Economics)
Market risk premium	7.10%	b	Global market risk premium (market studies) incl. adjustment for Damodaran's country risk premium for Brazil (Risk premiums for other markets 2019 - Damodaran)
Adjusted unlevered beta	0.881x	c	Derived from peer group median value (Capital IQ), adjustment according to Blume
Adjusted relevered beta	1.387x	d	According to Practitioners' Method: Beta (relevered) = beta (unlevered) * (1 + D/E)
Size premium	3.39%	e	Size premium for Micro-cap (Duff & Phelps, 2019)
Country risk premium	2.79%	f	Adjusted default spread based on country risk for Brazil (Risk premiums for other markets 2019 - Damodaran)
Cost of equity	**17.90%**	**g**	= a + b x d + e + f
Base rate / "risk free" rate	1.87%	h	Implied yield on 10-y gov. bond of Switzerland in local currency (Capital IQ) with floor at 0.0% incl. inflation differential (Oxford Economics)
Credit spread	1.19%	i	Credit Spread from Barclays Europe Aggregate Index - BBB
Country risk premium	2.79%	j	Adjusted default spread based on country risk for Brazil (Risk premiums for other markets 2019 - Damodaran)
Cost of debt	**5.85%**	**k**	= h + i + j
Equity ratio	63.47%	l	Capital structure derived from peer group median value (Capital IQ)
Debt ratio	36.53%	m	Capital structure derived from peer group median value (Capital IQ)
Corporate income tax rate	18.00%	n	Corporate income tax rate (EY Worldwide Corporate Tax Guide)
WACC	**13.1%**		= g x l + k x m x (1 - n)
Inflation differential			
Long-term inflation rate Switzerland	1.60%	o	Long-term inflation rate Switzerland (Oxford Economics)
Long-term inflation rate Brazil	3.50%	p	Long-term inflation rate Brazil (Oxford Economics)
Inflation differential	1.87%	q	Inflation differential between Switzerland and Brazil; (1 + p) / (1 + o) - 1
Base rate / "risk free" rate Switzerland	- %	r	Implied yield on 10-year government bond of Switzerland in local currency (Capital IQ)
Base rate / "risk free" rate	**1.87%**		= (1 + q) x (1 + r) - 1

Source: see comments
Valuation date: 31 December 2019

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About this publication
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