Prepared for IK 2514 Wireless Infrastructure Deployment & Economics

Investments and risk

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Key concepts

- Systematic risk - can not be diversified away, part of the economy as a whole
- Unsystematic risk - specific risk to project or business, such as currency, demand, technological
- Financial tools to measure risk, such as equity beta, CDS
- Decisions on Capital expenditures (Capex) require analysis and a dynamic approach

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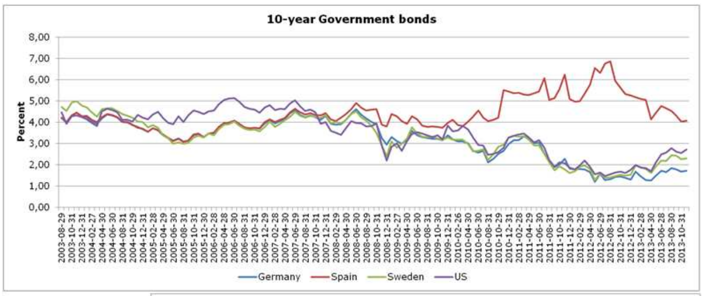
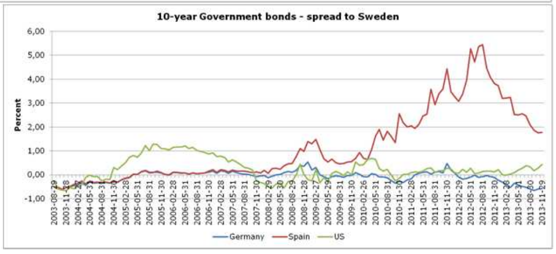
Risk free rate – 10-year government bonds

Germany
Spain
Sweden
US

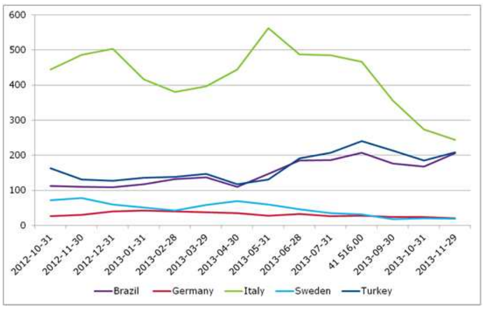


Bonds issued by Central Banks with a 10-year duration. They are traded on the secondary market.

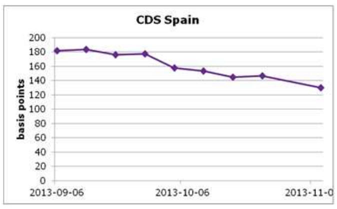


Source: Bloomberg

Risk for default – Buy protection with CDS



Credit Default Swap (CDS) = A swap designed to transfer the credit exposure of fixed income products between parties. The CDS spread is a percentage of the notional that the protection buyer pays the protection seller. In exchange, the protection seller agrees to pay the protection buyer the notional value of the CDS contract minus the recovery value should default occur.



Source: Bloomberg

Risk for inflation

Sweden
US

Zero coupon index swap – is a standard derivative product over inflation rate. The underlying asset is a single consumer price index (CPI).
Source: Wikipedia

Source: Bloomberg

Risk

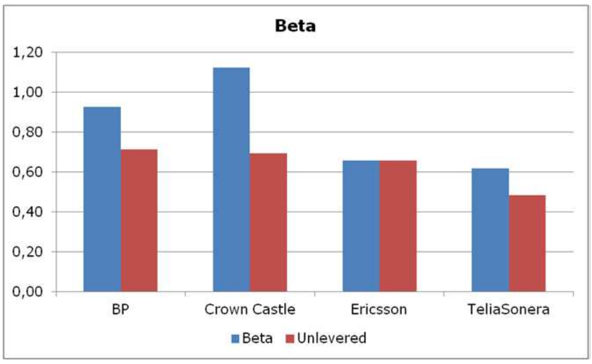
- Systematic risk: risk which can not be diversified. It is the degree to which the firm's performance covaries with the economy as a whole

- Unsystematic risk or specific risk: risk specific to a given company or project, like for example
- Demand risk
- Technological risk
- Currency risk
- Country risk
- Regulatory risk
- Political risk (corruption)

Equity beta measures the volatility of a share in relation to an index (MSCI World Index in this case

Equity beta reflects the systematic risk according to Capital Asset Pricing Model (CAPM).

Equity beta

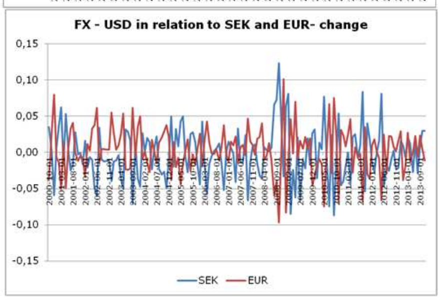


Source: Bloomberg

Unlevered beta = (market cap/(market cap + net debt)) * equity beta
Levered beta = unlevered beta + ((gearing/(1-gearing))* unlevered beta)

FX - Currency

SEK
EUR
USD



Currency risk is a financial risk from changes in the exchange rate of one currency in relation to another

WACC

- Weighted Average Cost of Capital (WACC) takes the systematic risk into account
- WACC does not compensate for company specific risks (unsystematic) as investors are assumed to hold diversified investments.
- Cost of equity = Risk free rate + (Equity risk premium x beta)
- Cost of debt = Risk free rate + Debt premium
- WACC = (Cost of equity x (1 – Gearing)) + Cost of debt x Gearing

Source: OFCOM

	Low gearing	High gearing	
Risk free rate	3,71%	3,71%	
Debt risk premium	1,25%	1,75%	
Cost of debt	**3,66%**	**4,02%**	
Risk free rate	3,71%	3,71%	
Equity risk premium	5,00%	5,00%	
Beta	0,75	0,98	Unlevered beta is 0.64
Cost for equity	**7,47%**	**8,63%**	
Gearing	15%	35%	
Tax	26,3%	26,3%	
WACC after tax	6,90%	7,02%	
WACC before tax	**9,36%**	**9,52%**	
Average	**9,4%**		

Source: PTS

Measures to reduce risk

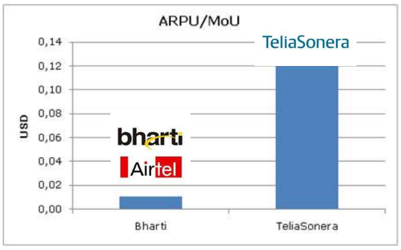
- Reduce cost base
- Lower capex
- Adjust rate of return (higher WACC)
- Lower gearing: financial theory underscores the relation between gearing and risk, but it depends on stability of cash flow generation.
- Diversification: broader range of services is a way to diversify away from unsystematic risk
- Internationalization: enter new markets as a way to broaden the footprint

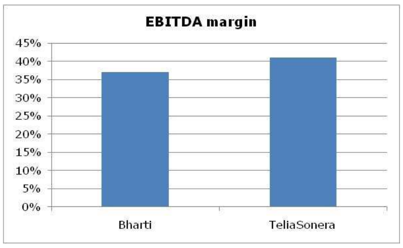
Other ways to reduce risk?

Source: Kingsley O. Olibe, Franklin A. Michello, Jerry Thorne, Systematic risk and international diversification: An empirical perspective, International Review of Financial Analysis 17 (2008) 681–698

Lower production costs

- Growing pressure to cut Opex and Capex in order to cope with lower revenue per MoU
- Network sharing is transforming the operator business
- Outsourcing





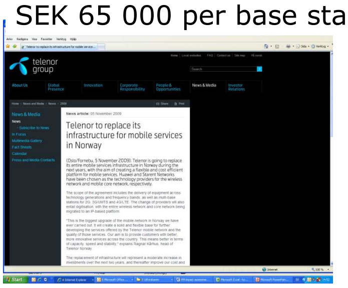
Source: Bharti, TeliaSonera

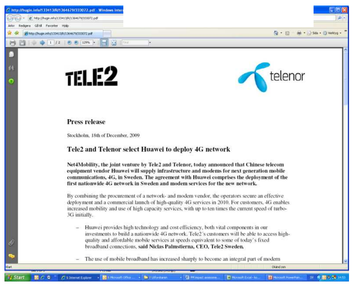
Bharti showing the way

Lower equipment prices with breaking contracts in 2009

SEK 512 m
SEK 65 000 per base station

~SEK 750 m





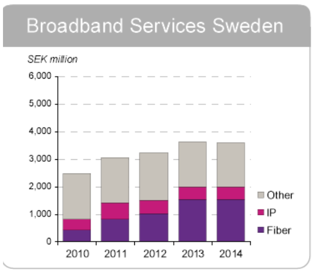
Consequences for operators' Capex and Opex budgets?

Capex and view on regulation

From TeliaSonera

Negatives

- Unclear if fiber to apartment buildings (FTTB) is regulated in Sweden
  - A decision from the administrative court is expected during 2011
- Absence of a long-term approach to price regulation of residential fiber (SDU) in Sweden
  - New analysis of price level by PTS in 2013
- Potential price regulation of fiber in Finland



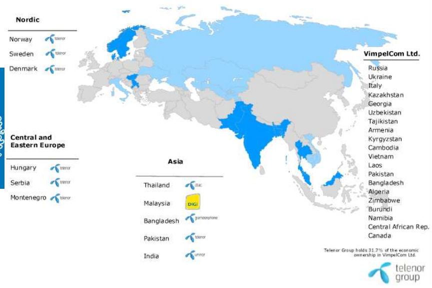
*Fiber investments of SEK 5.0 billion**

Relation between risk assessment and capex?

Source: TeliaSonera

Internationalization

Telenor Group’s operations



Source: Telenor, TeliaSonera

Key factors for growth? What risks are involved?

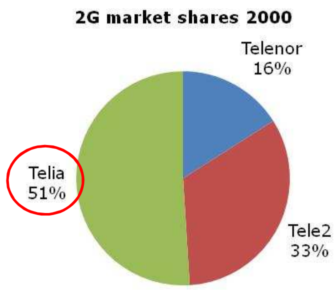
Case Swedish 3G

- Beauty contest mid 2000
- Decision Dec 2000

Issues

- Strategy
- Risks
- Market analysis
- Capital expenditures
- Return on investments

The Swedish story – how it started 2000



3G licenses

The incumbent did not get a 3G license

Telia dominated the market in 2000

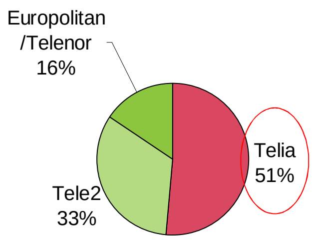
- 6.3m GSM subs (9m inhabitants)
- 70 subs per 100 inhabitants

Population coverage

- Telia 99%
- Europolitan (Vodafone/Telenor) and Tele2 96%

Geographical coverage

- Telia 80-90%
- Europolitan and Tele2 40-60%



Three network sharing companies

3G

TELIA TELE2 telenor 3

Svenska UMTS NÄT

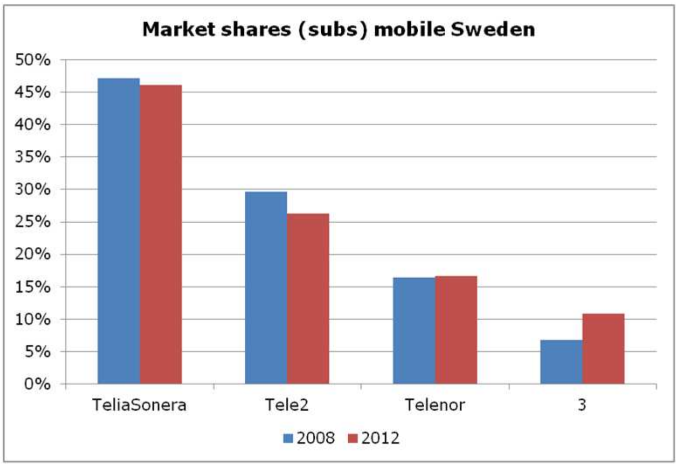
3GIS

4G

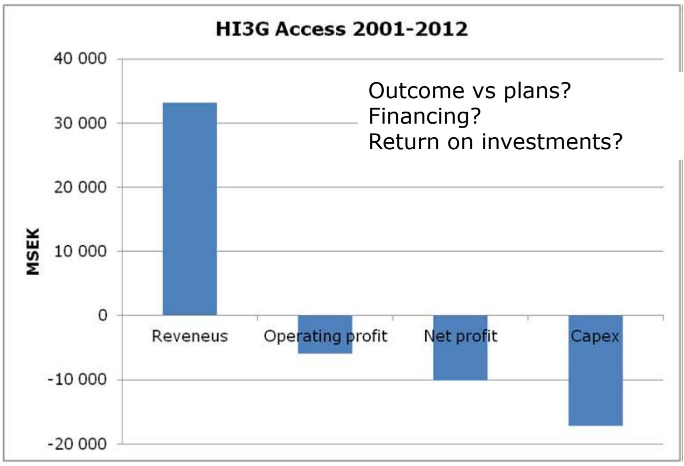
TELE2 telenor

Net4Mobility

Market shares 2008 vs 2012

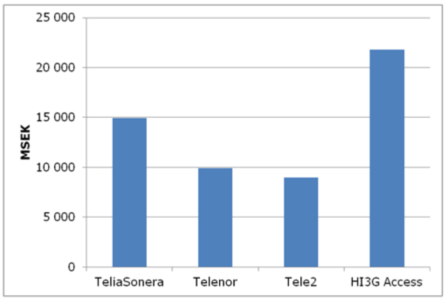


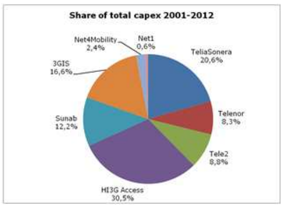
HI3G Sweden – 2001-2012



Accumulated number for the Swedish operation

Mobile capex – MSEK 56 bn 2001-2012





Capex made by network companies are distributed to respectively owners

Telenor acquired Europolitan/Vodafone Sweden in 2005 for EUR 1bn

Source: Company reports

Summing up

- Systematic risk (can not be diversified away, part of the economy as a whole)
- Unsystematic risk (specific risk to project or business, such as currency, demand, technological)
- Financial tools to measure risk, such as equity beta, and to off-load risk like CDS
- Decisions on Capital expenditures (Capex) require analysis and a dynamic approach

Concluding

- Different approaches are required to handle Systematic and unsystematic risk
- Wide variety of financial tools to measure and cope with risk
- Investment decisions require extensive research, but it is vital to maintain a dynamic approach