

Principles of discounting

- comments to new MOF guidelines on socio-economic assessment

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Discount rate recommendation

Tabel A1.1

Den samfundsøkonomiske diskonteringsrente

	0-35 år	36-70 år	>70 år
Diskonteringsrente	4 pct.	3 pct.	2 pct.
Risikofri kalkulationsrente	2,5 pct.	2,25 pct.	2 pct.
Risikopræmie	1,5 pct.	0,75 pct.	0 pct.

- Approach: descriptive method
- Components; risk free discount rate & risk supplement
- Declining over time to reflect uncertainty of future

10 year state debt bonds benchmark for stipulated risk free interest rate of 4.5%

- ”Konkret er den risikofrie kalkulationsrente fastsat ved at observere den rente, som markedet fastsætter på et risikofrit aktiv, der her anses bedst repræsenteret ved renten på statsgælden fratrukket den forventede inflation. I Finansministeriets fremskrivninger af dansk økonomi forventes i ligevægt en rente på lange statsobligationer på 4,5 pct. og en inflation på 1,8 pct., hvilket giver en realrente på 2,6 pct. Baseret herpå (og afrundet) er den risikofrie kalkulationsrente fastsat til 2,5 pct. for de første 0-35 år af projektperioden” (Appendix A1)

Bilagstabel B.3

Nøgletal for dansk økonomi (mellemløbet sigt)

Finansredegørelse 2014 · Januar 2014

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Pct.									
Obligationsrente	1,4	1,8	2,1	2,6	3,1	3,7	4,2	4,8	4,8

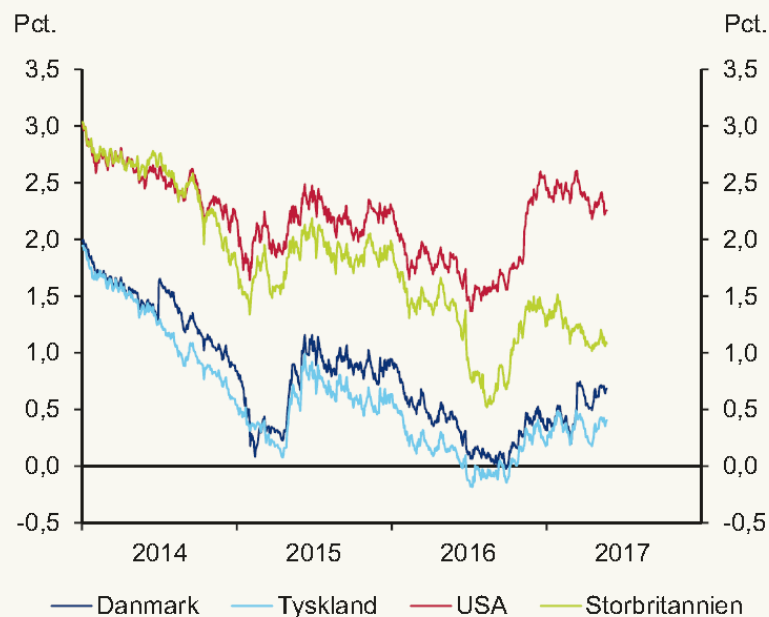


Recent market observations would suggest 2%

YEAR	IR	INFL	NET IR
2000	5,89%	2,50%	3,39%
2001	5,60%	2,90%	2,70%
2002	5,06%	2,40%	2,66%
2003	3,72%	2,40%	1,32%
2004	4,17%	2,10%	2,07%
2005	3,85%	1,20%	2,65%
2006	3,95%	1,80%	2,15%
2007	4,12%	1,90%	2,22%
2008			
2009	4,10%	3,40%	0,70%
2010	2,75%	1,30%	1,45%
2011	2,80%	2,30%	0,50%
2012	1,63%	2,80%	-1,17%
2013	1,72%	2,40%	-0,68%
2014	1,71%	0,80%	0,91%
2015	0,78%	0,60%	0,18%
2016	0,40%	0,50%	-0,10%

Figur 2.6

Rente på 10-årige statsobligationer for udvalgte lande.
Økonomisk Redegørelse · Maj 2017



Average 2009-2016: 2% (net of inflation: 0,2%)



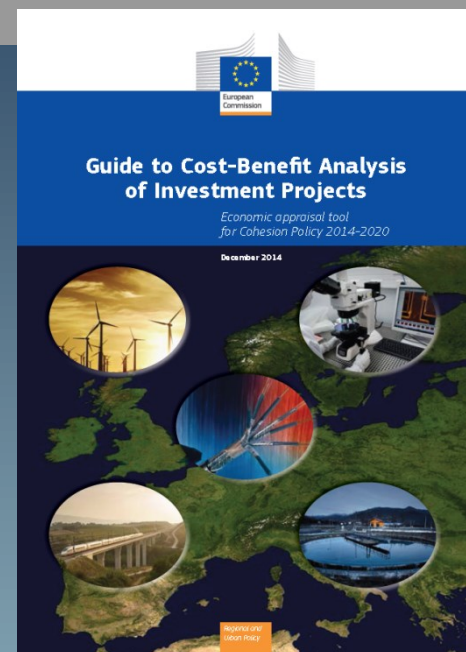
Is a risk supplement justified ?

MOF guidelines:

- systematic project risks; reflecting volatility in the marginal utility of consumption (cf. NOU, 2012)

EU guidelines:

- “risk supplement not to be included because society as a whole, or the government, has a much larger portfolio than any private investor has, and consequently is able to exploit risk pooling”



EU: Social rate of time preference approach

- "the rate at which society is willing to postpone a unit of current consumption in exchange for more future consumption"
- Ramsey (1928): $S RTP = p + e \cdot g$
 - where p is time preference, g is growth and e is elasticity of marginal utility of consumption
- Elasticity of marginal utility of consumption, e , measured as the progressivity of national personal income taxes;
 $e = \ln(1-t') / \ln(1-t)$
 - where t' and t are respectively the marginal and average income tax rates for an average tax payer
- Pure time preference, p , measured as population level mortality rate (1%)



Final comments and conclusions

- While MOF recommends a short term discount rate of 4%, the European Commission approach suggests 3% - perhaps not a big deal

However;

- A fixed 'equilibrium' benchmark for the state bond interest rate and risk supplement in MOF guidelines causes rigidity, e.g. for countercyclical measures
- Would it be too much to hope for a discount rate formula in updated annex ?



Thank you!



- Bonus slides

Value of statistical life (VSL)

NB: VSL is not the value of a human life as such but reflects preference for risk reduction

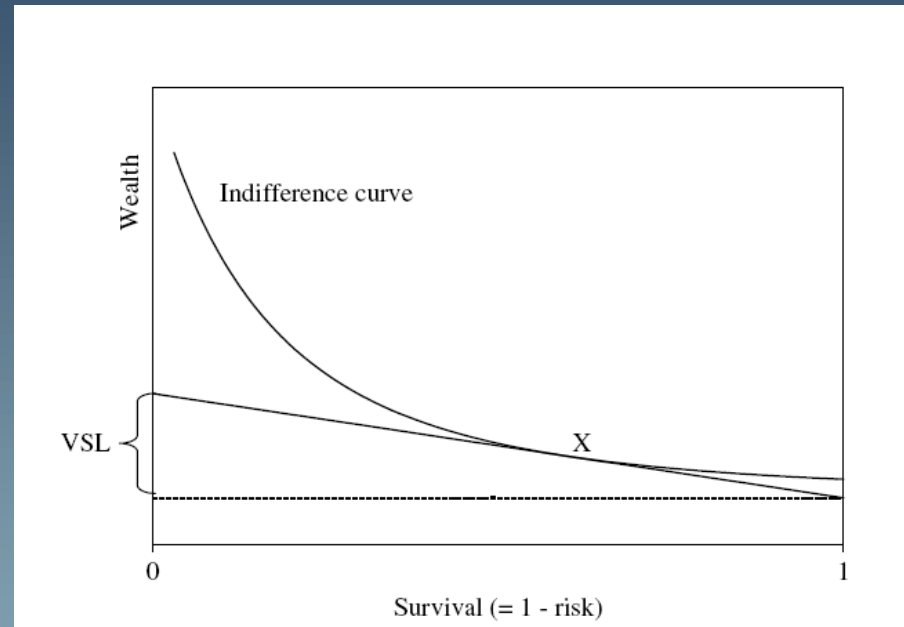
Preference for risk reduction determines indifference curve

Marginal substitution-rate between wealth and mortality risk (for defined time period) defines VSL

If WTP is 200 € for a risk reduction of 1/5.000/yr, then VSL is 1 mill. €

EU: Hypothetical valuation

USA: Wage-risk studies



Implications;

- WTP depends on initial risk
- Individual indifference curve may depend on age, income etc.

Deriving VOLY from VSL

- Acute VOLY

$$VSL = VOLY_r \cdot \sum_{i=a+1}^T {}_aP_i (1+r)^{i-a-1}$$

- Where a is the average age of the age group whose VSL is being estimated, ${}_aP_i$ is the conditional probability of surviving up to the year i having survived to the year a , T is the upper age bound and r is the discount rate

- Chronic VOLY

$$VOLY_{chronic}^r = \sum_{i=1}^{i=T} \frac{YOLL_i}{YOLL_{tot}} \cdot \frac{VOLY_r}{(1+r)^{i-1}}$$

- where $YOLL_i$ is the number of years of life lost as a result of an increment in the hazard in year i in each future year, and $YOLL_{tot}$ is the total number of years of life lost in the population

- Problem: a discount rate is superimposed by the analyst

