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From Solvency II with love: a Cost-of-Capital approach to determine an appropriate LGD discount rate

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22 November 2016

Agenda

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Introduction

Loss Given Default (LGD) is one of the key parameters used in determining regulatory capital under Basel II.

- Banks need to apply their own estimate of LGD under the advanced IRB approach.
- LGD is defined as the economic loss incurred in the event of default, including workout costs and material discount effects
- Workout period for recoveries may span several years, i.e. much reliance is placed on the rate used to discount future recovery cash flows.
- Seems to be little agreement amongst practitioners and regulators on how to choose appropriate rate.

Regulatory guidance & its implications

- Basel Committee on Banking Supervision:

> *"For the estimation of LGDs, measures of recovery rates should reflect the costs of holding defaulted assets over the workout period, including an **appropriate risk premium**. When recovery streams are uncertain and involve risk that cannot be diversified away, net present value calculations must reflect the time value of money and a risk premium appropriate to the **undiversifiable risk**."*

- Very little guidance is given on how to derive an appropriate risk premium

Regulatory guidance & its implications (2)

- Implications of regulatory guidance for the risk premium:
  - The risk premium should reflect the risk inherent in *uncertain recovery streams.*
  - The risk premium should reflect the *non-diversifiable* risk of recovery cash flows, i.e. *both systemic and bank idiosyncratic risk.*
  - The risk premium should be consistent with the uncertainty of recovery cash flows experienced in respect of *defaults during economic downturn conditions.*

Commonly used discount rates

- Contractual loan rate
- Lender's WACC / Cost of equity
- Lender's marginal cost of funding

Proposed methodology: The cost-of-capital approach

- Most studies attempt to infer an appropriate risk discount rate from the observed market prices of defaulted debt.
  - Of limited use for portfolios where (reliable) market prices are not observable.
    - Corporate bond market in South Africa is highly illiquid
    - No secondary market for bank loans exist
  - We propose borrowing from the Solvency II capital regime (for insurers and reinsurers) to calculate a “Market Consistent” (MC) price for a portfolio of defaulted debt, and hence infer a market consistent risk discount rate.

Proposed methodology: The cost-of-capital approach (2)

- The "Market Consistent" (MC) price under the Solvency II capital regime:
  - Where no deep, liquid and transparent market exists, an asset or liability should be valued as the best estimate of future cash-flows, adjusted by a Risk or Market Value Margin (MVM), resulting in a MC price.
    - With "best estimate" is meant the expected present value where cash-flows are discounted using the risk-free rate.
    - The MVM is needed to compensate the capital providers whose capital is used to absorb the risk assumed.
    - It is determined by calculating the cost of holding the required amount of capital over the run-off period of the asset / liability.

Proposed methodology: The cost-of-capital approach (3)

- The MC price for a portfolio of defaulted debt:

$$MC\ price\ = \sum_{t=0}^{n} \frac{Rec_t}{(1+r)^t} - \text{Cost of Capital}$$

$$= \sum_{t=0}^{n} \frac{Rec_t}{(1+r)^t} - \sum_{t=0}^{n} \frac{k\ \times C_t}{(1+r)^t}$$

Where:

Rec_t = Expected Recovery at time t
r = Average risk-free interest rate
C_t = Capital amount required at time t in respect of portfolio of defaulted loans
k = CoC rate
n = Term of recoveries

Proposed methodology: The cost-of-capital approach (4)

- An investor purchasing the portfolio of defaulted loans will:
  - Pay the MC price
  - Receive the recovery cash-flows in return
- The expected rate of return (RoR) earned by the investor is calculated by solving the equation:

$$\sum_{t=0}^{n} \frac{Rec_t}{(1+RoR)^t} = MC\ price$$

Where:

Rec_t = Expected recovery at time t
RoR = Expected rate of return

Proposed methodology: The cost-of-capital approach (5)

- RoR is inferred from the MC price, i.e. produce a “market consistent” risk discount rate.
- It incorporates a risk-premium to compensate the investor for the risk of purchasing an uncertain income stream.
- Having derived an appropriate capital amount the following can be noted:
  - The risk premium will be consistent with economic downturn conditions if the parameters (used to determine the capital amount) are estimated from data relating to a period of economic downturn.
  - Under these conditions the risk premium will therefore reflect the systemic risk inherent in the recoveries.
  - As long as a banks own recovery experience is used to calibrate the parameters, the risk premium will also reflect the bank idiosyncratic risk.

Proposed methodology: The cost-of-capital approach (6)

- A key consideration / area of further research is the determination of the appropriate capital amount in respect of recovery risk.
  - The required capital amount in respect of the risky cash-flows being valued should, as per the Basel II framework, correspond with a confidence level of 99.9% over a one-year period.
    - Standard "Asymptotic Single Risk Factor" Basel II model applied to non-performing loans results in a zero capital requirement.
    - A capital charge for defaulted assets is however desirable (BCBS, 2005)
- In our application we have used the single risk factor model, based on a parametric Beta-distribution, proposed by Tasche (2004), incorporating Loss Given Default (LGD) and Loss Given Default volatility (LGDV) as parameters.

Application of cost-of-capital methodology

- Application of cost-of-capital methodology to two simulated bank portfolios: Residential mortgages & Personal loans
  - Capital for “unexpected recovery risk” calculated as per Tasche (2004)
  - Risk-free rate assumed at 8% (should ideally be taken from yield curve, relating to the appropriate “downturn period”)

	LGD	LGDV	EAD-weighted term
Residential Mortgages	20%	30%	33 months
Personal loans	65%	25%	8 months

Application of cost-of-capital methodology (2)

- Initial results:

	Residential mortgages			Personal loans		
Cost-of-Capital rate (k)	ROR*	Risk-free rate	Risk premium	ROR*	Risk-free rate	Risk premium
6%	15.8%	8%	7.8%	18.7%	8%	10.7%
7%	17.2%	8%	9.2%	20.6%	8%	12.6%
8%	18.8%	8%	10.8%	22.5%	8%	14.5%

**Iterative algorithm used to solve "RoR"*

Application of cost-of-capital methodology (3)

- Cost-of-capital risk discount rates for Residential mortgages and Personal loans portfolios are surprisingly similar despite very different characteristics.
  - Residential mortgages: lower LGD, but higher volatility. Lengthier recoveries (longer period over which capital must be held)
  - Personal loans: higher LGD, lower recoveries, i.e. cost of capital carries more weight in determining RoR.
- Calculated risk discount rates are very sensitive to the cost-of-capital rate (k).
  - Should ideally be set by Regulator, similarly to Solvency II that prescribes a CoC rate of 6%

Conclusion

- Cost-of-capital approach offers methodology to determine a market consistent LGD discount rate
  - Useful when market prices are unavailable, e.g. retail portfolios

- The LGD discount rate includes a risk premium reflecting undiversifiable risk of uncertain recoveries:
  - Systemic risk (economic downturn conditions)
  - Bank idiosyncratic risk

Questions?

Thank you!

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