Stress Testing the Credit Risk of Mortgage Loans: the relationship between portfolio-LGD and the Loan-to-Value Distribution

Discussion by Valerie De Bruyckere (EBA)

Summary

- Presents a methodology to calculate the LGD of a bank mortgage portfolio under a stressed scenario for the housing market

- Takes into account the distribution in Loan-to-Value ratios of the portfolio

- Derives a closed-form solution for the mean portfolio LGD

- Assumes a beta distributed LTV ratio for the bank mortgage portfolio

- Provides a "rule-of-thumb" for benchmarking analyses by risk managers, rating agencies and regulators

$$LGD_P = 1 - F(RR, p, q) - RR \cdot \frac{p + q - 1}{p - 1} \cdot (1 - F(RR, p - 1, q))$$

**Assumed fixed
(stress test scenario)**

**Output of ML estimation
(LTV distribution)**

General remarks

1. Useful study for regulator and supervisor.

2. Theoretical model. It would be very interesting to see the empirical results of applying this model to a real bank mortgage loan portfolio.
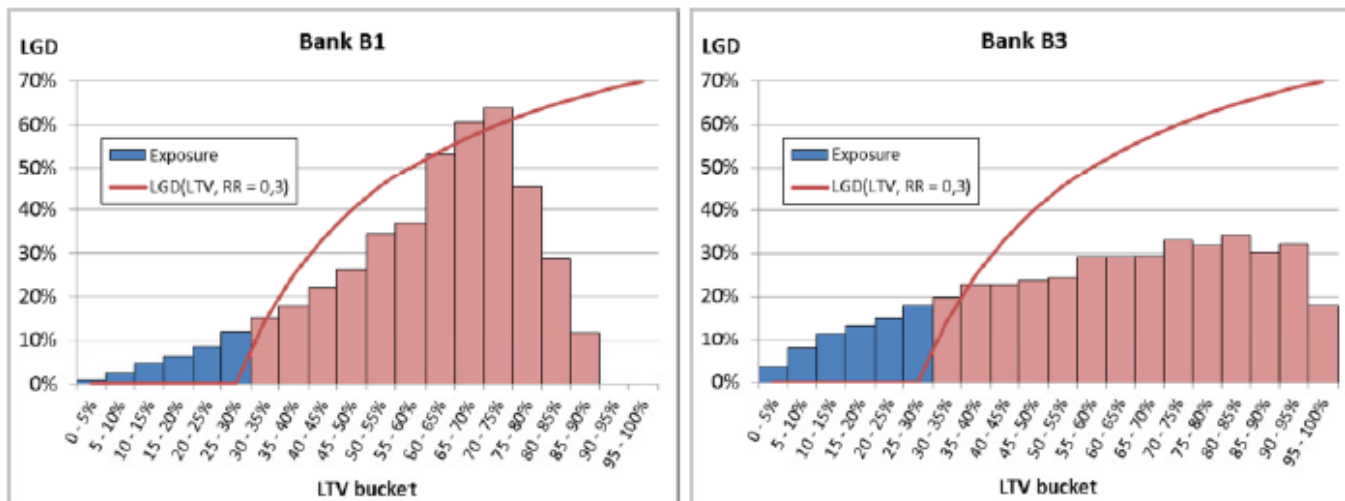
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Comments

1. Maximum Likelihood estimation of LTV distribution

- What if the portfolio LGD is concentrated in one specific LTV bucket? The fewer data points, the more difficult it becomes to optimize the ML function.

- In reality, a truncated Beta distribution for the LTV ratio may be more realistic.

- Why Beta distribution?

EBA report on consistency of RWA, 4th report

Figure 16: Minimum, maximum and EAD-weighted average for the drill-down variables, by country

	RW	LTVO Min | Mean | Max	ILTV Min | Mean | Max	DTSO Min | Mean | Max	LTIO Min | Mean | Max	CRMO Min | Mean | Max
AT						
BE	10%	73% | 80% | 86%	62% | 68% | 73%	31% | 37% | 45%	3.9 | 4.1 | 5.4	24% | 40% | 58%
CZ	26%	71% | 76% | 86%	70% | 73% | 76%	29% | 35% | 38%	4.3 | 4.5 | 5.6	0% | 2% | 7%
DE	16%		73% | 79% | 85%			0% | 22% | 38%
DK	12%	70% | 71% | 82%	72% | 75% | 86%		3.2 | 3.2 | 5.7	0% | 0% | 14%
ES	17%	66% | 73% | 75%	59% | 65% | 70%	27% | 32% | 45%	4.7 | 5 | 7	0% | 1% | 16%
FI	10%					
FR	16%	77% | 85% | 91%	71% | 72% | 84%	21% | 30% | 36%	3 | 3.3 | 4.8	4% | 62% | 75%
IE	45%	73% | 75% | 78%	103% | 109% | 117%	16% | 25% | 36%	3.5 | 4 | 5.9	0% | 0% | 0%
IT	15%	63% | 67% | 68%	59% | 61% | 65%	29% | 37% | 45%	4.4 | 5 | 6.2	0% | 0% | 7%
LU	16%	54% | 75% | 87%	51% | 68% | 76%			5% | 87% | 100%
NL	10%	86.6% | 87.1% | 89%	83% | 87% | 94%	23% | 26% | 29%	4.6 | 4.8 | 6	17% | 41% | 67%
NO	9%					
PL	18%					
PT	22%	76% | 77% | 80%	66% | 70% | 77%	17% | 31% | 62%	4.3 | 4.9 | 6	0% | 4% | 55%
SE	5%	69% | 72% | 75%	59% | 68% | 72%			0% | 1% | 4%
SK	30%					
UK	11%	65% | 71% | 79%	64% | 70% | 89%	16% | 23% | 30%	3.1 | 3.6 | 4.8	0% | 0% | 0%
Total	**15%**	**54% | 76% | 95%**	**51% | 74% | 117%**	**13% | 27% | 62%**	**2.4 | 3.9 | 7.2**	**0% | 18% | 100%**

Note: Country-weighted averages are based on bucket medians, but the upper bound is used for the lowest bucket. For exposures above the latest bucket, 160% is taken for LTVO and ILTV, 80% for DTSO and 9 for LTIO. Exposures reported as non-available are excluded. Only countries with at least four observations are represented. CRMO statistics are calculated on the percentages of exposures with credit risk mitigant (other than mortgages) over the total amount of residential mortgages.

Source: EBA data collection (reference date: December 2012), EBA calculation

Comments

2. Assumption of a fixed Recovery Rate (RR)

- How is "value" in the denominator of the LTV ratio measured? Market value (MV) or Mortgage Lending Value (MLV)? Both valuation methods are allowed by the CRR.
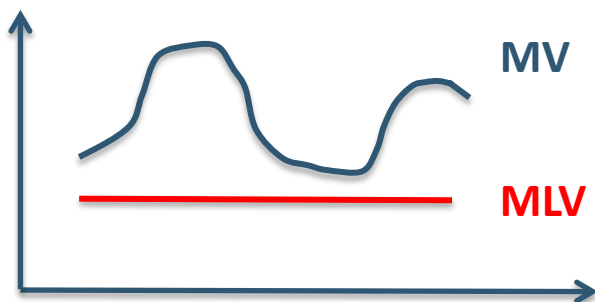
$$\frac{Loan}{Value}$$

- Valuation standard affects the recovery rate (RR). If the property is valued on the basis of MLV, the RR are usually higher. If the property is valued on the basis of MV, the RR will be higher during a boom of housing prices, and lower during an economic downturn.

Comments

- Germany has a strong background in MLV (Pfandbriefregulation)

- **EBA mandate** in Article 124(4)(a) CRR: "EBA shall develop regulatory technical standards to specify the rigorous criteria for the assessment of the mortgage lending value"

- The paper assumes that a drop in housing prices translates into a stressed recovery rate. In reality, recovery rates are often modelled independently from house prices, and they may differ across collateral classes

Comments

3. Use for benchmarking analysis. Be cautious:

Figure 1: Obseved variant to the LTVO core definition across European bank sample

Numerator	Denominator
(+) Prior liens	(-) Prior liens
(-) Other CRM	(+) Other CRM
(+) Undrawn exposures	Different 'value' concepts :
(+) Further advances on property	
(+) Costs, fees	Estimated/expected
	Market value (with haircut or not)
(+) Non-housing loans but same collateral	Purchase price
Split over multiple loans at 'origination' secured by the same collateral	Price based on internal models

Comments

4. Some tables show LGD values below 10%. The CRR imposes in Article 164 CRR a minimum exposure weighted average LGD ratio of 10% or 15% for retail exposures secured by RRE versus CRE

EBA mandates:

- Article 181(3)(a) CRR (downturn LGD): RTS to specify the nature, severity and duration of an economic downturn

- Article 164(6) CRR: RTS to specify the conditions that competent authorities shall take into account when determining higher minimum LGD values

Suggestions

- Empirical results. Bring the model to the data:

    ✓ Assess the accuracy of the LTV approximation

    ✓ Compare analytical results with loan-level results

- Given that lack of data is a common shortcoming in IRB modelling, can the model be transformed into a Bayesian variant?

    → Incorporate prior information, for instance, obtained from data pooling

- Can the model be extended?

    RR, LTI, DSTI, …

Suggestions

- Effect of national macro prudential policies

  - ✓ UK: mortgage lenders should limit the number of mortgage loans made at or greater than 4.5 times LTI to no more than 15% of their overall number of mortgage loans.

  - ✓ IR: limits on new owner occupied and new buy to let lending (BTL): with new owner occupied business restricted such that no more than 15% can be at LTVs above 80%, and no more than 20% can be a LTIs above 3.5x. New BTL business would be limited to no more than 10% above 70% LTV.

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