Descripte analysis

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Data

In this report I briefly describe the data collected so far and provide some descriptive analysis of two measures of capital savings.

Table 1 reports summary statistics for a few variables from Bankscope. The level division means if the bank's Pillar-III reports information has been collected. The p-values from Kruskal test reject the hypothesis that the two groups are draw from the same distribution. The banks collected tend to have higher leverage (both risk-weighted or not), be safer (higher Z-score and lower NPL to gross loans ratio), and higher return on equity.

Variable	**Levels**	**n**	$\bar{\mathbf{x}}$	**s**	**Min**	$\widetilde{\mathbf{x}}$	**Max**
ROA	No	6890	0.9	1.3	-3.0	1.0	4.6
	Yes	231	1.0	0.5	-2.7	1.1	2.6
$p = 0.02$	all	7121	1.0	1.2	-3.0	1.0	4.6
ROE	No	6871	8.7	10.6	-30.1	9.6	30.5
	Yes	231	14.1	7.1	-30.1	14.9	28.8
$p < 0.0001$	all	7102	8.8	10.6	-30.1	9.8	30.5
NPL/gross loans	No	6207	3.6	5.5	0.0	1.3	24.0
	Yes	231	1.8	1.8	0.0	1.1	7.6
$p = 0.03$	all	6438	3.5	5.4	0.0	1.3	24.0
Total capital ratio	No	4578	21.0	18.4	9.8	15.8	112.0
	Yes	173	14.5	2.1	10.5	14.6	22.9
$p < 0.0001$	all	4751	20.7	18.1	9.8	15.7	112.0
Equity/total assets	No	6889	12.5	12.5	3.5	9.9	76.3
	Yes	231	7.7	2.2	4.0	7.4	14.9
$p < 0.0001$	all	7120	12.4	12.3	3.5	9.8	76.3
Z-score	No	6846	38.7	38.2	2.3	26.7	172.9
	Yes	231	41.7	35.5	8.2	37.1	165.8
$p < 0.0001$	all	7077	38.8	38.1	2.3	26.9	172.9

Table 1: Summary statistics

Figure 1 plots the PD distribution collected by bank.

Figure 1: PD distribution by bank

Ordered by median PD

Basel formulas and capital savings

$$K = \sum_i EAD_i \times LGD_i \times \left[\Phi\left(\frac{\Phi^{-1}(PD_i)+\sqrt{\rho_i}\Phi^{-1}(0.999)}{\sqrt{1-\rho_i}}\right) - PD_i\right]$$

For wholesale portfolio:
$K_{\text{wholesale}} = K \times \frac{1+(M-2.5)b(PD_i))}{1-1.5b(PD_i)}$
with
$\rho_i = 0.12 \times \left(\frac{1-e^{-50\times PD_i}}{1-e^{-50}} + 0.24 \times \left(1 - \frac{1-e^{-50\times PD_i}}{1-e^{-50}}\right)\right)$

and $b(PD_i) = (0.11852 - 0.05478 \times log(PD_i))^2$

For retail portfolios the formula is equal to K with different formulas for the correlation coefficient:

Real estate: $\rho_i = 0.15$

Qualifying revolving: $\rho_i = 0.04$

Other retail: $0.03 \times \left(\frac{1-e^{-35 \times PD_i}}{1-e^{-35}} + 0.16 \times \left(1 - \frac{1-e^{-35 \times PD_i}}{1-e^{-35}} \right) \right)$

Using these formulas I computed two measures of capital requirement: $K_{distribution}$ using the distribution of PD_i (as it is required by the Basel accords), and $K_{average}$ using $\widetilde{PD} = \sum_i EAD_i LGD_i PD_i / \sum_i EAD_i LGD_i$. The percentage change $K_{distribution}/K_{average} - 1$ is called capital savings and is a measure of the amount of capital saved due to the concavity in the formula for K.

Figure 2 plots the calculated capital savings by country. Figure 3 plots the calculated capital savings by country. Figure 4 plots the evolution of calculated capital savings in time.

Figure 2: Capital savings by bank

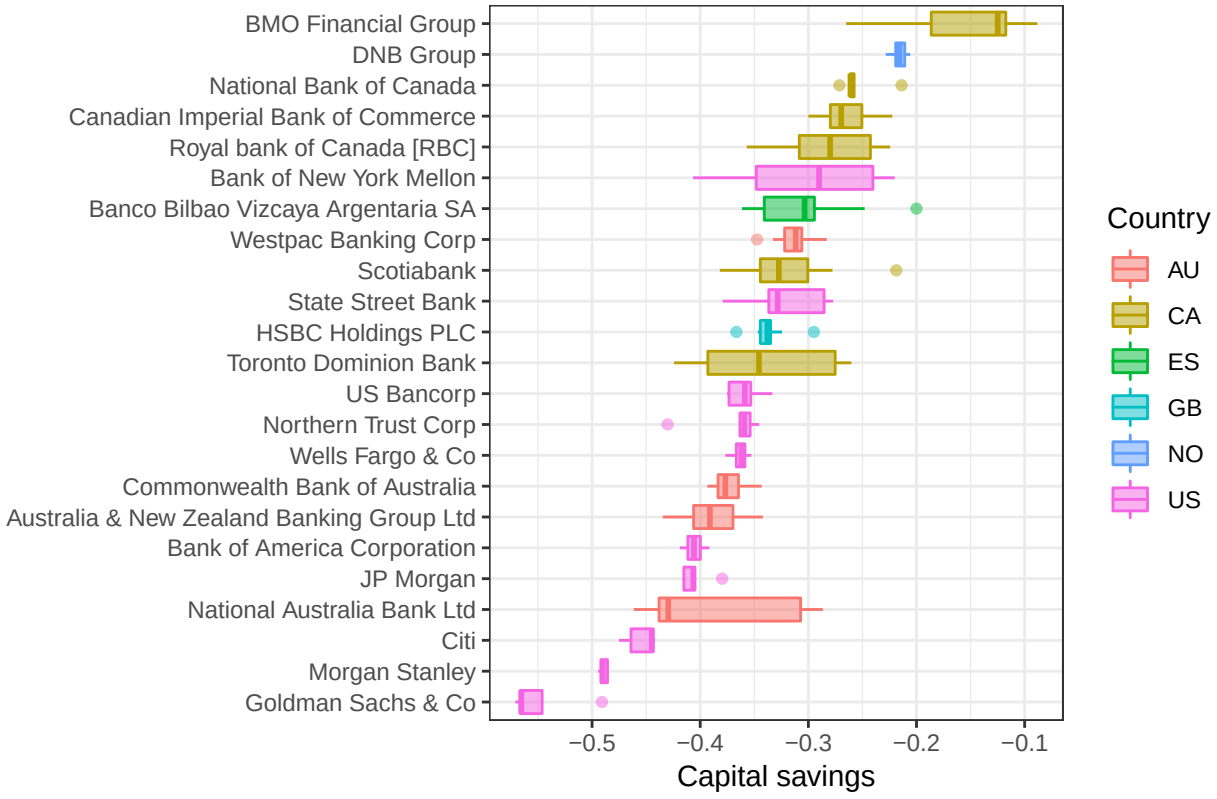


Figure 3: Capital savings by country

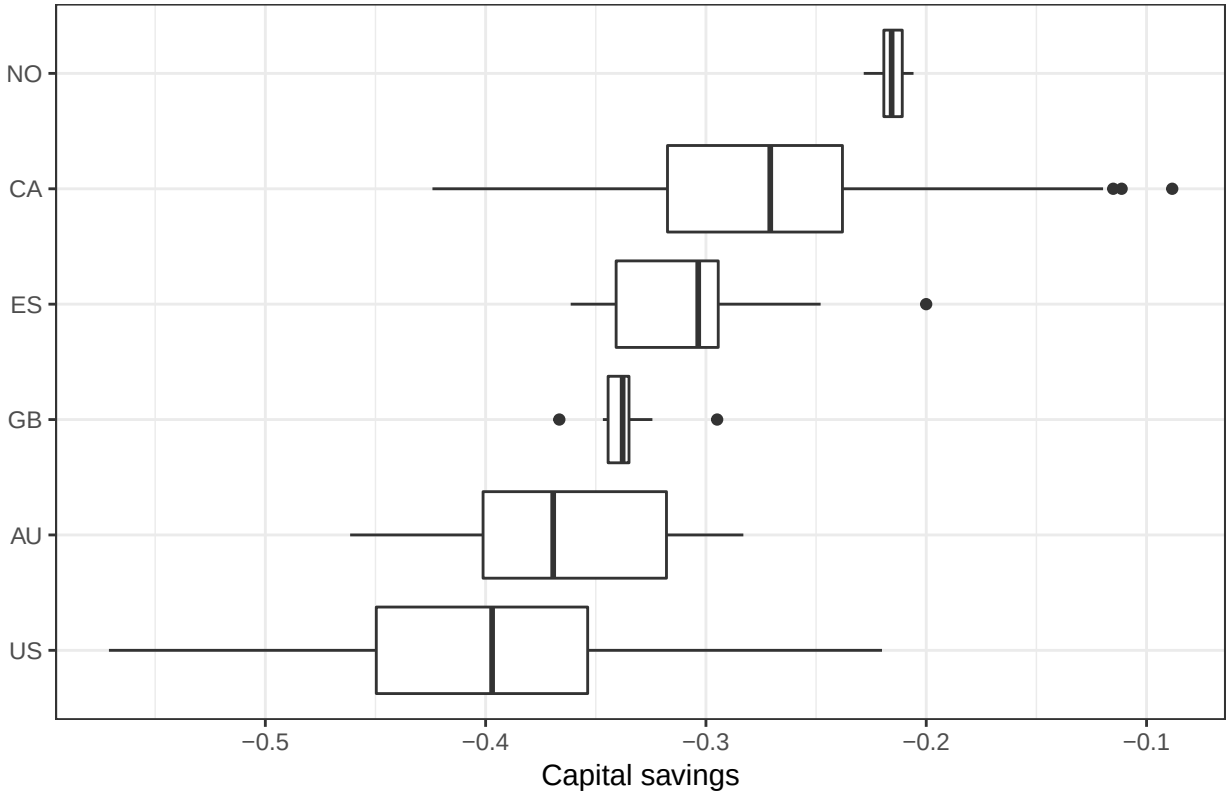
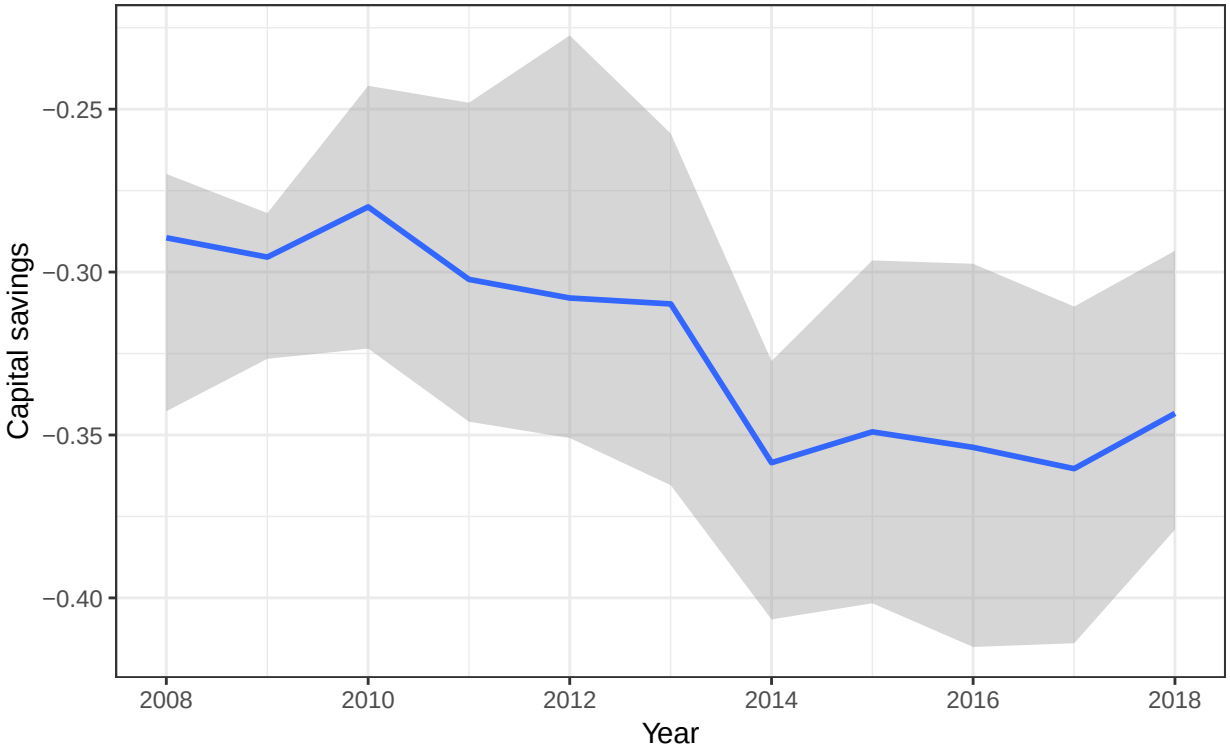


Figure 3: Average capital savings by year

First and third quartile shown



Basel formulas and Gini coefficient

As a second measure of the PD distribution dispersion I compute Gini coefficients. Figure 4 shows the Lorenz curve of the PD distributions by country. Figure 5 shows the Lorenz curve of the PD distributions by year. Figure 6 shows the Lorenz curve of the PD distributions by Bank (names omitted for visibility). Finally Figure 7 plots the measure of capital savings and the Gini coefficients.

Figure 4: Lorenz curve by country

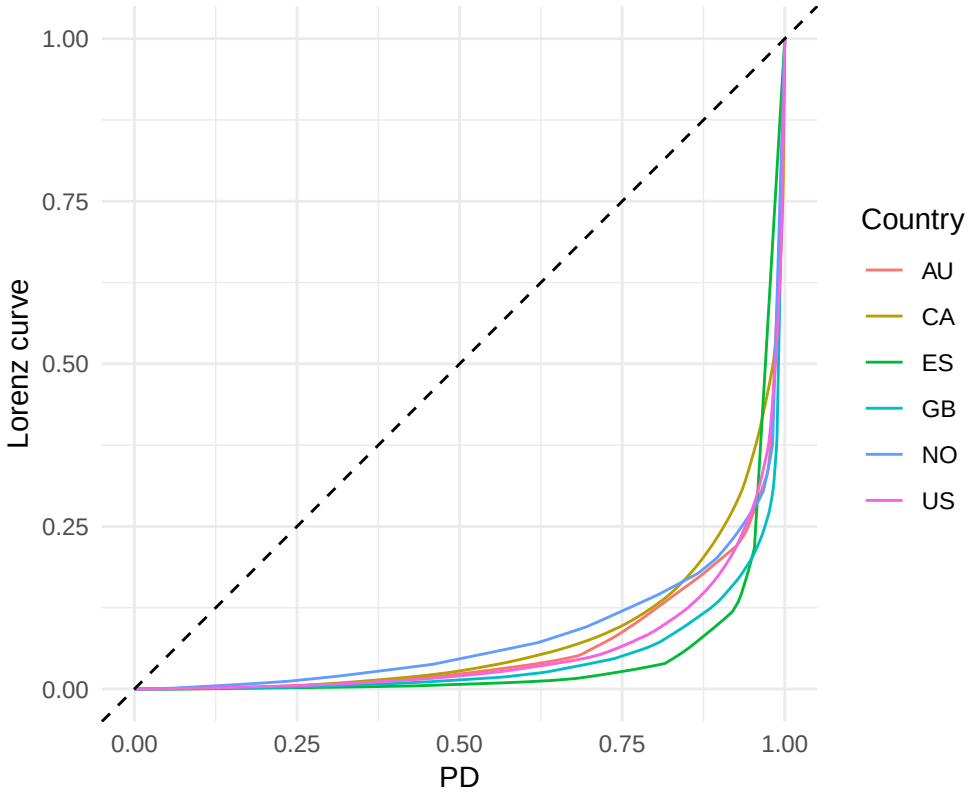


Figure 5: Lorenz curve by year

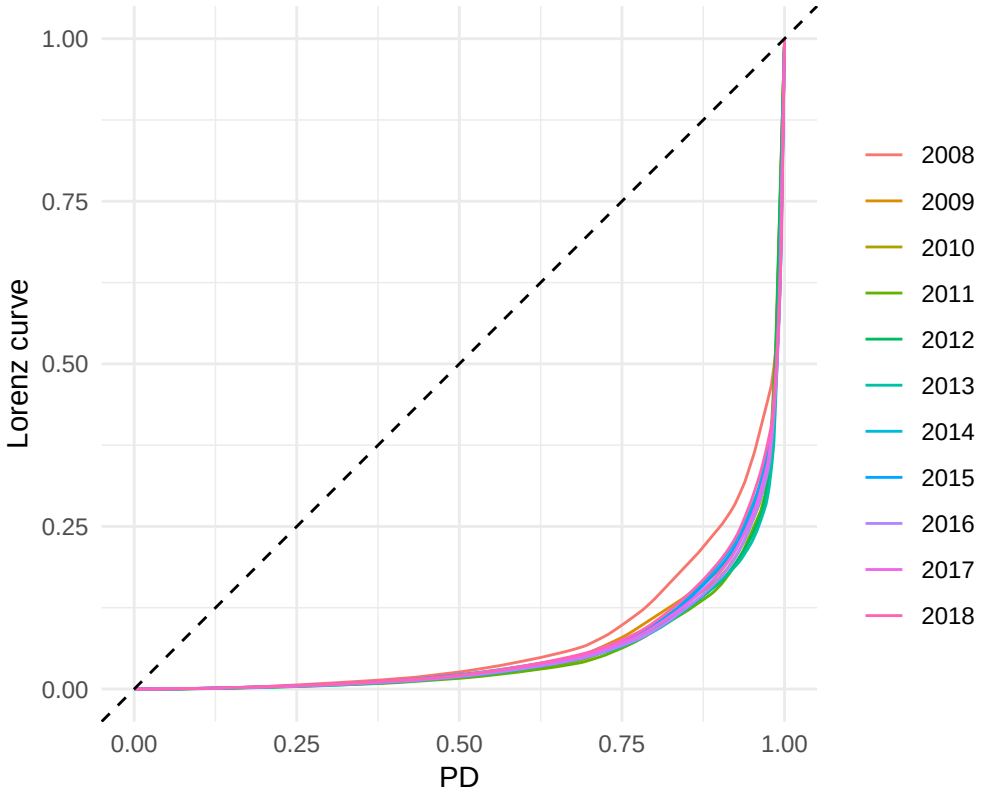


Figure 6: Lorenz curve by bank

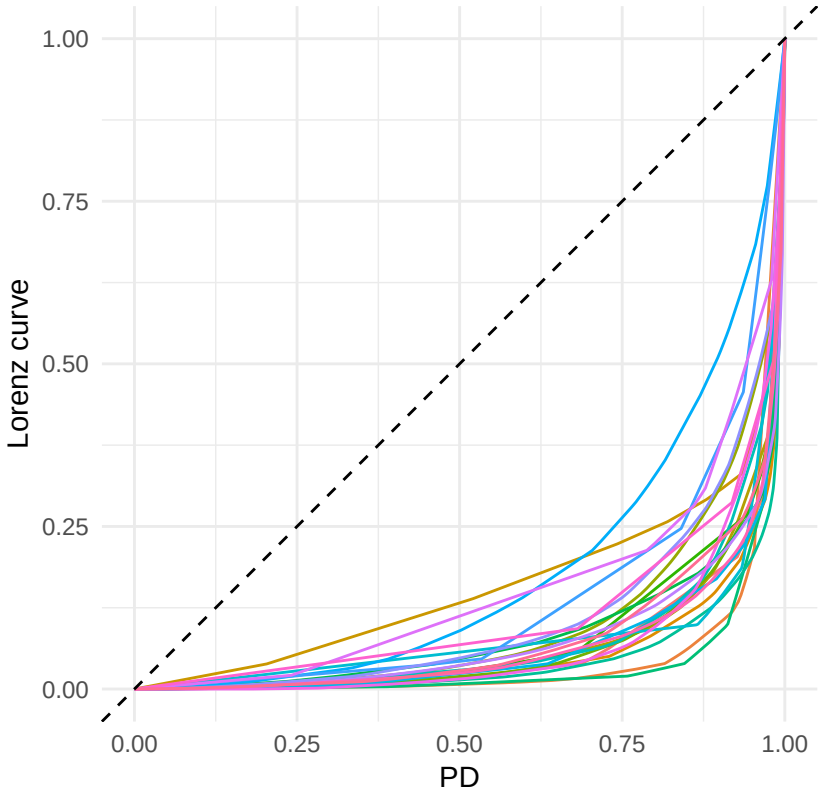


Figure 7: Capital savings and Gini coefficient

Each point is a bank−year−portfolio observation