

1. Project name: Unintended consequences of post-crisis banking reforms (PhD thesis)

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3. Data steward: Lisa Koks

4. Research question(s): Chapters 2 and 3

Do CoCo bonds increase the risk appetite of banks? And
What is the impact of the leverage ratio introduction on capital allocation and bank risk taking?

1. Data to be gathered (including location): A data description can be found below:

The location for data gathering is:

1. Bank of England for the following data sources Eikon Thomson One, Bloomberg, SNL, Refinitive Eikon, Bank of England internal measurement, SMMD (Sterling Money Market Data)
2. UvA for Yahoo Finance, Factset and Bank of England exchange rate statistics

A more detailed description can be found in the PhD thesis chapters, with a summary of data sources in Tables 3.1 and 4.2 (as shown below).

Table 3.1: Data sources

Variable	Nr of banks	Frequency	Timespan	Source
Adjusted close stock price	10	Daily	2000-2018	Yahoo Finance
CDS spreads	9	Daily	2000-2018	Eikon Thomson One
Market capitalisation/ share numbers	10	Semi-annual	2006-2018	Factset
FX rates	-	Daily	2000-2018	Bank of England Exchange rate statistics Database
AT1 CoCo issuance data	10	-	2013-2018	Bloomberg
Bank balance sheet	15	Semi-annual	2000-2018	SNL + directly from annual reports
Number of security issuances	15	Quarterly	2000-2018	Refinitive Eikon
Banking competition level	-	Semi-annual	2000-2018	Bank of England internal measurement
Macro-economic uncertainty	-	Semi-annual	2000-2018	Bank of England internal measurement

Table 4.2: Data sources

Variable description	Timespan	Frequency	Data source
Gross loans to customers	2015-2018	Semi annual	SNL
Impaired loans	2015-2018	Semi annual	SNL
Net interest margin	2015-2018	Semi annual	SNL
Cost of funds	2015-2018	Semi annual	SNL
Yield 15Y UK gilt	2015-2018	Daily	Factset
Repo Transaction Nominal Amount	2017-2019	Daily	SMMD
Repo interest rate	2017-2019	Daily	SMMD
Reverse repo Transaction Nominal Amount	2017-2019	Daily	SMMD
Reverse repo interest rate	2017-2019	Daily	SMMD

2. Method of data collection (in case of personal data indicate the basis

(grondslag)):

The method of data collection was collecting specific bank balance sheet data for each UK bank in our sample (15 banks) from the sources mentioned above, and also manual filling of various empty values directly from the annual reports (done by one of my co-authors). The two variables of internal measurement (banking competition level in the UK and macro-economic uncertainty) were taken on the aggregate value computed by Bank of England staff in internal reports. The SMMD database of repo transactions is a highly sensitive regulatory dataset at which my co-author (Quynh-Anh Vo) got a one-time access after asking special permission for our research project. The data collection happened in 2018 and 2019.

3. Individuals involved in data gathering, data manipulation/editing and with access to the data:

For chapter 3 of the thesis the other individuals involved besides myself were: Mahmoud Fatouh and Sweder van Wijnbergen.

For chapter 4: Quynh-Anh Vo.

4. Data Protection Impact Assessment

The data collected is either – public (Yahoo Finance share prices and Bank of England exchange rates database), proprietary (either from UvA – Factset, or Bank of England – Bloomberg, SNL, Refinitive Eikon, Eikon Thomson One) or highly sensitive/confidential (SMMD). For all the Bank of England proprietary data I had to sign a non-disclosure agreement, and I was only allowed to use the data gathered exclusively for the two projects mentioned above. The data mainly deals with bank balance sheet information and CDS spreads.

The Sterling Money Market Data (SMMD) is a regulatory dataset from the Bank of England which has transactional level data of repo and reverse repo transactions done in the UK. This granularity of information is highly sensitive, but we only had a one-off access when we aggregated and estimated our desired parameters. In other words, the dataset is exclusively stored on a Bank of England server and we do not have easy access to it anymore.

In other words, the majority of data is not available for distribution, except for a few variables (such as Yahoo Finance share prices and exchange rates which were further used to create some variables I use in the thesis).

5. Data editing/manipulation steps (e.g. SPSS Syntax files, R scripts).

The data editing was done using the following programs: Matlab, Stata and R.

We used R for estimating the desired parameters from SMMD dataset, Matlab to estimate curvatures and run the simulation analysis, and Stata to estimate our desired parameters from bank balance sheet data.

An extensive discussion of how we manipulated the data can be found in sections: 3.2 Data and empirical methodology (pages 71-85), 3.3.

Descriptive statistics and empirical results (pages 86-98), section 4.5

Model calibration (136-140) and section 4.6 Numerical simulations (140-151).

All the scripts are stored on my personal computer and are available at request.

Some summaries of the aggregate results of data manipulation or raw descriptive statistics are found below (the tables can be found in the thesis):

Table 3.2: CoCo issuances UK

Year	Amount EUR mn	N (from which CE)*	GBP	EUR	USD	SGD
2013	2753	2 (2)	0	1	1	0
2014	15936	15 (15)	8	3	4	0
2015	10128	8(7)	3	1	4	0
2016	7401	5(5)	1	0	4	0
2017	9246	10(7)	6	1	2	1
2018	8744	6(6)	1	0	4	1
Total UK	54208	46(42)	19	6	19	2
<i>Total Europe</i>	<i>158200</i>	<i>182(71)**</i>	<i>21</i>	<i>66</i>	<i>67</i>	<i>5</i>

* Total number of issuances, from which number of conversion to equity in brackets.

** The total number of issuances stated here is larger than the sum of issuances in the 4 currencies summarised after. This is because in Europe there were issuances in other currencies as well, which we do not cover in our summary table, given our UK focus.

Table 3.3: Bank Risk measures

Variable		N	Mean	Std. Dev.	Min	Max
Equity beta	overall	258	-.0109	.1302	-.4733	.4389
	between	10		.0592	-.1058	.0502
	within	25.8		.1211	-.4293	.3776
Asset beta	overall	226	-.0008	.0065	-.0154	.0225
	between	9		.0047	-.0097	.0028
	within	25.1		.0052	-.0160	.0190
CDS	overall	141	201.476	110.121	55.487	596.454
	between	9		48.316	116.480	248.139
	within	15.67		102.1	39.428	561.374
Z-score	overall	270	6.742	11.635	-5.746	99.1368
	between	15		5.809	-.823	20.915
	within	18		9.992	-12.480	84.964

Table 3.4: CoCo descriptive statistics

Variable		N	Mean	Std. Dev.	Min	Max
CoCo bonds to overall capital ratio	overall	69	.1233	.0891	.0272	.4310
	between	10		.0778	.0552	.3092
	within	6.9		.0387	.0168	.2452
Prob of CoCo conversion	overall	69	8.27e-06	.0000417	3.47e-51	.00026
Total CoCo shares mn	overall	78	19.387	27.620	0	83.171
	between	11		25.880	0	83.171
Marginal wealth transfer per share (empirical decline)	overall	57	.3288	.27027	0	1.1509
Total expected WT at conversion £mn (empirical decline)	overall	57	3979.367	3280.7	0	13272.63

Table 4.4: Business model descriptives

Description	Variable	Values		
		Retail	Wholesale	Capital oriented
Interest rate unsecured debt	R	0.0129 (47)	0.0094 (27)	0.0065 (4)
Leverage ratio	LR	0.0549 (55)	0.0537 (39)	0.0457 (4)
Fully loaded risk weighted capital ratio		0.2528 (43)	0.184 (24)	0.187 (8)
Loans to total assets	L/total assets	0.7649 (63)	0.6601 (37)	0.3653 (6)
Percentage of impaired loans to total loan size		1.11% (53)	1.99% (26)	2.74% (2)

The number of observations is in brackets, unless otherwise stated.

Table 4.3: Calibration UK

Description	Parameters	Calibrated Value
VaR confidence level	a	0.001
Leverage requirement	χ	0.03
Coupon on government bond	c	1.0172
Bank's borrowing cost	R	1.0114
Lending unit		
Marginal return on loan	g_1	1.0369
Curvature of loan return	g_2	$-2.22 \cdot 10^{-5}$
Log-normal parameter of Z (Mean Z)	μ_Z^{log}	-4.568 (0.015)
Log-normal parameter of Z (Standard deviation Z)	σ_Z^{log}	0.913 (0.018)
Repo unit		
Return on reverse repo - repo	γ_1	0.000427
Diminishing return parameter	γ_2	$-6.943 \cdot 10^{-4}$

Table 4.5: Calibration UK business models

Description	Parameters	Retail banks	Wholesale and cap.
Bank's borrowing cost	R	0.0129	0.009
Lending			
Marginal return on loan	g_1	1.0369	1.03081
Curvature of loan return	g_2	$-3.15 \cdot 10^{-5}$	$-1.03 \cdot 10^{-5}$
Log-normal parameter of Z (Mean Z)	μ_Z^{log}	-4.885 (0.0118)	-3.97 (0.0207)
Log-normal parameter of Z (Standard deviation Z)	σ_Z^{log}	0.945 (0.0142)	0.429 (0.0093)

6. Where and how will the data be stored (including temporary storage for research use) and security measures applied:

The proprietary and public (edited) data is stored on Bank of England computers and part of it on my personal computer, and the raw confidential dataset is on a Bank of England server we do not have immediate access to anymore (unless we make a special request).

7. Approval EBEC (Economics & Business Ethics Committee) obtained: approval yes/no

8. Intellectual property, copyright and ownership of the data:

The ownership of the data varies based on the source: that is either the UvA or Bank of England. The copyright of the raw data belongs to Bloomberg, Factset, Thomson One Eikon, SNL, Refinitive Eikon, and Yahoo Finance.