



Fakultät für Wirtschaftswissenschaften
Institut für Volkswirtschaftslehre (ECON)

Bachelor Thesis in Macroeconomics

„US commercial banks“

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Alexander Schlechter
Matr.-Nr. 2054108
alexander.schlechter@student.kit.edu

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1 Introduction

2 Main part

2.1 General look at us banks

2.1.1 Assets

The following section will show some insights about the asset side of the whole us commercial banking sector. The asset side is composed of: ...

Figure 1: Asset side

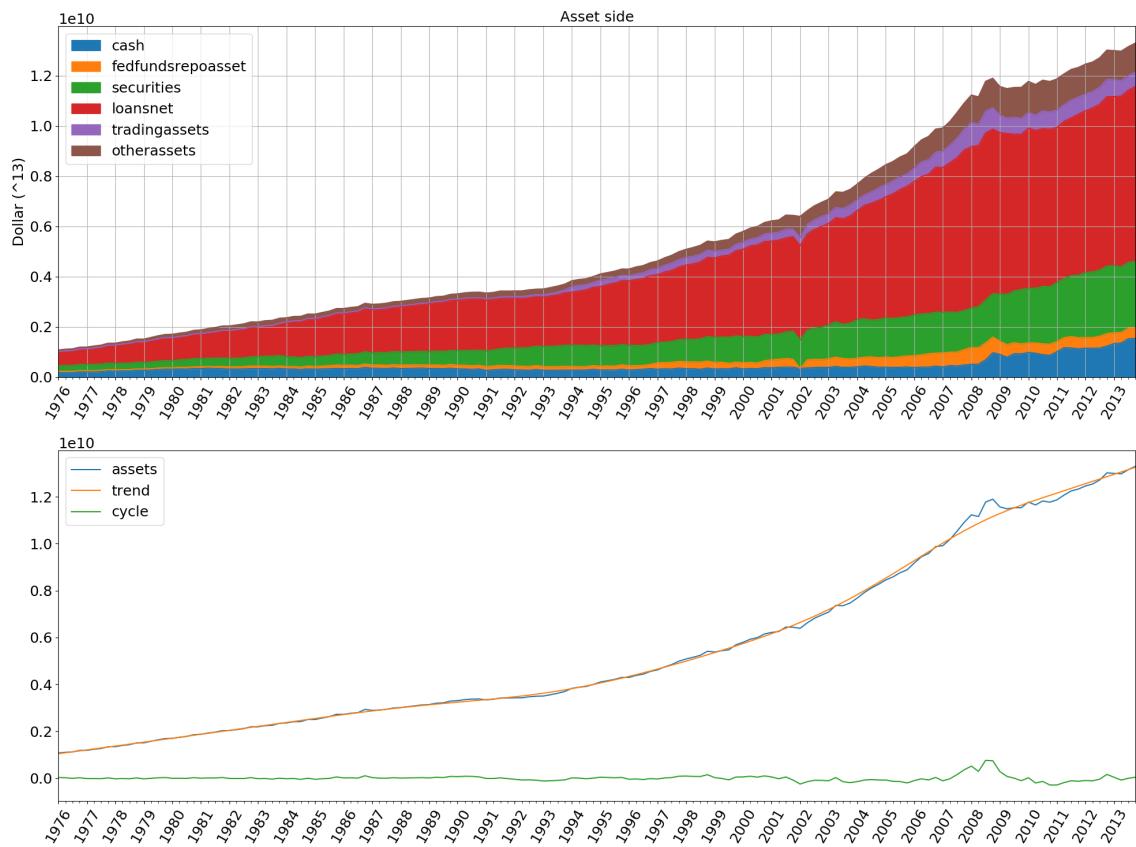
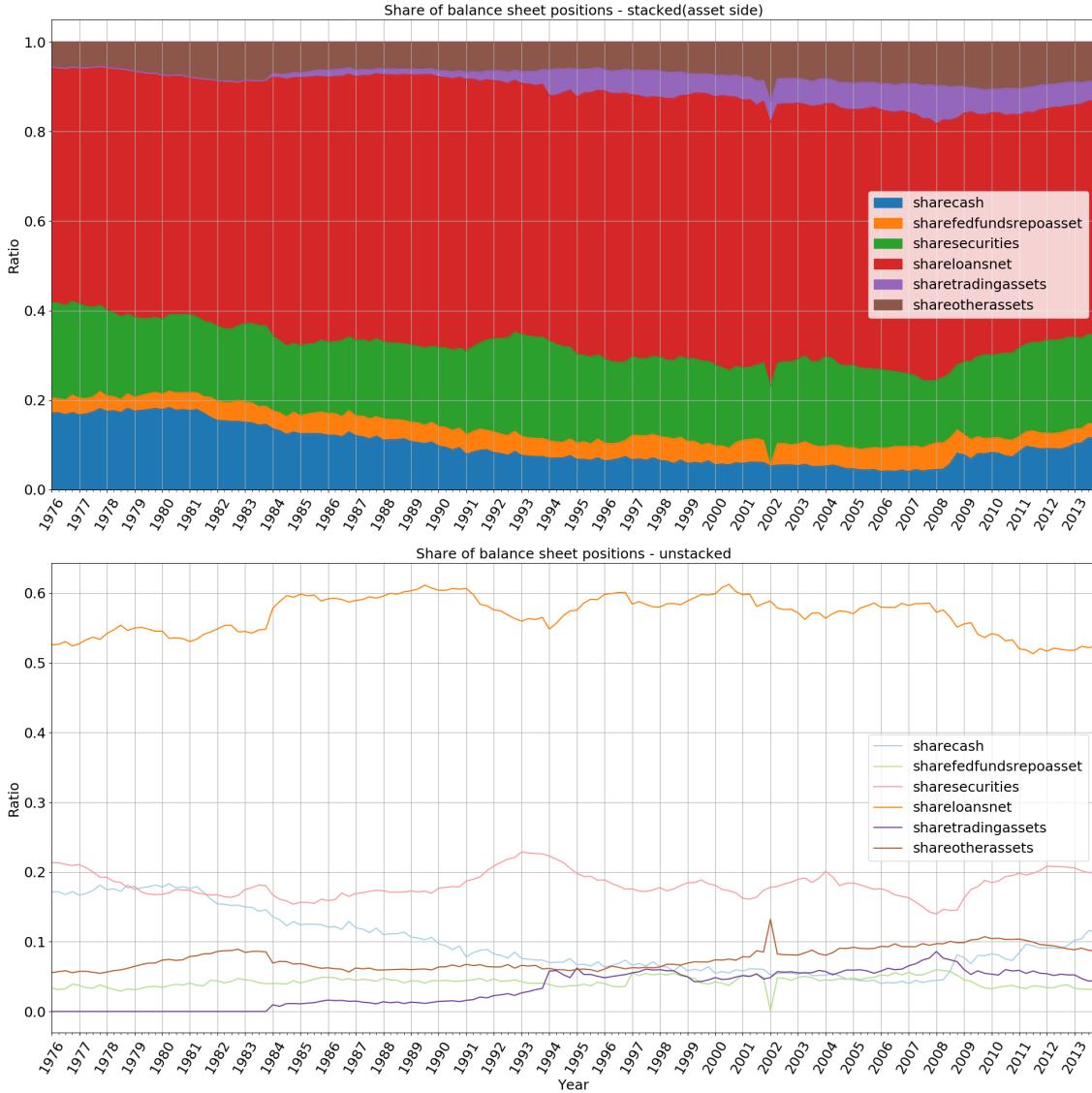


Figure 2: Share of asset positions - unstacked



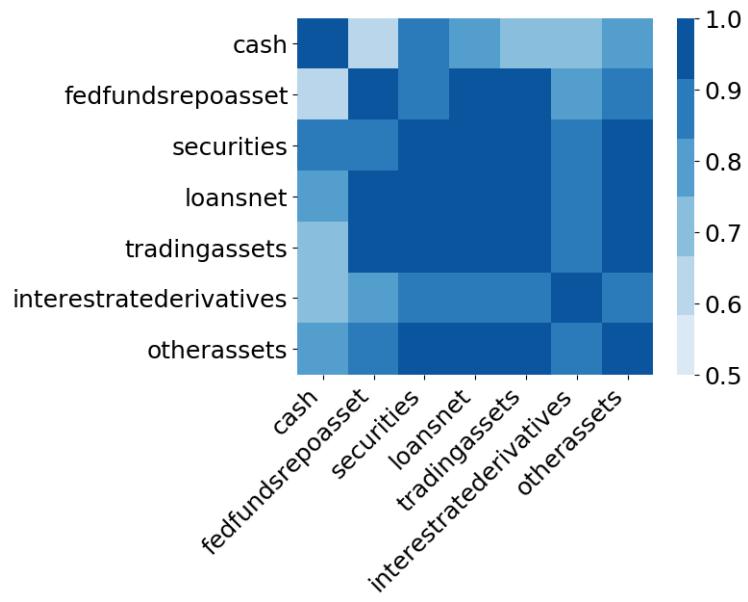
Graph description: Figure 1 shows the aggregates of the main variables from the asset side of the balance sheet over time. Figure 2 shows the share of each aggregated balance sheet position of all commercial banks over time. Figure 3 plots the share of each balance sheet position unstacked.

Key Observations:

- loans make up the largest share of assets
- share of trading assets have risen as well as interest rate derivatives
- loans and trading assets have risen more than securities in timeframe year 2000-2009
- Share of trading assets peaked in 2008 while securities fell.

- There is a noticeable anomaly in year 2002. Significant amounts of repo lending is transferred into other assets. Other assets are derivatives not available for sale.
- drop in assets in 2002 and 2008
- share in cash has fallen until 2008 and then increased again
- Share of cash continuously fell until 2008, and then it increased significantly again

Figure 3: Correlation of balance sheet positions (assets side)



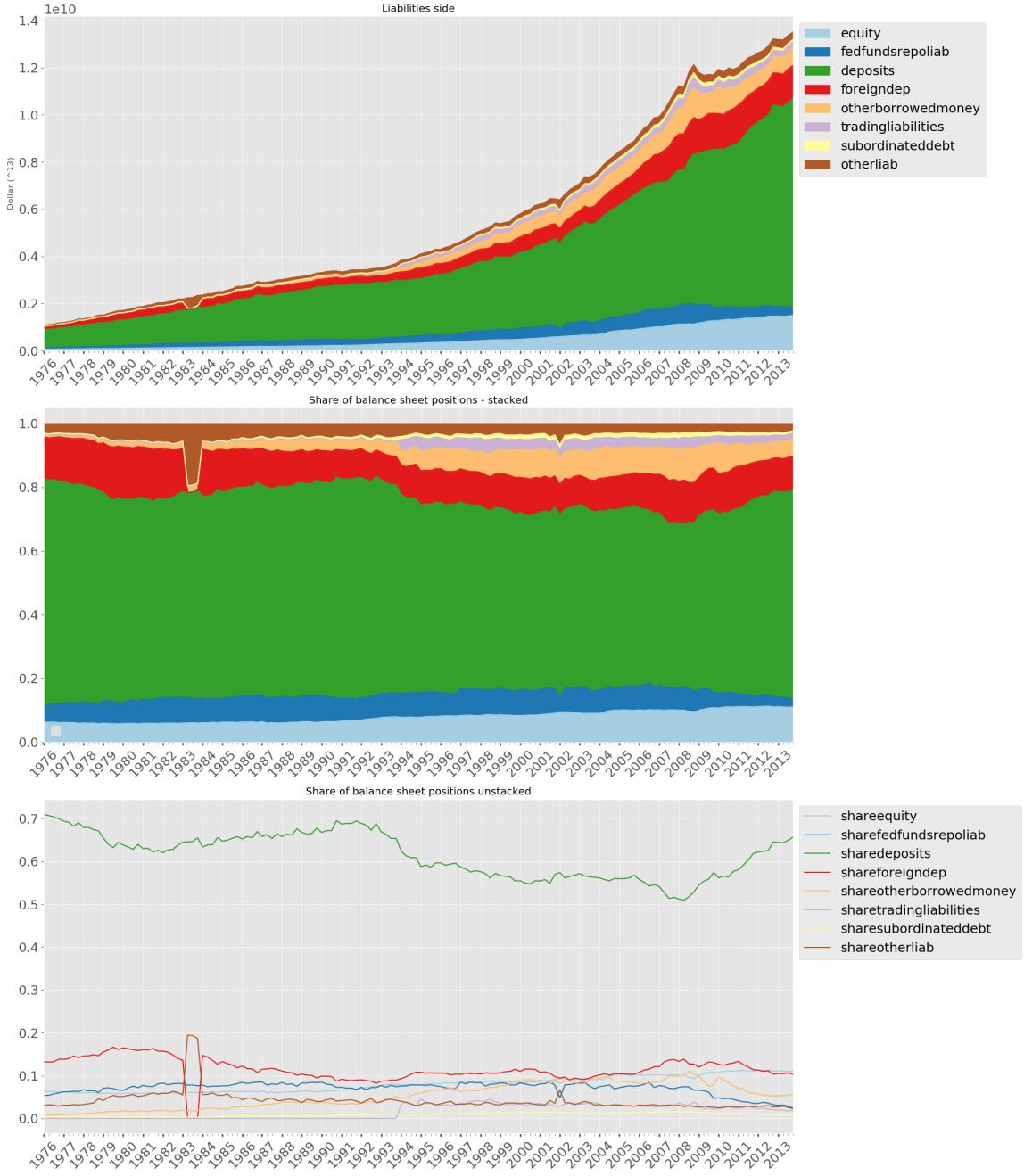
Graph description: Figure 3 shows the Pearson Correlation Coefficient between different balance sheet positions

Key Observations:

- Cash has the weakest correlation with the rest positions
- No significant stand outs

2.1.2 Liabilities

Figure 4: Share of liabilities positions



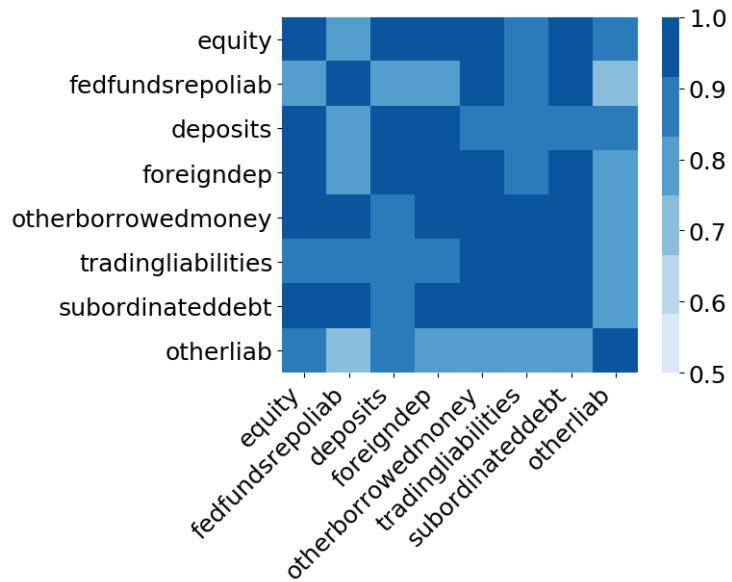
Graph description: The graph shows the aggregates of the main variables from the liabilities side of the balance sheet over time.

Key Observations:

- Deposits as main source of funding
- Irregularities in year 2002: repos drop while other liabilities rise

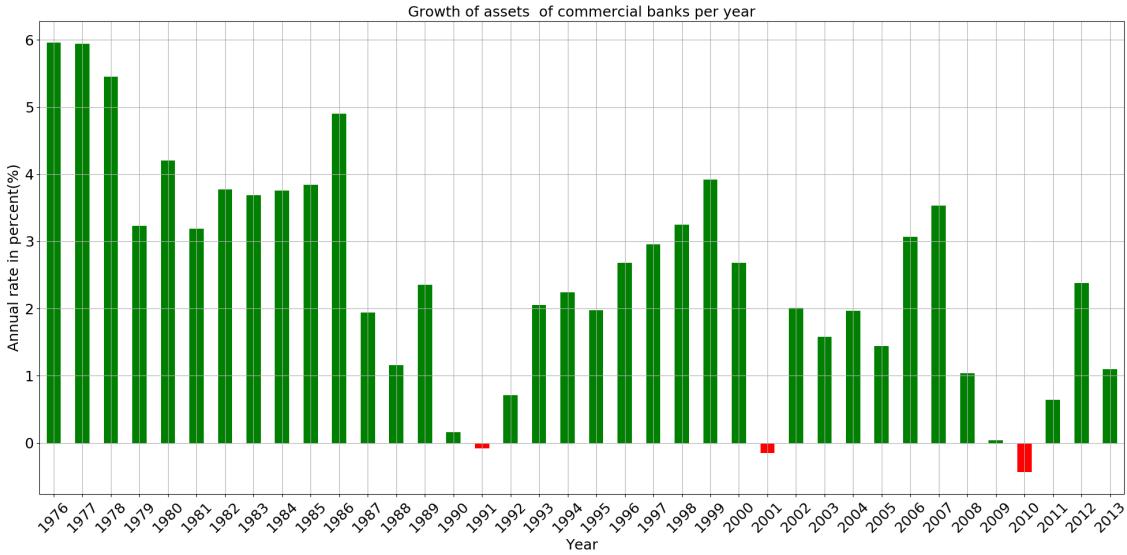
- Irregularity in year 1983 might be caused by measuring/reporting differences
- In 2008 share of deposits at lowest point. Although the aggregated assets peaked at that time.
- Deposits continuously decreased from 1990 onwards. Other financing such as "Other borrowed money" and "trading liabilities" rose
- repos share decreased significantly until end of 2013

Figure 5: Correlation of balance sheet positions (liabilities side)



2.2 Growth

Figure 6: Growth of assets

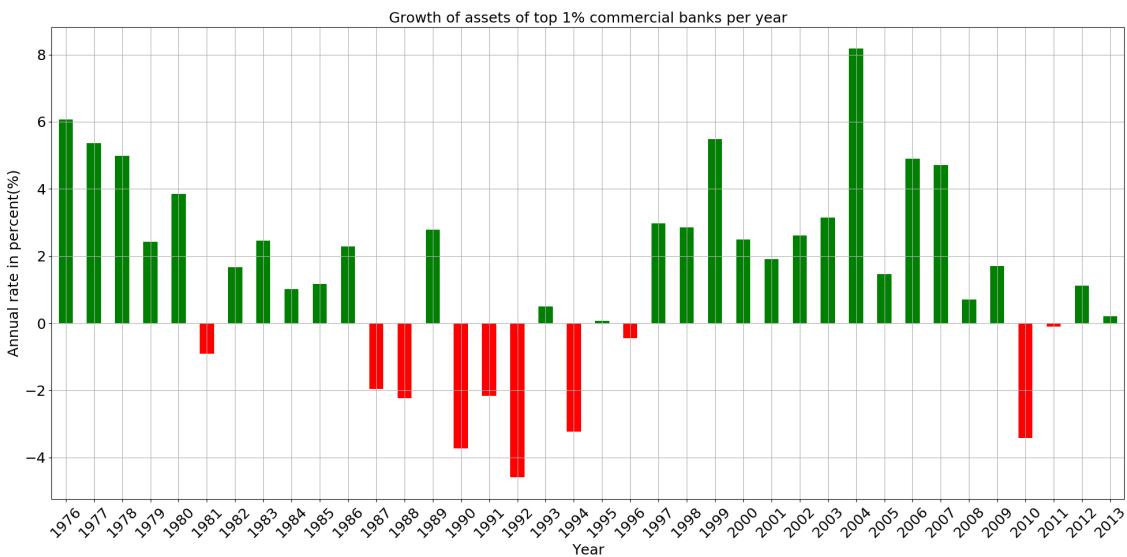


Graph description: The graph shows the annual growth rate of aggregated assets of all commercial banks. Two investment banks, who did become commercial banks in 2009, are excluded.

Key Observations:

- Three negative growth rates in year 1991, 2001, 2010

Figure 7: Growth of top 1 percent banks assets



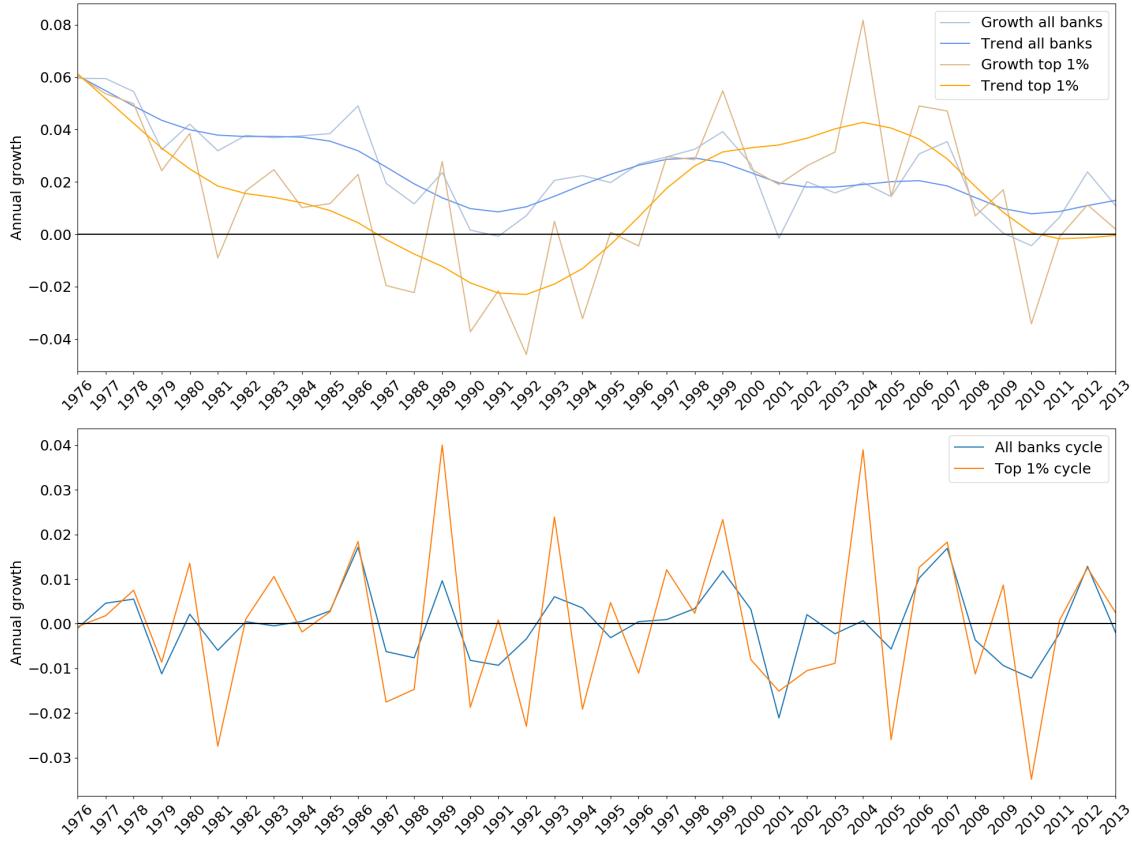
Graph description: The graph shows the annual growth rate of aggregated assets of top 1% commercial banks. Two investment banks, who did become commercial banks in

2009, are excluded.

Key Observations:

- More negative growth rates in 1990 and 2010
- No negative growth in 2001

Figure 8: Growth of all banks vs top 1 percent

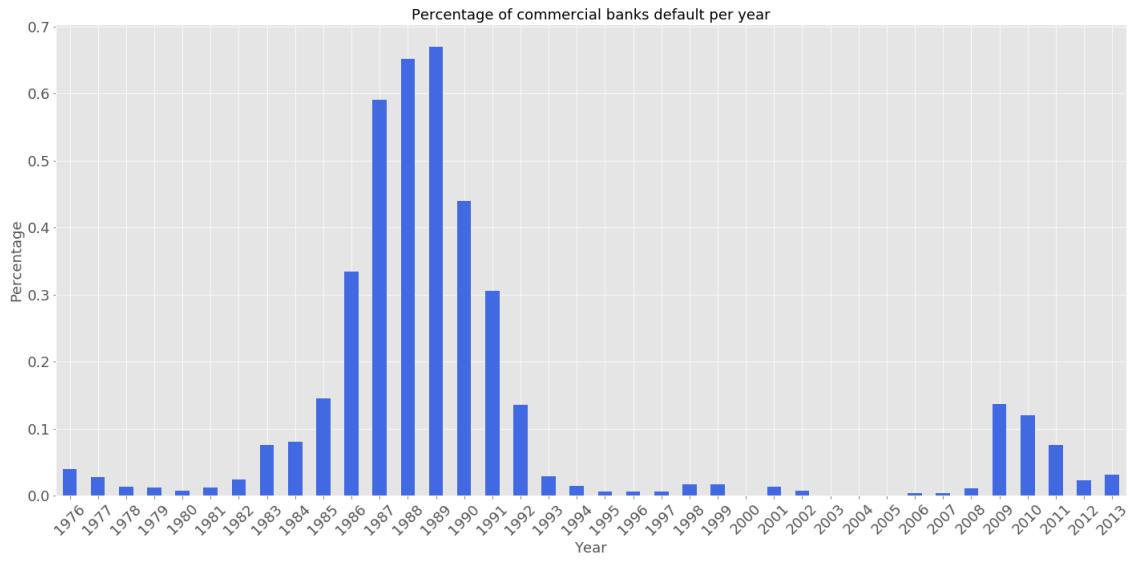


Graph description: Annual growth rate with trend for all banks and top 1%. The second graph shows the cycle part from the time series filter.

Key Observations:

- Top 1% growth rates are more volatile
- Pearson Correlation between all banks vs top 1%, Significance: (0.6371607133788253, 1.696703469447756e-05)
- 1986, 2001, 2006 almost 0,02 difference toward trend

Figure 9: Banks default



Graph description: The graph shows an estimation of how many banks have defaulted at a certain time (year,quarter). It is based on the negative equity recorded by banks. Hence, it is not exact and some banks might continue to exist in case of mergers or bailouts. Also sometimes banks are double counted, if a negative equity does not immediately result in bankruptcy.

Key Observations:

- main defaults in years 1986-1991 and 2009-2011
- long stable period from 1991-2008
- In 1990 there were many more smaller banks. Smaller banks might have a higher likelihood to fail. In 1990: 74% small banks, 2010: 35% small banks

2.3 Loans

Graph description: It shows the share of loan types of total loans over time.

Key Observations:

- real estate loans has largest share

Figure 10: Loans

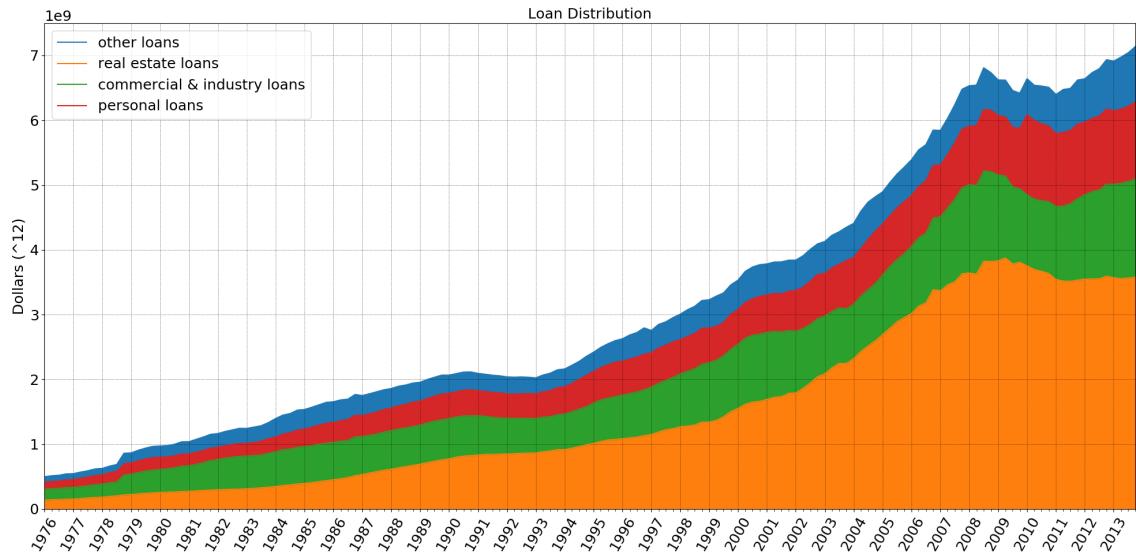


Figure 11: Loans by repricing maturity

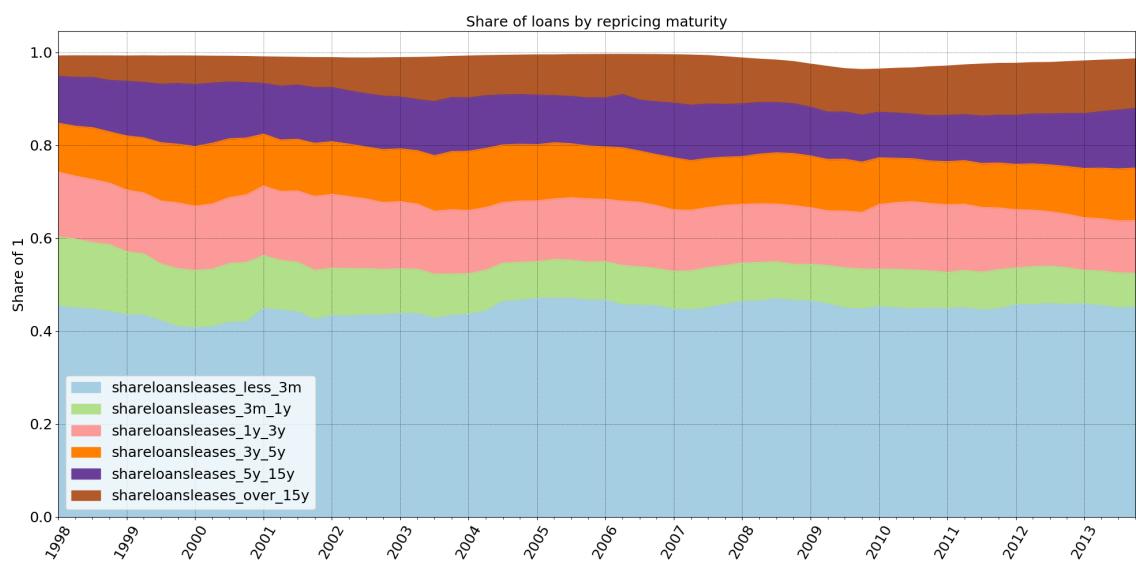
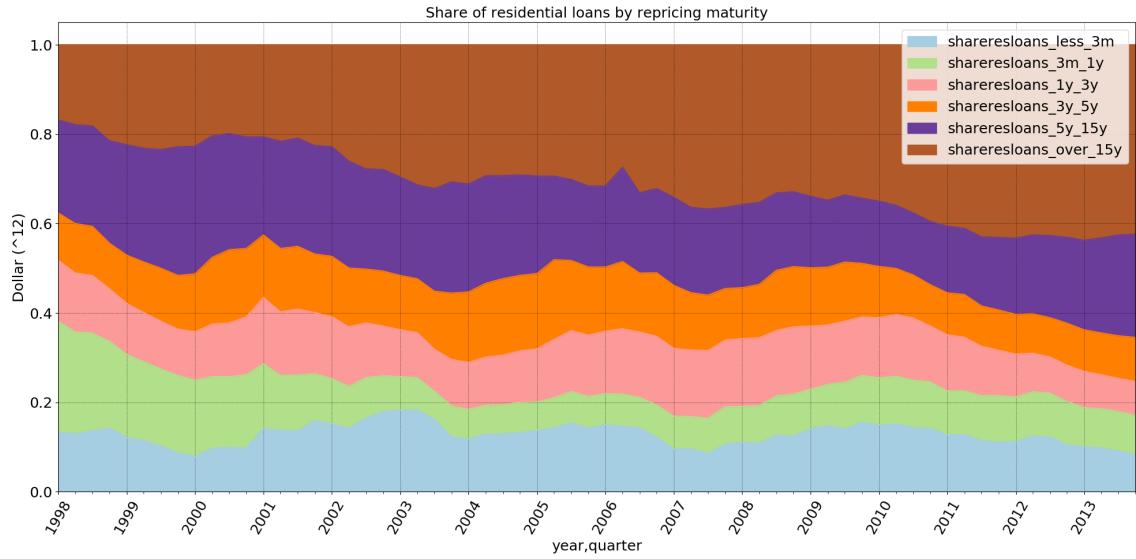


Figure 12: Residential Loans by repricing maturity

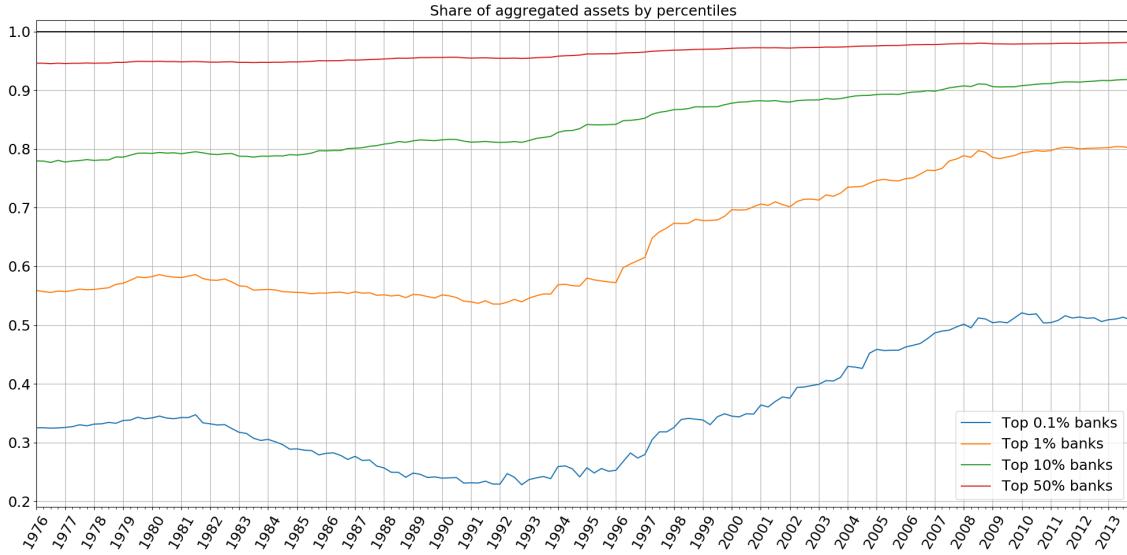


2.4 Distribution of asset sizes among banks - To Big to Fail

Figure 13: Count of banks by percentiles

	Top 0.1%	01Share	Top 1%	1PercentShare	Top 10%	10PercentShare	Top 50%	50PercentShare	Total all banks
1976	14	0.324922	144	0.558099	1442	0.780650	7210	0.946214	14419
1980	14	0.340622	144	0.581818	1442	0.793497	7208	0.948957	14417
1984	14	0.288709	144	0.556493	1439	0.790446	7194	0.948429	14389
1988	13	0.240856	130	0.546860	1298	0.811423	6491	0.954550	12982
1992	11	0.228150	114	0.539679	1136	0.811301	5682	0.954310	11363
1996	9	0.273671	95	0.609738	946	0.850118	4732	0.964386	9464
2000	8	0.348473	83	0.701729	825	0.881838	4126	0.972520	8252
2004	8	0.452258	76	0.741929	757	0.891446	3784	0.975372	7567
2008	7	0.510510	70	0.794367	702	0.910356	3511	0.980069	7022
2012	6	0.506170	60	0.801828	604	0.916754	3018	0.980764	6035

Figure 14: Aggregate assets by percentiles



2.5 Median banks by asset size

In Figure 15, we have in the left column the asset interval size and in the corresponding row the number of banks per year.

Figure 15: Banks count by asset size

	1980	1985	1990	1995	2000	2005	2010
(-0.001, 100000.0]	12717.0	11674.0	9145.0	6613.0	4810.0	3435.0	2313.0
(100000.0, 1000000.0]	1507.0	2287.0	2693.0	2843.0	3055.0	3562.0	3670.0
(1000000.0, 10000000.0]	174.0	287.0	325.0	342.0	307.0	381.0	413.0
(10000000.0, 100000000000.0]	18.0	27.0	49.0	75.0	80.0	80.0	83.0

Typical small/medium/large bank

Banks are assigned three different buckets (small/medium/large) depending on asset size.

Small bank: $0 < \text{assets} \leq 10^5$

Medium bank: $10^5 < \text{assets} \leq 10^6$

Large bank: $10^6 < \text{assets}$

Figure 16: Asset size by bank

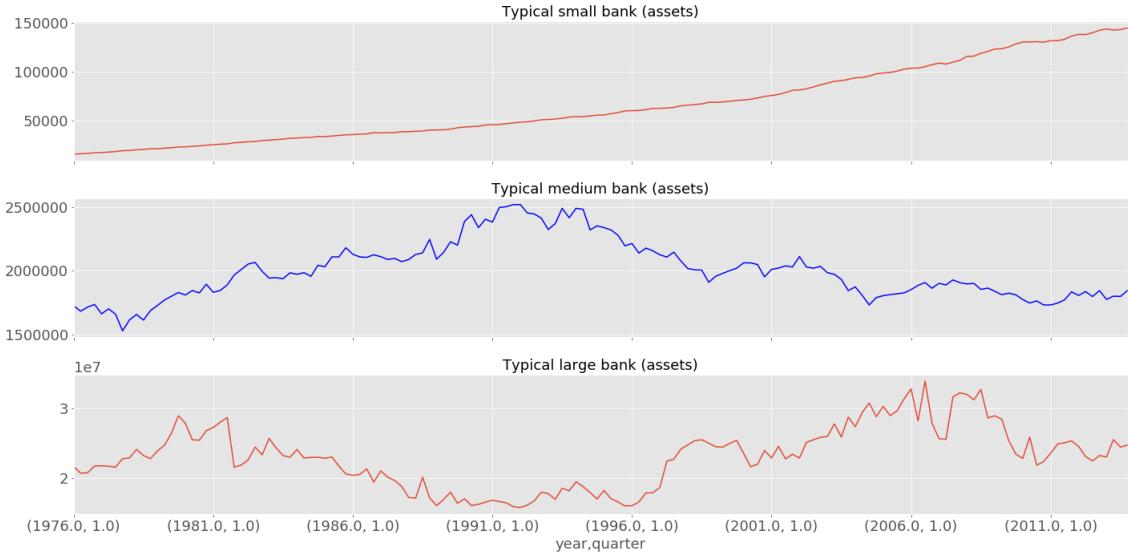


Figure 17: Medium vs large bank by asset size



Figure 18: Small bank: liability side

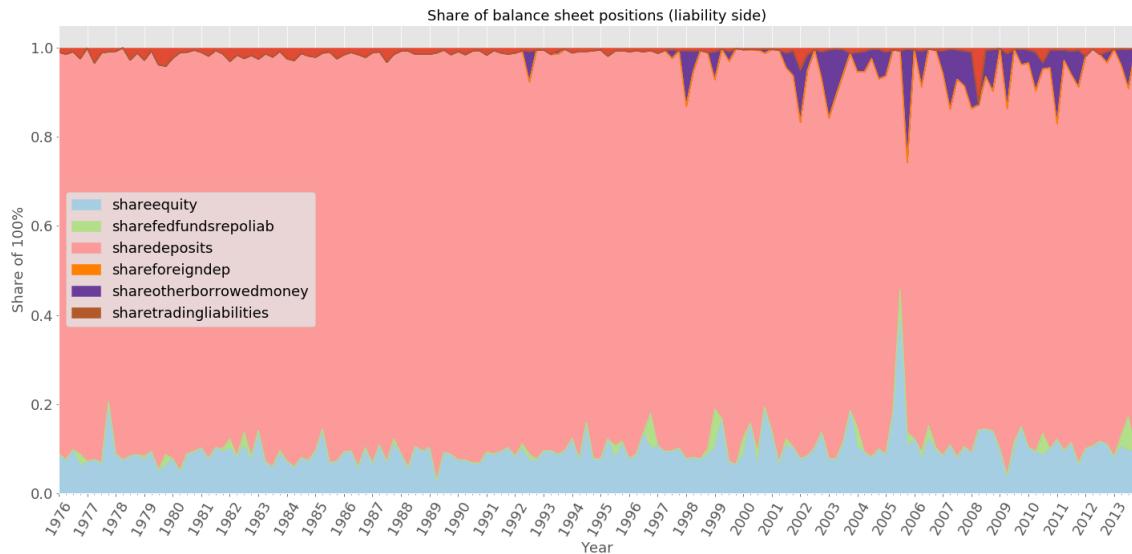


Figure 19: Medium bank: liability side

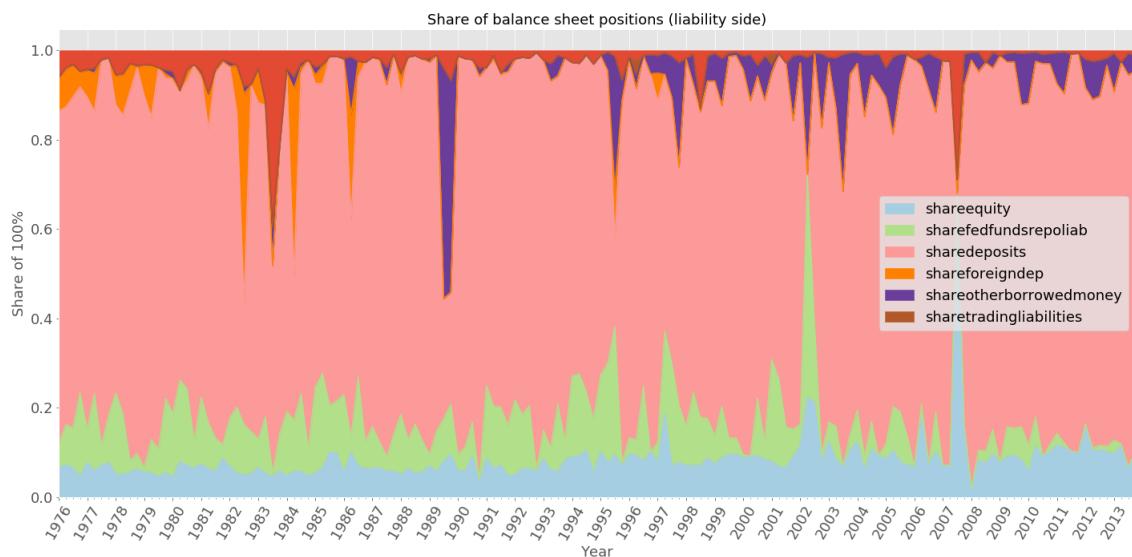
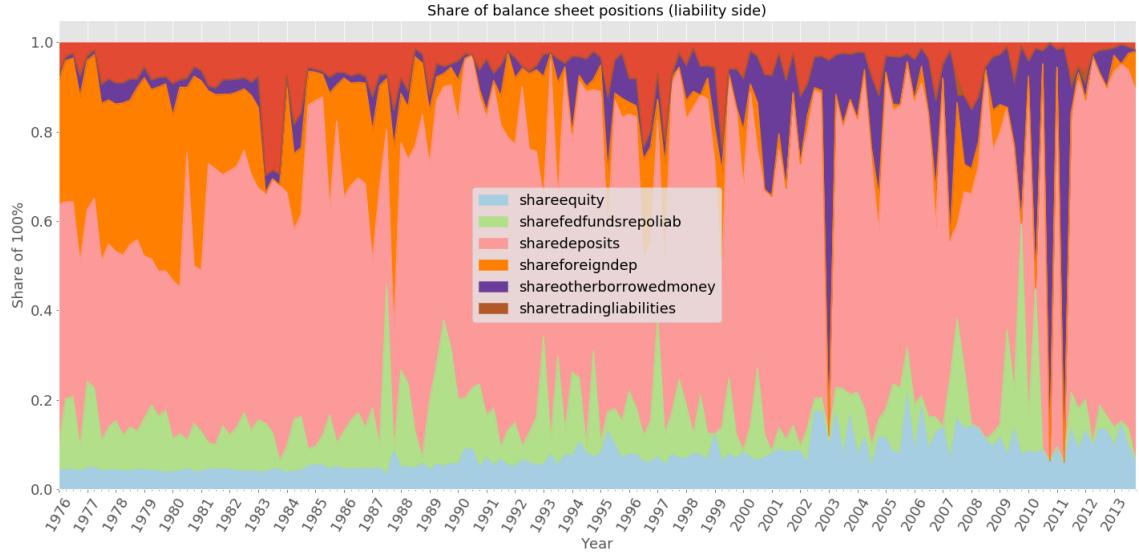


Figure 20: Large bank: liability side



2.6 Leverage

Throughout the analysis the definition of accounting leverage (assets/equity) is used. Equity is calculated by total assets minus total liabilities. In addition, for risk analysis banks belonging a bank holding company were aggregated. Hence, the dataset which was used contained bhcs and independent banks.

Figure 21: Median and Average leverage for all banks

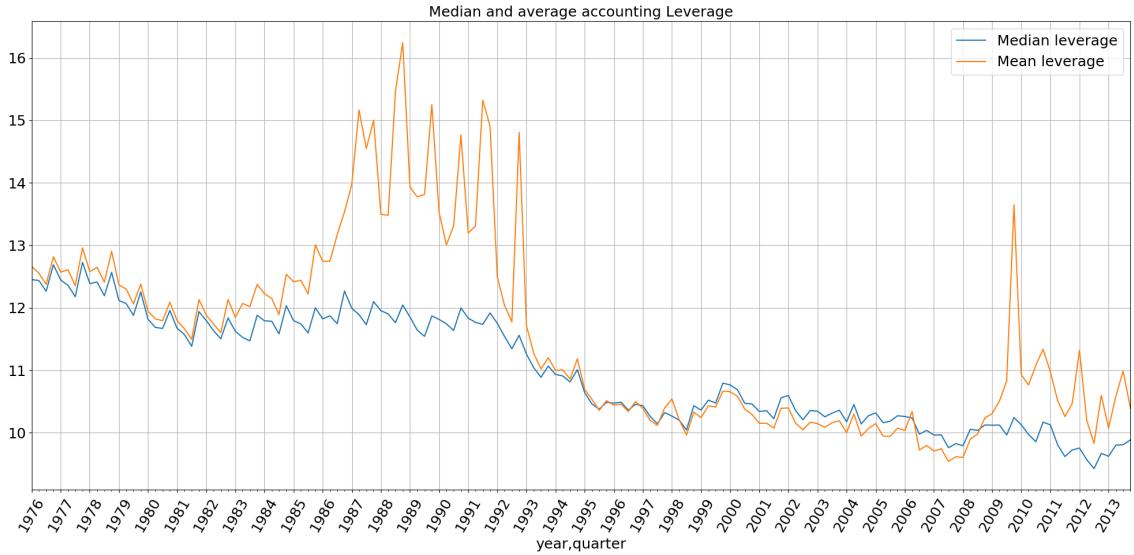


Figure 22: Average/Mean leverage plots

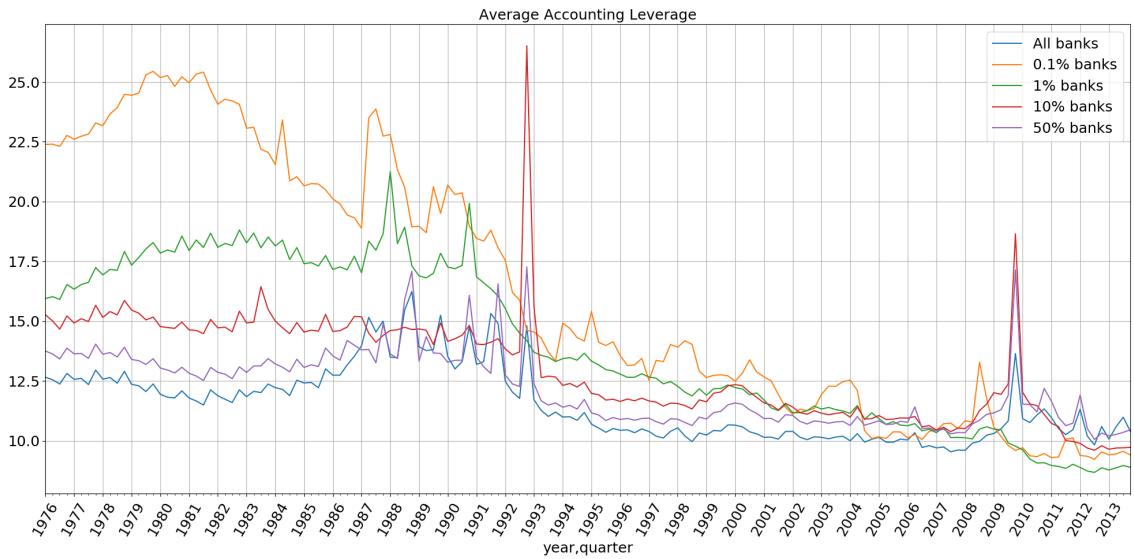


Figure 23: Median leverage plots

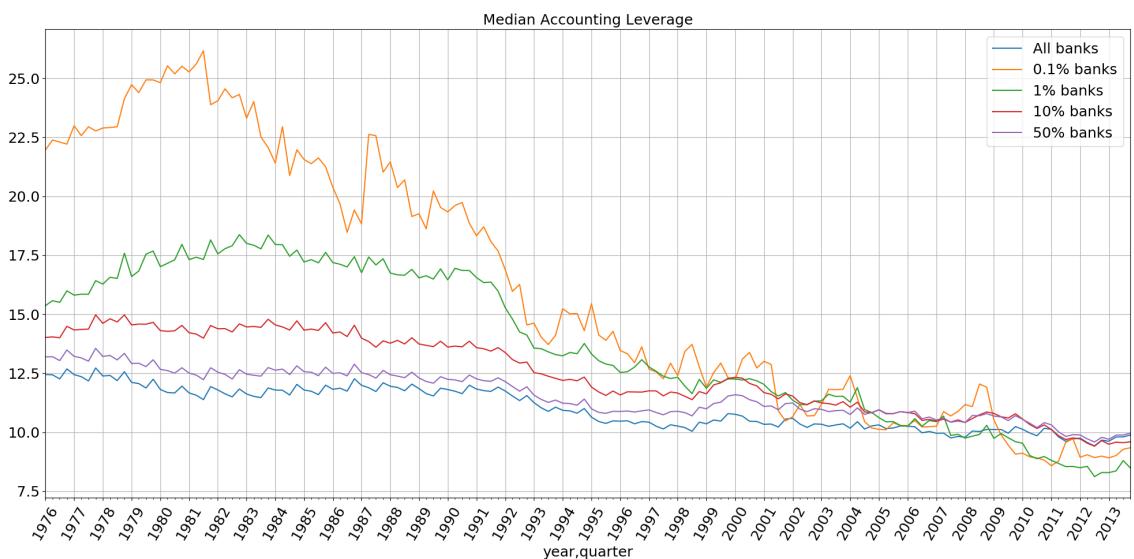


Figure 24: Trend plots

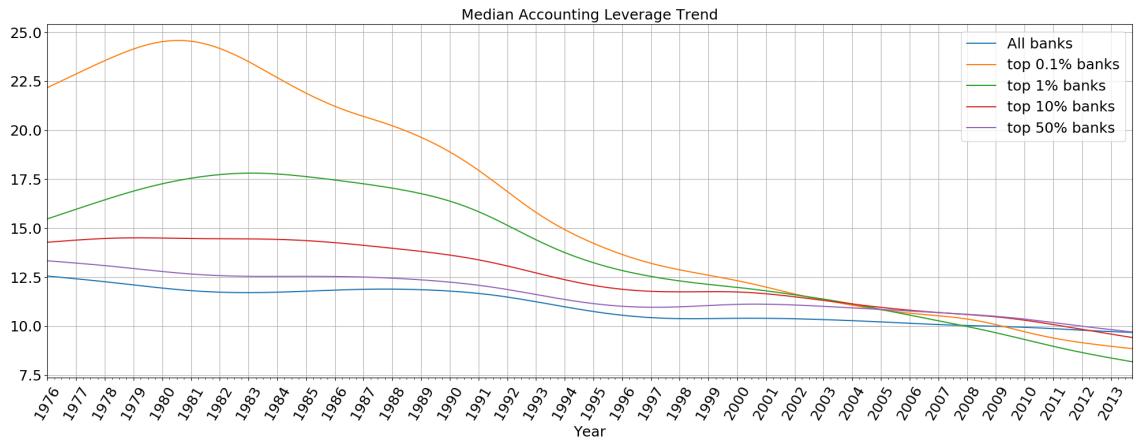


Figure 25: Cyclical plots



Figure 26: Correlation cyclical leverage

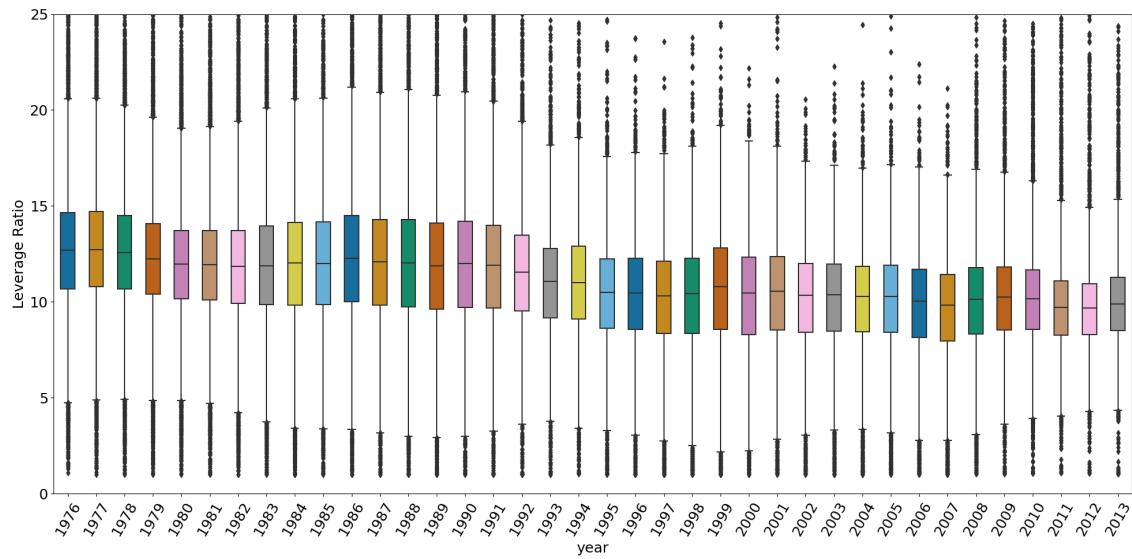
	Top 0.1%	Top 1%	Top 10%	Top 50%	all
Top 0.1%	1.000000	0.389020	-0.035984	-0.066798	-0.139484
Top 1%	0.389020	1.000000	0.567942	0.509148	0.454866
Top 10%	-0.035984	0.567942	1.000000	0.910975	0.816169
Top 50%	-0.066798	0.509148	0.910975	1.000000	0.951795
all	-0.139484	0.454866	0.816169	0.951795	1.000000

Graph description: Figures 21-25 focus on leverage ratios for every year and quarter over all banks. Banks with equity or assets below zero are excluded.

Key Observations:

- Extreme outliers of leverage in year 1992/93 and 2009 lead to spikes in average leverage.
- Figure 21: All banks median leverage, seasonal effect every year?
- Leverage lowest in 2007
- Overall Leverage did fall over time: Introduction of Basel 1 in 1988 might have lead to continuously decrease in leverage
- Top 0.1% have much higher volatility, which could just be caused by the low sample size.
- Top 0.1% and 1% actually become less risky than all banks together from 2010 onwards
- Figure 25 shows slightly negative correlation between the top 0.1% banks and all banks.

Figure 27: Boxplots (1976-2013)



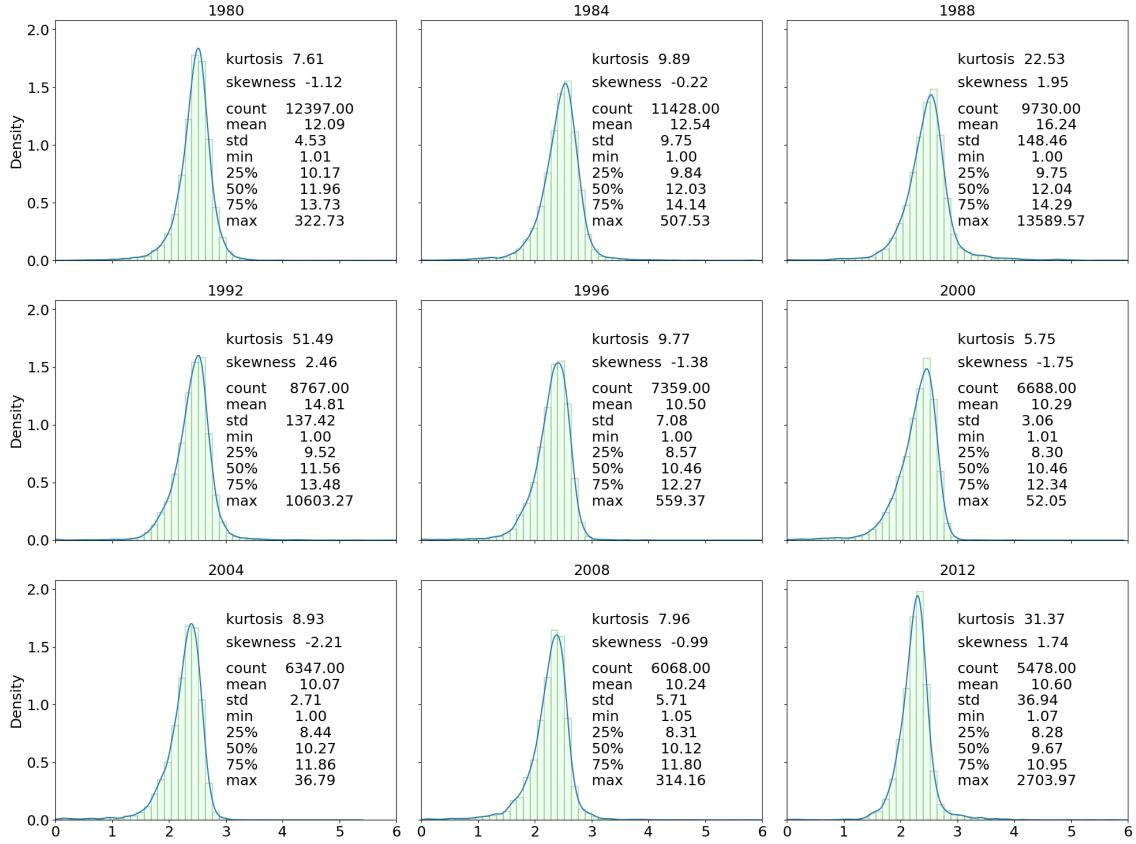
Graph description: Boxplots of all leverage ratios by banks by year.

Key Observations:

- 75% of all banks have a leverage ratio between 10-15.

A look into the distribution of leverage

Figure 28: Distribution 1980-2013



Graph description: Counts are normed to 1. Leverage are transformed with log10. Leverage ratios are always from quarter 4.

Key Observations:

- Log-normal distribution
- Large standard deviation in year 2010 with 18.82
- Less and higher bars in 2012 indicate higher homogeneity in 2013 compared to the years before.

3 Conclusion