

Leverage Across Firms, Banks and Countries

VERY PRELIMINARY: UPDATED PROPOSAL FOR NBER-SLOAN PROJECT ON GLOBAL
FINANCIAL CRISIS

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1 Introduction

The 2007–2008 global crisis started in the financial sector and quickly turned into a global recession with an unprecedented decline in output, employment, and trade. As past crises have shown, firms' financing conditions are often the key mechanism turning a financial crisis into a real one. Higher cost of external financing, and declining collateral values, force firms to lower leverage which in turn lowers investment and output (Kiyotaki and Moore, 1997). Changes in leverage over the business cycle is a potentially important amplification mechanism propagating the initial adverse shock to the real economy (Bernanke and Gertler, 1995). Many commentators have argued that the lending boom of the early 2000s, which fueled the sub-prime crises, caused firms and banks to increase their leverage to unprecedented levels. When the boom turned into a bust, following the banks' contraction of credit, a sharp de-leveraging accompanied the largest global financial meltdown since the Great Depression.

To this date, no empirical evidence has been brought on this issue in spite of the fact that many recent theory papers aims at understanding the endogenous leverage process (Fahri and Tirole (2010); Fostel and Geanakoplos (2008)). This is a task we undertake in this paper by studying the determinants of leverage across, firms, banks, and countries over time. To be able to understand the dynamic changes in the leverage patterns of firms and banks during the 2007–2008 crisis, we first need to have an understanding of cross-sectional and time-series determinants of leverage in the pre-crisis period.

Since the celebrated paper of Modigliani and Miller (1958), there has been an immense explosion in theoretical underpinnings of the firm's capital structure but empirical work is only slowly catching up. Theoretical models pinpoint important departures from the Modigliani-Miller assumption which makes capital structure relevant for the value of firms. However, we still do not know the empirical relevance of many different theories. As a result, we lack a good understanding of the

determinants of capital structure of the private and public sector outside the United States, since most of the empirical literature focuses on the U.S. using data from COMPUSTAT on large listed firms. The literature on U.S. firms shows that the most important cross-firm determinants of leverage are size, profitability and tangibility (collateral). This literature is mainly static. In a seminal paper Rajan and Zingales (1995) (RZ), using data from non-financial listed firms for the year 1991, find that these factors are also important for leverage in the G7 countries. They also find that European countries have higher levels of leverage on average than U.S. firms. Booth et al. (2001) study 10 developing countries using a data set of large listed firms in a static setting and find that the factors important for leverage in developed countries (size, profitability, and tangibility) are also important for developing countries; however, at the same time there are significant country-level differences. Lemmon et al. (2006) undertake a dynamic analysis using data from listed U.S. firms and conclude that more than 90 percent of the variation in leverage is captured by firm-fixed effects and the determinants identified by the previous cross-sectional literature—such as size, profitability and collateral—only account for 10 percent of the variation.

For banks, we are only aware of one study by Gropp and Heider (2009) (GH) who apply the insights of the firm-level literature to banks. They undertake an analysis similar to that of RZ using data for large listed European and the U.S. banks between 1991 and 2004. However, as in the U.S. firm-level study of Lemmon et al. (2006), they find the importance of determinants such as size, profitability and tangibility disappears once we account for bank-fixed effects and exploit variation over time. As a result, the main conclusion of the empirical literature on the determinants of firms' and banks' leverage so far is that these patterns are pretty stable over time and determined by similar cross-sectional determinants in different countries.

The current global crisis underscores the importance of understanding what drives leverage, what are the changes over time, and whether determinants of leverage across firms, banks and time differ across countries with different institutional and regulatory structures? In particular, we would like to know what type of firms and banks were highly leveraged in which countries in the run-up to crisis. We study these patterns by utilizing the most comprehensive firm-level and bank-level world-wide dataset, ORBIS from Bureau van Dijk Electronic Publishing (BvD), between 1998–2009. Our data set covers listed, private, large, and small firms as well as banks. In fact, listed firms constitute a very small fraction, less than 0.1% of our observations.¹ There appears to

¹Aralleno and Bai (2010), using a data set similar to ours (version of our data set for 40 European countries, AMADEUS), study the relationship between leverage and financial development for one year (2004) but do not analyze dynamic properties of leverage. Coricelli et al. (2009) use ORBIS data for 9 CEE countries in the pre-crisis

be no previous work that investigates the determinants of firms' capital structure using data from many countries with a big and comprehensive data set as ours. Hence, the novelty of our study is precisely comes from the fact that we are first to investigate patterns of firm leverage together with patterns of bank-financing using a global micro-level data set over time.

2 Data and Methodology

We use a unique data set composed of firm- and bank-level observations from the ORBIS database provided by Bureau van Dijk Electronic Publishing (BvD), between 1998–2010. This database is an umbrella product that covers the other well-known databases from the same company such as AMADEUS, ZEPHRY, BANKSCOPE and OSIRIS. The time coverage of each firm/bank is a subset of the sample period, leading to an unbalanced panel.

The database comes in two modules: Financials, which provides financial information—both balance-sheet and off-balance sheet items—and Ownership/Corporate tree, which provides information on foreign and domestic owners of each firm and all the subsidiaries and many establishments, hence we have information on the whole corporate tree over time in the last decade.

In our data set we have 60,000 publicly quoted companies worldwide (OSIRIS), 30,000+ banks (BANKSCOPE), 29 million European companies from 46 countries (AMADEUS), 18+ million US and Canadian companies, 5+ million South and Central American companies, 6+ million companies in the Far East and Central Asia (mainly in Japan, Korea, China), 690,000 African companies, 70,200 companies in Oceania, and 78,700 companies in the Middle East (ORBIS).

We are going to start with large firms from Europe and the United States but we are in the process of downloading all firms from 100+ countries. We have finished the download of all the banks worldwide so we use all of them. For now we will also stop at the end of 2008 because 2009 data is incomplete given the fact that only a minority of firms have reported as of the first quarter of 2010.

We will use three different measure for leverage for firms: Leverage1 is the most widely use measure, that is total liabilities/total assets. Leverage2 is total debt/total assets and leverage3 is total debt/capital where capital is defined as total debt plus equity (proxied by shareholders' funds). Each measure has pros and cons as argued in RZ. For bank leverage we follow Gropp and Heider (2009) and use the measure 1–equity/assets in order to include all debt and non-debt liabilities of

period of 1996–2005.

banks such as deposits. For banks, as an alternative measure, we will also investigate the behavior of off balance sheet items. Many have argued that the main amplification mechanism rests on the shadow banking system which flourished thanks to the off-balance sheet investment vehicles (see Brunnermeier, 2009, for example). For the main explanatory variables we use size (proxied by log assets), profitability (proxied by cash flow/assets) and tangibility (proxied by tangible fixed assets/assets). We will also investigate the role of foreign ownership, especially because the previous literature has overlooked the potential effects of foreign ownership on leverage. We will divide our countries in different groups (EU, OECD, Emerging,...) and we will compare listed versus non-listed firms/banks, big versus small firms/banks and investment banks versus commercial banks. For firms, we initially focus on non-financial firms.

3 Preliminary Findings

Table 1 and 2 show the number of unique firms and banks and firm and bank year observations by country. We have a total of 34,000 banks from 150+ countries during the period 1998–2008, amounting to almost 225,000 observations. We only show large firms for now. Large firms are defined as firms with assets more than 28 million USD and employees more than 150. We have 40,000 large firms from all Europe and the U.S., summing over 315,000 observations. Table 3 and 4 show the corresponding descriptive statistics. Banks have higher levels of leverage (both mean and median) than firms.

We plot these median values of leverage for the large firms and banks over time. In figure 1, we find that for Europe the median firm leverage is close to 0.73 value found by RZ for 1991 for the listed firms of Europe. However there seems to be a decrease since 2000 and no apparent increase in the pre-crisis period. When we look at the median U.S. firm, in figure 2, we see a lower average value (0.62) than found for European countries. The U.S. firms seem to be increasing risk-taking starting in 2005. These value are much higher then the 0.38 value found by RZ for listed firms of the United States. Hence in figure 3, we look at listed firms and foreign owned firms separately. Listed firms have lower leverage in 1998 with leverage increased gradually over the last decade leading to an increase of above 10 percentage points during this period. Foreign owned firms on the contrary have experienced a decrease of a magnitude almost as large.

Next we plot the median leverage for banks over time. Bank leverage is much higher than firm leverage, around 0.9, as also found by Gropp and Heider (2009). Figure 4 shows that European banks have increased their leverage by around 5 percentage points starting in 2005 while such

an increase is not visible for the United States or OECD. As shown in figure 5, in emerging markets and in oil exporters leverage is slightly lower and decreasing over time, especially for the oil exporters. Figure 6 shows that large (defined as banks with assets more than one billion), listed, and commercial banks have higher but very stable leverage patterns compared to investment banks who increased their leverage by more than 5 percentage points starting in 2005. A smaller increase is observed for banks with largest owner being foreign.

Next, we plot off-balance sheet items which may be consider an alternative channel of leverage. Off-balance sheet items are defined as obligations that are contingent liabilities of a bank, thus do not appear on its balance sheet, in general, off-balance sheet items include the following: direct credit subsidies in which a bank substitutes its own credit for a third party (including standby letters of credit), irrevocable letters of credit that guarantee repayment of commercial paper of tax exempt securities, risk participation in bankers acceptances, sale and repurchase agreements, and asset sales with recourse against the sell, interest rate swaps, interest rate options and currency options, and so on. We plot the log of this ratio given the extreme outliers. This ratio shows an increase over time of more than 50 percent for all country groups as shown in figure 7 and, in the case of the United States (figure 8), it shows an almost doubling. For emerging markets and oil exporters the increase is not that visible but the average level over time is higher (figure 9). When we investigate across different bank types in figure 10 we do not see stark differences. It appears that banks of all types were taking risk via the off balance sheet vehicles. A sharp de-leveraging in 2008 is visible for listed and investment banks.

Next, we regress leverage on profitability, tangibility of assets (collateral), log size (measured as sales for firms and as assets for banks), and percent foreign ownership. Table 5, displaying firm-level results for all countries, finds a robustly (t-statistics of 100!) negative coefficient to profits and a positive coefficient to size (sales)—both in agreement with RZ—a negative coefficient to tangibility which is different from what RZ found, and a negative effect of foreign ownership. The effect of tangibility is less strong when firm-fixed effects are included while the effect of size is stronger, implying that growing firms are more leveraged, and the effect of profitability pretty much unchanged. The results are not sensitive to the leverage measure used. The results are, in general, robust to the choice of leverage measure as can be seen from comparing the first four columns with the last four columns.

Table 6 displays results for the EU and US subsamples. The effect of profitability is stronger in the EU while the effect of size is much stronger in the United States. The latter results is, however, entirely driven by differences between firm size isn't important in the United States when

firm fixed effects are included. Tangibility of assets has a negative effect in the EU while tangibility is estimated to have a strongly significant positive effect in the United States. Table 7 displays a large number of coefficients from one richly specified regression: the first column shows in the top row the coefficient to profitability, with the interpretation being the size of the coefficient in 1998, and in the following rows the coefficient to an interaction of profitability with a year dummy—the interpretation of these rows is that they capture the difference between the impact of profitability in the given year and the impact of profitability in the base year 1998. A clear trend can be seen in the coefficients with the negative impact of profitability growing numerically stronger almost year-for-year. The second column shows the impact of collateral from the same regression: the effect of collateral on leverage is negative in 1998 but the trend for this variable is towards a weakening of the effect and the coefficient in the last row is close to that in the first row with an opposite sign which implies that collateral was not important for leverage at the end of our sample. The impact of size is significantly larger at the end of the sample, but the coefficients outside the first row are not large and do not reveal any systematic trend.

Turning to banks in Table 8, we confirm the results of Gropp and Heider (2009) that profits has a strong negative influence on leverage while size has a positive impact. Similarly to GH, we find strongly significant impact of tangibility of assets. The effect of these variables are all very precisely estimated and the results are robust to the inclusion of bank- or country-fixed effects. This is one difference than GH since they find that bank fixed effects wipe out all the explanatory power of the RHS variables. The role of foreign ownership is previously unexplored but we find a clear negative relation between foreign ownership and leverage (due to data availability, we are limited to average foreign ownership and we are therefore not able to include this variable in regressions with bank-fixed effects).

Table 9 repeats the analysis of Table 8 for banks in the EU (four left-most columns) and banks in the United States (right-most three columns). There are some interesting differences between these groups. The effect of profitability is robustly negative but the magnitudes are much larger for the EU. The impact of collateral and size is similar for the EU and the United States but the negative effect of foreign ownership is much larger for the United States than for the EU, where the coefficient is not significant.

In Table 10, we consider the time patterns in the estimated coefficients. The numbers in the table are estimated in one richly parameterized regression with the first row showing the benchmark value (interpreted as the 1998 value) and the other rows showing the interactions for other years, interpreted as capturing the difference between the year and 1998. For profitability, the numerical

size of the negative coefficient declined dramatically from 1998 to 1999 and then slowly reverted back to the 1998 level and the impact of profitability remained at the 1998 level for the years 2002-2007. However, in 2008, with the onset of the subprime crisis, the negative impact of profitability became much stronger. This pattern is consistent with banks worrying about funding and therefore using profits to lower leverage. The role of collateral is positive and staying insignificantly different from the 1998 level until 2006 but in 2007 and 2008 banks with better collateral had higher leverage. Finally, the role of size increased in 1999 and 2000, then reverted to the 1998 level until around 2003 when larger banks started to have less leverage.

Table 11 examines the time-trends in the estimated coefficients using the same specification as the previous table for EU and the United States, respectively. The left-most three columns show the result of a regression for the EU and it appears that collateral become less important for leverage starting in 2004 while profits and size showed little change over time. For the United States, the source of the sub-prime crises, profits became more important in 2007 and, in particular, 2008. This variable shows some unsystematic significant movements over time that are hard to explain. The role of collateral in the United States increased monotonically from 1998 to 2007 and this pattern must be independent of the crises; however in 2008 the role of collateral for leverage declined compared to the previous two years. The role of size remained quite stable over time but showed some decline at the end of our sample.

4 Next

So far we have provided a general overview using large non-financial firms from Europe and U.S. and all size banks from many countries. We are planning to undertake the following analysis next:

1. Additional data: 2009; more countries; medium size firms (definition: assets bigger than 2.5 million USD and employment bigger than 15).
2. Do a full-fledged diff-in-diff analysis using post-Lehman as the treatment. Specifically:
 - Do firms and banks with more collateral de-leverage quicker?
 - What about listed firms/banks and foreign owned firms/banks?
3. Do these effects differ across countries? If so are the differences related to the regulatory structures?

Figure 1: Median Firm Leverage: Country Groups

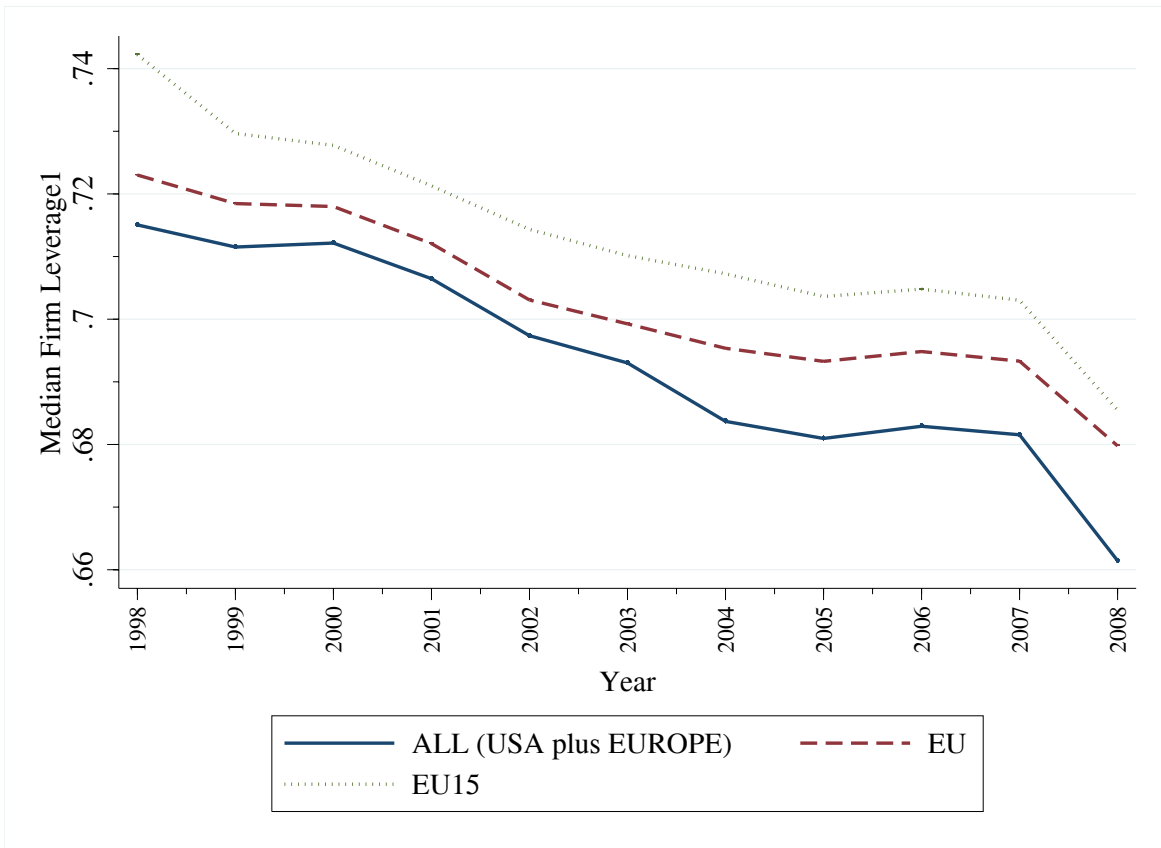


Figure 2: Median Firm Leverage: U.S.

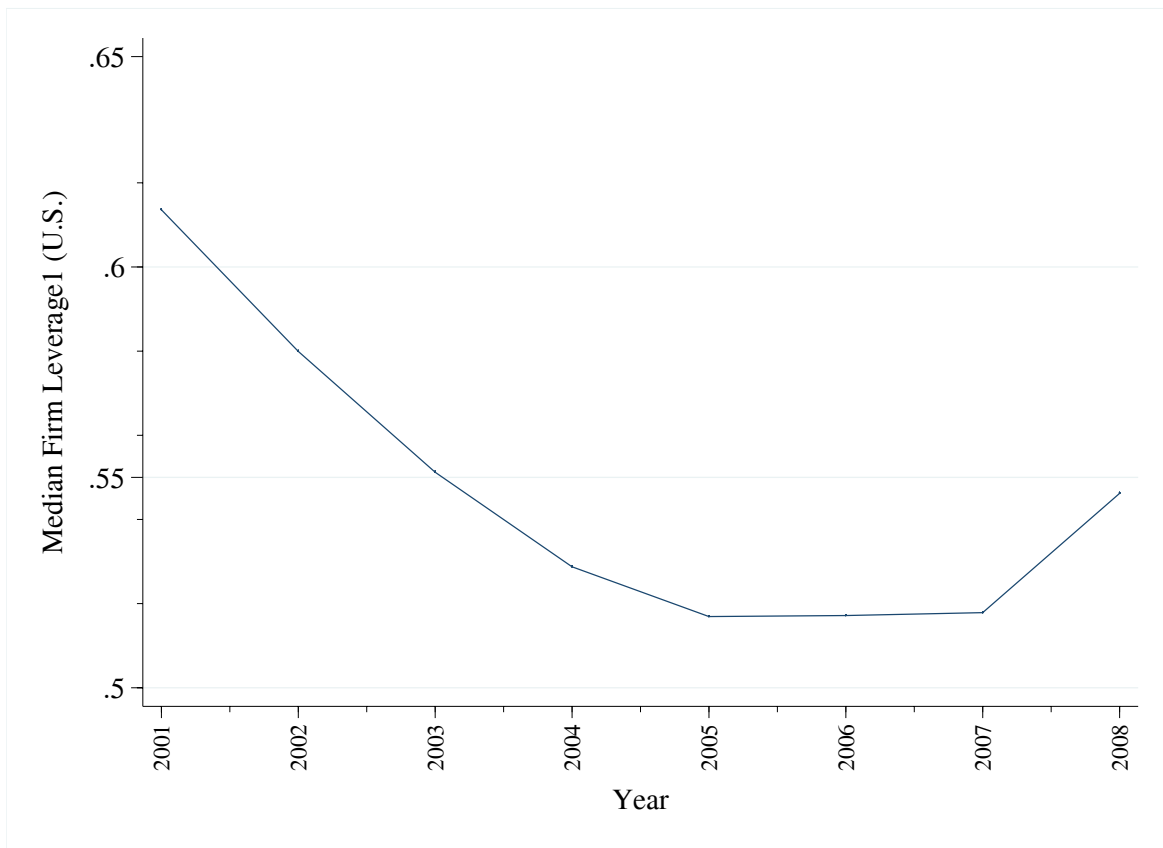


Figure 3: Median Firm Leverage: Firm Groups

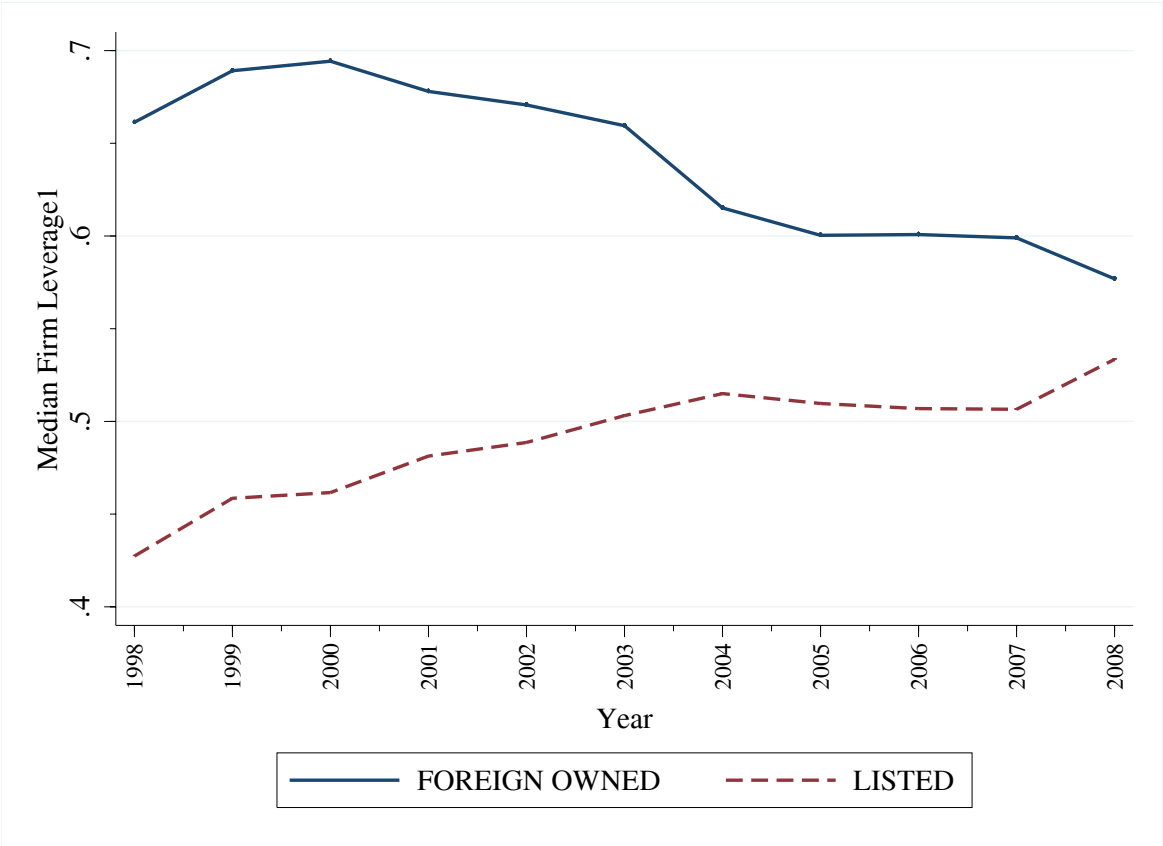


Figure 4: Median Bank Leverage: Developed Countries



Figure 5: Median Bank Leverage: Emerging Markets and Oil Exporters

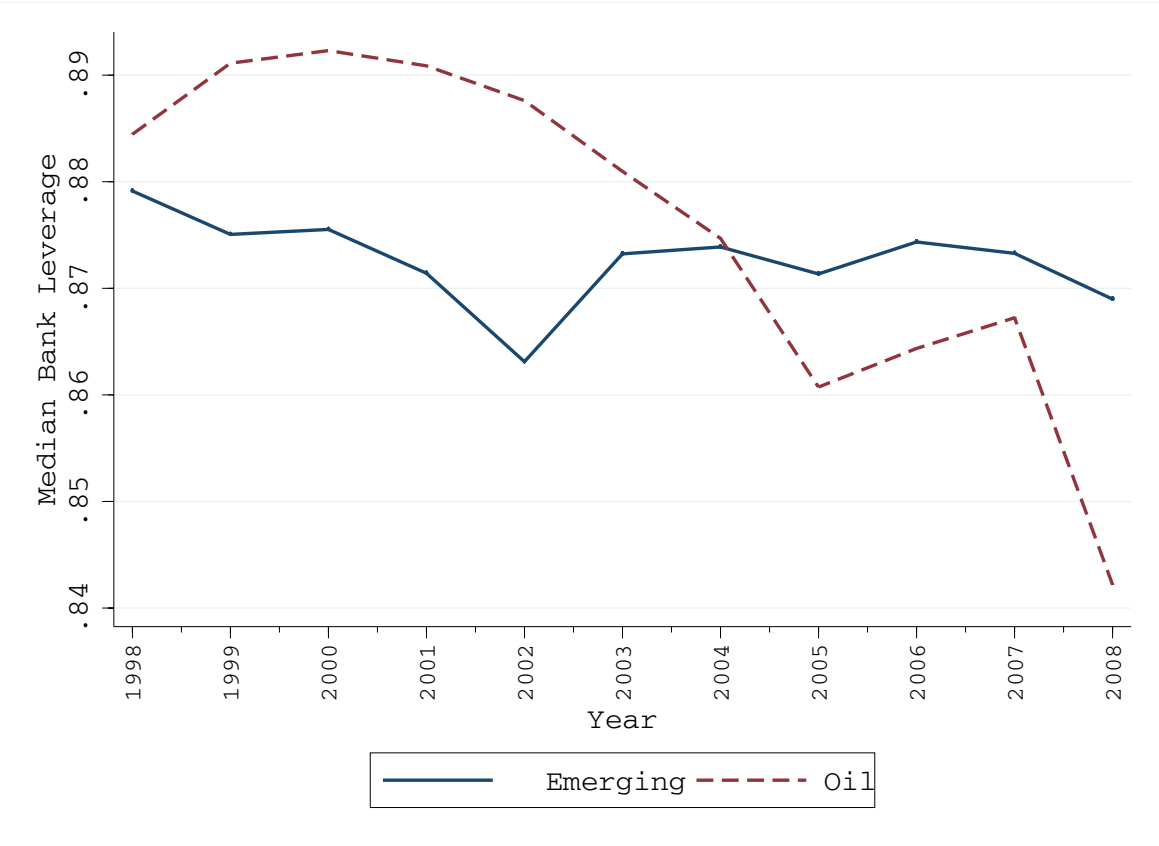


Figure 6: Median Bank Leverage: Bank Types

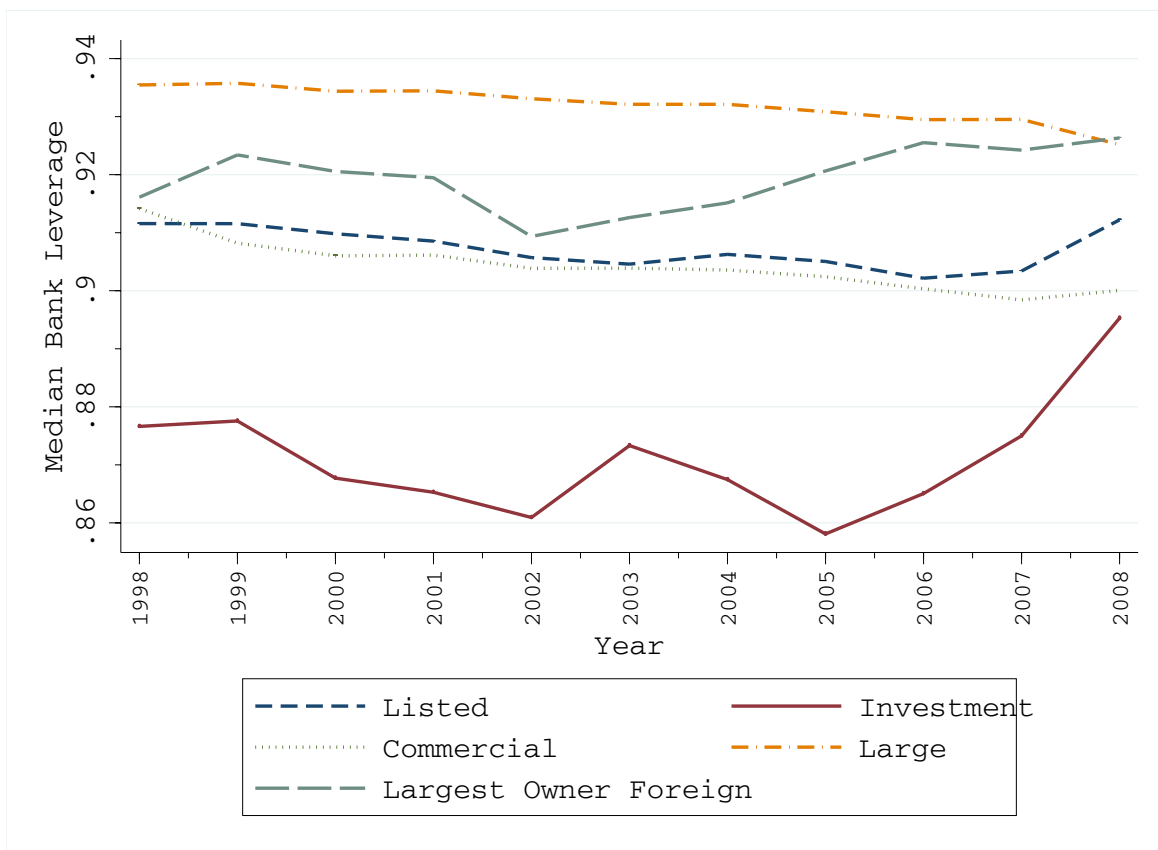


Figure 7: Median Bank Off Balance Sheet/Assets: Developed Countries



Figure 8: Median Bank Off Balance Sheet/Assets: US

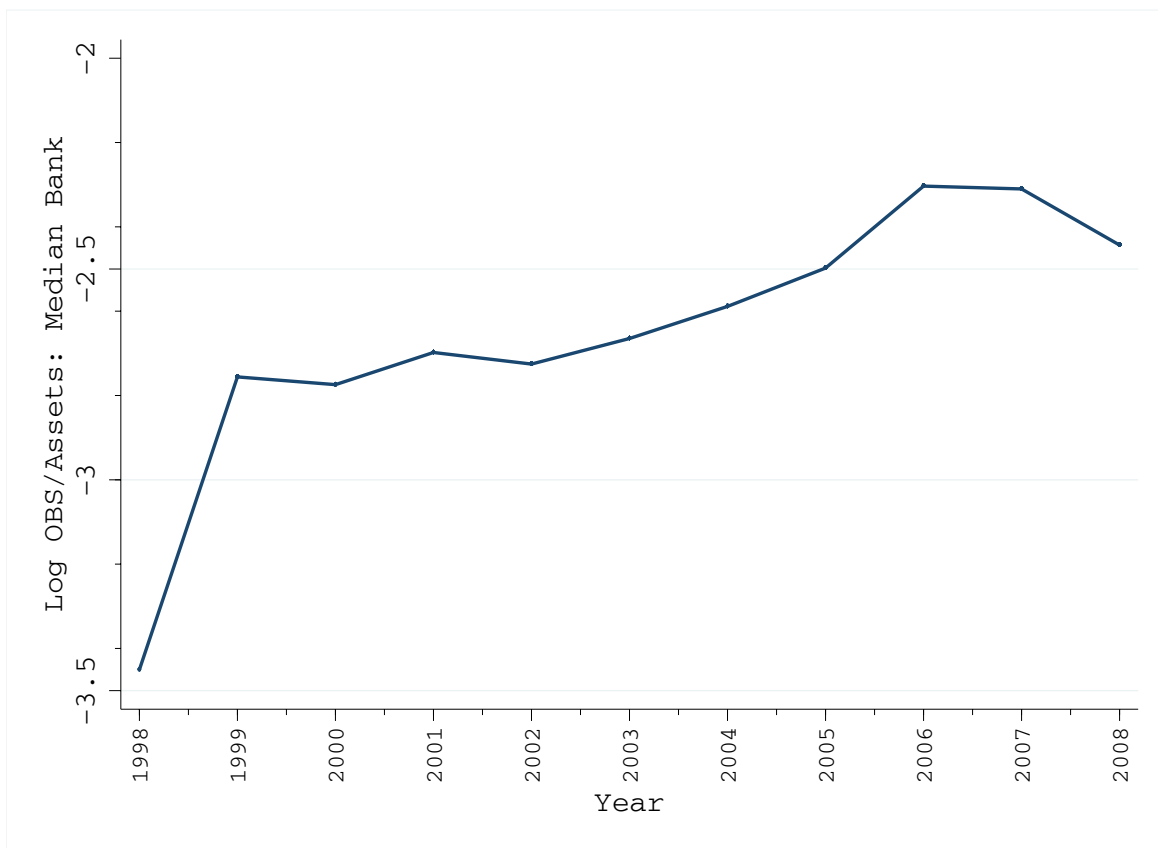


Figure 9: Median Bank Off Balance Sheet/Assets: Emerging and Oil

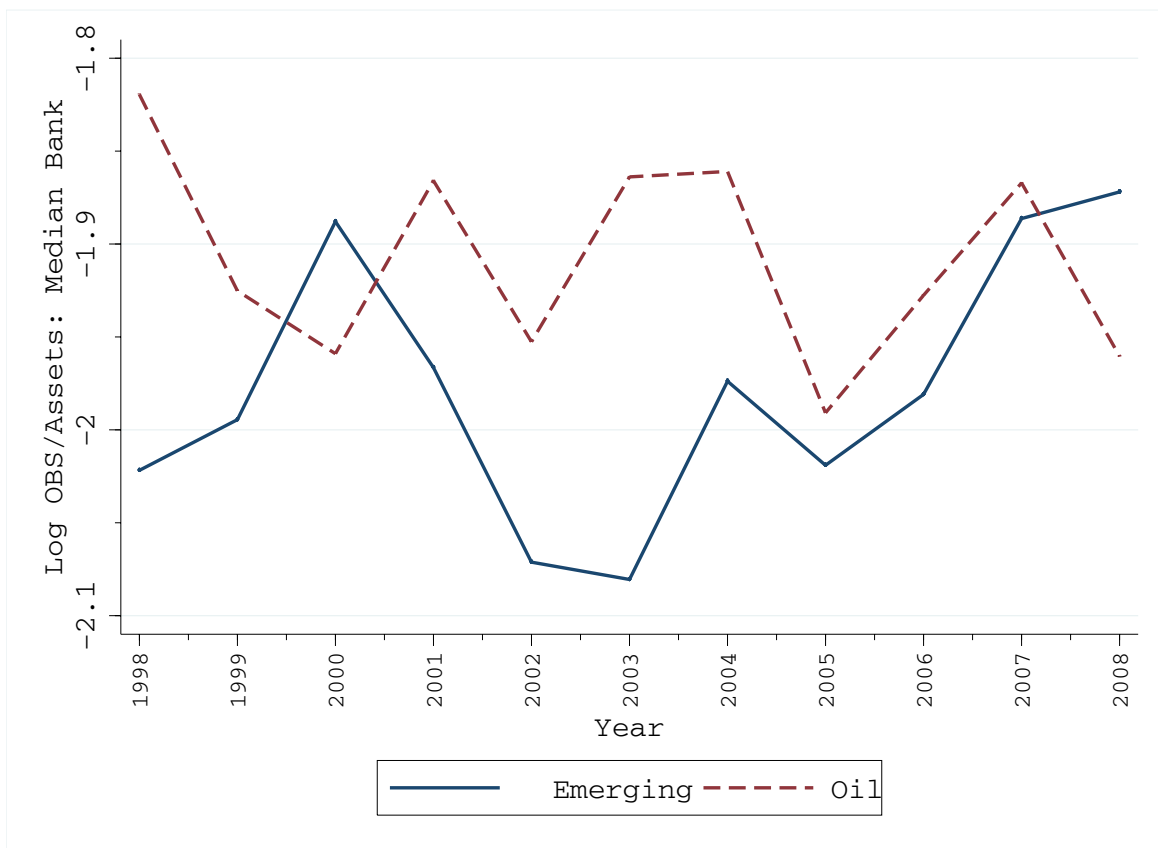


Figure 10: Median Bank Off Balance Sheet/Assets: Bank Types

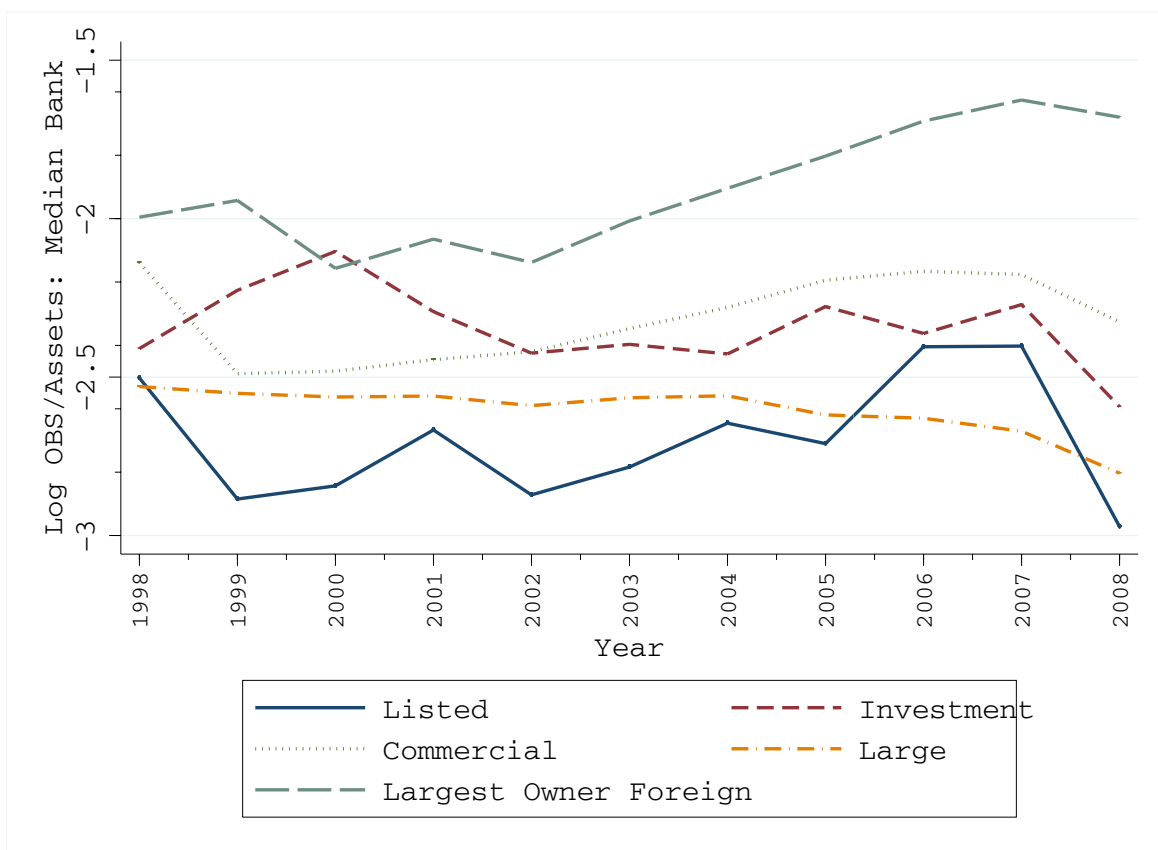


Table 1: Unique Firms Across Countries: 1998–2008 (LARGE FIRMS ONLY)

Country	Firm-Year Obs.	Firm Obs.
AUSTRIA	2519	953
BELGIUM	8606	973
BULGARIA	1102	148
CROATIA	1859	208
CZECH REPUBLIC	773	119
DENMARK	1813	410
ESTONIA	238	28
FINLAND	7113	786
FRANCE	84817	9989
GERMANY	24565	6639
GREECE	8469	926
HUNGARY	5815	662
ICELAND	79	11
IRELAND	108	21
ITALY	63878	7198
LATVIA	472	53
LITHUANIA	634	95
LUXEMBOURG	211	34
MACEDONIA	22	5
MALTA	16	4
MOLDOVA REPUBLIC	135	28
MONTENEGRO	24	5
NETHERLANDS	258	51
NORWAY	2288	270
POLAND	11290	1461
PORTUGAL	4618	536
ROMANIA	523	134
RUSSIAN FEDERATION	3780	464
SERBIA	1226	153
SLOVAKIA	198	37
SLOVENIA	2217	345
SPAIN	48040	5401
SWEDEN	2100	240
SWITZERLAND	17	3
UKRAINE	2101	241
UNITED KINGDOM	2550	407
UNITED STATES OF AMERICA	19707	2632

Table 2: Unique Banks Across Countries: 1998–2008

Country	Bank-Year Obs.	Bank Obs.	COUNTRY	Bank-Year Obs.	Bank Obs.
AFGHANISTAN	14	5	LAOS	16	5
ALBANIA	83	18	LATVIA	318	41
ALGERIA	106	17	LEBANON	459	77
ANGOLA	82	15	LESOTHO	34	5
ARGENTINA	1167	167	LIBERIA	9	3
ARMENIA	129	28	LIBYAN ARAB JAMAHIRIYA	61	12
AUSTRALIA	1148	270	LITHUANIA	174	23
AUSTRIA	2679	402	LUXEMBOURG	1305	205
AZERBAIJAN	162	30	MACEDONIA (FYROM)	151	27
BAHRAIN	331	59	MADAGASCAR	54	6
BANGLADESH	367	44	MALAWI	125	20
BELARUS	182	43	MALAYSIA	1234	199
BELGIUM	1120	199	MALI	23	5
BENIN	52	9	MAURITIUS	156	27
BHUTAN	19	2	MEXICO	673	125
BOLIVIA	146	18	MOLDOVA REP. OF	145	29
BOSNIA-HERZEGOVINA	235	41	MONACO	139	22
BOTSWANA	121	20	MONGOLIA	57	9
BRAZIL	1883	323	MONTENEGRO	53	13
BULGARIA	296	44	MOROCCO	204	36
BURKINA FASO	65	10	MOZAMBIQUE	94	16
BURUNDI	52	9	MYANMAR UNION OF	73	12
CAMBODIA	77	17	NAMIBIA	128	30
CAMEROON	88	14	NEPAL	131	21
CANADA	818	129	NETHERLANDS	1108	230
CENTRAL AFRICAN REPUBLIC	8	1	NEW ZEALAND	243	55
CHAD	20	3	NICARAGUA	117	25
CHILE	448	86	NIGER	33	5
CHINA-PEOPLE'S REP.	905	204	NIGERIA	694	122
COLOMBIA	412	75	NORWAY	1342	264
CONGO REP. OF	3	2	OMAN	133	18
CONGO, DEMOCRATIC REP. OF	47	10	PAKISTAN	491	78
COSTA RICA	817	139	PARAGUAY	205	43
CROATIA	423	75	PERU	338	63
CYPRUS	263	50	PHILIPPINES	618	155
CZECH REPUBLIC	378	69	POLAND	589	125
DENMARK	1548	215	PORTUGAL	652	148
DJIBOUTI	15	2	QATAR	96	15
DOMINICAN REPUBLIC	386	61	ROMANIA	345	62
ECUADOR	353	71	RUSSIAN FEDERATION	4792	1312
EGYPT	392	48	RWANDA	50	8
EL SALVADOR	249	38	SAUDI ARABIA	174	24
EQUATORIAL GUINEA, REP. OF	4	1	SENEGAL	88	13
ERITREA	15	3	SERBIA	313	67
ESTONIA	123	18	SEYCHELLES	34	6
ETHIOPIA	104	14	SIERRA LEONE	52	10
FINLAND	305	65	SINGAPORE	624	176
FRANCE	5640	965	SLOVAKIA	246	41
GABON	50	7	SLOVENIA	268	50
GAMBIA	35	7	SOUTH AFRICA	779	179
GEORGIA REP. OF	114	24	SPAIN	2565	590
GERMANY	19000	2744	SRI LANKA	264	36
GHANA	295	47	SUDAN	141	24
GREECE	393	91	SURINAME	40	4
GUATEMALA	361	55	SWAZILAND	63	8
GUINEA	11	3	SWEDEN	1254	205
GUYANA	30	3	SWITZERLAND	5256	741
HONDURAS	249	44	SYRIA	37	13
HONG KONG	1336	306	TAIWAN	1127	171
HUNGARY	470	78	TAJIKISTAN	18	6
ICELAND	243	73	TANZANIA	241	58
INDIA	1156	159	THAILAND	577	85
INDONESIA	667	104	TOGO	49	10
IRAN	158	19	TUNISIA	400	54
IRAQ	42	12	TURKEY	867	255
IRELAND	778	164	TURKMENISTAN	9	1
ISRAEL	271	37	UGANDA	189	25
ITALY	8716	1852	UKRAINE	519	109
IVORY COAST	114	21	UNITED ARAB EMIRATES	305	43
JAMAICA	237	51	UNITED KINGDOM	5415	1028
JAPAN	9469	1231	URUGUAY	421	93
JORDAN	185	22	USA	109270	13508
KAZAKHSTAN	268	51	UZBEKISTAN	118	26
KENYA	546	82	VENEZUELA	564	94
KIRIBATI	1	1	VIETNAM	223	46
KOREA REP. OF	635	113	YEMEN	104	15
KUWAIT	254	40	ZAMBIA	172	28
KYRGYZSTAN	47	13	ZIMBABWE	329	95

Table 3: Descriptive Statistics of Firms (All Countries): 1998–2008

Panel A: Leverage Variables										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Leverage1	301119	0,66	0,692	0,22	-0,372	3,047	0,048	1,763	0,517	0,826
Leverage2	291354	0,688	0,641	0,44	0,419	2,317	0	2,162	0,315	1,012
Leverage3	291354	0,623	0,675	0,275	-0,317	4,67	-1,736	2,793	0,429	0,837
Panel B: RHS Variables										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Profitability1	292436	0,105	0,091	0,101	0,976	13,178	-0,622	1,429	0,051	0,149
Profitability2	290069	0,075	0,066	0,085	-0,388	12,411	-0,76	0,623	0,033	0,112
Collateral1	304880	0,352	0,31	0,233	0,615	2,507	0,005	0,973	0,16	0,508
Collateral2	304722	0,233	0,172	0,208	1,224	3,969	0,001	0,955	0,07	0,336
Size	292024	17,612	17,359	1,263	1,11	5,067	13,669	23,8	16,779	18,208
Foreign Ownership	297537	0,171	0	0,841	4,829	24,621	0	4,615	0	0
Panel C: Winsorized Variables										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Leverage1	301119	0,664	0,692	0,186	-0,346	1,889	0,344	0,913	0,517	0,826
Leverage2	291354	0,675	0,641	0,396	0,2	1,754	0,131	1,315	0,315	1,012
Leverage3	291354	0,625	0,675	0,239	-0,426	1,858	0,214	0,923	0,429	0,837
Profitability1	292436	0,103	0,091	0,065	0,446	2,074	0,016	0,22	0,051	0,149
Profitability2	290069	0,075	0,066	0,051	0,455	2,048	0,008	0,168	0,033	0,112
Collateral1	304880	0,344	0,31	0,207	0,385	1,887	0,077	0,704	0,16	0,508
Collateral2	304722	0,219	0,172	0,17	0,67	2,176	0,027	0,542	0,07	0,336
Size	292024	17,552	17,359	0,935	0,523	2,109	16,348	19,279	16,779	18,208

Notes: Leverage1 is measured as Total Liabilities over Total Assets. Leverage2 is measured as Total Debt over Total Assets. Leverage3 is measured as Total Debt over Total Debt plus Shareholders Funds. Profitability1 is calculated as EBITDA over Total Assets; Collateral1 is calculated as Total Fixed assets over Total Assets. Size is Logarithm of Net Sales where Net Sales is in PPP Dollar units. Foreign Ownership is calculated as $\ln(1+FO)$ where FO is percent stakes owned by foreigners. Alternative measures of profitability (Profitability2) and collateral (Collateral2) are calculated as Cash Flow over Total Assets and Tangible Fixed Assets over Total Assets, respectively. The variables shown in Panel C are winsorized at fraction 0.1 of both tails.

Table 4: Descriptive Statistics of Banks by (All Countries): 1998–2008

Panel A: Leverage										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Leverage	219658	0.872	0.908	0.141	-3.817	19.530	0.001	1.474	0.873	0.931
OffBSheet	209615	0.428	0.055	24.701	212.521	56335.751	-0.885	7321.878	0.009	0.128
LogOffBSheet	179315	-2.900	-2.649	1.582	-0.709	5.572	-13.853	8.899	-3.611	-1.933
Panel B: RHS										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Profitability	218352	0.010	0.008	0.029	0.252	68.939	-0.490	0.414	0.003	0.013
Collateral	219593	0.906	0.928	0.099	-4.448	29.974	0.004	1	0.896	0.953
Size	219712	19.909	19.540	2.145	0.759	3.530	14.177	27.996	18.388	21.096
FO	12128	0.912	0	1.666	1.466	3.369	0	4.615	0	0.691
Panel C: Winsorized										
	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Min	Max	p25	p75
Leverage	219658	0.895	0.908	0.050	-0.916	2.864	0.789	0.955	0.873	0.931
Profitability	218352	0.009	0.008	0.007	0.505	2.216	0.000	0.022	0.003	0.013
Collateral	219593	0.920	0.928	0.042	-0.730	2.512	0.834	0.971	0.896	0.953
Size	219712	19.841	19.540	1.746	0.440	2.046	17.526	22.988	18.388	21.096

Notes: Leverage is calculated as $(1 - (\text{book value of equity} / \text{book value of assets}))$. Profitability is measured as Net income over Book value of Total Assets. Collateral is measured as Earning Assets over Book value of Total Assets. Size is the logarithm of size (book value of assets in PPP Dollar units). FO is calculated as $\ln(1 + \text{FO})$ where FO is percent stakes owned by foreigners. OffBSheet are off balance-sheet items such as credit lines and guarantees. The variables shown in Panel C are winsorized at fraction 0.1 of both tails.

Table 5: Firm-Level Determinants of Leverage (All Countries): 1998–2008

Leverage Measure	Lev1 (1)	Lev1 (2)	Lev1 (3)	Lev1 (4)	Lev3 (5)	Lev3 (6)	Lev3 (7)	Lev3 (8)
Profitability	-1.408*** (-107.52)	-1.356*** (-105.23)	-0.800*** (-96.62)	-0.808*** (-95.62)	-1.469*** (-87.58)	-1.362*** (-84.56)	-0.796*** (-81.72)	-0.811*** (-81.73)
Collateral	-0.158*** (-32.09)	-0.098*** (-19.68)	-0.016*** (-2.76)	-0.019*** (-3.19)	-0.333*** (-52.36)	-0.241*** (-37.54)	-0.043*** (-6.43)	-0.046*** (-6.87)
Size	0.002* (1.77)	0.006*** (6.65)	0.031*** (21.87)	0.032*** (22.37)	-0.019*** (-16.76)	-0.001 (-0.74)	0.040*** (23.45)	0.041*** (23.98)
Foreign Ownership				-0.001** (-2.18)				-0.001*** (-3.49)
Constant	0.807*** (54.48)	0.708*** (46.95)	0.217*** (8.90)	0.205*** (8.35)	1.195*** (61.53)	0.823*** (43.61)	0.034 (1.15)	0.021 (0.70)
Country fixed effects	no	yes	no	no	no	yes	no	no
Firm fixed effects	no	no	yes	yes	no	no	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R sq.	0.194	0.242	0.117	0.120	0.202	0.312	0.091	0.095
F	1215.3	976.2	776.9	709.1	1437.7	858.4	591.6	551.6
N	279610	279610	279610	271645	274530	274530	274530	266651

Notes: Profitability calculated as Cash Flow over Total Assets; Collateral calculated as Tangible Fixed assets over Total Assets. Size is Logarithm of Net Sales where Net Sales is in PPP Dollar units. Foreign Ownership is calculated as $\ln(1+FO)$ where FO is percent stakes owned by foreigners. Lev1 is leverage measured as Total Liabilities over Total Assets. Lev3 is leverage measured as Total Debt over Total Debt plus Shareholders Funds. We have also used another leverage measure, total debt over total assets obtaining similar results. Our alternative measures of tangibility (EBITDA/assets) and profitability (EBITDA/assets) also give us similar results. Standard errors are clustered by firm. t-statistics in parenthesis.

Table 6: Firm-Level Determinants of Leverage (EU and US): 1998–2008

Leverage Measure	Lev1	Lev1	Lev1	Lev1	Lev1	Lev1	Lev1	Lev1
Countries	EU	EU	EU	EU	US	US	US	US
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Profitability	-1.460*** (-109.58)	-1.388*** (-104.15)	-0.814*** (-95.37)	-0.814*** (-95.36)	-1.089*** (-19.59)	-1.089*** (-19.59)	-0.576*** (-15.20)	-0.444*** (-3.40)
Collateral	-0.151*** (-29.96)	-0.108*** (-21.04)	-0.011* (-1.89)	-0.011* (-1.90)	0.261*** (12.68)	0.261*** (12.68)	0.188*** (4.18)	0.448*** (3.67)
Size	0.005*** (5.48)	0.004*** (4.09)	0.032*** (22.39)	0.032*** (22.39)	0.038*** (9.50)	0.038*** (9.50)	-0.012 (-1.21)	0.011 (0.42)
Foreign Ownership				-0.001** (-2.57)				-0.000 (-0.02)
Constant	0.753*** (48.64)	0.756*** (48.94)	0.204*** (8.22)	0.204*** (8.21)	-0.080 (-1.09)	-0.080 (-1.09)	0.767*** (4.28)	0.279 (0.56)
Country fixed effects	no	yes	no	no	no	yes	no	no
Firm fixed effects	no	no	yes	yes	no	no	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R sq.	0.207	0.235	0.124	0.124	0.137	0.137	0.076	0.110
F	1192.4	971.7	767.8	713.2	67.5	67.5	38.6	7.4
N	264394	264394	264394	264394	10112	10112	10112	2147

Notes: Profitability calculated as Cash Flow over Total Assets; Collateral calculated as Tangible Fixed assets over Total Assets. Size is Logarithm of Net Sales where Net Sales is in PPP Dollar units. Foreign Ownership is calculated as $\ln(1+FO)$ where FO is percent stakes owned by foreigners. Lev1 is leverage measured as Total Liabilities over Total Assets. Standard errors are clustered by firm. t-statistics in parenthesis.

Table 7: Time Varying Determinants of Firm Leverage (All Countries): 1998–2008

Dependent Variable: Leverage1	Profitability	Collateral	Size
1998 (reference year)	-0.495*** (-20.99)	-0.093*** (-10.34)	0.029*** (16.24)
1999	-0.060*** (-2.72)	0.025*** (4.02)	0.001 (1.36)
2000	-0.104*** (-4.46)	0.034*** (4.93)	0.004*** (3.63)
2001	-0.184*** (-7.64)	0.048*** (6.56)	0.005*** (3.98)
2002	-0.217*** (-8.92)	0.061*** (8.07)	0.006*** (4.94)
2003	-0.274*** (-11.16)	0.076*** (9.82)	0.007*** (5.14)
2004	-0.344*** (-13.94)	0.085*** (10.92)	0.007*** (5.05)
2005	-0.427*** (-17.04)	0.091*** (11.37)	0.006*** (4.06)
2006	-0.506*** (-19.78)	0.097*** (12.03)	0.004*** (3.20)
2007	-0.593*** (-22.69)	0.103*** (12.34)	0.005*** (3.36)
2008	-0.599*** (-18.53)	0.108*** (10.72)	0.007*** (4.23)
Adj. R sq.	0.134		
N	271645		

Notes: The table shows the results of a regression of leverage on profitability, collateral, size, where all these variables are interacted with year dummies. The first column shows the coefficients to profitability*year dummies, where each interpreted as the difference in the coefficient to profitability in the current year and in the previous year, etc. Standard errors are clustered by firm. t-statistics in parenthesis.

Table 8: Determinants of Bank Leverage (All Countries)

Profitability	-2.442*** (-72.00)	-2.408*** (-36.83)	-2.237*** (-35.03)	-0.733*** (-32.21)
Collateral	0.204*** (36.77)	0.173*** (16.39)	0.198*** (16.99)	0.134*** (24.21)
Size	0.009*** (68.73)	0.011*** (38.39)	0.013*** (42.87)	0.021*** (43.35)
Foreign Ownership (FO)	.	-0.003*** (-9.79)	-0.002*** (-5.22)	.
Country fixed effects	no	no	yes	n/a
Bank fixed effects	no	no	no	yes
Year fixed effects	yes	yes	yes	yes
Adj. R sq.	0.282	0.331	0.425	0.858
F	1496.9	393.5	1024.4	1260.7
N	218189	53024	53024	218189

Notes: Bank leverage is $(1 - (\text{book value of equity} / \text{book value of assets}))$; profitability is $(\text{net income} / \text{book value of assets})$, collateral $(\text{earning assets} / \text{book value of assets})$; size is the logarithm of size (book value of assets); foreign ownership is logarithm of $1 + \text{foreign ownership}$ ("FO") (in percent) averaged across time for each bank. Standard errors are clustered by bank. t-statistics in parenthesis.

Table 9: Determinants of Bank Leverage (EU/US)

	EU countries				US		
Prof	-4.307*** (-64.94)	-3.158*** (-22.99)	-3.057*** (-23.14)	-1.086*** (-22.08)	-0.617*** (-11.83)	-1.050*** (-8.38)	-0.283*** (-9.34)
Coll	0.197*** (18.09)	0.158*** (7.78)	0.134*** (6.06)	0.046*** (4.31)	0.107*** (10.30)	0.312*** (14.03)	0.223*** (26.20)
Size	0.011*** (44.56)	0.015*** (24.78)	0.016*** (25.43)	0.026*** (24.81)	0.008*** (36.41)	0.007*** (16.42)	0.015*** (23.84)
FO	.	-0.000 (-1.01)	-0.001* (-1.77)	.	.	-0.004*** (-3.34)	.
Ctry fe	no	no	yes	n/a	n/a	n/a	n/a
Bank fe	no	no	no	yes	no	no	yes
Year fe	yes	yes	yes	yes	yes	yes	yes
R sq.	0.451	0.438	0.467	0.909	0.092	0.183	0.776
F	864.2	191.7	565.6	410.6	197.8	50.2	515.1
N	55412	13174	13174	55412	108588	20741	108588

Notes: Bank leverage is $(1 - (\text{book value of equity} / \text{book value of assets}))$; profitability is $(\text{net income} / \text{book value of assets})$, collateral $(\text{earning assets} / \text{book value of assets})$; size is the logarithm of size (book value of assets); foreign ownership is logarithm of $1 + \text{foreign ownership}$ ("FO") (in percent) averaged across time for each bank. Standard errors are clustered by bank. t-statistics in parenthesis.

Table 10: Time-Varying Determinants of Bank Leverage (All Countries)

	Profitability	Collateral	Size
1998 (reference year)	-0.753*** (-9.10)	0.125*** (-16.56)	0.027*** (76.68)
1999	0.384*** (7.61)	0.005 (0.69)	0.001*** (3.64)
2000	0.295*** (5.94)	-0.000 (-0.06)	0.001*** (5.95)
2001	0.136*** (2.79)	-0.005 (-0.70)	0.000 (0.54)
2002	0.008 (0.16)	0.003 (0.41)	-0.000 (-1.28)
2003	-0.037 (-0.75)	0.002 (0.24)	-0.000** (-2.55)
2004	-0.022 (-0.45)	-0.001 (-0.18)	-0.001*** (-3.63)
2005	0.028 (0.56)	0.000 (0.05)	-0.001*** (-5.17)
2006	0.040 (0.80)	0.009 (1.15)	-0.001*** (-5.63)
2007	-0.038 (-0.73)	0.020** (2.35)	-0.001*** (-7.11)
2008	-0.453*** (-8.02)	0.024** (2.57)	-0.002*** (-10.84)
Adj. R sq.		0.864	
F		295.2	
N		218189	

Notes: The table shows the results of a regression of leverage on profitability, collateral, size, where all these variables are interacted with year dummies. The first column shows the coefficients to profitability*year dummies, where each interpreted as the difference in the coefficient to profitability in the current year and in the previous year, etc. Standard errors are clustered by bank. t-statistics in parenthesis.

Table 11: Time-Varying Determinants of Bank Leverage (EU/US)

	EU countries			US		
	Profit	Collateral	Size	Profit	Collateral	Size
1998 (reference year)	-1.017*** (-14.55)	0.076*** (5.86)	0.030*** (45.70)	-0.138 (-0.79)	0.119*** (5.30)	0.022*** (29.58)
1999	-0.037 (-0.47)	-0.007 (-0.46)	0.001*** (2.71)	0.484*** (2.70)	0.053** (2.28)	0.002*** (4.04)
2000	0.042 (0.55)	-0.007 (-0.47)	0.001*** (4.82)	0.258 (1.45)	0.060*** (2.60)	0.002*** (4.09)
2001	0.041 (0.53)	-0.016 (-1.10)	0.001*** (2.85)	-0.114 (-0.65)	0.061*** (2.72)	0.001 (1.23)
2002	0.002 (0.02)	-0.014 (-0.99)	0.000 (1.13)	-0.306* (-1.74)	0.065*** (2.88)	-0.000 (-0.18)
2003	-0.020 (-0.25)	-0.023 (-1.52)	-0.000 (-0.32)	-0.280 (-1.60)	0.092*** (4.06)	-0.001 (-1.45)
2004	-0.100 (-1.22)	-0.047*** (-3.24)	-0.000 (-1.16)	-0.208 (-1.18)	0.112*** (4.87)	-0.001* (-1.70)
2005	0.047 (0.61)	-0.052*** (-3.53)	0.000 (1.56)	-0.055 (-0.31)	0.109*** (4.73)	-0.001* (-1.85)
2006	0.067 (0.82)	-0.060*** (-3.84)	0.001*** (3.18)	-0.114 (-0.65)	0.136*** (5.87)	-0.001*** (-2.64)
2007	-0.027 (-0.30)	-0.059*** (-3.52)	0.001*** (3.35)	-0.349** (-1.97)	0.153*** (6.42)	-0.002*** (-3.30)
2008	-0.154 (-0.99)	-0.040* (-1.95)	0.001** (2.12)	-1.005*** (-5.66)	0.101*** (4.21)	-0.003*** (-4.44)
Adj. R sq.		0.915			0.790	
F		114.1			150.5	
N		55412			108588	

Notes: The table shows the results of a regression of leverage on profitability, collateral, size, where all these variables are interacted with year dummies. The first column shows the coefficients to profitability*year dummies, where each interpreted as the difference in the coefficient to profitability in the current year and in the previous year, etc. Standard errors are clustered by bank. t-statistics in parenthesis.