

Internet Appendix for
“Tracing the International Transmission of a Crisis
Through Multinational Firms”

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This Internet Appendix provides additional tables, figures, and analyses supporting the main text.

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Appendix I. Supplementary Figures and Tables

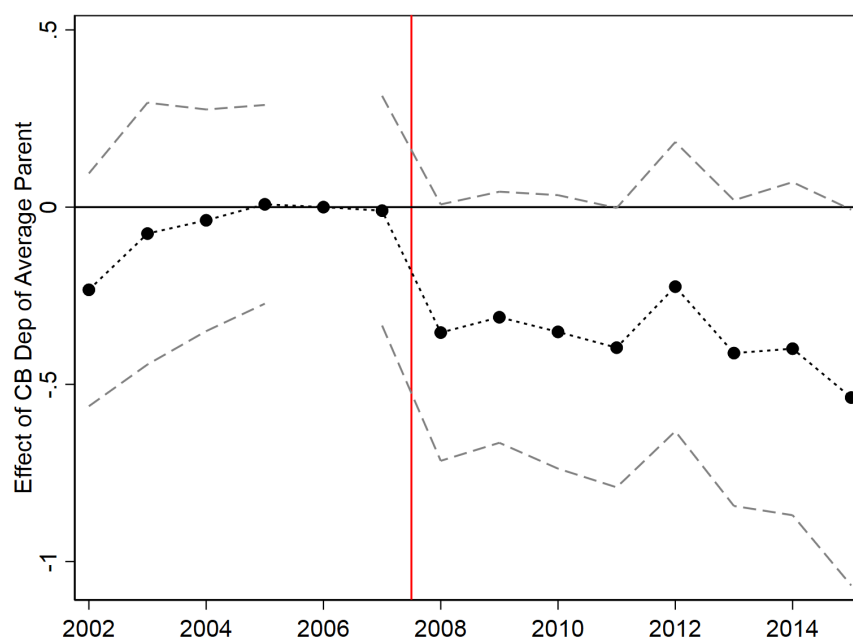


Figure IA.1. Impact of Commerzbank Dependence on Parent Bank Debt.

The figure plots coefficients on *Parent Commerzbank Dependence*, interacted with year fixed effects. The grey, dashed lines represent 90 percent confidence intervals. The coefficients are estimated in a single regression. The outcome is $\log(\text{Parent bank debt})$. The following time-invariant control variables are calculated for parents in the year 2006 and interacted with year fixed effects: industry fixed effects, fixed effects for deciles of total sales, fixed effects for deciles of leverage, and fixed effects for whether the parent had an affiliate in Asia, the EU, or the US. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. Standard errors are clustered at the parent level. Data source: Research Data and Service Centre of the Deutsche Bundesbank, Ustan 2002-2015, Orbis Historical Financials, own calculations.

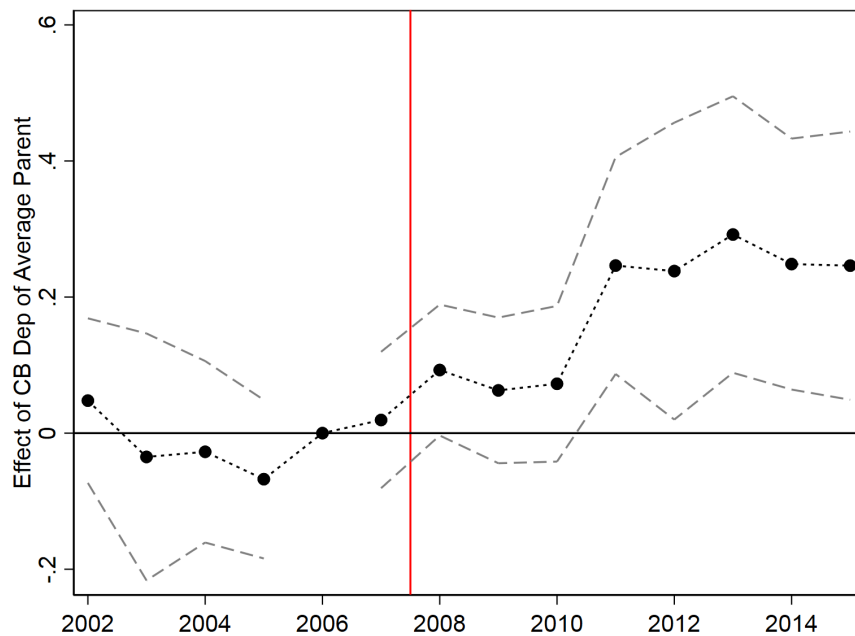


Figure IA.2. Impact of Commerzbank Dependence on Parent Trade Credit.

The figure plots coefficients on *Parent Commerzbank Dependence*, interacted with year fixed effects. The grey, dashed lines represent 90 percent confidence intervals. The coefficients are estimated in a single regression. The outcome is $\log(\text{Trade credit borrowed by a parent from external sources})$. The following time-invariant control variables are calculated for parents in the year 2006 and interacted with year fixed effects: industry fixed effects, fixed effects for deciles of total sales, fixed effects for deciles of leverage, and fixed effects for whether the parent had an affiliate in Asia, the EU, or the US. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. Standard errors are clustered at the parent level. Data source: Research Data and Service Centre of the Deutsche Bundesbank, Ustan 2002-2015, Orbis Historical Financials, own calculations.

Table IA.I. Insights about Commerzbank's Lending Cut from Financial Analyst Reports

This table summarizes insights from 110 financial analyst reports. Reports are included if they are available on the Thomson Reuters Investtext Database and contain information about at least one of the six questions listed in the table. We use all reports on Commerzbank/Dresdner Bank from the years 2008 and 2009 as well as all reports that are relevant to one of the six questions from years before and after. The full list of reports appears as the final table of this appendix.

We formulate six key questions that relate to the origin and nature of Commerzbank's lending cut. For each question, we count the number of reports that contain any information relating to a question (column "Number of relevant reports"). We then categorize the reports into three categories. Either a report offers a clear conclusion (columns "Answer yes" and "Answer no") or it discusses the question but offers no clear judgment ("Answer unclear").

For example, consider question 1 about whether the German loan portfolio contributed to Commerzbank's losses. 83 out of 110 reports discuss the origins of Commerzbank's lending cut. Not a single report mentions that developments in the loan portfolio of Commerzbank in Germany caused its losses and lending cut in 2008/09. Hence, all reports get counted as answering no. For questions 1, 3, and 5 there are no unclear answers because the questions simply count whether a report mentions a topic.

For questions 2 and 6, there can in principle be unclear answers due to the open nature of the questions. In practice, there are no unclear answers to question 2 because all reports take a clear stance on the risk of Commerzbank's loans. There are two unclear answers to question 6 because two reports mention that Commerzbank repaid government equity without stating whether this implies a full recovery.

The acquisition of Dresdner Bank by Commerzbank was announced in mid-2008 and completed in January 2009 (see Section III of the Internet Appendix). There are few relevant reports that analyze Dresdner Bank separately, so we provide information for the enlarged Commerzbank. Generally, when we refer to Commerzbank, this includes the old branches and divisions of Dresdner Bank.

Question	Number of relevant reports	Answer yes	Answer no	Answer unclear
1) Does the report mention that the German loan portfolio contributed to Commerzbank's losses from 2008 to 2009?	83	0	83	0
2) Was the loan portfolio to German firms and households riskier at Commerzbank than at other German banks from 2004 to 2007?	16	0	16	0
3) Does the report mention that the trading and lending divisions at Commerzbank cross-hedged risk from 2004 to 2009?	110	0	110	0
4) Does the report mention that exposure to US mortgage-related securities contributed to Commerzbank's losses from 2008 to 2009?	83	72	11	0
5) Does the report mention that exposure to Lehman brothers and the Icelandic banks contributed to Commerzbank's losses from 2008 to 2009?	83	8	75	0
6) Did Commerzbank stabilize after 2010?	10	8	0	2

Table IA.II. Parent Commerzbank Dependence and Parent Characteristics

The table reports estimates from an OLS regression. The outcome in column (1) is *Parent Commerzbank Dependence*. The regression includes fixed effects for parent industry. Standard errors are clustered at the level of the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Parent CB Dep (1)
log(Parent sales)	−0.0074 (0.0047)
log(Parent total assets)	0.0065 (0.0119)
Number of affiliates	0.0022 (0.0014)
log(Parent bank debt)	0.0043 (0.0031)
log(Parent trade credit)	−0.0022 (0.0106)
Parent leverage	−0.0070 (0.0577)
R^2	0.050
Number of firms	320
Observations	320
Industry FE	Yes

Table IA.III. Parent Summary Statistics by Bins of Commerzbank Dependence

The table shows means (standard deviations) for parents. Bank debt, sales, total assets, and trade credit are in thousand euro. Leverage is defined as liabilities divided by total assets. The number of parents in the bottom row refers to the number of parents in MiDi in 2006. All values are for 2006. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, Ustan 2002-2015, Orbis Historical Financials, own calculations.

	Range of parent Commerzbank dependence				
	0	0.01-0.25	0.26-0.50	0.51-1	Total
Commerzbank dep	0 (0)	0.211 (0.038)	0.400 (0.073)	0.896 (0.157)	0.235 (0.238)
Sales	349,843 (1,527,767)	391,211 (1,613,460)	484,549 (1,877,845)	152,829 (515,649)	395,394 (1,641,595)
Total assets	535,864 (2,929,303)	640,151 (3,285,272)	1,317,124 (5,242,464)	578,200 (2,184,213)	831,892 (3,934,859)
Number of affiliates	2.95 (4.56)	3.89 (6.58)	4.55 (6.87)	4.89 (9.18)	3.82 (6.23)
Bank debt	73,915 (197,131)	46,898 (151,873)	60,267 (145,003)	54,447 (96,847)	59,895 (161,721)
Trade credit	44,047 (159,189)	39,164 (175,074)	46,206 (142,306)	23,139 (64,090)	42,693 (155,222)
Leverage (%)	46.38 (29.01)	50.48 (21.33)	48.62 (22.81)	43.67 (25.67)	47.97 (25.12)
Number of parents	242	152	226	35	655

Table IA.IV. Parent Commerzbank Dependence and Affiliate Characteristics

The table reports estimates from an OLS regression. The outcome in column (1) is *Parent Commerzbank Dependence*. The balance sheet items are in percent of total assets. The regression includes fixed effects for affiliate country and industry. Standard errors are clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Parent CB Dep (1)
log(Affiliate sales)	−0.0051 (0.0037)
log(Affiliate employment)	−0.0027 (0.0058)
log(Affiliate total assets)	0.0131* (0.0077)
Affiliate leverage	0.0054 (0.0060)
Long-term loans to parent (%)	0.1412 (0.1065)
Equity from parent (%)	0.0224 (0.0139)
Liabilities toward parent (%)	0.0025 (0.0059)
Short-term claims on parent (%)	−0.0315 (0.0503)
Ownership share of parent in affiliate	0.0036 (0.0029)
R^2	0.128
Number of firms	2,695
Observations	2,695
Industry FE	Yes
Country FE	Yes

Table IA.V. Distribution of Affiliates by Industry and Country

The table displays the most common industries (measured using the NACE 1.1. classification) and the most common host countries of foreign affiliates, separately for affiliates whose parents had zero Commerzbank dependence and for affiliates whose parents had positive Commerzbank dependence. The data are from 2006. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

	Parent CB dep= 0	Parent CB dep> 0	Total
Industry			
Wholesale, retail, and repair	36.62	36.52	36.55
Manufacturing	26.35	33.28	31.43
Real estate, renting, and business activities	28.57	16.97	20.07
Transport, storage, and communication	3.19	5.72	5.05
Country			
United States	8.18	7.85	7.94
France	9.57	7.24	7.87
Italy	6.38	4.46	4.97
Netherlands	5.27	4.86	4.97
United Kingdom	6.24	4.51	4.97
Switzerland	6.80	3.85	4.64
Spain	5.83	4.05	4.53
Austria	6.24	3.80	4.45
Poland	3.47	4.41	4.16
China	2.08	4.41	3.78
Czech Republic	4.58	3.14	3.53
Number of affiliates	721	1,974	2,695

Table IA.VI. The Relationship between Internal Capital Market Positions and Interest Rates

The table reports estimates from OLS cross-sectional regressions. The outcome variable in columns (1) and (2) is *Total lending by the affiliate to the parent* (long-term loans plus short-term claims). The outcome variable in columns (3) and (4) is *Total funding provided by the parent to the affiliate* (equity plus liabilities). Interest rate spread is the difference between lending and deposit rate in the affiliate host country. The regressions in columns (2) and (4) control for the corporate tax rate and log GDP of the affiliate host country. The data are for 2006. Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Total lending by affiliate to parent		Total funding by parent to affiliate	
	(1)	(2)	(3)	(4)
Interest rate spread	-0.1818* (0.1060)	-0.2023* (0.1076)	0.4263*** (0.1155)	0.4120*** (0.0900)
R^2	0.007	0.012	0.008	0.031
Number of affiliates	1,594	1,363	1,594	1,363
Corporate tax rate	No	Yes	No	Yes
log(GDP)	No	Yes	No	Yes

Table IA.VII. Impact of Parent Commerzbank Dependence on Parent Bank Debt

The table reports estimates from OLS panel regressions. The outcome in column (1) is $\log(\text{Parent bank debt})$. The outcome in column (2) is the *Inverse hyperbolic sine of parent bank debt*, defined as $\text{IHS}(y) = \log(y + (y^2 + 1)^{\frac{1}{2}})$. *Parent CB dep* is the fraction of the parent's relationship banks that were Commerzbank branches in 2006. Time fixed effects is an indicator for the period 2008 to 2015. The following time-invariant control variables are calculated for parents in the year 2006 and interacted with time fixed effects: industry fixed effects, fixed effects for deciles of total sales, fixed effects for deciles of leverage, and fixed effects for whether the parent had an affiliate in Asia, the EU, or the US. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are clustered at the parent level. Data source: Research Data and Service Centre of the Deutsche Bundesbank, Ustan 2002-2015, Orbis Historical Financials, own calculations.

Outcome	log(bank debt) (1)	IHS(bank debt) (2)
Parent CB dep \times 2008-15	-0.3470* (0.1962)	-0.3702* (0.2081)
R^2	0.041	0.041
Number of firms	407	407
Observations	4,495	4,495
Parent FE	Yes	Yes
Year FE	Yes	Yes
Size bin FE \times Time FE	Yes	Yes
Industry FE \times Time FE	Yes	Yes
Affiliate location FE \times Time FE	Yes	Yes
Leverage bin FE \times Time FE	Yes	Yes

Table IA.VIII. Survey Among German Firms on Bank Credit Supply

This table reports estimates from cross-sectional firm-level regressions for different years. The outcome is the answer to the question: “How do you evaluate the current willingness of banks to grant loans to businesses: cooperative (coded as 1), normal (0), or restrictive (-1)?” It is standardized to have zero mean and unit variance. The coefficients are interpreted as the standard deviation increase in banks’ willingness to grant loans from increasing Commerzbank dependence by one. Surveying for most firms happens early every year, which is why the result for 2008 does not yet reflect the effect of Commerzbank’s lending cut. The control variables include industry fixed effects, state fixed effects, bins for employment size (1-49, 50-249, 250-999, and over 1,000 employees in 2006), log firm age in 2006, and the outcome measured in 2006. Standard errors are clustered at the level of the county. The table is from Huber (2018) and uses data from the Ifo Institute.

YEAR	(1) 2007	(2) 2008	(3) 2009	(4) 2010	(5) 2011	(6) 2012
CB dep	-0.111 (0.157)	-0.095 (0.140)	-0.473** (0.190)	-0.316* (0.182)	0.059 (0.197)	0.379** (0.184)
Observations	856	988	1,032	946	898	503
R^2	0.460	0.371	0.204	0.213	0.207	0.199
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Size bin FE	Yes	Yes	Yes	Yes	Yes	Yes
log age	Yes	Yes	Yes	Yes	Yes	Yes
Dep var from 2006	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.IX. Impact on Parent External Financing and Sales

The table reports estimates from OLS panel regressions. The outcome in column (1) is $\log(\text{Parent trade credit from external sources})$, in column (2) $\log(\text{Parent bonds and other debt})$, in column (3) $\log(\text{Parent equity})$, and in column (4) $\log(\text{Parent sales})$. The regressors and controls are explained in Table IA.VII, and the controls include fixed effects for size bin, industry, affiliate location, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. Time fixed effects are indicators for the years from 2008 to 2010 and 2011 to 2015. R^2 is within-firm R^2 . Standard errors are clustered at the parent level. The data in columns (1) to (3) are from the Research Data and Service Centre of the Deutsche Bundesbank, Ustan 2002-2015. The data in column (4) are from Orbis Historical Financials, 1990-2015. The sample of parents in column (4) is a subset of the sample in columns (1) to (3).

Outcome	Trade credit (1)	Bonds and other debt (2)	Equity (3)	Sales (4)
Parent CB dep \times 2008-10	0.0840 (0.0585)	-0.0012 (0.1431)	-0.0494 (0.0461)	-0.1465* (0.0827)
Parent CB dep \times 2011-15	0.2639*** (0.1017)	0.1198 (0.2468)	-0.0855 (0.0639)	-0.0359 (0.1169)
R^2	0.132	0.057	0.213	0.222
Number of firms	407	407	407	136
Observations	4,495	4,495	4,495	2,457
Parent FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Size bin FE \times Time FE	Yes	Yes	Yes	Yes
Industry FE \times Time FE	Yes	Yes	Yes	Yes
Affiliate location FE \times Time FE	Yes	Yes	Yes	Yes
Leverage bin FE \times Time FE	Yes	Yes	Yes	Yes

Table IA.X. Entry and Exit of Affiliates and Parents

The table reports estimates from OLS cross-sectional regressions. The outcome in column (1) is the log(*Number of the parent's affiliates that exited between 2008 and 2015*). The outcome in column (2) is the log(*Number of affiliates newly added by the parent between 2008 and 2015*). The outcome in column (3) is an indicator for whether the parent did not report any affiliates in MiDi in 2015 (i.e., whether the parent exited between 2008 and 2015). The regressors are explained in Table IA.VII, and the controls include fixed effects for size bin, industry, affiliate location, and leverage bin. We additionally control for the log number of affiliates in 2006. The coefficients are scaled to reflect the effect of average parent Commerzbank dependence, which was 0.23. Standard errors clustered at the level of the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Number of exiting affiliates (1)	Number of new affiliates (2)	Parent exit (3)
Parent CB dep	0.0249 (0.0205)	-0.0260 (0.0266)	0.0155 (0.0201)
R^2	0.446	0.416	0.075
Number of firms	624	624	624
Observations	624	624	624
Controls	Yes	Yes	Yes
Number of affiliates in 2006	Yes	Yes	Yes

Table IA.XI. Impact on Affiliate Employment

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate employment})$. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate employment		
	(1)	(2)	(3)
Parent CB dep \times 2008-10	-0.0447 (0.0307)		
Parent CB dep: (0, 0.25] \times 2008-10		0.0040 (0.0076)	
Parent CB dep: (0.25, 0.5] \times 2008-10		-0.0180* (0.0093)	
Parent CB dep: (0.5, 1] \times 2008-10		-0.0555 (0.0345)	
Parent CB dep: (0.25, 1] \times 2008-10			-0.0242*** (0.0093)
Parent CB dep \times 2011-15	0.0109 (0.0271)	0.0057 (0.0268)	0.0110 (0.0224)
R^2	0.078	0.079	0.079
Number of firms	2,695	2,695	2,695
Observations	24,941	24,941	24,941
Affiliate FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes

Table IA.XII. Characteristics of Affiliates with Previous Long-term Loans to Parent

The table reports estimates from an OLS regression. The outcome in column (1) is a dummy equal to one if the affiliate had issued long-term loans to its parent in any year before 2008. The regression includes fixed effects for affiliate country and industry. Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Previous long-term loans to parent (1)
log(Affiliate sales)	0.0013 (0.0029)
log(Affiliate employment)	−0.0010 (0.0038)
Affiliate pre-growth	−0.0025 (0.0033)
Ownership share of parent in affiliate	0.0035* (0.0018)
Affiliate leverage	−0.0037* (0.0020)
R^2	0.088
Number of firms	2,224
Observations	2,224
Industry FE	Yes
Country FE	Yes

Table IA.XIII. Impact on Affiliate Liabilities Toward Parents and Equity from Parents

The table reports estimates from OLS panel regressions. The outcome in column (1) is $\log(\text{Liabilities toward the parent})$. The outcome in columns (2) is $\log(\text{Equity invested into the affiliate by the parent})$. The regressors are explained in Table II, and the baseline controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Liabilities toward parent (1)	Equity from parent (2)
Parent CB dep \times 2008-10	0.0788 (0.0948)	-0.0465 (0.0354)
Parent CB dep \times 2011-15	0.0050 (0.1410)	-0.0743* (0.0436)
R^2	0.043	0.100
Number of firms	2,695	2,695
Observations	24,941	24,941
Affiliate FE	Yes	Yes
Year FE	Yes	Yes
Controls \times Time FE	Yes	Yes

Table IA.XIV. Effects Did Not Differ by Parent Equity Holdings

The table reports estimates from OLS panel regressions. The outcome in columns (1) is $\log(\text{Equity invested into the affiliate by the parent})$. The outcome in column (2) is $\log(\text{Affiliate sales})$. Columns (1) and (2) analyze heterogeneity by the ratio of equity invested into affiliate by the parent over affiliate total assets in 2007. The regressors are explained in Table II, and the baseline controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Equity from parent (1)	Sales (2)
Parent CB dep \times 2008-10	-0.0473 (0.0388)	-0.0927** (0.0454)
Parent CB dep \times 2008-10 \times Equity from parent/assets	0.0095 (0.0375)	0.0095 (0.1735)
Parent CB dep \times 2011-15	-0.0697 (0.0452)	0.0371 (0.0437)
R^2	0.103	0.097
Number of firms	2,244	2,244
Observations	23,143	23,143
Affiliate FE	Yes	Yes
Year FE	Yes	Yes
Controls \times Time FE	Yes	Yes
Equity from parent/assets \times Time FE	Yes	Yes

Table IA.XV. Impact on Sales of Domestic and International Affiliates

Domestic affiliates are firms owned by a German multinational parent located within Germany. International affiliates are firms owned by a German multinational parent located outside Germany. The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, location, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are clustered at the level of the parent. Data sources: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, Orbis Historical Ownership 2007 and Orbis Historical Financials data, 1990-2015, own calculations.

Outcome	Affiliate sales (1)
Parent CB dep \times 2008-10	-0.0893* (0.0475)
Parent CB dep \times 2008-10 \times Domestic affiliate	0.0874** (0.0444)
Parent CB dep \times 2008-10 \times Affiliate pre-growth	0.0616** (0.0284)
Parent CB dep \times 2008-10 \times Affiliate pre-growth \times Domestic affiliate	-0.0801*** (0.0135)
Parent CB dep \times 2011-15	0.0407 (0.0358)
R^2	0.115
Number of firms	2,863
Observations	28,949
Affiliate FE	Yes
Year FE	Yes
Controls \times Time FE	Yes
Affiliate pre-growth \times 2008-10	Yes

Table IA.XVI. Heterogeneity by Affiliate Employment

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. The regression analyzes heterogeneity by log affiliate employment. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales (1)
Parent CB dep \times 2008-10	-0.1470* (0.0879)
Parent CB dep \times 2008-10 \times $\log(\text{Affiliate employment})$	0.0145 (0.0182)
Parent CB dep \times 2011-15	0.0294 (0.0424)
R^2	0.092
Number of firms	2,695
Observations	24,941
Affiliate FE	Yes
Year FE	Yes
Controls \times Time FE	Yes
$\log(\text{Affiliate employment}) \times$ 2008-10	Yes

Table IA.XVII. Effects were Similar in Countries with Capital Controls

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. The interaction coefficients in columns (1) to (3) estimate the additional impact of a one standard deviation increase in the given index (see Fernández et al. 2016). The interaction coefficients in columns (4) to (6) estimate the additional impact for firms in the top decile of the given index. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent CB dep \times 2008-10	-0.1497*** (0.0520)	-0.1543*** (0.0562)	-0.1395*** (0.0480)	-0.1149** (0.0489)	-0.1154** (0.0475)	-0.1150** (0.0502)
Parent CB dep \times 2008-10 \times Overall restrictions index (std.)	0.0396 (0.0262)					
Parent CB dep \times 2008-10 \times Outflow restrictions index (std.)		0.0404 (0.0273)				
Parent CB dep \times 2008-10 \times Inflow restrictions index (std.)			0.0359 (0.0246)			
Parent CB dep \times 2008-10 \times Overall restrictions index in top decile				0.0313 (0.0629)		
Parent CB dep \times 2008-10 \times Outflow restrictions index in top decile					0.0415 (0.0911)	
Parent CB dep \times 2008-10 \times Inflow restrictions index in top decile						0.0341 (0.0667)
Parent CB dep \times 2011-15	0.0181 (0.0434)	0.0182 (0.0434)	0.0179 (0.0434)	0.0170 (0.0432)	0.0170 (0.0431)	0.0170 (0.0431)
R^2	0.074	0.074	0.074	0.074	0.074	0.074
Number of firms	2,471	2,471	2,471	2,471	2,471	2,471
Observations	23,703	23,703	23,703	23,703	23,703	23,703
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.XVIII. Effects were Similar for Vertical and Service Sector Affiliates

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. Column (1) analyzes heterogeneity by whether the affiliate is vertical, i.e., active in a different industry than the parent. Column (2) studies heterogeneity by whether the affiliate is in the service sector, as defined in Eaton et al. (2016). The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales	
	(1)	(2)
Parent CB dep \times 2008-10	-0.1277* (0.0733)	-0.0982 (0.0895)
Parent CB dep \times 2008-10 \times Vertical affiliate	0.0567 (0.0735)	
Parent CB dep \times 2008-10 \times Affiliate in service sector		0.0015 (0.0866)
Parent CB dep \times 2011-15	0.0296 (0.0425)	0.0304 (0.0427)
R^2	0.092	0.092
Number of firms	2,695	2,695
Observations	24,941	24,941
Affiliate FE	Yes	Yes
Year FE	Yes	Yes
Controls \times Time FE	Yes	Yes
Vertical Affiliate FE \times 2008-10	Yes	No
Services FE \times 2008-10	No	Yes

Table IA.XIX. Excluding Affiliates in Wholesale and Retail

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. The regression excludes affiliates in wholesale and retail. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales (1)
Parent CB dep \times 2008-10	-0.1484* (0.0773)
Parent CB dep \times 2011-15	0.0442 (0.0743)
R^2	0.099
Number of firms	1,788
Observations	16,161
Affiliate FE	Yes
Year FE	Yes
Controls \times Time FE	Yes

Table IA.XX. Controlling for Direct Lending by Commerzbank in Affiliate Host Countries

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. Column (1) restricts the sample to affiliate locations in which Commerzbank did not have a branch. Column (2) tests for heterogeneity by the fraction of bank lending to nonfinancial firms in the affiliate's host country that came directly from German branches of the three largest German banks in 2006, as recorded in Austa (Krueger, Munzert, and Stahl 2017). Column (3) tests for heterogeneity by the fraction of bank lending to financial firms in the affiliate's host country that came directly from German branches of the three largest German banks in 2006. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, Austa and MiDi 2002-2015, BIS total credit statistics, own calculations.

Outcome	Affiliate sales		
	(1)	(2)	(3)
Parent CB dep \times 2008-10	-0.1203* (0.0642)	-0.1180** (0.0526)	-0.1158** (0.0525)
Parent CB dep \times 2008-10 \times Lending to nonfinancials from top 3 German banks		0.0512 (0.0327)	
Parent CB dep \times 2008-10 \times Lending to financials from top 3 German banks			0.0019 (0.0013)
Parent CB dep \times 2011-15	-0.0106 (0.0719)	0.0279 (0.0508)	0.0279 (0.0509)
R^2	0.168	0.072	0.072
Number of firms	1,020	2,350	2,350
Observations	9,371	21,783	21,783
Affiliate FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes

Table IA.XXI. Impact of the 2013 Flood on Parent Bank Debt and Total Assets

The table reports estimates from OLS panel regressions. The outcome variable in column (1) is $\log(\text{Parent total assets})$ and in column (2) it is $\log(\text{Parent bank debt})$. A flooded parent (1) had its headquarter in states where at least 0.24 percent of flood insurance contracts were activated in 2013 (according to the German Association of Insurers) and (2) a relationship bank located outside these states. The following time-invariant control variables are calculated for parents in the year 2006 and interacted with a fixed effect for the years 2013 to 2015: industry fixed effects, fixed effects for deciles of total sales, fixed effects for deciles of leverage, and fixed effects for whether the parent had an affiliate in Asia, the EU, or the US. R^2 is within-firm R^2 . Standard errors are clustered at the parent level. Data sources: Research Data and Service Centre of the Deutsche Bundesbank, Ustan 2002-2015, Orbis Historical Financials, German Association of Insurers, own calculations.

Outcome	Total assets (1)	Bank debt (2)
Flooded parent 2013 \times 2013-2015	-0.0197* (0.0113)	0.2055** (0.0967)
R^2	0.340	0.049
Number of firms	431	325
Observations	5,245	4,133
Parent FE	Yes	Yes
Year FE	Yes	Yes
Size bin FE \times Time FE	Yes	Yes
Industry FE \times Time FE	Yes	Yes
Affiliate location FE \times Time FE	Yes	Yes
Leverage bin FE \times Time FE	Yes	Yes

Table IA.XXII. Impact of Other German Banks on Affiliate Sales

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. The table tests whether parent dependence on other banks affected affiliate sales. Landesbanken in crisis were BayernLB, HSH Nordbank, Landesbank Baden-Württemberg, Sachsen LB, and WestLB. Affected savings banks owned these Landesbanken. Other banks with trading losses were Deutsche Bank, DZ Bank, IKB, HypoVereinsbank, and KfW, as listed in Hübner (2010). The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled by the average parent Commerzbank dependence, which was 0.23, to make them comparable to the previous results. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales		
	(1)	(2)	(3)
Parent CB dep \times 2008-10	-0.0983** (0.0476)	-0.0746 (0.0515)	-0.1034** (0.0484)
Parent dep on Landesbank in crisis \times 2008-10	-0.0217 (0.0450)		
Parent dep on affected savings bank \times 2008-10		0.0820** (0.0329)	
Parent dep on other banks with trading losses \times 2008-10			-0.0398 (0.0410)
Parent CB dep \times 2011-15	0.0298 (0.0423)	0.0289 (0.0423)	0.0295 (0.0423)
R^2	0.092	0.092	0.092
Number of firms	2,695	2,695	2,695
Observations	24,941	24,941	24,941
Affiliate FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes

Table IA.XXIII. Impact on Affiliate Sales by Bins of Parent Commerzbank Dependence

The table reports estimates from OLS panel regressions. The outcome variable is $\log(\text{Affiliate sales})$. The regressors are explained in Table II, and the baseline controls include fixed effects for size bin, industry, country, and leverage bin. Columns (1) and (4) interact the controls with indicator variables for the periods 2008 to 2010 and 2011 to 2015. Columns (2) and (5) contain finer (two-digit) industry fixed effects as well as all the controls interacted with year fixed effects. Columns (3) and (6) contain all controls interacted with year fixed effects as well as country-industry-year fixed effects. The coefficients are scaled by the average parent Commerzbank dependence, which was 0.23, to make them comparable to the previous results. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales					
	(1)	(2)	(3)	(4)	(5)	(6)
Parent CB dep: $(0, 0.25] \times 2008-10$	-0.0147 (0.0258)	-0.0025 (0.0241)	-0.0044 (0.0253)			
Parent CB dep: $(0.25, 0.5] \times 2008-10$	-0.0553*** (0.0206)	-0.0430** (0.0200)	-0.0416** (0.0210)			
Parent CB dep: $(0.5, 1] \times 2008-10$	-0.1060* (0.0564)	-0.0728** (0.0369)	-0.0820 (0.0599)			
Parent CB dep: $(0.25, 1] \times 2008-10$				-0.0538*** (0.0178)	-0.0450*** (0.0161)	-0.0435*** (0.0169)
Parent CB dep $\times 2011-15$	0.0172 (0.0418)	0.0524 (0.0378)	0.0225 (0.0382)	0.0290 (0.0387)	0.0580 (0.0385)	0.0302 (0.0347)
R^2	0.092	0.192	0.294	0.092	0.192	0.294
Number of firms	2,695	2,695	2,695	2,695	2,695	2,695
Observations	24,941	24,941	24,941	24,941	24,941	24,941
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls \times Time FE	Yes	No	No	Yes	No	No
Controls \times Year FE	No	Yes	Yes	No	Yes	Yes
Country FE \times Industry FE \times Year FE	No	No	Yes	No	No	Yes

Table IA.XXIV. Controlling for Parent Characteristics and Using a Balanced Panel

The table reports estimates from OLS panel regressions. The outcome in all columns is $\log(\text{Affiliate sales})$. Columns (1) and (2) add fixed effects for the number of the parent's relationship banks and parent industry, respectively. Column (3) uses a fully balanced panel of affiliates with data in every year from 2002 to 2015. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The reported coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales		
	(1)	(2)	(3)
Parent CB dep \times 2008-10	-0.0842** (0.0405)	-0.1032** (0.0451)	-0.1208** (0.0561)
Parent CB dep \times 2011-15	0.0417 (0.0384)	0.0163 (0.0452)	0.0418 (0.0611)
R^2	0.093	0.094	0.108
Number of firms	2,695	2,695	704
Observations	24,941	24,941	9,856
Affiliate FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes
Parent number of banks FE \times Time FE	Yes	No	No
Parent industry FE \times Time FE	No	Yes	No

Table IA.XXV. Impact on the Inverse Hyperbolic Sine of Affiliate Sales

The table reports estimates from OLS panel regressions. The outcome is the *Inverse hyperbolic sine of affiliate sales*, defined as $\text{IHS}(y) = \log(y + (y^2 + 1)^{\frac{1}{2}})$. The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, Ustan 2002-2015, Orbis Historical Financials, own calculations.

Outcome	IHS(affiliate sales) (1)
Parent CB dep \times 2008-10	-0.1034** (0.0520)
Parent CB dep \times 2011-15	0.0282 (0.0452)
R^2	0.084
Number of firms	2,695
Observations	24,941
Affiliate FE	Yes
Year FE	Yes
Controls \times Time FE	Yes

Table IA.XXVI. Effects Did Not Differ by Domestic Growth

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. Column (1) tests for heterogeneity by whether the affiliate host country was in the top or bottom 10 percent of the distribution of GDP per capita growth from 2007 to 2009 (based on World Bank data). Column (2) tests for heterogeneity by whether the affiliate host country was in the top or bottom 10 percent of the distribution of house price growth from 2007 to 2009 (based on the OECD house price index). The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on an affiliate whose parent had average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales	
	(1)	(2)
Parent CB dep \times 2008-10	-0.0994** (0.0460)	-0.1021** (0.0487)
Parent CB dep \times 2008-10 \times GDP per capita growth in bottom 10%	-0.0094 (0.1163)	
Parent CB dep \times 2008-10 \times GDP per capita growth in top 10%	-0.0382 (0.0268)	
Parent CB dep \times 2008-10 \times House price growth in bottom 10%		-0.0055 (0.0632)
Parent CB dep \times 2008-10 \times House price growth in top 10%		-0.0174 (0.0710)
Parent CB dep \times 2011-15	0.0299 (0.0427)	0.0603 (0.0561)
R^2	0.074	0.064
Number of firms	2,664	1,879
Observations	24,718	17,367
Affiliate FE	Yes	Yes
Year FE	Yes	Yes
Controls \times Time FE	Yes	Yes

Table IA.XXVII. Controlling for Tax-shifting Incentives

The table reports estimates from OLS panel regressions. The outcome is $\log(\text{Affiliate sales})$. Column (1) excludes from the sample affiliates in countries classified as tax havens by Gumpert, Hines, and Schnitzer (2016). These countries are Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, Switzerland, Bermuda, British Virgin Islands, Cayman Islands, Cyprus, Channel Islands, Luxembourg, Malta, Andorra, Anguilla, Antigua and Barbuda, Bahamas, Bahrain, Barbados, Belize, Cook Islands, Dominica, Gibraltar, Grenada, Isle of Man, Jordan, Liechtenstein, Macau, Maldives, Marshall Islands, Montserrat, Netherlands Antilles, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, and Vanuatu. Columns (2) and (3) examine heterogeneity with respect to the corporate tax differential between Germany and the affiliate country (using data from the Oxford Centre for Business Taxation). The regressors are explained in Table II, and the controls include fixed effects for size bin, industry, country, and leverage bin. The coefficients are scaled to reflect the effect on a parent with average Commerzbank dependence, which was 0.23. R^2 is within-firm R^2 . Standard errors are two-way clustered at the level of the country and the parent. Data source: Research Data and Service Centre of the Deutsche Bundesbank, MiDi 2002-2015, own calculations.

Outcome	Affiliate sales		
	(1)	(2)	(3)
Parent CB dep \times 2008-10	-0.1036** (0.0493)	-0.1130** (0.0471)	-0.1109* (0.0644)
Parent CB dep \times 2008-10 \times Corporate tax rate differential		-0.0020 (0.0031)	
Parent CB dep \times 2008-10 \times Corporate tax rate higher in Germany			0.0077 (0.0525)
Parent CB dep \times 2011-15	0.0114 (0.0413)	0.0327 (0.0494)	0.0324 (0.0493)
R^2	0.076	0.069	0.069
Number of firms	2,414	2,393	2,393
Observations	22,371	22,185	22,185
Affiliate FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Controls \times Time FE	Yes	Yes	Yes

Reference List of Financial Analyst Reports

Year	Month	Day	Source of Report	Title of Report
2004	1	16	Deutsche Bank Equity Research	German Banks: The Re-Turn
2004	1	23	JPMorgan	Commerzbank : Management Meeting - Feedback On Outlook
2004	8	4	Morgan Stanley	Commerzbank: Quality Concerns
2005	1	7	CA Cheuvreux	Commerzbank: Refocusing On Core Business Following Securities Restructuring
2005	8	3	Deutsche Bank Equity Research	Commerzbank AG : A Nice Surprise
2005	9	5	Bear Stearns & Co. Inc.	CBKG.DE: Commerzbank: Last Man Standing
2006	2	7	Deutsche Bank Equity Research	Commerzbank AG : Back To Normality. Downgrade To Hold.
2006	11	6	Kepler Cheuvreux	Commerzbank : Upside After A Solid Quarter
2006	11	22	Natixis	Allianz - Dresdner Bank, A New Growth Driver For The Group
2007	1	10	UBS Equities	German Banks Revisited
2007	6	26	Bank Vontobel AG	Allianz - Once More Rumours Dresdner Bank Is Being Sold
2007	8	10	JPMorgan	Commerzbank - 2Q07: Good Domestic Trends, Disappointing Treasury
2007	10	30	fairesearch	Commerzbank - Subprime And Other One-Offs In 3Q07 - 30Th October, 2007.
2007	12	17	JPMorgan	Allianz : Allianz Is Oversold, In Our View; We Think The Only Downside Risk Is A Rights Issue - Very Unlikely
2008	1	2	Bear Stearns & Co. Inc.	CBKG.DE: Difficult Times Ahead For Commercial Real Estate
2008	1	2	Fox-Pitt Kelton Cochran Caronia Waller	European Banks: Credit Crisis - Stock Impact
2008	1	16	Natixis	Commerzbank - No Visibility In The Short Term
2008	1	17	JPMorgan	Allianz : Less Exposure To Credit Crunch, More Cost Cutting
2008	1	18	Bear Stearns & Co. Inc.	CBKG.DE: Tidying Up With More Sub Prime Provisions Amending Estimates
2008	1	18	Deutsche Bank Equity Research	German Banks : Quantifying The Revenue Risk
2008	1	28	UBS Equities	Commerzbank "Factoring In A Tougher Environment" (Neutral) Zieschang
2008	2	14	Thomson Reuters StreetEvents	Crzby - Event Transcript Of Commerzbank AG Conference Call, Feb. 14, 2008 / 8:15Am Et
2008	2	15	Bear Stearns & Co. Inc.	CBKG.DE: Q4 2007 Results Solid Results In Difficult Markets
2008	2	15	Societe Generale	Commerzbank-Target Price Downgrade Q4 07 - A Solid End To 2007 With Manageable "Crisis" Impact
2008	2	15	UniCredit Research	Commerzbank (Hold) - Q4 Numbers Lower Than Expected
2008	2	27	Auerbach Grayson & Co., Inc.	Allianz Holding - Excellent Results For Insurance Business And Asset Management (Germany)

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Year	Month	Day	Source of Report	Title of Report
2008	2	28	Deutsche Bank Equity Research	Allianz : Breaking The Bank?
2008	3	25	Credit Suisse - Europe	CBKG.F: Commerzbank - Resilience > Perception
2008	4	8	Moody's	Negative Outlook For German Banking System Reflects Impact Of Credit Crisis And Sectoral Challenges
2008	4	24	CA Cheuvreux	Allianz: Main Value Drivers Intact
2008	4	25	Natixis	Allianz - Strong Upside Potential Despite Crisis
2008	5	8	UniCredit Research	Commerzbank (Hold) - Unspectacular Q1 Numbers, In Our View
2008	5	13	Deutsche Bank Equity Research	German Banks : Amended: Still Facing Headwinds
2008	6	5	CA Cheuvreux	Commerzbank: (E)Merging Opportunites - The Resurrection Of German Banking Consolidation
2008	6	24	Natixis	Allianz - What Does The Future Hold For Dresdner
2008	8	6	JPMorgan	Commerzbank : Q208 First Glance- Good Underlying But Focus On Cre Large LLP - Alert
2008	8	6	Macquarie (formerly Oppenheim Research) — Historical	Strong Q2 Results
2008	8	7	Kepler Cheuvreux	Landsbanki Kepler Research: Reduce On Commerzbank (Q2 Earnings)
2008	8	7	UBS Equities	Commerzbank "As Good As It Gets?" (Neutral) Zieschang
2008	8	28	JPMorgan	Commerzbank : Working Through The Numbers Of A Potential Commerz/Dresdner Deal
2008	9	1	Morgan Stanley	Commerzbank: Dresdner Deal: Initial Take
2008	9	1	Warburg Research GmbH	Commerzbank
2008	9	2	Fortis Bank Financial Markets	Credit Research - Banks: All Recommendations Revised Down On Dresdner And Commerzbank
2008	9	2	Kepler Cheuvreux	Landsbanki Kepler Research: Reduce On Commerzbank (AGM)
2008	9	2	Macquarie (formerly Oppenheim Research) — Historical	No Guts, No Glory?
2008	9	2	Moody's	Moody's Downgrades Dresdner Bank's Ratings To Aa3
2008	9	4	MF Global (Historical)	Mf Global Securities - Commerzbank - Buy - €Tp25 - Initiation Report
2008	9	12	Natixis	Commerzbank - Integration Time
2008	10	31	UniCredit Research	Commerzbank (Hold) - Preview Of Q3/08 Figures
2008	11	3	Macquarie (formerly Oppenheim Research) — Historical	Superior Way To Raise Capital
2008	11	3	Raymond James Europe RJEE/RJFI	Commerzbank - Q3 2008 Earnings And Capital Raising.
2008	11	3	Thomson Reuters StreetEvents	Crzby Conference Call Final Transcript, 3-Nov-08 9:00Am Cet
2008	11	4	ESN/ equinet Bank	Equinet (4.11.2008): Commerzbank With Weak Q3 Results (Hold, Tp Eur 10)

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Year	Month	Day	Source of Report	Title of Report
2008	11	4	Natixis	Commerzbank - A Sound Move
2008	11	5	Warburg Research GmbH	Commerzbank
2008	11	13	CA Cheuvreux	Commerzbank: The Good, The Bad And The New Bank Integrating Complexity
2008	11	28	Natixis	Commerzbank - Revisions To Terms Of Dresdner Acquisition
2008	12	12	Macquarie (formerly Oppenheim Research) — Historical	Downgrade To Sell - Falling Behind
2008	12	12	Macquarie (formerly Oppenheim Research) — Historical	Falling Behind
2009	1	1	Global Markets Direct	Commerzbank AG - Financial And Strategic Analysis Review
2009	1	7	JPMorgan	Commerzbank : Challenges Ahead - Resuming Coverage With Uw
2009	1	7	UBS Equities	Commerzbank “Tough Times Ahead” (Neutral) Zieschang
2009	1	9	UBS Equities	Commerzbank “Taxpayer Steps In Again” (Neutral) Zieschang
2009	1	12	ESN	German Banks : German Banks: Still No Light At The End Of The Tunnel
2009	1	13	Moody’s	Moody’s Affirms Commerzbank’s Aa3 Long-Term Ratings, Stable Outlook
2009	1	13	Moody’s	Moody’s Affirms Dresdner Bank’s Aa3 Long-Term Ratings, Stable Outlook
2009	2	12	Morgan Stanley	Commerzbank: Many Hurdles & Very Little Visibility: Underweight
2009	2	19	Kepler Cheuvreux	Commerzbank - Yellow Submarine
2009	2	26	Credit Suisse - Europe	Credit Suisse Breakfast Banker - Financial News - Thursday, 26 February 2009
2009	2	26	JPMorgan	Commerzbank : Dresdner Q4 Numbers Cause Further Erosion Of Nav - Alert
2009	3	20	UniCredit Research	Sector Report - German Banks
2009	3	30	Deutsche Bank Equity Research	Commerzbank: Flirting With Disaster
2009	5	11	Macquarie (formerly Oppenheim Research) — Historical	Capital Position Worse Than Assumed
2009	5	12	Credit Suisse - Europe	CBKG.F: Commerzbank - Cash Is King
2009	5	12	Standard & Poor’s	Commerzbank AG And Dresdner Bank AG Outlooks To Negative On Worsening Credit Conditions; A/A-1 Ratings Affirmed
2009	5	12	Warburg Research GmbH	Commerzbank
2009	5	13	JPMorgan	Commerzbank : Capital Raising Required
2009	8	6	BHF-BANK AG	Commerzbank - Sell, Target Price: Eur 4.00
2009	8	6	Deutsche Bank Equity Research	Commerzbank : A Levered View On Abs Prices
2009	8	7	Auerbach Grayson & Co., Inc.	Auerbach Grayson: Commerzbank - Losses In Q2, But Without Any Nasty Surprises (Germany)
2009	8	7	JPMorgan	Commerzbank : Q209, Still In The Red

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Year	Month	Day	Source of Report	Title of Report
2009	8	7	Kepler Cheuvreux	Commerzbank - Not A Good Restructuring Play
2009	8	7	Societe Generale	Commerzbank - Quarterly Results - Too Early To Judge Whether Major Dilution Can Be Avoided
2009	8	10	Warburg Research GmbH	Commerzbank
2009	8	13	Fox-Pitt Kelton Cochran Caronia Waller	Questioning Capital Downgrade To Underperform
2009	8	20	UBS Equities	Commerzbank “Downgrade To Sell” (Sell) Zieschang
2009	11	5	Auerbach Grayson & Co., Inc.	Auerbach Grayson: Commerzbank - Weak Q3 Results (Germany)
2009	11	5	Deutsche Bank Equity Research	Commerzbank : Unconvincing Proposition Despite Subsidies
2009	11	5	JPMorgan	Commerzbank : Results Q309 - Alert
2009	11	5	Macquarie (formerly Oppenheim Research) — Historical	Quality Of Results Matters
2009	11	5	Natixis	Commerzbank - Earnings Boosted By A €435M Provision Release On Toxic Assets
2009	11	6	Natixis	Commerzbank - Too Many Balance Sheet Risks
2009	11	27	Deutsche Bank Equity Research	Commerzbank : Roadmap 2012 In Spotlight
2009	11	30	Warburg Research GmbH	Commerzbank
2010	2	23	JPMorgan	Q409 Results Snapshot Before The Call - Alert
34 2010	2	23	Macquarie (formerly Oppenheim Research) — Historical	Negative Earnings Surprise Driven By Trading
2010	2	23	Raymond James Europe RJEE/RJFI	Commerzbank: Worrying Q4 Figures But Upbeat Guidance
2010	2	24	Credit Suisse - Europe	CBKG.F: Commerzbank - Still Under Water
2010	2	24	Deutsche Bank Equity Research	Commerzbank : 2010 - Transition To Operating Profitability
2010	2	24	Societe Generale	Commerzbank - 12M Target Downgrade - Tangible Book Takes Another Hit In Q4. Soffin Repayment Still Unresolved
2010	2	24	UBS Equities	Commerzbank “Tough Quarter And Subdued 2010 Outlook” (Sell) Zieschang
2010	2	25	ESN/ equinet Bank	Commerzbank - Review Q4 Results (Reduce, Tp Eur 4.60)
2011	2	23	CA Cheuvreux	Commerzbank - 2/Outperform - Q4-10 Results Well Above Estimates
2011	2	23	JPMorgan	Commerzbank : Q4 Earnings Above Consensus, Focus On Soffin Repayment And Rwa Reduction - Alert
2012	2	23	Deutsche Bank Equity Research	Commerzbank : Cinderellabank Has Not Arrived At The Ball (Yet)
2012	2	23	JPMorgan	Commerzbank : Q411 Results: Better Than Expected Adj. Pbt But All Eyes Remain On Capital - Alert
2012	2	24	Morgan Stanley	Commerzbank: Capital Ok, Eps Still At Risk
2012	2	24	Societe Generale	Commerzbank - Full-Year Results - Capital Shortfall Reduced Poor Organic Capital Generation And Too Many Risks
2012	2	27	ESN/ equinet Bank	Commerzbank Q4 Results All In All In Line With Exp., Capital Increase Should Ease Investors’ Concerns About CBK’S Capital Position - Company Update
2012	2	28	UBS Equities	Commerzbank “Sell Rating Reiterated” (Sell) Zieschang

The reference list includes all reports used for the analysis in Table IA.I.

Appendix II. Theoretical Model of an Internal Capital Market

We present a simple theoretical model of a multinational. We assume that the multinational is directly exposed to Commerzbank's lending cut and therefore hit by a credit shock. The model then illustrates how an internal capital market can transmit the credit supply shock from parent to affiliates.

The multinational consists of n firms. Without loss of generality, we index the parent by $i = 1$ and the affiliates by $i \in \{2, \dots, n\}$. The objective of the multinational is to maximize the sum of parent and affiliate profits. The multinational chooses how much capital each firm (parent and affiliates) borrows from external sources and how much capital each firm receives to use in production. External capital borrowed by firm i is given by b_i and capital used in production by k_i . The multinational operates an internal capital market. It can move capital across its firms, so that capital borrowed by one firm can be used for production by another firm. Hence, the budget constraint of the multinational is given by $\sum_{i=1}^n [b_i - k_i]$.

A firm generates sales using production function $f_i(k_i)$ where capital is the only input. Each production function satisfies the neoclassical conditions $f_{i,1}(k_i) > 0$, $f_{i,11}(k_i) < 0$, $f_i(0) = 0$, $\lim_{k_i \rightarrow 0} f_{i,1}(k_i) = \infty$, and $\lim_{k_i \rightarrow \infty} f_{i,1}(k_i) = 0$. (We use subscripts 1 and 2 to indicate the derivative of a function with respect to its first and second argument, respectively. Two subscripts indicate a second derivative.)

The total cost of external borrowing is given by $r(b_i, c_i)$. Borrowing costs depend on the severity of credit supply disruptions hitting the firm, measured by c_i . The greater c_i , the greater the disruption. A negative credit supply shock raises both the total and marginal costs of borrowing (i.e., $r_2(b_i, c_i) > 0$ and $r_{12}(b_i, c_i) > 0$). Borrowing costs are increasing and convex in borrowed capital (i.e., $r_1(b_i, c_i) > 0$ and $r_{11}(b_i, c_i) > 0$). The borrowing cost function satisfies limit conditions $r(0, c_i) = 0$, $\lim_{b_i \rightarrow 0} r_1(b_i, c_i) = 0$, and $\lim_{b_i \rightarrow \infty} r_1(b_i, c_i) = \infty$. The optimization problem of the multinational is

$$\max_{\{k_i, b_i, \lambda\}_{i=1}^n} \sum_{i=1}^n [f_i(k_i) - r(b_i, c_i)] + \lambda \left[\sum_{i=1}^n (b_i - k_i) \right]. \quad (\text{IA.1})$$

The first-order conditions are

$$f_{i,1}(k_i) - \lambda = 0 \quad \forall i, \quad (\text{IA.2})$$

$$r_1(b_i, c_i) - \lambda = 0 \quad \forall i, \quad (\text{IA.3})$$

$$\lambda \left[\sum_{i=1}^n (b_i - k_i) \right] = 0 \quad \lambda \geq 0. \quad (\text{IA.4})$$

Optimality requires that the budget constraint of the multinational firm binds, so that $\lambda > 0$. To investigate the effect of a shock to parent credit supply (keeping constant affiliate credit supply), we fully differentiate the first-order conditions with respect to c_1 :

$$f_{i,11}(k_i) \frac{dk_i}{dc_1} - \frac{d\lambda}{dc_1} = 0, \quad (\text{IA.5})$$

$$r_{11}(b_i, c_i) \frac{db_i}{dc_1} + r_{12}(b_i, c_i) \frac{dc_i}{dc_1} - \frac{d\lambda}{dc_1} = 0, \quad (\text{IA.6})$$

$$\sum_{i=1}^n \left[\frac{db_i}{dc_1} - \frac{dk_i}{dc_1} \right] = 0. \quad (\text{IA.7})$$

We substitute equations (IA.5) and (IA.6) into equation (IA.7). Solving for $\frac{d\lambda}{dc_1}$ gives

$$\frac{d\lambda}{dc_1} = \frac{r_{12}(b_1, c_1)}{r_{11}(b_1, c_1)} \left[\sum_{i=1}^n \left[\frac{1}{r_{11}(b_i, c_i)} - \frac{1}{f_{i,11}(k_i)} \right] \right]^{-1}. \quad (\text{IA.8})$$

Since for all firms $r_{12}(b_i, c_i)$ and $r_{11}(b_i, c_i)$ are positive and $f_{i,11}(k_i)$ is negative, $\frac{d\lambda}{dc_1}$ is positive. Intuitively, the existence of an internal capital market implies that the marginal shadow cost of capital increases at all firms following a credit supply shock to the parent. The changes in affiliate production capital k_i and borrowed capital b_i are:

$$\frac{dk_i}{dc_1} = \underbrace{\frac{d\lambda}{dc_1}}_{>0} \underbrace{\frac{1}{f_{i,11}(k_i)}}_{<0} < 0 \quad \forall i, \quad (\text{IA.9})$$

$$\frac{db_i}{dc_1} = \underbrace{\frac{d\lambda}{dc_1}}_{>0} \underbrace{\frac{1}{r_{11}(b_i, c_i)}}_{>0} > 0 \quad \forall i \neq 1. \quad (\text{IA.10})$$

The multinational smooths out the shock by lowering production capital of each affiliate, not just the parent (equation IA.9). As a result, sales of all affiliates fall. The reduction in production capital is greatest for affiliates with low marginal product (i.e., where the second derivative of the production function is greater in absolute terms). Intuitively, the multinational cuts production capital the least for affiliates that have the greatest potential to transform capital into sales growth.

To compensate for the shock, affiliates may increase external borrowing. This effect depends crucially on the marginal cost of external borrowing (equation IA.10). If the marginal cost of borrowing increases gently (i.e., $r_{11}(b_i, c_i)$ is low), affiliates raise borrowing by almost enough to offset the shock to the parent. However, firms commonly face borrowing constraints,

for example due to collateral or cash-flow requirements set by lenders. In this case, the marginal cost increases sharply and affiliates do not raise borrowing.

Independent of borrowing costs, a robust prediction is that each affiliate increases net lending through the internal capital market. Net lending is the difference between capital borrowed by an affiliate, which is stable or increasing after the parent is shocked, and capital used in production by an affiliate, which falls. The increased internal lending by affiliates goes to the parent, so net lending by the parent falls.

Appendix III. Institutional Details on German Banks

Commerzbank's Expansion Into International Financial Markets

German banks had relatively small trading and investment divisions until the early 2000s. In 2003, Germany was in recession and the banking sector was considered to be relatively weak. German politicians encouraged banks to increase their international activities, hoping that this would raise credit supply in Germany. However, unlike French, Spanish, and Italian banks, German banks did not grow internationally by establishing branches, taking retail deposits, and directly lending abroad. Instead, German banks expanded their international trading and investment divisions. Supporting this development, the 2003 Kleinunternehmerförderungsgesetz (small businesses promotion law) granted tax breaks for banks involved in securitization markets. Commerzbank participated in the expansion of trading and investment divisions, but not to a greater extent than other commercial banks.¹ For example, the share of trading assets at Commerzbank was 22% in 2005, that of Dresdner Bank was 35%, and that of Deutsche Bank was 45%. For two examples of publicly owned Landesbanken, HSH Nordbank and WestLB, the shares were 13.4% and 32.5% (Hardie and Howarth 2013).

While Commerzbank was growing its trading and investment divisions, the markets for U.S. mortgage-related securities developed rapidly, peaking in 2006. Commerzbank invested heavily in securities with high ratings sold by American investment banks. At the same time, the banking sector in Iceland grew by more than sixfold between 2003 and 2007. Total assets of Icelandic banks amounted to 10 times of Icelandic GDP. The Icelandic banks relied to a large extent on interbank credit lines and wholesale market funding. Commerzbank provided

¹None of the information on individual banks is provided by the Deutsche Bundesbank. Main sources are bank annual reports, financial analyst reports listed at the end of Section I of the Internet Appendix, and reports by the European Commission.

that funding and became more exposed to Iceland than the other German banks. However, this was not considered a risky strategy by the analysts at the time (Flannery 2009).

The capital ratios of German banks support the view that Commerzbank was not following riskier strategies than other German banks. In 2005, the tier 1 capital ratio at Commerzbank was at 8%, Dresdner Bank was 10%, Deutsche Bank was at 8.7%, and the aggregate of German banks was 7.8%.

Commerzbank's 2009 Acquisition of Dresdner Bank

Dresdner Bank was acquired by Allianz, a large German insurance company, in 2001. Allianz wanted to generate synergies between banking and insurance divisions ("bankassurance"), but the plan was eventually unsuccessful. Analysts described the task of combining a large bank and insurance company as too complex and the execution by managers as flawed (2008 CA Cheuvreux report). Allianz refocused on its core insurance business in 2007 and to sell Dresdner Bank.

Commerzbank was becoming worried about being a takeover target in 2007. It also wanted to enlarge its branch network. For both reasons, acquiring a large German bank was an attractive option. Dresdner Bank was the natural target, as it was for sale and had a large branch network. German politicians strongly encouraged Commerzbank's plans, in particular the Minister of Finance Steinbrück. He appeared on television promoting the planned deal. The government wanted to create a second German "banking champion," next to Deutsche Bank. Analysts also generally welcomed the deal as "making perfect strategic sense" (2008 Morgan Stanley report).

For the purposes of this paper, three factors are important. First, Commerzbank already decided to acquire Dresdner Bank before the crisis hit both banks severely. That means the trading losses and the lending cut did not affect the principal decision to acquire. Second, both banks suffered significant losses in 2008. Dresdner Bank was more exposed to asset-backed securities, while Commerzbank was more exposed to failing public and institutional debt (including the Icelandic crisis and the Lehman Brothers insolvency). Third, the effects of the lending cut on borrowers were similar, independent of whether they had originally banked with an old Dresdner Bank or old Commerzbank branch, as shown by Huber (2018). Hence, we construct the treatment variable based on relationships to either bank.

Dependence on Other German Banks

We study whether parent dependence on other German banks affected affiliates from 2008 to 2010. We study three groups of other banks that suffered losses during the financial crisis 2008 to 2009 (Hüfner 2010): Landesbanken (state-level publicly owned banks) with trading losses, municipal savings banks that partially owned these Landesbanken, and other banks with trading losses.²

We find no evidence that affiliates whose parents depended on any of these banks grew more slowly from 2008 to 2010 (Table IA.XXII). The results are consistent with the narrative evidence detailed below, which suggests that other German banks did not cut lending during the crisis. In sum, the Landesbanken received quicker and more comprehensive guarantees from the government, relative to Commerzbank. The savings banks did not have to guarantee large losses and actually increased lending during the crisis. And other commercial banks had stronger financial buffers and hedging strategies than Commerzbank.

Losses at Landesbanken and Savings Banks

Landesbanken (translated as "banks of federal states") are public banks that are jointly owned by the federal state and the savings banks of their region. During the financial crisis, several Landesbanken announced large losses on international financial markets: Sachsen LB, HSH Nordbank, WestLB, BayernLB, and Landesbank Baden-Württemberg. However, these losses did not translate into lending cuts at either the Landesbanken or their part-owners savings banks. The reason is that the Landesbanken were very quickly (often within a couple of days) and generously (often guaranteeing all potential losses of the banks) supported by public funds from the state and federal governments and other Landesbanken. This stands in contrast to the support for Commerzbank, which was less quick and comprehensive. As a result, affected Landesbanken and savings banks did not suffer capital shortages and did not cut lending, unlike Commerzbank. We describe the various cases in more detail here.

Sachsen LB had invested into U.S. mortgage-related securities (Kroes 2008). The bank struggled to access wholesale funding markets when it announced losses from mortgage-related securities on August 17. On the same day, a support package was announced. A national

²The affected Landesbanken were BayernLB, HSH Nordbank, Landesbank Baden-Württemberg, Sachsen LB, and WestLB. Other affected banks are Deutsche Bank, DZ Bank, IKB, HypoVereinsbank, and KfW, as listed in Hüfner (2010). Huber (2018, Appendices E and F) also shows that trading losses at other German banks did not have real effects on firms.

public bank called DekaBank and the other German Landesbanken purchased a large share of underperforming securities from Sachsen LB. Nine days later, on August 26, Landesbank Baden-Württemberg took over Sachsen LB and provided its lending operations with capital. Landesbank Baden-Württemberg received a guarantee that the state government of Sachsen would cover losses from mortgage-related securities. The public support measures were decided days after Sachsen LB encountered losses. As a result, Sachsen LB did not have to cut lending. There were also no effects on local savings banks in Saxony, as they did not have to provide capital or guarantees. In their annual report, the savings banks state that "the sale of Sachsen LB produced no financial burden for the savings banks" (Sachsen Finanzgruppe Geschäftsbericht 2007, page 4). Their capital and lending grew in 2007.

HSH Nordbank also suffered from mortgage-related losses in 2008 (Almunia 2011a). The bank owners injected 5 billion euro of capital and provided liquidity guarantees of 27 billion. An additional 248 million of the capital injection came from the savings bank association of Schleswig-Holstein. Overall, the savings banks contributed less than one percent of the total rescue package. Their contribution amounted to 0.7% of the assets of savings banks. This modest contribution did not have an effect on the lending of the savings banks, which increased by 3.8% in 2008.

The North-Rhine Westphalian Landesbank WestLB held underperforming assets in a subsidiary called Phoenix Light (Almunia 2011b). It received support from the German government in the form of a 3 billion euro capital injection in 2009. In addition, the federal state government provided a guarantee to secure underperforming assets of 4 billion euro. The savings banks of North-Rhine Westphalia provided a guarantee of 1 billion euro. The German government agreed to initially cover all losses resulting from a failure of WestLB. Only 25 years later would the savings banks have to cover any losses. Their contribution would be capped at a maximum of 4.5 billion euro. This was a generous support package for the savings banks, since they were 50% owners of WestLB and would normally have to cover 50% of losses immediately. The support measures for WestLB occurred in 2008 and 2009. Between the end of 2007 and 2009, the aggregate equity capital of savings banks in North-Rhine Westphalia rose by 11%.

BayernLB suffered losses on mortgage-related securities in early 2008 (Almunia 2013). It received a 10 billion euro capital injection and a guarantee for losses of 4.8 billion from the Bavarian government. The Bavarian savings banks did not contribute to these measures and increased lending by 4% from 2007 to 2009.

After the Lehman Brothers insolvency, Landesbank Baden-Württemberg recorded serious losses on its international financial investments (Kroes 2009). On 21 November, the bank

owners injected a total of 5 billion euro. The savings banks contributed 1.8 billion euro (Gubitz 2013). Despite this injection, the aggregate capital of savings banks in Baden-Württemberg increased by 6% and lending by 5%. This highlights that the savings banks were large enough to continue stable operations despite injecting capital.

Other German Banks With Trading Losses

Other banks also suffered trading and investment losses during the 2008 to 2009 financial crisis, as listed in Hüfner (2010): Deutsche Bank, DZ Bank, IKB, HypoVereinsbank, and KfW. However, these banks either did not cut lending in response to the losses or their borrowers were on different growth paths than borrowers of other banks. In either case, it is not possible to create a quasi-experimental research design of a lending cut around the developments at these other banks. We explain the individual cases here.

Deutsche Bank hedged its portfolio of mortgage-related securities more carefully than Commerzbank. It shorted the U.S. mortgage market already in 2007 (2008 Fox-Pitt Kelton Cochran Caronia Waller report). As a result, Deutsche Bank could expand its lending in Germany during the financial crisis. For instance, mortgage issuance in the private customer division increased by 21.7% between 2007 and 2010. In line with this narrative, firms dependent on Deutsche Bank did not grow more slowly during and after the financial crisis, as shown by Huber (2018). DZ Bank and HypoVereinsbank were relatively large institutions with sizable capital ratios of 14% and 15.7%, respectively. In addition, both banks were part of a large banking network. DZ Bank could rely on funding from all German cooperative banks, which were not exposed to financial markets. DZ bank is the central bank of cooperatives. HypoVereinsbank belonged to the international UniCredit Group, which also provided additional funding.

IKB was a small bank specialized in real estate financing and markets. It suffered large losses when U.S. mortgage markets crashed. However, its borrowers were also more likely to be involved in real estate financing. This makes it difficult to argue that IKB's borrowers were on parallel growth paths to other firms around the financial crisis. In any case, IKB played a small role in corporate lending in Germany. Only 0.1% of firms have IKB as one of their relationship banks in the Creditreform data. Among these firms, over 90% had at least two other relationship banks. That means that almost all borrowers of IKB were able to switch to other lenders when IKB became distressed.

KfW is a government-owned development bank. Similar to the Landesbanken, KfW was immediately supported by the government when it suffered losses. KfW carried out large-

scale public credit programs during the crisis and increased its household mortgage lending by 26.5%.

Appendix IV. Robustness Checks for the Effect on Affiliates

Affiliates of Parents With Alternative Relationships Banks

Some parents that had Commerzbank as relationship bank also had other relationship banks in 2006. These parents may have found it easier to substitute the missing credit from Commerzbank with lending from other banks, since the vast majority of German banks continued to lend during the crisis (Figure 2 of the main article). To test this argument, we construct six bins of parent Commerzbank dependence: one bin for affiliates with zero parent Commerzbank dependence and five bins for the quintiles of positive parent Commerzbank dependence. We then estimate one specification based on equation (3) of the main article. The only difference is that the relevant treatment variables are now indicators for the six bins interacted with the 2008 to 2010 indicator instead of the linear parent Commerzbank dependence interacted with the 2008 to 2010 indicator.

We plot the effects on affiliates falling into the six bins of parent Commerzbank dependence (Figure 5 of the main article). The excluded bin is for affiliates with zero parent Commerzbank dependence. The point estimates for affiliates with parent Commerzbank dependence in the bins up to 0.25 are small and insignificant. In contrast, point estimates are negative, significant, and of roughly equal magnitude for the two bins between 0.25 and 0.5. Finally, the coefficient for the top quintile of affiliates above 0.5 is the largest and is significant. The sample size in this bin is small, so standard errors overlap with the bins between 0.25 and 0.5.

We explore potential differences across bins more formally in Table IA.XXIII. We test for differences between affiliates from zero to 0.25, 0.25 to 0.5, and above 0.5 (columns 1-3) or between affiliates up to 0.25 and above 0.25 (columns 4-6). We find that the coefficient on affiliates from zero up to 0.25 is essentially zero and not significantly different from affiliates with zero parent Commerzbank dependence (Table IA.XXIII, column 1). This implies that affiliates with positive but low parent Commerzbank dependence faced no financial shock because their parents could borrow from a relatively large number of other relationship banks after Commerzbank's lending cut. This finding further strengthens the identification assumption because it highlights that there was no general relationship between positive parent Commerzbank dependence and slow growth. There was only a difference if the parent was relatively strongly dependent on Commerzbank. The coefficients on affiliates above 0.25 are consistently negative and significantly different compared to affiliates from zero up to 0.25

(column 1) and compared to all affiliates below 0.25 (column 4).

Additional Controls and Specifications

Choosing the number of baseline controls poses a trade-off. On the one hand, a large number of fixed effects may control for endogenous variation more accurately. On the other hand, many fixed effects may overweight small differences in treatment within fixed effect groups and produce unrepresentative estimates (Angrist and Pischke 2008, page 226).

In the baseline specifications, we balance this trade-off by including country-year and industry-year fixed effects separately and by classifying industries according to the NACE 1.1 one-digit classification (16 industries in total). We explore the robustness of the results further. The point estimates are very similar when we use a larger set of control variables, replacing one-digit with two-digit industry fixed effects (88 industries) and interacting all controls with year fixed effects (Table IA.XXIII, columns 2 and 5). Results also remain stable when we include the full interaction of country-industry-year fixed effects (columns 3 and 6). Given the large number of regressions, it is not surprising that one coefficient becomes marginally insignificant for the group of affiliates with parent Commerzbank dependence above 0.5 in one regression (column 3). All other coefficients remain significant at least at the 5% level.

Results are similar when we additionally control for parent characteristics and when we use a fully balanced panel (Table IA.XXIV). The results are also robust to using the inverse hyperbolic sine of sales instead of log sales as outcome (Table IA.XXV).

Appendix V. Local Business Cycles and Tax Differences

We find no evidence that the effects differed by GDP per capita growth (Table IA.XXVI, column 1) or national house price growth (column 2) between 2007 and 2009. The Great Recession hit firms in the service sector less strongly than nonservice firms (Eaton et al. 2016), but the effect on affiliates in the service sector was similar to other sectors (Table IA.XVIII, column 2). These results show that local demand conditions or the magnitude of the Great Recession do not drive the results.

We test whether tax shifting between parents and affiliates influences the results. We drop all affiliates located in countries defined as tax havens by Gumpert, Hines, and Schnitzer (2016) (Table IA.XXVII, column 1). We interact parent Commerzbank dependence with the difference in the corporate tax rate between Germany and the affiliate host country (column 2). Finally, we interact parent Commerzbank dependence with an indicator for affiliates located in countries where the corporate tax rate was lower than in Germany (column 3). The coefficients on parent

Commerzbank dependence remain stable and significant in all specifications. Hence, there is no evidence that the effects differ in countries with low tax rates. This is not surprising, given that we use a dynamic research design where the shock varies within countries over time, while tax rates are absorbed by country-year fixed effects.

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