Lecture 13: The Financial Accelerator

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Motivating Facts

- Take the Great Depression
  - On one side, waves of bank failures, culminating with the shutdown of the banking system in March 1933.
  - On the other side, high rates of layoffs and bankruptcy in the real sector
- Coincidence in timing
  - The first banking crisis 1930 stalled the initial recovery
  - New slump after a bank panic in 1931
  - The economy and the banking sector reached lows in 1933.

One unlucky coincidence or cuts in lending supply damaged the economy?

Motivation

- Causal effects of shocks to the banking sector on firms
- You can think of it as a joint hypothesis
  - Banks pass-through their shocks to their lenders (bank-lending channel)
  - Firms cannot find alternatives to bank lending (firm-borrowing channel)

Simplest Regression

- Think of a panel of firms producing Y_i and borrowing Q_i
- Δ computes the difference between a pre-recession to recession period

$$\Delta \log Y_i = \beta_0 + \beta_1 \Delta \log Q_i + \epsilon_i$$

- What is $\hat{\beta_1}$ measuring?

Intuitive identification challenge

$$\Delta \log Y_i = \beta_0 + \beta_1 \Delta \log Q_i + \epsilon_i$$

- Reverse causality: Not only shifts to credit supply in the data, but also to credit demand
  - Firms that produce more, may need to raise additional credit
- Omitted Variables bias: Future investment opportunities may drive both $\mathbb{E}(\epsilon_i \Delta \log Q_i) \neq 0$

Theoretical basis for $\beta_1 > 0$: Bernanke Gertler (1989), among others: Shifts in financial variables impair non-financial production

Khwaja and Mian 2008

- Context: Nuclear tests in Pakistan in 1998 triggered sanctions
- Government stopped USD deposit convertibility
  - Convertibility: Convert one asset (deposits) into another (cash)
- Not unusual. The American banking system suspended convertibility several times in the XIX and early XX century
- The key references on bank runs and suspension of convertibility are
  - Bryant 1980
  - Diamond Dybvig 1983
  - Gorton 1985

Khwaja and Mian 2008

- USD deposits widely popular
- But heterogeneous across banks. Not obviously random.
- Savers deposited USD in commercial banks. Commercial banks sent USD to the CB in exchange for rupees. When a depositor demanded their deposits back, the CB handed the dollars to the commercial bank at the *time of deposit* exchange rate in exchange for rupees.
- Reform after massive depreciation
  - Government allowed demand deposits back at the current (worse) exchange rate
  - Partial default on dollar deposits
  - Savers lost confidence and demanded their deposits back. Differential liquidity shock to banks who received USD deposits

Khwaja and Mian 2008

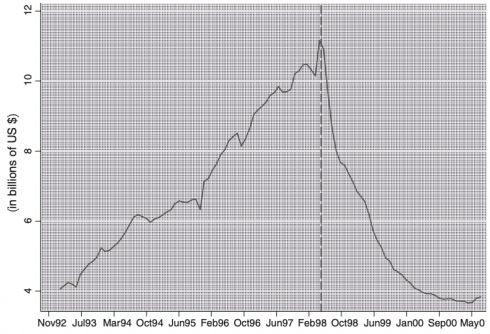

FIGURE 1. TOTAL DOLLAR DEPOSITS

Notes: Figure 1 examines the prevalence of foreign currency deposit accounts in Pakistan. These accounts (introduced in the early 1990s) grew steadily until March 1998, the date of the nuclear shock (indicated by the dashed line), and then fell rapidly after that.

Khwaja and Mian 2008

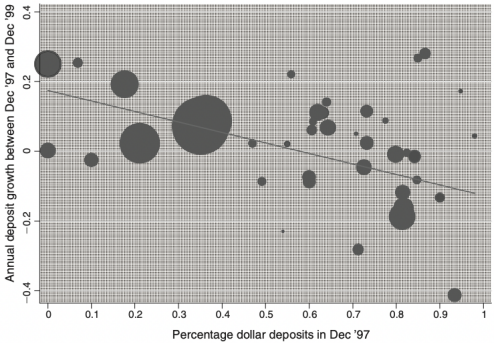

FIGURE 2. ANNUAL DEPOSIT GROWTH IN DEPOSITS AGAINST INITIAL DOLLAR DEPOSIT EXPOSURE (WEIGHTED)

Empirical Specification

Do balance sheet shocks to banks pass-through to firm borrowing?

$$\Delta Q_{ij} = \beta_j + \beta_1 \Delta D_i + \epsilon_{ij}$$

- Q_{ij} loan size of a firm-bank pair
- β_j firm fixed effect
- ΔD_i change in bank-level dollar-denominated deposits
- This firm-fixed effect approach became the standard in the literature

Empirical Specification

- Effectively uses only multi-bank firms
- The firm fixed effect soaks any shock that causes changes in overall firm credit
- How much firms increase their borrowing from one bank relative to another bank
- What could go wrong?

The null hypothesis

$$\Delta Q_{ij} = \beta_j + \beta_1 \Delta D_i + \epsilon_{ij}$$

- What is the economic meaning of the null hypothesis $H_0 : \beta_1 = 0$?
- Think of two worlds in which $\beta_1 = 0$. Thoughts?

Identifying assumption

- Recall

$$\Delta L_{ij} = \beta_j + \beta_1 \Delta D_i + \epsilon_{ij}$$

- What we need to assume

$$\mathbb{E}(\Delta D_i \epsilon_{ij}) = 0$$

- What does it mean?
- Construct a scenario that breaks the assumption

Results

TABLE 3—THE BANK LENDING CHANNEL—INTENSIVE MARGIN

	Δ Log loan size						
Dependent variable	FE (1)	FE (2)	FE (3)	OLS (4)	OLS (5)	OLS (6)	OLS (7)
Δ Log bank liquidity	0.60	0.63	0.64	0.46	0.64	0.30	0.33
	(0.09)	(0.10)	(0.11)	(0.14)	(0.17)	(0.12)	(0.15)
Δ Log bank liquidity × small firms						0.57	0.40
						(0.26)	(0.21)
Small firms						0.18	0.24
						(0.06)	(0.03)
Lag Δ log bank liquidity		0.15					−0.13
		(0.10)					(0.14)
Preshock average bank ROA		0.99					−0.27
		(1.73)					(1.66)
Log bank size		0.02					−0.02
		(0.03)					(0.03)
Preshock bank capitalization		−1.16					0.09
		(0.97)					(1.13)
Preshock bank default rate		−0.869					−0.518
		(0.36)					(0.32)
Government bank dummy		0.13					−0.01
		(0.06)					(0.08)
Foreign bank dummy		0.01					−0.12
		(0.06)					(0.08)
Fixed effects	Firm	Firm	Firm × loan-type				Firm Controls
Constant	—	—	—	−0.06	−0.04	−0.14	—
				(0.04)	(0.04)	(0.03)	
Number of observations	5,382	5,382	5,382	5,382	22,176	22,176	22,176
R-squared	0.44	0.44	0.6	0.01	0.02	0.03	0.05

Notes: These regressions examine the bank lending channel for the set of firms borrowing at the time of the shock (the intensive margin) in more detail. All quarterly data for a given loan are collapsed to a single pre– and post–nuclear test period. The nuclear test occurred in the second quarter of 1998, so all observations from 1996:III to 1998:I for a given loan are time-averaged into one. Similarly, all observations from 1998:III to 2000:I are time-averaged into one. Data are restricted to: (a) banks that take retail (commercial) deposits (78 percent of all formal financing), and (b) loans that were not in default in the first quarter of 1998 (i.e., just before the nuclear tests). Columns 1–4 are run on the sample of firms that borrow from multiple banks (preshock) and include firm fixed effects (firm interacted with loan type for column 4). Columns 5–7 also include firms borrowing from single banks and run an OLS specification. Firm controls in column 7 include dummies for each of the 134 cities/towns the firm is located in, 21 industry dummies, whether the firm is politically connected, its membership in a business conglomerate, and whether it borrows from multiple banks. Standard errors in parentheses are clustered at the bank level (42 banks in total).

Results

TABLE 4—THE BANK LENDING CHANNEL—EXTENSIVE MARGIN

Dependent variable	Exit?			Entry?		
	FE (1)	FE (2)	OLS (3)	FE (4)	FE (5)	OLS (6)
Δ Log bank liquidity	−0.21 (0.05)	−0.19 (0.05)	−0.16 (0.059)	0.12 (0.05)	0.15 (0.04)	0.087 (0.049)
Small			0.084 (0.019)			0.2 (0.015)
Small × Δ log bank liquidity			0.077 (0.084)			0.11 (0.067)
Constant	—	—	—	—	—	—
Firm fixed effects	Yes	Yes		Yes	Yes	
Bank controls		Yes	Yes		Yes	Yes
Firm controls			Yes			Yes
Number of observations	6,517	6,517	26,730	8,516	8,516	35,921
R-squared	0.48	0.49	0.09	0.54	0.55	0.21

Notes: These regressions examine how the bank lending channel affected exit and entry of firms (from borrowing). Data are restricted to: (a) banks that take retail (commercial) deposits (78 percent of all formal financing), and (b) loans that were not in default in the first quarter of 1998 (i.e., just before the nuclear tests). Columns 1–3 look at exit by including all loans that were outstanding at the time of the nuclear tests. For a given loan, "exit" is classified as one if the loan is not renewed and the firm exits its banking relationship by the first postshock year. Columns 1–2 further limit the sample to only firms that were borrowing from multiple banks before the shock and include firm fixed effects. Columns 4–6 look at entry and include all loans given out after the nuclear tests quarter. For a given loan, "entry" is classified as one if the loan was made for the first time in the postshock year. Columns 4–5 further limit the sample to only firms that were borrowing from multiple banks after the shock and include firm fixed effects. All regressions include bank level controls: lagged change in bank liquidity, preshock bank ROA, log bank size, bank capitalization, fraction of portfolio in default, and dummies for foreign and government banks. The OLS regressions also include an extensive set of firm-level controls that include dummies for each of the 134 cities/towns the firm is located in, 21 industry dummies, whether the firm is politically connected, its membership in a business conglomerate, and whether it borrows from multiple banks. Standard errors in parentheses are clustered at the bank level (42 banks in total).

Relation to Chodorow-Reich 2014

- Khwaja-Mian (2008) mostly about financial variables
- In particular credit demand
- Need variation within the firm
- But are credit effects relevant at the firm level?
- Aggregate bank-firm results at the firm level

Chodorow-Reich 2014

- Casual observation suggests the Lehman bankruptcy changed the scope of the Great Recession (Blinder 2013)
- Corporate paper markets, interbank lending, lending supply froze
- Many of these effects were national (even global) driven by panic/pessimism/...
- The recession turned from a Wall Street problem into a Main Street problem after September 15th, 2008
- But is there a causal link from drops in lending to drops in employment?
- idea: look at firms with differential exposure to Lehman

Variation across firms

- Start by measuring the cut in lending by bank b
- $L_{b,j,t}$ The loans given by bank b to firm j in period t
- Leave-one-out growth in bank credit

$$\Delta L_{-i,b} = \frac{\sum_{i \neq j} \alpha_{b,j,crisis} L_{b,j,crisis}}{\sum_{i \neq j} \alpha_{b,j,normal} L_{b,j,normal}}$$

- Aggregate for firm i across banks b

$$\Delta \tilde{L}_{i,s} = \sum_{b \in s} \alpha_{b,i,last} \Delta L_{-i,b}$$

- Shift-share design. Bank-level shocks, firm-level exposure

Firm-bank relationships are sticky - Suggests room for a strong first stage

TABLE I

BANKING RELATIONSHIP REGRESSIONS

	(1) Lender chosen as lead	(2) Lender chosen as lead	(3) Lender chosen as participant	(4) Lender chosen as participant
Explanatory variables				
Previous lead	0.71**	0.67**	0.022**	-0.023**
	(0.011)	(0.012)	(0.0040)	(0.0045)
Previous participant	0.029**	0.020**	0.50**	0.46**
	(0.0014)	(0.0015)	(0.011)	(0.011)
Previous lead × Public (Unrated)	−0.052**	−0.043*		
	(0.016)	(0.017)		
Previous lead × Public (Rated)	−0.058**	−0.086**		
	(0.014)	(0.016)		
Previous participant × Public (Unrated)			0.039*	0.033+
			(0.018)	(0.018)
Previous participant × Public (Rated)			0.012	−0.038*
			(0.014)	(0.015)
Lender FE	Yes	Yes	Yes	Yes
2-digit SIC × lender FE	No	Yes	No	Yes
State × lender FE	No	Yes	No	Yes
Year × lender FE	No	Yes	No	Yes
Public/private × lender FE	No	Yes	No	Yes
All in drawn quartile × lender FE	No	Yes	No	Yes
Sales quartile × lender FE	No	Yes	No	Yes
R^2	0.480	0.504	0.285	0.334
Borrower clusters	3,253	3,253	3,253	3,253
Observations	349,008	349,008	349,008	349,008

Notes. The dependent variable is an indicator for whether the lender serves in the role indicated in the table header. For each loan in which the borrower has previous accessed the syndicated market, the data set contains one observation for each potential lender, where a potential lender is a lender active in the syndicated loan market in that year. The variables Previous lead and Previous participant equal 1 if the lender served as the lead or as a participant on the borrower's previous loan, respectively. The sample covers 2001 to June 2009 and excludes loans to borrowers in finance, insurance, or real estate, and for which the purpose of the loan is not working capital or general corporate purposes. Estimation is via OLS. Standard errors in parentheses and clustered by borrower. +, *, and ** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

IV First Stage

TABLE III

DETERMINANTS OF BANK LENDING

	(1)	(2)	(3)
	Change in lending during the crisis		
Explanatory variables			
Lehman cosyndication exposure	−0.14**		
	(0.049)		
ABX exposure		−0.11*	
		(0.041)	
2007–8 trading revenue/assets			0.046
			(0.040)
Real estate charge-offs flag			0.012
			(0.050)
2007–8 real estate net charge-offs/assets			−0.092+
			(0.051)
2007 Bank Deposits/Assets			0.19**
			(0.059)
Joint test p-value	0.008	0.013	0.002
R^2	0.16	0.15	0.35
Observations	42	40	42

Notes. The dependent variable is the change in the annualized number of loans made by the bank between the periods October 2005 to June 2007 and October 2008 to June 2009, with each loan scaled by the importance of the lender in the loan syndicate as described in Section IV.C of the text. Observations weighted by number of precrisis borrowers. The explanatory variables have been normalized to have unit variance. +, *, and ** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Results on Rates - Suggests credit supply disruptions

TABLE VII

THE EFFECT OF BANK HEALTH ON INTEREST RATE SPREADS

	(1)	(2)	(3)	(4)	(5)	(6)
	Change in interest rate spread					
	OLS		$\Delta\tilde{L}_{i,s}$ instrumented using			
			Lehman exposure	ABX exposure	Bank statement items	All
Explanatory variables						
%Δ loans to other firms ($\Delta\tilde{L}_{i,s}$)	−14.6**	−12.2**	−23.1*	−20.0	−17.2*	−17.6**
	(5.26)	(4.15)	(11.2)	(13.3)	(7.63)	(6.68)
1-digit SIC, loan year FE	No	Yes	Yes	Yes	Yes	Yes
Bond access/public/private FE	No	Yes	Yes	Yes	Yes	Yes
Additional Dealscan controls	No	Yes	Yes	Yes	Yes	Yes
First stage F-statistic			60.5	7.8	14.3	14.5
J-statistic p-value	.	.	.	.	.	0.967
$E[\Delta Spread]$	130.6	130.6	130.6	130.7	130.6	130.7
$E[Spread{:}\Delta\tilde{L}_{p90} - \Delta\tilde{L}_{p10}]$	−39.7	−33.0	−62.8	−54.3	−46.6	−47.7
Lead lender 1 clusters	34	34	34	32	34	32
Lead lender 2 clusters	30	30	30	28	30	28
Observations	350	350	350	346	350	346

Notes. The dependent variable is the interest spread, in basis points, charged to a firm on a loan starting between October 2008 and June 2009, less the interest spread charged to the same firm on its last loan of the same type (credit line or term loan) obtained prior to September 15, 2008. The regressions exclude loan pairs with an increase of >400 basis points. See the text for further details of the sample construction. The variable $\Delta\tilde{L}_{i,s}$ equals the change in the annualized number of loans made by the bank between the periods October 2005 to June 2007 and October 2008 to June 2009 and has been normalized to have unit variance. The variable Lehman cosyndication exposure equals the fraction of the bank's syndication portfolio where Lehman Brothers had a lead role in the loan deal. The variable ABX exposure equals the loading of the bank's stock return on the ABX AAA 2006-H1 index between October 2007 and December 2007. The balance sheet and income statement items include the ratio of deposits to assets at the end of 2007, the ratio of trading revenue over 2007–8 to assets, the ratio of net real estate charge-offs over 2007–8 to assets, and an indicator for reporting real estate charge-offs. For each firm, the bank-level measures are averaged over the members of the firm's last precrisis loan syndicate, with weights given according to each bank's role. Additional Dealscan controls: multiple lead lenders indicator, loan due during crisis indicator, credit line indicator, log sales at close, all in drawn spread, credit line * all in drawn. Standard errors in parentheses and two-way clustered on the lead lenders in the borrower's last precrisis loan syndicate. +, *, and ** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Results on Employment

TABLE IX

THE EFFECT OF LENDER CREDIT SUPPLY ON EMPLOYMENT

	(1)	(2)	(3)	(4)	(5)	(6)
	Employment growth rate 2008:3–2009:3					
	OLS		$\Delta\tilde{L}_{i,s}$ instrumented using			
			Lehman exposure	ABX exposure	Bank statement items	All
Explanatory variables						
%Δ loans to other firms ($\Delta\tilde{L}_{i,s}$)	1.17*	1.67**	2.49*	3.17*	2.13*	2.38**
	(0.58)	(0.61)	(1.00)	(1.35)	(0.88)	(0.77)
Lagged employment growth		0.0033	0.0039	0.0045	0.0036	0.0039
		(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Emp. change in firm's county		0.89*	0.85+	0.86+	0.87+	0.89+
		(0.43)	(0.46)	(0.48)	(0.45)	(0.46)
2-digit SIC, state, loan year FE	No	Yes	Yes	Yes	Yes	Yes
Firm size bin FE	No	Yes	Yes	Yes	Yes	Yes
Firm age bin FE	No	Yes	Yes	Yes	Yes	Yes
Bond access/public/private FE	No	Yes	Yes	Yes	Yes	Yes
Additional Dealscan controls	No	Yes	Yes	Yes	Yes	Yes
First-stage F-statistic			15.5	8.5	18.5	23.1
J-statistic p-value			.	.	.	0.190
$E[g_i^s]$	−0.092	−0.092	−0.092	−0.093	−0.092	−0.093
$E[g_i^s \cdot \Delta\tilde{L}_{p90} - \Delta\tilde{L}_{p10}]$	0.027	0.039	0.058	0.074	0.050	0.055
Lead lender 1 clusters	43	43	43	40	43	40
Lead lender 2 clusters	43	43	43	40	43	40
Observations	2,040	2,040	2,040	2,015	2,040	2,015

Notes. The dependent variable is the symmetric growth rate g_i^s of employment. The variable $\Delta\tilde{L}_{i,s}$ equals the change in the annualized number of loans made by the bank between the periods October 2005 to June 2007 and October 2008 to June 2009 and has been normalized to have unit variance. The variable Lehman co-syndication exposure equals the fraction of the bank's syndication portfolio where Lehman Brothers had a lead role in the loan deal. The variable ABX exposure equals the loading of the bank's stock return on the ABX AAA 2006-H1 index between October 2007 and December 2007. The balance sheet and income statement items include the ratio of deposits to assets at the end of 2007, the ratio of trading revenue over 2007–8 to assets, the ratio of net real estate charge-offs over 2007–8 to assets, and an indicator for report real estate charge-offs. For each firm, the bank-level measures are averaged over the members of the firm's last precrisis loan syndicate, with weights given according to each bank's role. In columns (1) and (2) estimation is via OLS. In columns (3)–(6) $\Delta\tilde{L}_{i,s}$ is instrumented using the variable indicated in the column heading. Borrower-level covariates are as of the last precrisis loan taken by each borrower. Firms divided into size bin classes of 1–250, 250–999, and 1,000+, and age bins for birth in the 2000s, 1990s, or earlier. Additional Dealscan controls: multiple lead lenders indicator, loan due during crisis indicator, credit line indicator, log sales at close, all in drawn spread, credit line * all in drawn.

Aggregate at the regional level

- You could be worried that firm-level effects wash out in the aggregate
- Lehman firms do worse, but non-Lehman firms might do better, nothing much happens in the aggregate
- One idea is to aggregate at a regional level
- Why? If you think this competition of Lehman and non-Lehman firms happens in every region, regional outcomes are inclusive of this particular general equilibrium effect
- Peek and Rosengren (2000) is the seminal paper
- We will study Huber (2018)

Huber 2018

- The allies were convinced that the ability of Germany to wage war came from economic centralization
- From 1948 to 1957, broke up three major banks and created banking zones
- Firms form ties with banks close to them (Degryse and Ongena 2005)
- Commerzbank had three HQ's
- Instrument: Distance to a Commerzbank HQ

Results

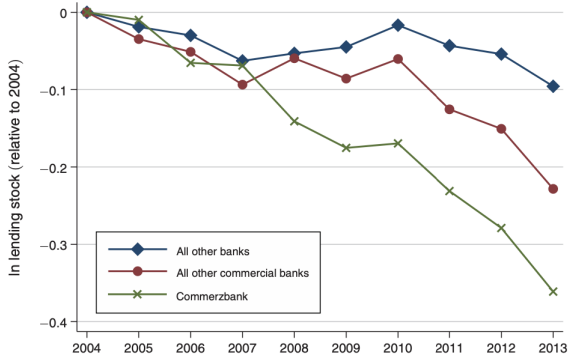

FIGURE 1. THE LENDING STOCK OF GERMAN BANKS

Notes: This figure plots the ln lending stock to German non-financial customers, relative to the year 2004, in 2010 billions of euros. The data for Commerzbank include lending by branches of Commerzbank and Dresdner Bank. I sum their lending stock for the years before the 2009 take-over, using data from the annual reports. For all other banks, I use aggregated data from the Deutsche Bundesbank on German banks and subtract lending by Commerzbank. For all other commercial banks, I subtract lending by Commerzbank, the savings banks, the Landesbanken, and the cooperative banks.

Specification

- Firm-level effects

$$y_{fct} = \zeta + \beta CBdep_{fc} \times d_t^{post} + \kappa_c \times d_t^{post} + \Gamma' X_{fc} \times d_t^{post} + \gamma_{cf} + \lambda_t + \epsilon_{fct}$$

- Thoughts?

Results

TABLE 4—FIRM BANK LOANS AND COMMERZBANK DEPENDENCE

	(1)	(2)	(3)
Firm *CB dep* × *d*	−0.101	−0.166	−0.205
	(0.079)	(0.080)	(0.078)
Observations	12,066	12,066	12,066
R^2	0.009	0.078	0.094
Number of firms	2,011	2,011	2,011
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
County fixed effects × *d*	No	Yes	Yes
ln age × *d*	No	Yes	Yes
Size bin fixed effects × *d*	No	Yes	Yes
Industry fixed effects × *d*	No	No	Yes
Import and export share × *d*	No	No	Yes

Notes: This table reports estimates from firm OLS panel regressions. The outcome in all columns is firm ln bank loans. Firm *CB dep* is the fraction of the firm's relationship banks that were Commerzbank branches in 2006. *d* is a dummy for the years following the lending cut, 2009 to 2012. The following time-invariant control variables are calculated for the year 2006 and interacted with *d*: fixed effects for 70 industries, 357 counties, and 4 firm size bins (1–49, 50–249, 250–999, and over 1,000 employees); the ln of firm age; the export share (fraction of exports out of total revenue); and the import share (fraction of imports out of total costs). The data include the years 2007 to 2012. R^2 is the within-firm R^2. Standard errors are two-way clustered at the level of the county and the industry.

Results

TABLE 6—FIRM EMPLOYMENT AND COMMERZBANK DEPENDENCE

	(1)	(2)	(3)	(4)	(5)
Firm *CB dep* × *d*	−0.044	−0.047	−0.053		
	(0.021)	(0.016)	(0.015)		
Low bank debt dep. × firm *CB dep* × *d*				−0.035	
				(0.032)	
High bank debt dep. × firm *CB dep* × *d*				−0.071	
				(0.020)	
(0 < firm *CB dep* ≤ 0.25) × *d*					0.007
					(0.016)
(0.25 < firm *CB dep* ≤ 0.5) × *d*					−0.017
					(0.008)
(0.5 < firm *CB dep* ≤ 1) × *d*					−0.065
					(0.018)
Observations	12,066	12,066	12,066	12,066	12,066
R^2	0.026	0.098	0.124	0.125	0.125
Number of firms	2,011	2,011	2,011	2,011	2,011
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
County fixed effects × *d*	No	Yes	Yes	Yes	Yes
Size bin fixed effects × *d*	No	Yes	Yes	Yes	Yes
ln age × *d*	No	Yes	Yes	Yes	Yes
Industry fixed effects × *d*	No	No	Yes	Yes	Yes
Import and export share × *d*	No	No	Yes	Yes	Yes

Notes: This table reports estimates from firm OLS panel regressions. The outcome in all columns is firm ln employment. Firms with low (high) bank debt dependence have up to (over) 50 percent of their liabilities with banks. The control variables, the standard error calculations, the years covered by the data, and the definition of R^2 are explained in Table 4.

Results

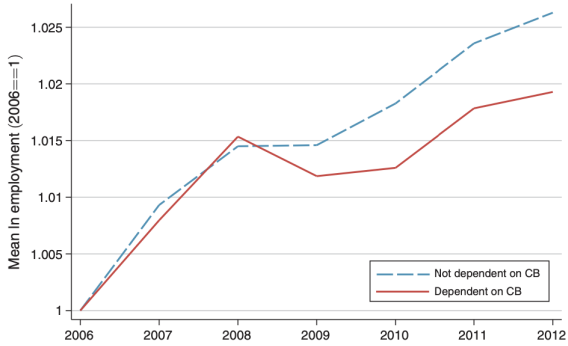

FIGURE 4. FIRM EMPLOYMENT EFFECTS

County Specification

- Aggregate at the county level using average exposure

$$y_{ct} = \zeta + \rho \overline{CBdep_c} \times d_t^{post} + \Gamma' X_c \times d_t^{post} + \gamma_c + \lambda_t + \epsilon_{fct}$$

Results

TABLE 9—COUNTY OUTCOMES AND COMMERZBANK DEPENDENCE (IV)

Outcome:	CB dep (1)	CB dep (2)	GDP (3)	GDP (4)	GDP (5)	Empl (6)	Net migr (7)
Distance instrument × *d*	0.028	0.042					
	(0.005)	(0.006)					
County *CB dep* × *d*			−0.335	−0.367	−0.345	−0.208	0.026
			(0.118)	(0.182)	(0.173)	(0.113)	(0.020)
Observations	5,005	5,005	5,005	5,005	5,005	5,005	1,925
R^2	0.876	0.941	0.322	0.348	0.355	0.504	0.590
Number of counties	385	385	385	385	385	385	385
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Former GDR fixed effects × *d*	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear distances × *d*	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry shares × *d*	No	Yes	No	Yes	Yes	Yes	Yes
Export and import shares × *d*	No	Yes	No	Yes	Yes	Yes	Yes
Landesbank in crisis × *d*	No	Yes	No	Yes	Yes	Yes	Yes
Population × *d*	No	Yes	No	No	Yes	No	No
Population density × *d*	No	Yes	No	No	Yes	No	No
GDP per capita × *d*	No	Yes	No	No	Yes	No	No
Debt index × *d*	No	Yes	No	No	Yes	No	No
Estimator	OLS	OLS	IV	IV	IV	IV	IV

Notes: This table reports estimates from county panel regressions. Columns 1 and 2 report the first stage and columns 3 to 7 the IV regressions. The distance instrument is the negative of the county's distance to the closest post-war Commerzbank head office, in 100 kilometers. The linear distances include the county's distances to Düsseldorf, Frankfurt, Hamburg, Berlin, and Dresden. The outcomes, other control variables, weights, standard error calculations, the years covered by the data, and the definition of R^2 are explained in Table 8.

Indirect Effects

- Estimate spillovers in local economies

$$\Delta y_{fc} = \zeta + \beta CBdep_{fc} + \sigma \overline{CBdep_{fc}} + \Gamma' X_{fc} + \xi fc$$

Results

TABLE 10—THE DIRECT AND INDIRECT EFFECTS ON FIRM EMPLOYMENT GROWTH

	(1)	(2)
Firm *CB dep*	−0.030	−0.036
	(0.009)	(0.009)
CB dep of other firms in county	−0.166	−0.170
	(0.076)	(0.082)
Observations	48,101	48,101
R^2	0.012	0.017
Firm controls	Yes	Yes
County controls	No	Yes

Notes: This table reports estimates from cross-sectional firm OLS regressions. The outcome is the symmetric growth rate of firm employment from 2008 to 2012. *CB dep* of other firms in county is the average firm Commerzbank dependence of all the other firms in the county. The firm control variables are the same as in Table 4, except there are no county fixed effects. The county controls and the standard error calculations are the same as in Table 8.