Banking Without Branches

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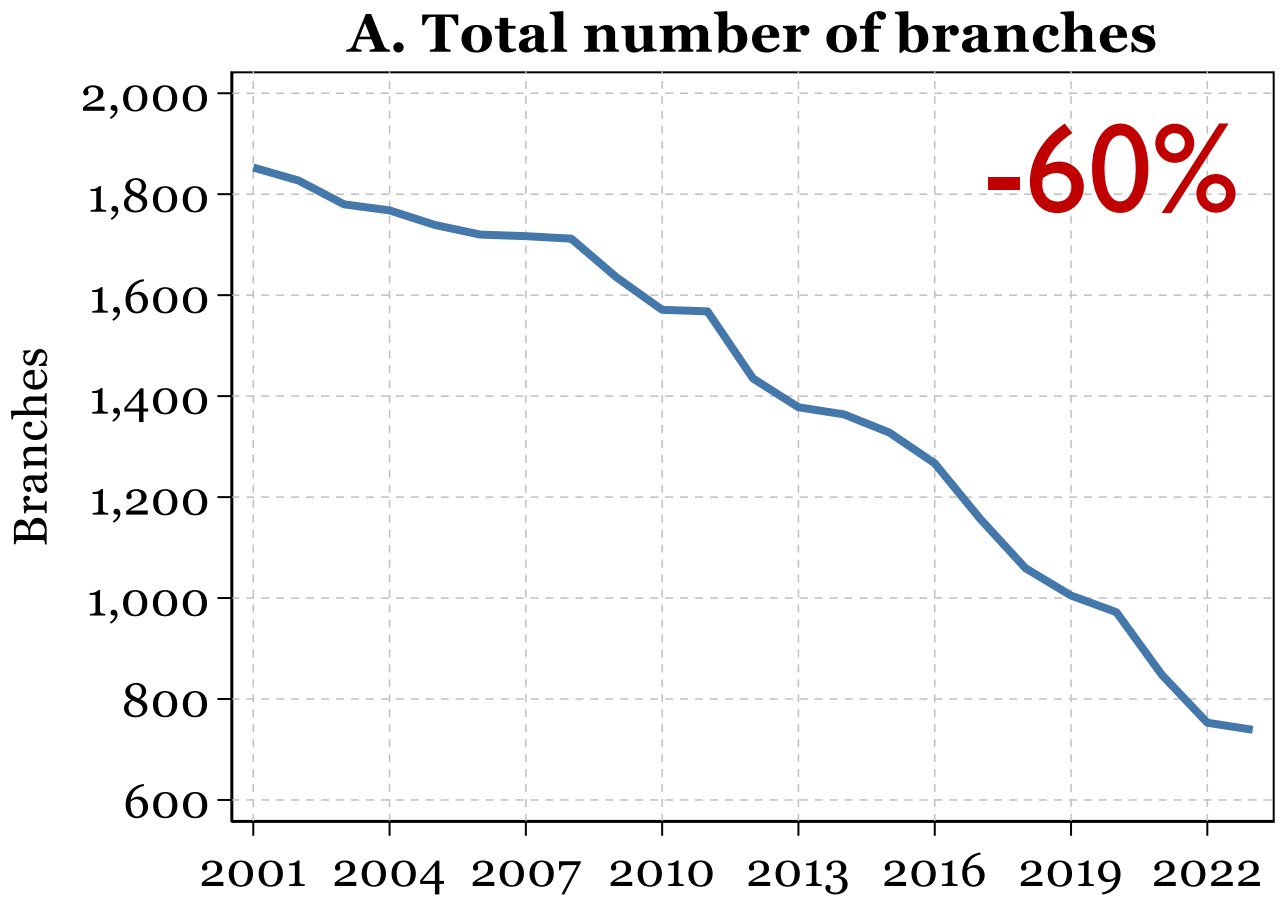
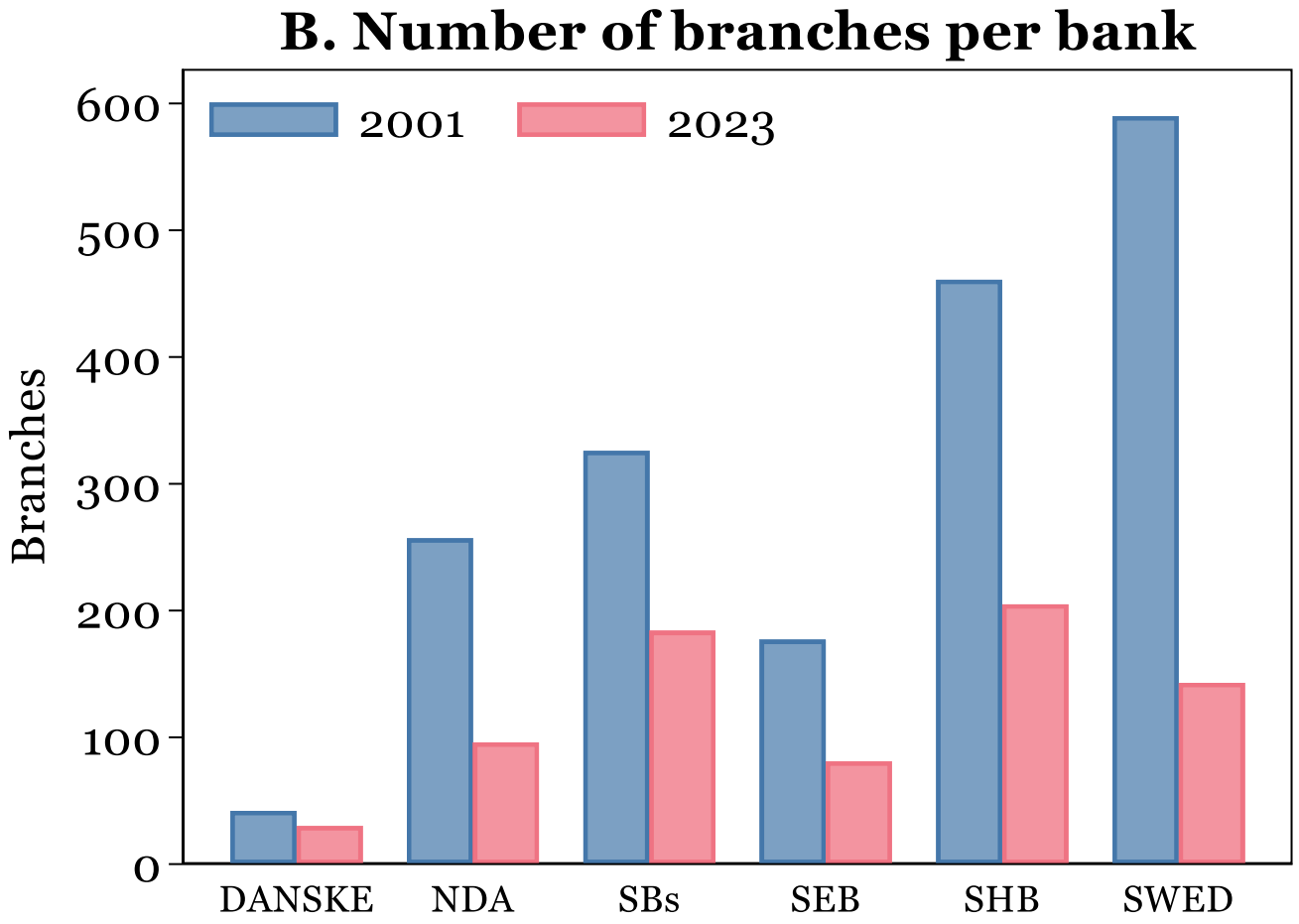
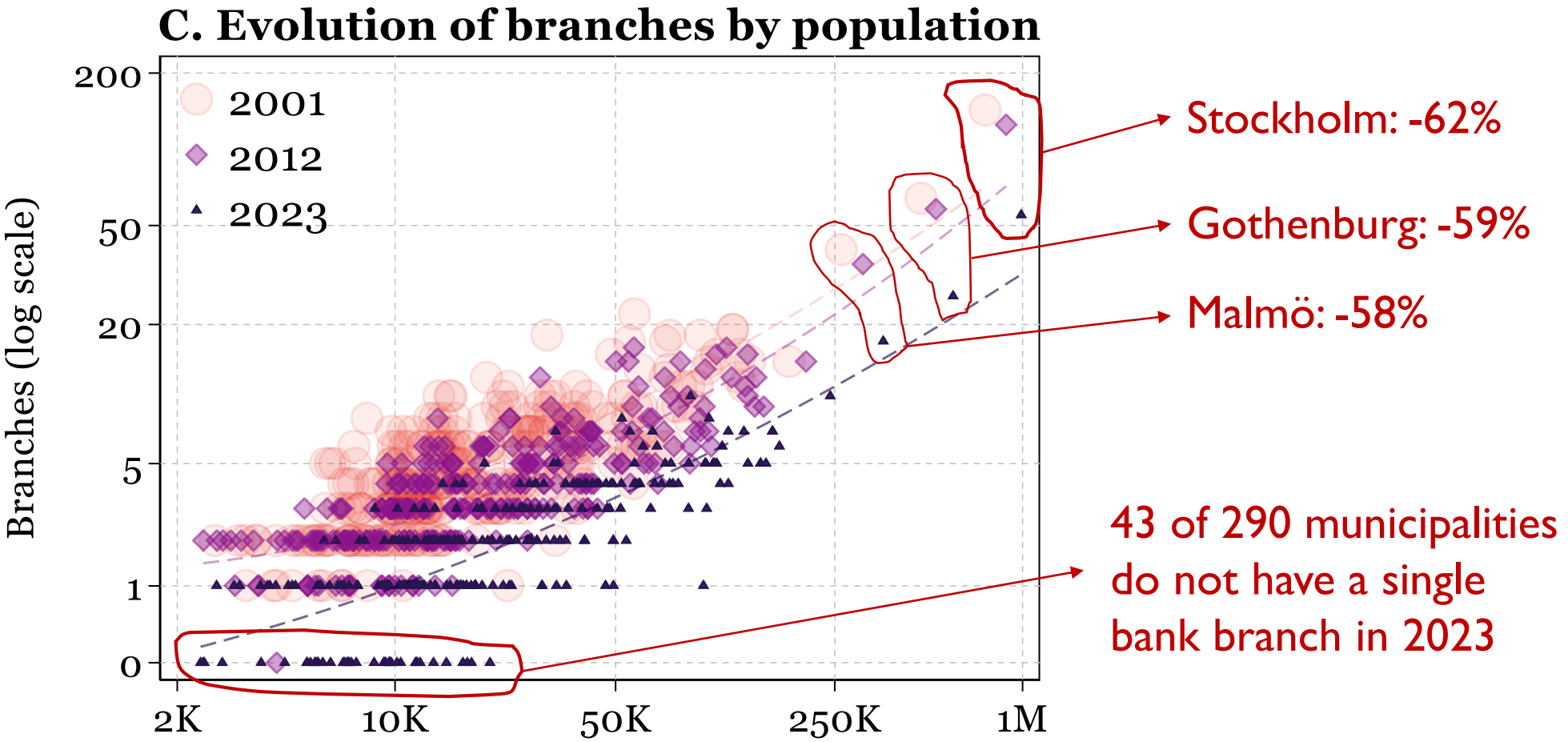
The great bank-branch closure wave in Sweden



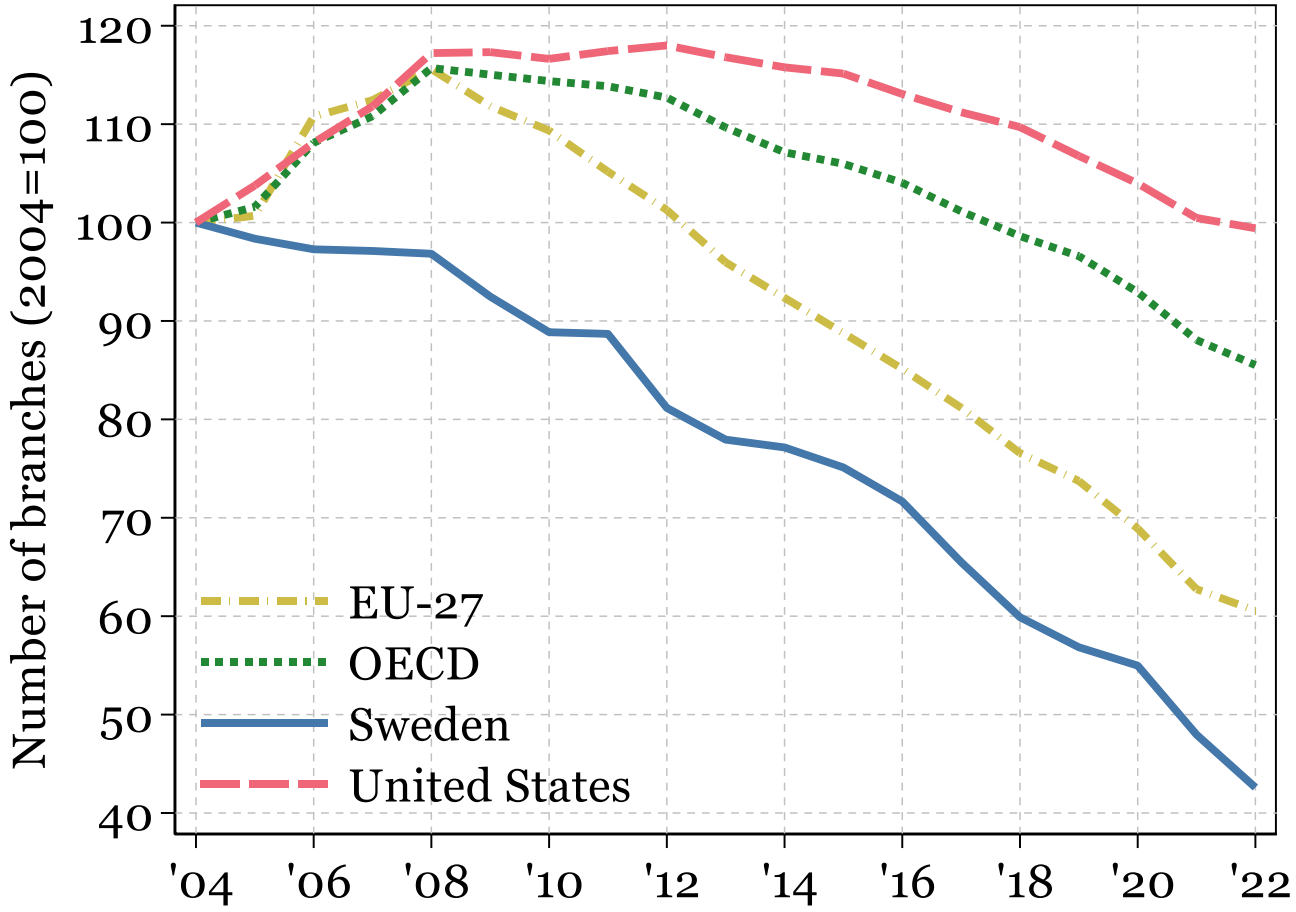
Branches are being closed by all banks…



…and throughout the country



Broad trend across countries, but differences in timing and speed



Branch networks, soft information, and business lending

Traditional view: Soft information critical for business lending – especially SME lending

> Petersen and Rajan (2002): Information that is "hard to communicate to others, capture in written documents, or quantify"
>
> Berger et al (2005): Information that "cannot be verifiably documented in a report that the loan officer can pass on to his superiors"
>
> Soft information needs to be collected via relationship-based lending in local branch networks. Decision making needs to be local.

Hypothesis: Branch closures cause reductions in credit supply

Data and empirical framework

Data

Annual panel with the number of branches per bank, municipality, and year during 2001–2023. Constructed based on two sources:

1. Bankplatser i Sverige: Print publication issued annually by the Swedish Bankers' Association until 2008. Addresses of all bank branches in Sweden.
2. Pipos: Administrative data from the Swedish Agency for Economic and Regional Growth. Exact location of all bank branches in Sweden 2011-2023.

Annual firm-level panel comprising all Swedish non-financial firms

i. Financial-accounts variables: Loans, investment, employment, etc.
ii. Demographic variables: Location, industry, legal form, etc.

A local-projections model

We use the following local-projections model to estimate the effects of branch closures on firm-level outcomes:

$$\Delta Y_{i,t+h} = \alpha_i^h + \theta_t^h + \beta^h \cdot \Delta Branches_{j,t} + \gamma^{\mathbf{h}} \cdot \mathbf{X_{i,t}} + \varepsilon_{i,t}^h$$

$\Delta Branches_{j,t}$: Branch growth in municipality j between years $t-1$ and t

$\Delta Y_{i,t+h}$: Symmetric growth rate of some outcome Y (e.g., loans when we look at credits-supply effects) between years $t-1$ and $t+h$ for firm i in municipality j

Empirical challenge: OLS is likely to yield biased estimates of β^h

A shift-share instrument

We instrument the actual change in bank branches in a municipality with a shift-share instrument in the spirit of Bartik (1991):

$$Z_{j,t} = \sum_b \frac{Branches_{b,j,t-1}}{Branches_{j,t-1}} \cdot \Delta Branches_{b,t}$$

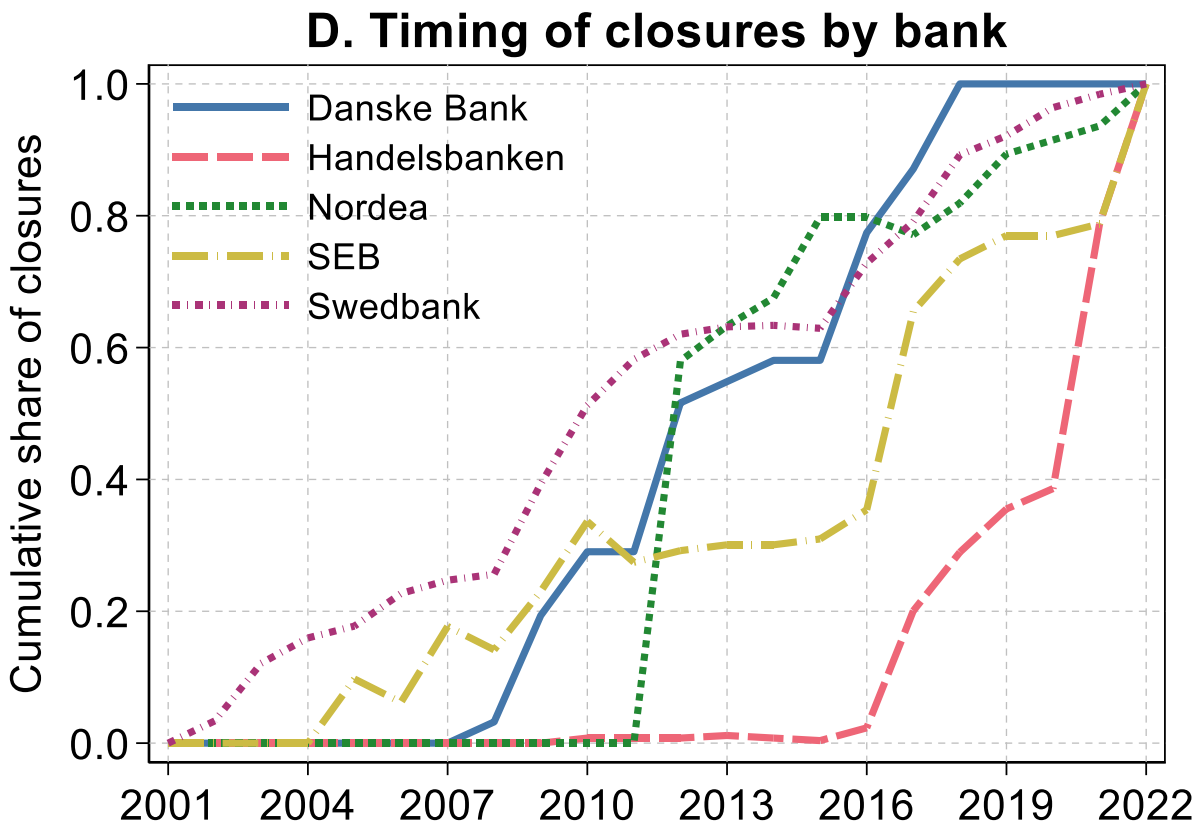
Shares: Bank b's share in the total number of bank branches in municipality j in year $t-1$

Shifts: Percent change in the number of bank branches nationwide for bank b between years $t-1$ and t

What generates variation in the instrument?

1. Spatial distribution of banks
2. Timing of branch closures

Key ingredient: Branch closures have mostly been due to central strategic decisions of the banks and concentrated in time (nationwide closure waves)



Baseline empirical specification

We introduce the instrument into the empirical model by supplementing the structural equation

$$\Delta Y_{i,t+h} = \alpha_i^h + \theta_t^h + \beta^h \cdot \Delta Branches_{j,t} + \gamma^{\mathbf{h}} \cdot \mathbf{X_{i,t}} + \varepsilon_{i,t}^h$$

with the following first-stage regression:

$$\Delta Branches_{j,t} = \phi_i + \psi_t + \xi \cdot Z_{j,t} + \theta \cdot \mathbf{X_{i,t}} + u_{i,t}$$

We then undertake two-stage least squares (2SLS) estimation of the resulting two-equation system. SEs clustered by municipality-year.

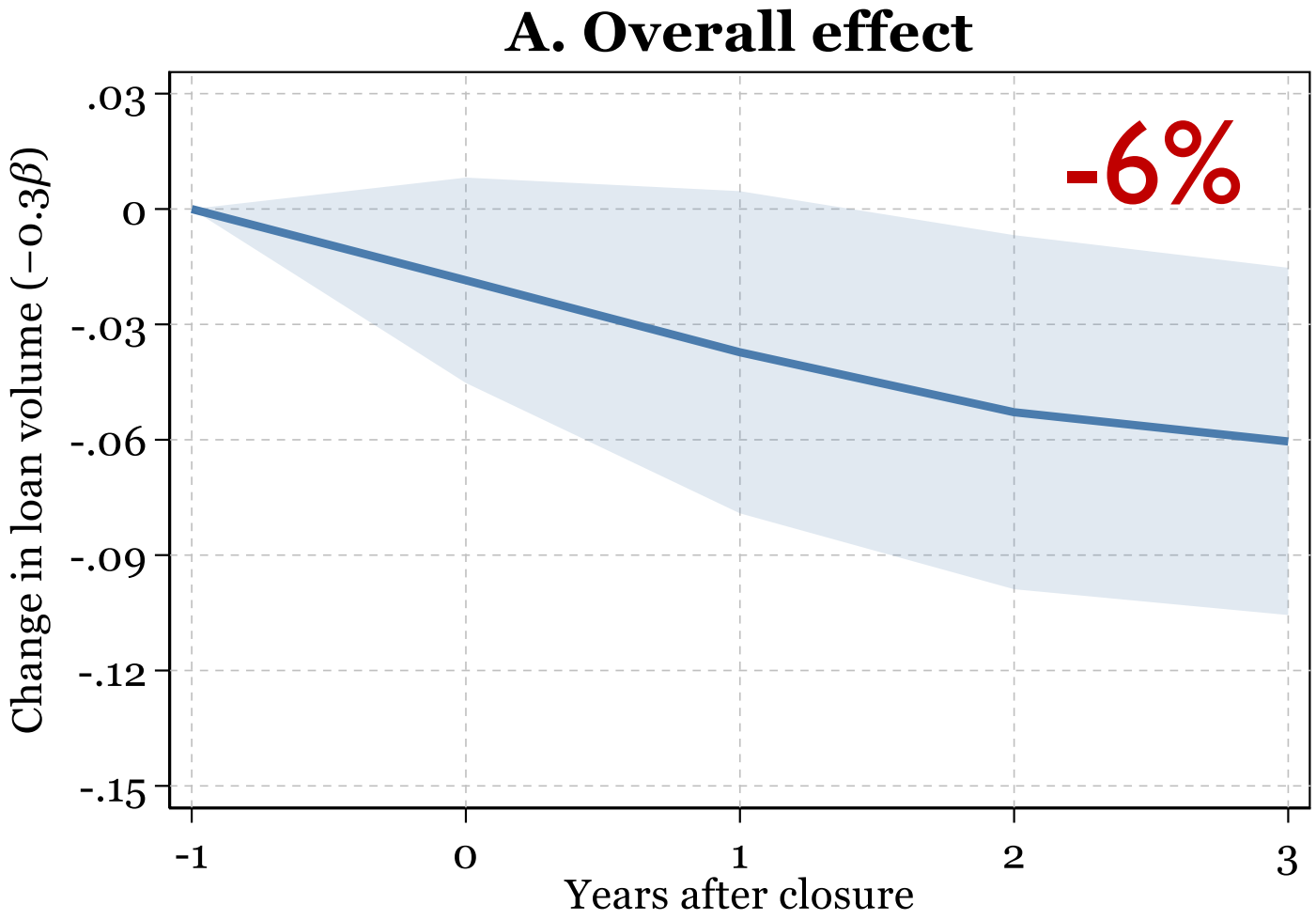
Conditions for LATE identification

2SLS estimates of β^h capture the local average treatment effect (LATE) of branch closures on local firms given four conditions:

1. Instrument strength: $Z_{j,t}$ strongly affects municipality-level branch growth
2. Instrument independence: $Z_{j,t}$ is as good as randomly assigned – i.e., is not correlated with other factors affecting the outcomes of interest
3. Exclusion restriction: $Z_{j,t}$ does not affect the outcomes of interest except through the effect on branch growth
4. Monotonicity: There are no "defier" municipalities in the sample

Results

The local credit-supply effects of branch closures



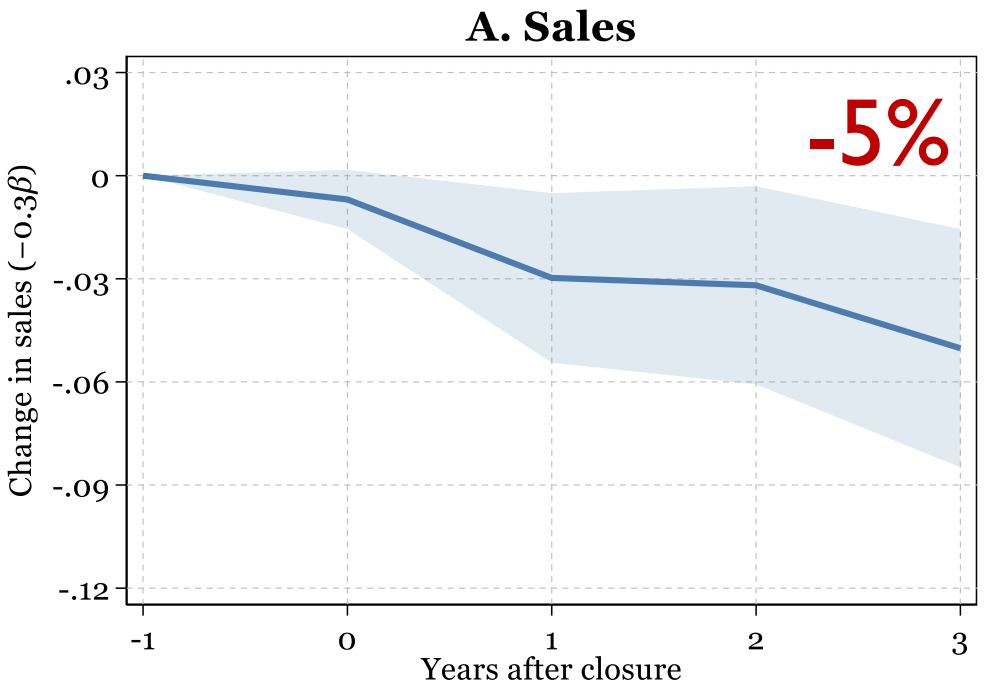
Heterogeneity in credit-supply effects

Subsample regressions reveal that the credit-supply effects are only significant for:

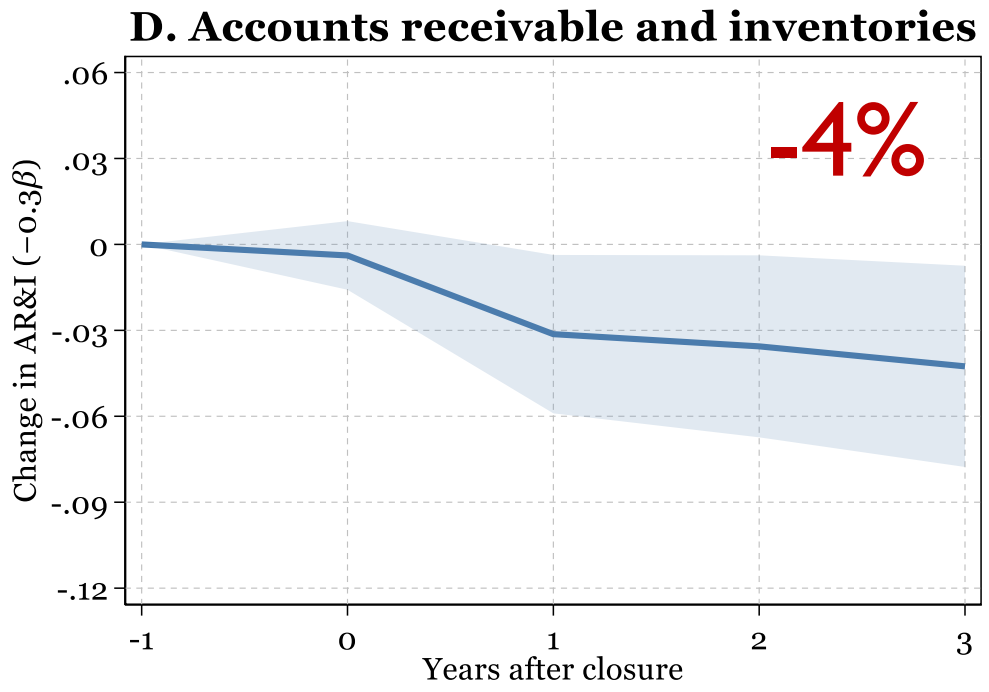
1. Small firms, whether measured by sales or assets (below 75th pct.)
2. Collateral-poor firms, as measured by asset tangibility (below 75th pct.)
3. Risky firms, as measured by the ex-ante probability of default (above 25th pct.)

Differences across groups statistically significant in all but a few cases

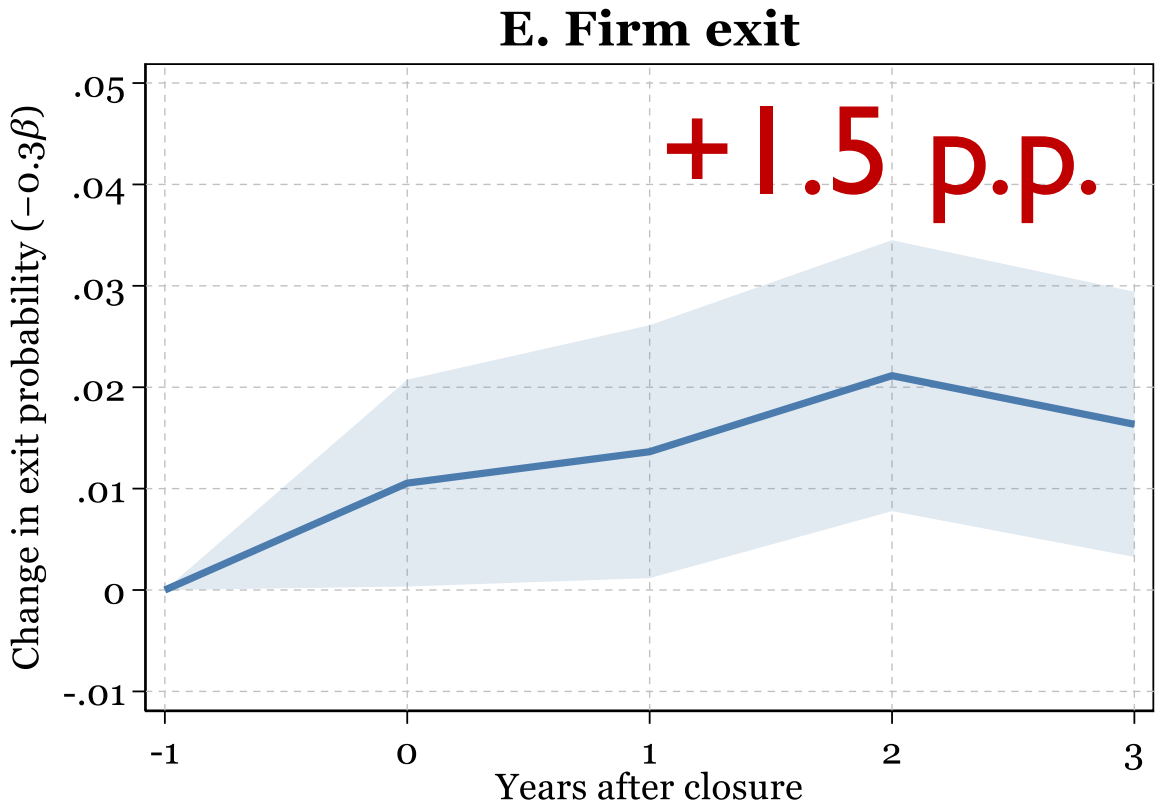
Direct real effects: Employment and sales



Direct real effects: Fixed assets and working capital



Direct real effects: Firm exit



Additional results

1. Higher loan exit is an important part of the overall credit-supply response to branch closures – lower loan entry is not
2. Firms respond to branch closures by drawing more liquidity from their suppliers (longer payable days)
   - No effects on cash holdings or downstream trade credit. Equity declines due to lower profits and thereby lower retained earnings.
3. Some evidence of indirect real effects via aggregate-demand spillovers to non-bank dependent firms

Summary and implications

1. Bank branches remain important, despite technological advances
   - Soft information collected via local branches still crucial for banks' ability to make business loans (cf. Petersen and Rajan1994, 2002; Granja, Leuz, Rajan, 2022)
   - Especially so for lending to small, collateral-poor, and risky firms
2. The closure of a country's branch network therefore has large negative effects on firms' access to credit and real activity
3. Fintechs are not (yet) a fully adequate substitute for traditional branch-based banking

Extras

Related literature

SME lending, distance to branches, and technology

Claessens, Frost, Turner, and Zhu (2018), Granja, Leuz, Rajan (2022), Liberti and Petersen (2018), Petersen and Rajan (1994, 2002), D'Andrea, Pelosi, and Sette (2024)

Effects of branch closures on firms

Ashcraft (2005), Garmaise and Moskowitz (2006), Nguyen (2019), Garrì (2019), Bonfim, Noguera, and Ongena (2021), Jiménez et al. (2022), Ranish et al. (2024)

Technological change and corporate lending/banking

Liberti, Seru, and Vig (2016), Vallée and Zhang (2019), Cornelli, Frost, and Gambacorta (2020), Rau, Wardrop, and Ziegler (2020)

Assessing the LATE conditions

1. Instrument strength: The effective first-stage F-statistic (Montiel Olea and Pflueger, 2013) is 166.0 ⇒ Instrument is strong

   First-stage coefficient is 1.168 (not significantly different from 1)

   One percentage point higher *predicted* branch growth thus associated with 1.2 percentage point higher *actual* branch growth

Assessing the LATE conditions

2. Instrument independence:
   Good covariate balance between municipality-years with negative and non-negative values of $Z_{j,t}$

	$Z_{i,t} < 0$			$Z_{i,t} \geq 0$			Normalized
	Mean	SD	N	Mean	SD	N	difference
A. Firm-level characteristics							
Assets (MSEK)	28.6	98.7	665,961	23.5	83.5	147,300	0.06
Sales (MSEK)	32.4	84.1	665,961	28.6	76.4	147,300	0.05
Number of employees	14.1	27.8	665,961	13.3	26.3	147,300	0.03
Age (years)	19.88	14.30	665,961	19.36	13.92	147,300	0.04
Debt/Assets	0.75	0.18	665,961	0.76	0.18	147,300	–0.06
EBIT/Assets	0.07	0.13	665,961	0.07	0.12	147,300	–0.01
Cash/Assets	0.12	0.14	665,961	0.11	0.14	147,300	0.04
Probability of default	1.95	4.79	665,961	2.01	4.78	147,300	–0.01
B. Municipality-level characteristics							
Population (1000s)	36.1	70.5	3,528	23.4	51.3	1,112	0.21
Five-year population growth (%)	1.33	4.29	3,528	0.28	3.61	1,112	0.26
Population density	150	515	3,528	113	435	1,112	0.08
Branches per 1,000 inhabitants	0.22	0.14	3,528	0.24	0.13	1,112	–0.16
Employment ratio	0.68	0.04	3,528	0.68	0.04	1,112	0.07
Relative labor income	0.95	0.12	3,528	0.93	0.11	1,112	0.16
Manufacturing share	0.33	0.18	3,528	0.37	0.18	1,112	–0.20

Assessing the LATE conditions

3. Exclusion restriction: Hard to think of plausible violations

   Recall: Exclusion restriction is violated if $Z_{j,t}$ affects $Y_{i,t+h}$ through channels other than its effect on the number of bank branches

   For example: Suppose Nordea (i) has many branches in Malmö, and (ii) undertakes large-scale nationwide branch closures, but keeps its Malmö branches open

   Bank lending and real economic activity in Malmö would have to be affected by this for the exclusion restriction to be violated

   Hard to think of plausible mechanisms that could give rise to such an effect (expectations of future closures?)

Assessing the LATE conditions

4. Monotonicity: First-stage effect consistently positive and large in subsamples of the data ⇒ Supports monotonicity assumption

	Below median		Above median	
	$\hat{\xi}$	se($\hat{\xi}$)	$\hat{\xi}$	se($\hat{\xi}$)
A. Firm-level characteristics				
Assets (MSEK)	1.194***	0.091	1.245***	0.097
Sales (MSEK)	1.178***	0.090	1.259***	0.098
Number of employees	1.188***	0.091	1.247***	0.096
Age (years)	1.254***	0.095	1.205***	0.094
Debt/Assets	1.245***	0.095	1.193***	0.092
EBIT/Assets	1.188***	0.090	1.244***	0.095
Cash/Assets	1.184***	0.091	1.260***	0.096
Probability of default	1.253***	0.096	1.183***	0.090
B. Municipality-level characteristics				
Population (1000s)	1.086***	0.103	1.922***	0.294
Five-year population growth (%)	1.076***	0.113	1.584***	0.202
Population density	1.045***	0.109	1.892***	0.226
Branches per 1,000 inhabitants	1.629***	0.212	0.984***	0.095
Employment ratio	1.287***	0.130	1.274***	0.147
Relative labor income	1.146***	0.114	1.489***	0.202
Manufacturing share	1.445***	0.166	1.106***	0.114

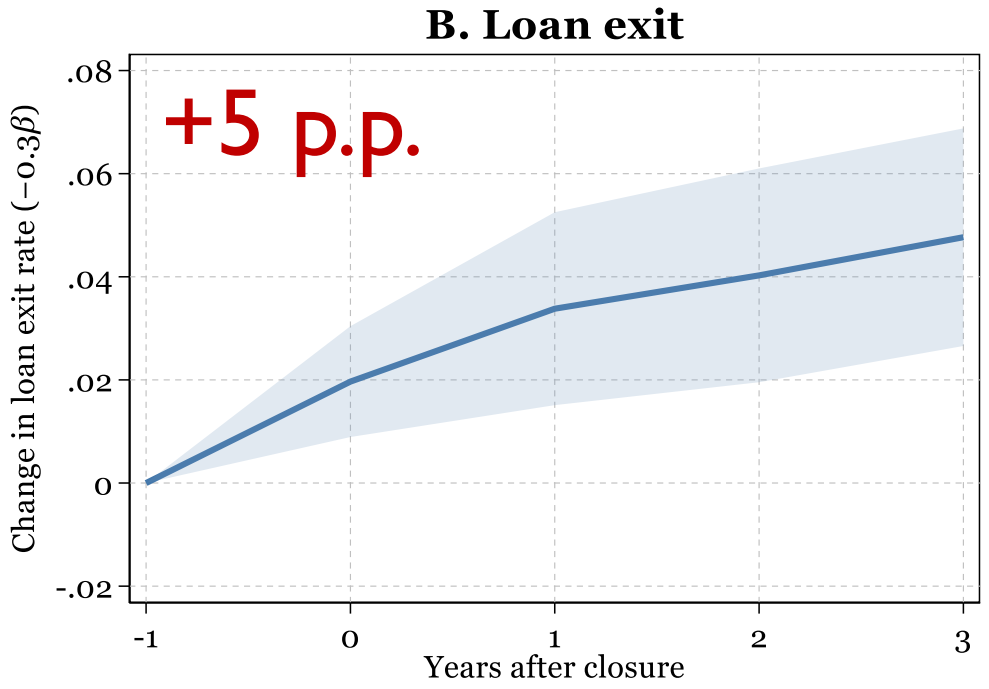
The local credit-supply effects of branch closures

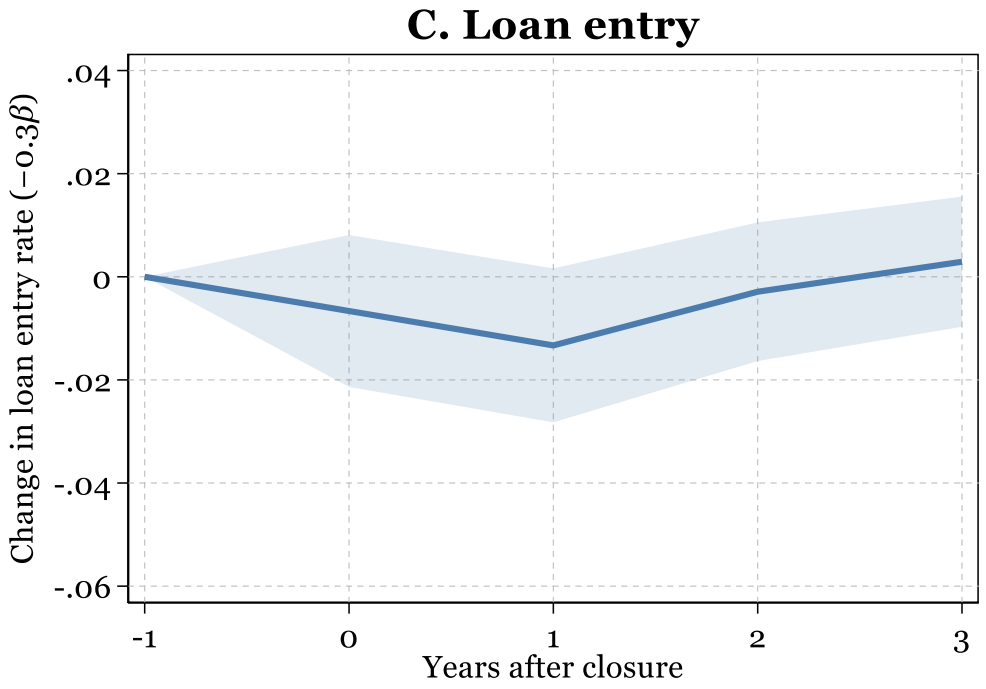
		Dependent variable: $\Delta Loans_{i,t+3}$		
	First stage	Reduced form	2SLS	OLS
$Z_{j,t}$	1.169***	0.236***		
	(0.091)	(0.089)		
$\Delta Branches_{j,t}$			0.201***	0.014
			(0.077)	(0.015)
Number of observations	813,261	813,261	813,261	813,261
Number of firms	107,441	107,441	107,441	107,441

Specification checks for baseline result

	(1) Overall effect	(2) Loan exit	(3) Loan entry
A. Baseline specification	0.201***	–0.159***	–0.010
	(0.077)	(0.036)	(0.021)
B. Instrumenting with $Z_{j,t}^{Initial}$	0.200	–0.157**	–0.031
	(0.138)	(0.061)	(0.039)
C. Dropping if $Branches_{j,t-1} \leq 1$	0.230***	–0.165***	–0.014
	(0.082)	(0.038)	(0.023)
D. Including municipality controls	0.189**	–0.149***	–0.012
	(0.074)	(0.034)	(0.021)
E. Including non-linear firm controls	0.192**	–0.151***	–0.011
	(0.075)	(0.035)	(0.021)
F. Excluding all control variables	0.202***	–0.146***	–0.011
	(0.074)	(0.034)	(0.020)

Large effect on loan exit, but not on loan entry





Margins of adjustment to the credit-supply contraction

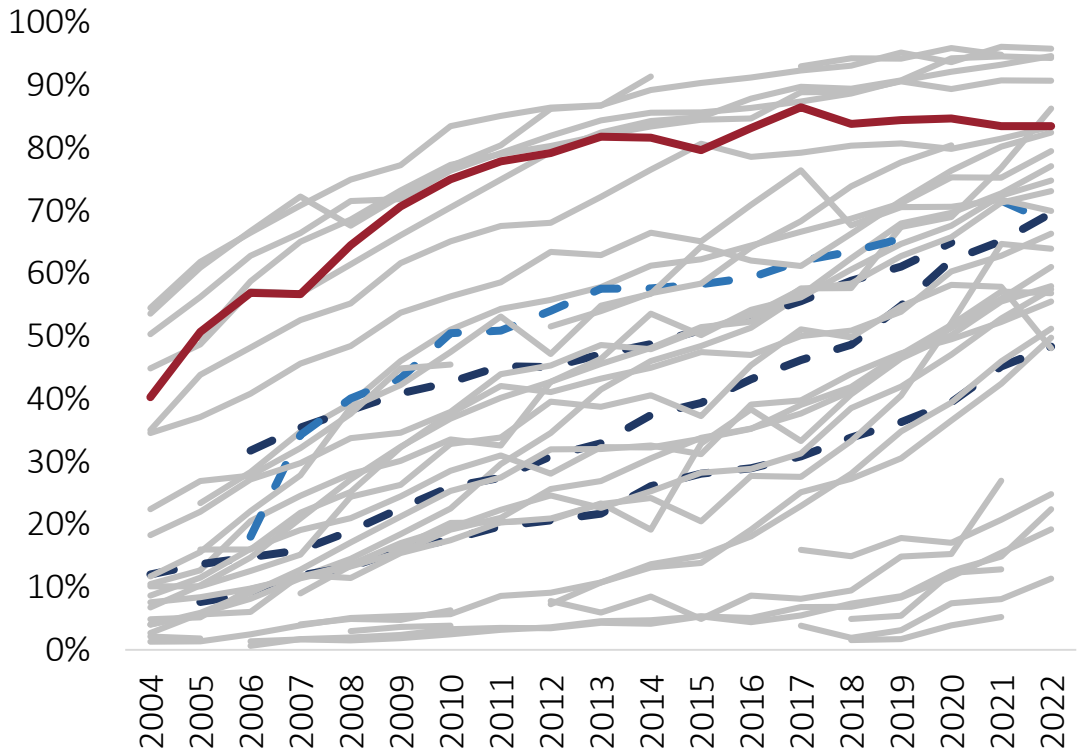
	(1)	(2)	(3)	(4)	(5)	(6)
	Cash holdings	Receivable days	Payable days	Total equity	Retained earnings	Other equity
$\Delta Branches_{j,t}$	0.002	–0.228	–4.065**	0.020***	0.025***	–0.006
	(0.006)	(1.236)	(1.704)	(0.007)	(0.008)	(0.004)
Scaled effect $(0.3 \cdot \hat{\beta})$	–0.000	0.068	1.219	–0.006	–0.008	0.002
Weak IV statistic	164.2	164.2	163.1	164.3	164.3	164.3
Number of obs.	642,688	643,060	604,842	639,547	639,547	639,547
Number of firms	82,347	82,375	78,524	81,972	81,972	81,972

Indirect real effects

	A. Non-tradable sectors		B. Tradable sectors	
	(1)	(2)	(3)	(4)
	Sales	Employment	Sales	Employment
$\Delta Branches_{j,t}$	0.147*	0.052	–0.086	–0.004
	(0.085)	(0.071)	(0.104)	(0.105)
Scaled effect $(-0.3 \cdot \hat{\beta})$	–0.044	–0.016	0.026	0.001
Weak IV statistic	150.296	150.307	135.901	135.911
Number of obs.	364,922	364,922	102,177	102,177
Number of firms	62,280	62,280	16,193	16,193

Digital retail banking drives branch closures

Share of households using internet banking services



Source: Eurostat "Digital society statistics at regional level", May 2022; Sweden, Spain, Germany, France, Italy.

Excerpt from Handelsbanken's Annual Report 2021:

> *"In places where almost all of our customers can manage their finances via their computer and smartphone, we have seen a marked downturn in the number of visits to our branches. When there is no longer any real need for a branch, it is time to close the doors for good."*

The economics of bank branches

Banks have traditionally exploited economies of scope to economize on the fixed costs associated with running bank branches

When retail banking goes digital, economies of scope disappear. What can a bank then do?

1. Run the same number of branches at smaller scale, focusing only on corporate lending? No, unprofitable because of lack of economies of scope
2. Consolidate the network, gathering the loan officers in fewer branches? Possible to some extent, but the point of a branch is to have a *local* presence
3. Shrink the size of the branch network (number of branches and loan officers), even if it means reduced offering of credit and other services to firms