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Do Local Bank Branches Reduce SME Credit Constraints? Evidence from Public-Private Bank Interaction

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Do local bank branches reduce SME credit constraints? Evidence from public-private bank interaction

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Abstract

In the past few decades, commercial banks have substantially reduced the number of their branch offices. We address the question of whether or not the increased distance from the lenders correspondingly faced by many small and medium sized enterprises (SMEs) translates into a lower volume of loans. We use a unique dataset on loans from a state owned Swedish bank designed to support credit-constrained SMEs and interact their loan portfolio with the number of nearby commercial bank offices at the firm level along with an IV strategy to account for endogeneity. The estimation results strongly indicate that a larger number of local bank offices increases the local credit supply, and decreases the credit constraints of nearby SMEs.

Keywords: Credit constraints, Relationship banking, State owned bank, Small business

JEL: L52, O38, H81, L26, G28

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1 Introduction

The substantial reduction of the number of commercial banks' offices observed in many countries has engendered widespread concerns related to financing opportunities faced by SMEs (Saunders and Steffen, 2011). This reduction increases the physical distance between lenders and borrowers, which could hamper the flow of soft and/or unverifiable information that facilitates lending operations (Agarwal and Hauswald, 2010; Inderst and Mueller, 2007). These negative effects could, however, be countered by an increased reliance on hard information (Petersen and Rajan, 2002) and contractual covenants (Hollander and Verriest, 2016; Knyazeva and Knyazeva, 2012).

Empirical evidence of a negative relationship between the availability of credit and the distance from potential lenders is found, for example, in Agarwal and Hauswald (2010), Backman and Wallin (2018) and Nguyen (2019). Nevertheless, technological improvements also allow banks to make loans to more distant customers (Milani, 2014; Petersen and Rajan, 2002). Hence, the question of whether or not reductions in the number of bank offices creates limited credit availability for SMEs remains empirically unsettled.

We address this question by using a unique firm-level dataset on loans granted by Almi, a state owned Swedish bank designed to reduce credit constraints.¹ Because Almi charges interest rates higher than the market rate, we regard each Almi loan as evidence of a credit-constrained SME, and test whether the local density of commercial banks affects the amounts and the rates of Almi loans. We employ an IV strategy to account for endogeneity of the number of local bank offices, and find that SMEs based in areas served by a larger number of bank offices, or in which banks employ more employees, have superior access to credit.

2 Empirical strategy and results

2.1 Data

Our sample of loans is obtained from the Swedish Agency of Growth Policy Analysis (*Tillväxtanalys*) and provides information on the lending activities of the state-owned bank Almi between 2000-2010 and 2012-2016.² The number of commercial bank offices in each Swedish municipality in each year is calculated using data from Statistics Sweden (*SCB*). There are 290 municipalities in Sweden, and the number of commercial bank offices in a municipality

¹The effects of Almi's activities are analyzed in Gustafsson (2018) and Gustafsson and Stephan (2019).

²Loans fully covered by Almi are not included in the sample. Due to idiosyncrasies of Almi's internal accounting in the year 2011, loans granted in that year are missing.

ranges from one to several hundred.³ Firm-level information, such as sales, number of employees and industry, is added to the loan sample by utilizing an employer-employee dataset of all Swedish firms between 2000-2016 from SCB. Table 1 reports the summary statistics of the loans in our sample.

Table 1: Summary statistics for Almi loans

	Observations	Mean	Median	Std. Dev.	Min	Max
Borrowing firms' no. employees	33,389	3.9	1	9.59	0	232
Borrowing firms' net sales (000)	33,389	3,808	905	12,951	0	670,135
Loan amount from state-owned bank (000)	33,389	457	212	807	1	25,759
Loan amount from private bank (000)	33,389	1,017	229	3,319	0	147,468
Interest rate on Almi loan %	33,322	7.3	8	1.9	0	15
Borrowing firms' age (years)	22,149	2.6	0	5.15	0	30

Notes: Almi=state-owned bank. All monetary variables inflation adjusted.

2.2 Regression results

We regress the interest rate of the loan and the loan amount on the number of bank offices in the firm's municipality in the year when the loan was granted. If there is a larger number of nearby commercial bank offices and/or if there are more bank employees in a municipality, we would expect a reduced demand for Almi loans. Since Almi's rate is typically set at a sizable markup over the commercial banks' rate, it stands to reason that firms would avoid applying for an Almi loan if they are able to obtain a commercial bank loan at a lower interest rate. However, if loans from Almi are complementary to commercial bank loans, the amount of Almi loans could increase if there are a larger number of nearby commercial bank offices.⁴ A potential concern is that a decrease in the number of bank offices in a municipality could be related to a lack of growth opportunities, thus reflecting an anticipated lower credit demand of local SMEs. To address this potential endogeneity issue caused by reverse causality, we perform IV estimations with regional level instrumental variables. Regional level IVs for local bank presence in a loan level regression are assumed to satisfy the exclusion restriction. The number of bank offices in municipality i at year t is instrumented with the population size of the respective municipality and the Gross Regional Product (GRP) of the region in which the municipality is located. The number of bank employees is instrumented with regional GRP per capita, the number of bank offices in the surrounding municipalities and with GRP

³For a description of the number of bank offices and their distribution, see Figures 1 and 2 in the Appendix.

⁴The rationale for the existence of Almi is to provide loans to firms whose applications would be without Almi's part rejected by a commercial bank.

growth. We present both OLS regressions and IV-GMM regressions using the aforementioned instruments for comparison. In all regressions, we control for net sales (in log), firm age, a firm's judicial type, loan type, number of employees and include municipality, year and industry fixed effects. In the regressions with interest rate as the dependent variable, we additionally control for loan size.

The results presented in Table 2 strongly support the conjecture that both the number of banks and the number bank employees have a negative impact on the interest rate charged by Almi, but a positive impact on loan size. In other words, an increase in the number of bank offices and/or bank employees is associated with an increase in the supply of Almi credit, and also lowers the interest rates of Almi loans. Thus, firms use Almi loans as a complement to rather than as a substitute for loans from commercial banks.

Table 2: OLS and IV-GMM RESULTS

	OLS			IV-GMM		
	Rate	Rate	Loansize	Rate	Loansize	Loansize
Banks per municipality	-0.026*** (0.0031)		0.0022** (0.0010)	-0.34*** (0.036)	0.049*** (0.011)	
Bank emp. per municipality		-0.00022*** (0.000020)				0.00027*** (0.000059)
Net sales (log)	0.0069 (0.0086)	0.0070 (0.0087)	0.13*** (0.0075)	-0.0024 (0.0087)	0.13*** (0.0062)	0.13*** (0.0065)
6-10 Emp.	-0.057** (0.027)	-0.053* (0.027)	0.14*** (0.020)	-0.054** (0.026)	0.13*** (0.016)	0.13*** (0.017)
11-50 Emp.	-0.16*** (0.035)	-0.16*** (0.035)	0.45*** (0.028)	-0.15*** (0.034)	0.43*** (0.024)	0.44*** (0.025)
51-250 Emp.	-0.35*** (0.086)	-0.34*** (0.087)	1.07*** (0.054)	-0.45*** (0.081)	1.07*** (0.053)	1.08*** (0.053)
Firm age	-0.0064*** (0.0018)	-0.0064*** (0.0018)	0.000089 (0.0012)	-0.0052*** (0.0019)	0.0066 (0.0012)	0.00094 (0.0012)
Loan amount 100-200 tSEK	0.30*** (0.063)	0.30*** (0.064)		0.31*** (0.055)	0.36*** (0.056)	
Loan amount 200-300 tSEK	0.038 (0.059)	0.034 (0.058)		0.061 (0.054)	0.079* (0.048)	
Loan amount 300-650 tSEK	-0.034 (0.075)	-0.035 (0.074)		-0.051 (0.063)	0.019 (0.059)	
Loan amount >650 tSEK	-0.33*** (0.075)	-0.34*** (0.074)		-0.42*** (0.062)	-0.36*** (0.060)	
Constant	4.15*** (0.17)	4.02*** (0.16)	5.38*** (0.15)			
Observations	19,045	19,045	19,088	18,388	18,431	18,432
Hansen J test				6.06	3.87	2.03
p-value				0.048**	0.056*	0.36
Hausman endog test				0.0071	3.02	1.59
p-value				0.93	0.0097***	0.082*

Notes: Dependent variables: Interest rate and log of loan principle. Cluster robust s.e. at municipality level. Year, industry and municipality fixed effects. IVs for no. of banks: Population size and GRP growth. IVs for no. of bank employees: number of banks in surrounding municipalities in the same region, GRP/Pop, GRP growth. Categorical variables are partialled out in the IV-GMM estimations, therefore no constant is reported. * p<0.1, ** p<0.05, *** p<0.01

Table 3: GMM estimation specification tests

	Rate	IV-GMM		
		Rate	Loansize	Loansize
Kleibergen-Paap rk LM statistic) (robust)	332.2***	543.8***	330.9***	542.3***
Kleibergen-Paap rk Wald F statistic (robust)	116.7***	163.6***	116.1***	163.4***
Observations	18,388	18,389	18,431	18,432
Notes: Kleibergen-Paap rk LM test has H_0 : excluded instruments are relevant, Kleibergen-Paap rk Wald F test has H_0 : weak instruments, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$				

The IV results confirm this conclusion. Table 3 shows that for 3 out of 4 models the IVs pass the Hansen J -test for overidentification at a 5% level as well as the Kleibergen-Paap rank test for underidentification and also reject weak instruments hypothesis. However, it is noteworthy that endogeneity is indicated at a 10% level only by 2 of the 4 models, as implied by the results of the Hausman tests (Table 2).

2.3 Local private banks and default risk

A remaining question is whether the negative impact on the interest rate and the positive impact on loan size is caused by a lower credit risk for Almi when the number of local private banks increases. Therefore we investigate whether loan default risk is inversely related to the presence of local private banks. We use probit and IV-probit regressions to explain loan default with the same explanatory variables and IVs as in the previous models over years 2013-2016 when reliable loan default information is available. The IV-probit results⁵ show that loan default risk is positively related to the number of local private banks and also to the number of local bank employees nearby (Table 4). This implies that Almi lends to riskier projects when the number of local private banks is higher. Again, this evidence points out that Almi's credit supply is a complement rather than a substitute to local private banks.

3 Conclusions

This paper investigates the potentially negative effects of the increased distance between SMEs and their potential lending bank caused by the reduction of the number of commercial bank branch offices. A unique dataset allows us to estimate how the number of nearby commercial banks effects the size and interest rates of loans offered by the state owned Swedish bank Almi. Based on OLS and IV regressions, we find that a higher number of

⁵The χ^2 -tests confirm endogeneity of the main variables of interest at a 10% level for both models.

Table 4: Probit and IV probit estimations of likelihood of loan default

	Probit	Probit	IV - Probit	IV - Probit
Banks per municipality	0.0032 (0.0051)		0.059** (0.029)	
Bank emp. per municipality		0.0000053* (0.0000031)		0.00064*** (0.00021)
Net sales (log)	-0.090*** (0.016)	-0.088*** (0.016)	-0.084*** (0.016)	-0.084*** (0.016)
6-10 emp.	-0.0057 (0.057)	0.000095 (0.057)	-0.023 (0.057)	-0.038 (0.057)
11-50 emp.	0.13* (0.069)	0.13* (0.068)	0.10 (0.069)	0.097 (0.069)
51-250 emp.	0.15 (0.17)	0.18 (0.16)	0.16 (0.16)	0.15 (0.16)
Firm age	-0.0066* (0.0037)	-0.0076** (0.0036)	-0.0058 (0.0036)	-0.0054 (0.0036)
Loan amount 100-200 tSEK	0.18*** (0.057)	0.17*** (0.056)	0.18*** (0.057)	0.18*** (0.056)
Loan amount 200-300 tSEK	0.17** (0.079)	0.16** (0.078)	0.17** (0.079)	0.18** (0.078)
Loan amount 300-650 tSEK	0.17** (0.079)	0.16** (0.078)	0.16** (0.079)	0.16** (0.078)
Loan amount >650 tSEK	0.20** (0.082)	0.20** (0.080)	0.20** (0.082)	0.21*** (0.081)
Constant	-1.21*** (0.42)	-1.63*** (0.40)	-1.33*** (0.43)	-1.08** (0.42)
Observations	17,360	18,776	16,811	16,811
pseudo R^2	0.10	0.076		
Log-Likelihood	-3,373.1	-3,542.2	-48,661.2	-126,150.6
$\text{atanh } \rho$			-0.21* (0.11)	-0.25*** (0.082)
χ^2 test H0: exogeneity			3.62*	9.04***
p-value			0.057	0.0026

Notes: Dependent variable - default of Almi loan, available for years 2013-2016. Endogenous variables: Banks per municipality and Bank employees per municipality. Cluster robust s.e. reported. Year, industry and municipality fixed effects. IVs for no. of banks: Population size and GRP growth. IVs for no. of bank employees: number of banks in surrounding municipalities with the same region, GRP/Pop, GRP growth.

* p<0.1, ** p<0.05, *** p<0.01

local bank offices and bank employees increases the local credit supply with a corresponding *increase* in loan amounts and *lower* interest rates for loans that Almi offers to SMEs. These results suggest that the ongoing reduction of the number of local bank offices exacerbates the financial problems faced by SMEs.

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A Bank offices statistics

Figure 1: Number of bank offices in Sweden, 2000-2016

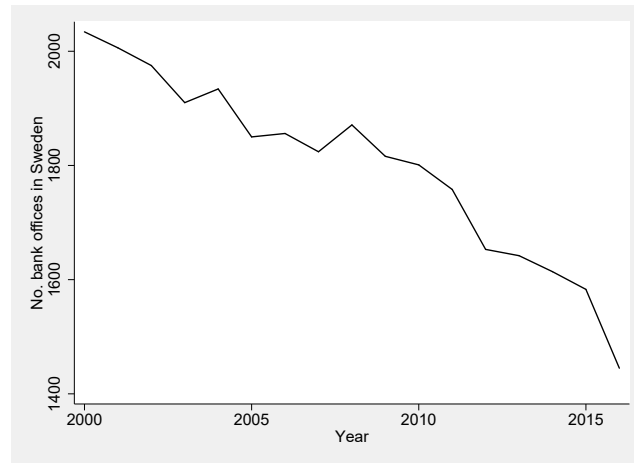
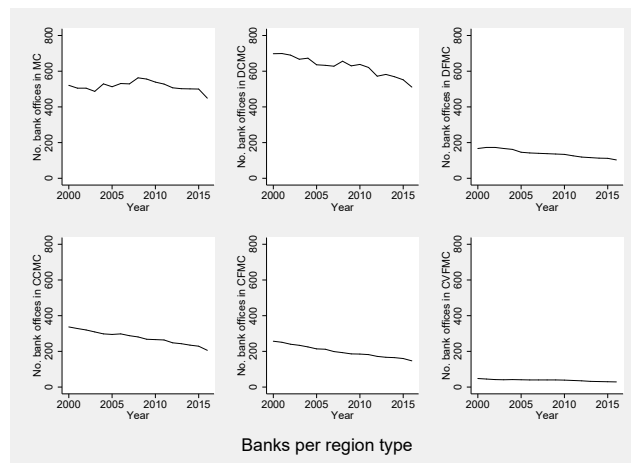


Figure 2: Number of bank offices per region type in Sweden, 2000-2016



Notes: The definition of region types is due to The Swedish Agency for Economic and Regional Growth. Region types: MC= major city, DCMC = dense municipality close to major city, DFMC = dense municipality far away from MC, CCMC = countryside municipality close to MC, CFMC = countryside municipality far away from MC, CVFMC = countryside municipality very far away from MC.