The Last Chapter of the Local Bank Office?

Exploring Swedish Bank Branch Closings and their Effects on the Economy

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Abstract:

Bank branches have closed across Sweden and other countries. Existing literature describes this phenomenon from different angles. Niklas Amberg & Bo Becker (2025) focus on Swedish bank branch closings, and how local businesses are affected, "Banking Without Branches", with data on a municipality level. My thesis explores if the local economic effects they find influence regional economic growth in Sweden. The main question in this thesis is therefore: **"Do bank branch closings affect regional economic growth?"**. I apply a local projections model where the main explanatory variable is branch change (change in number of local bank offices) year t in region r, and the dependent variable is percentage change in GRP growth (gross regional product growth), the same year and region. I then construct a 2SLS as identification strategy. The first equation estimates bank branch change in region r year t, with a shift-share instrument. The second equation is similar to the local projections model, but the main explanatory variable branch change is endogenous (generated in the first stage equation). Since sectors might be adversely affected by branch change, I repeat the 2SLS on four broad sectors, to answer my second question: **"Are sectors affected differently by the branch closings?"**. To make the analysis more fine grained I also apply the model for 58 more specific industries, with percentage change in industry revenue growth as the dependent variable in the second stage, to answer **"Are industries differently affected by branch closings?"**. For robustness I apply the local projections model on 4 selected industries, again with percentage change in revenue growth as the dependent variable. According to the local projections model, GRP growth increases if a bank branch closed two years ago, but effects of a closing current year or last year are unsignificant. The 2SLS doesn't show effects of branch change on total GRP growth. The service industry and goods industry are both negatively affected by bank branch closings, according to the sector 2SLS. Out of the 58 regressions on the specific industries, 4 regressions each have at least one significant effect of branch change this year, last year or two years ago, indicating possible heterogenous effects on an industry level. If a bank closed two years ago, the food, drink and tobacco industry's revenue growth is estimated to increase. If a bank closed a year ago, revenue growth is estimated to decrease in the water, water treatment, disposals, recycling and sanitation industry and for post offices. Revenue growth from other companies in law, business, science and tech is estimated to increase if a bank closed last year. The local projections model estimation on each of the specific industries shows similar results, except there's no significant estimated effect on the food, drink and tobacco industry or other companies in law, business, science and tech. I also show examples of welfare effects beyond my data.

Keywords:

Bank branches, soft information, narrow-scope trust

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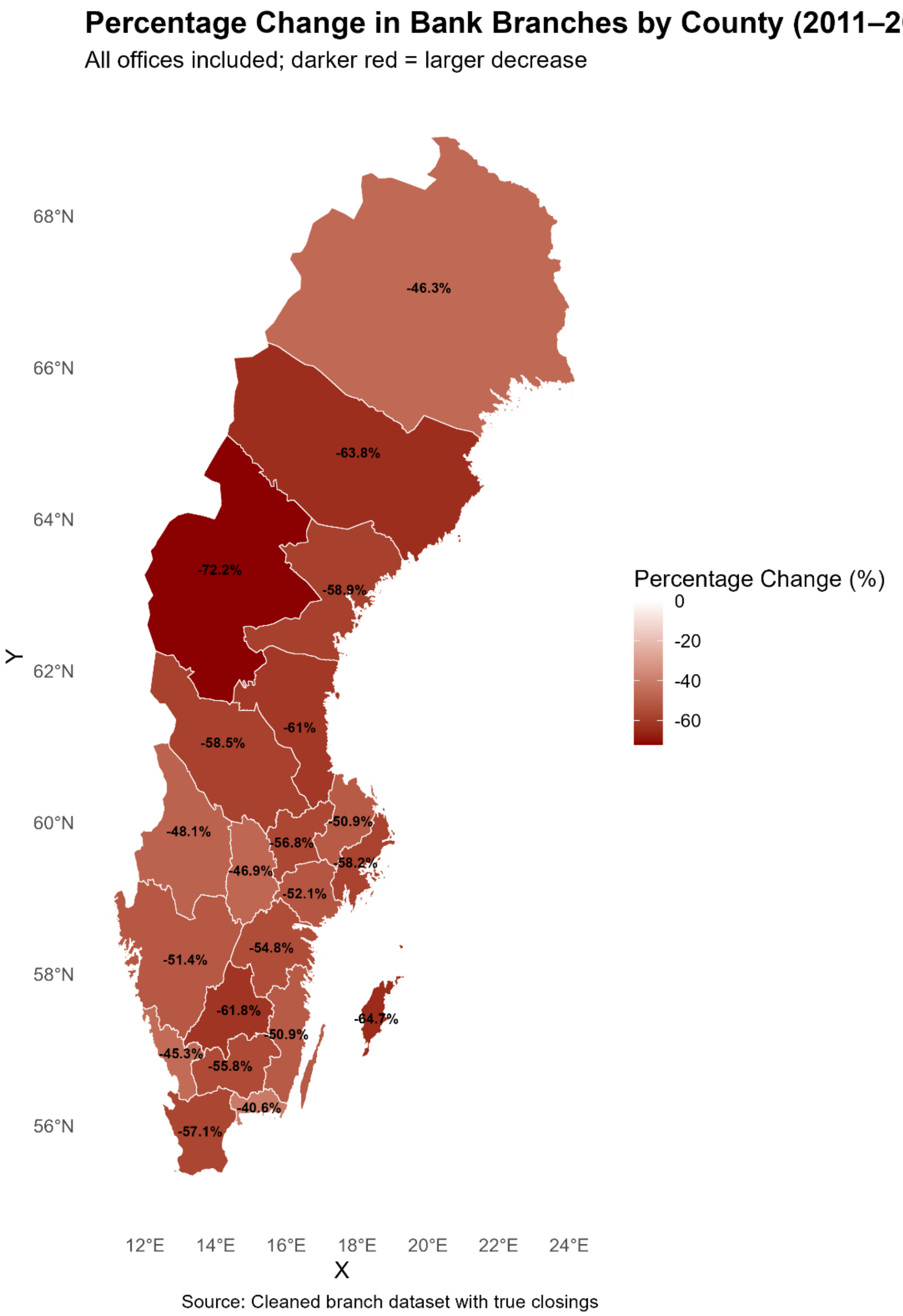
1.2. Introduction

Through the 2000's, several countries have seen trends of bank branch (local bank office) closings. The euro area saw a peak in bank branch numbers year 2008, with approximately 186 000 offices, reports Daniel Legran, Olli Tuomikoski and Johanna Spitz (2024), "The changing landscape of bank offices in the euro area". This number declined to around 106 000, in the year 2023. Sweden has also seen a decreasing trend in number of bank branches: There were almost 1900 banks year 2001, and approximately 750, year 2023 (Niklas Amberg & Bo Becker, 2025, "Banking Without Branches"). Four major bank corporations "storbanker" dominate the Swedish bank market – Handelsbanken, Nordea, SEB and Swedbank. All of them have closed bank offices broadly. Also, other players on the Swedish bank market – such as savings banks “sparbanker”, have significantly closed local bank offices. All Swedish regions have seen large decreases in number of bank branches, between 2011 and 2022 (Figure 1). This thesis investigates if the decreased access of a region’s bank offices influences the region’s economic growth (GRP growth).

Figure 1



Literature mentions several reasons for why countries have seen a pattern of bank branches disappearing, such as reduced demand to visit a physical bank office, the growing use of online banking, and banks wanting to cut costs. New technology is described as one reason for branch closures. Because retail banking customers start using online banking, and the demand for physical meetings therefore decreases. In Europe, 24 percent of households used online banking services in 2007, compared to 64 percent 2023, tells Amberg and Becker (2025).

However, technology introductions might help branches, as technologies can enhance the branch activities. For example, in an Italian setting, Angelo D'Andrea, Marco Pelosi and Enrico Sette shows fast internet can improve loan monitoring and consequently increase loan supply and lower interest rates (2025), "When broadband comes to banks: credit supply, market structure and information acquisition". In other words, a local bank office could use online banking as a complement. So, technology introductions don't have to mean an office should close. Though in the Swedish setting online banking appears as a substitute, replacing some services that before were conducted by the local branch. Therefore, online banking increase is one way of understanding the closures. Further, if a bank company wants to go more digital, they need to invest in establishing and maintaining the technology required. So, there's less resources left for operating a local bank office. In a previous school project, my working group interviewed someone working with artificial intelligence at a bank office, showing some employees focus on technology, and have less time/ no time for customer contact.

So, bank branch closings are connected to different areas, for example technology, costumer research and organization. As I describe in more detail in Related Literature and Discussion, Amberg and Becker (2025) shows bank branch closings can reduce lending to local firms, and consequently negatively affect the local economy. I'm thinking the effects might transfer to a regional level. Therefore, the main question this thesis aims to answer is: **"Do bank branch closings affect regional economic growth?"**. The branch closing timings differ between regions (or counties) in Sweden. Because GRP growth also varies, I'm able to analyze if the variation in GRP growth can be explained by the change in number of a region's bank branches (branch change), with the help of theory by Amberg and Becker (2025). I firstly estimate a local projections model, specified in Model specification. The estimation of branch change (t-2) indicates a branch closing two years ago had a slightly positive effect, in percentage, on GRP growth. However, because of the identification problem described in Identification problem, I also apply an identification strategy, a 2SLS model. The 2SLS model estimation doesn't prove an effect of branch closings on the whole regional GRP growth.

I think sectors are differently affected, because different types of companies or organizations have different relationships or ties with banks, and therefore different needs for a local bank office (bank branch). So, a second question of the thesis is: **"Are sectors**

affected differently by the branch closings?”. I apply the 2SLS on four broad sectors. The estimation says a branch closing reduces GRP growth for goods producers and service companies.

Continuing the above argument that the tie to a bank can be explained by the type of organization, a third question I aim to answer is: **“Are industries differently affected by branch closings?”**. Estimations of the 2SLS model show a branch closing positively affects the food, drink and tobacco industry and other companies in law, business, science and tech. The water treatment, disposals, recycling and sanitation industry and post offices are instead negatively affected. For robustness I apply the local projections model on these four industries. The result says the food, drink and tobacco industry and other companies in law, business, science and tech are not affected by any branch closing, while the water treatment, disposals, recycling and sanitation industry and post offices are negatively affected.

I also create a reverse causality check model, where Δlog(GRP) explains branch change. The estimation result is that Δlog(GRP) doesn’t explain GRP growth – So according to these results there’s not more or less closings in a region where GRP growth increases – No reverse causality.

1.3. Related Literature

1.3.1. Starting point

The main inspiration for this thesis is the working paper “Banking Without Branches” by Niklas Amberg & Bo Becker (2025). They describe the trend of Swedish bank branch closings with Swedish bank branch data 2001-2023. The paper also investigates economic effects. They find a decline in lending to local firms, as an effect of the branch closures, negatively impacting the real economic activity of the firms. They explain the decline in lending with theory of soft information: When there’s no local bank office available, and a business must apply for a loan from the bank online, the bank cannot get soft information about the loan applicant. An example of soft information creation is that a bank officer meets a loan applicant, and the bank officer forms an opinion of the trustworthiness of the applicant, or more specifically finance related: judges if they think the applicant can pay back the loan. Following this theory, when the distance between the loan applicants and loan decision makers increases, soft information decreases, possibly reducing the chance to receive a loan. Reading Amber and Becker (2025), I wonder if the local effects (on a municipality level), affect regional economic growth. Further, they do show effects differ between firm sizes and ages (new and small firms with little hard information access less loans). I'm thinking that different sectors and industries don't have the same access either, which I also test below.

1.3.2. Banks' perspective

Philip S. Morrison and Rachel O'Brien (2001) use a GIS (Geographic information system) and show how a special interaction model can help Banks decide what branches to close, in "Bank branch closures in New Zealand: The application of a spatial interaction model".

Alfredo Martín-Oliver, József Sákovics and Vicente Salas-Fumás (2025) also focuses on the banks' perspective, when it's beneficial to close a branch, in: "Who closes first? The interaction of market structure and fall in demand in bank branch closures".

1.3.3. My contribution

To sum up my literature search, several papers describe this branch closing phenomenon with the lens of the bank: when and how is it beneficial for the bank? Amberg and Becker (2025), describe branch closings from business customers' point of view in the Swedish context, which I also look at. I attempt to extend their research by zoning out to a regional level in my data analysis: Are there implications for the whole regional economy? I also divide up the analysis into different sectors and industries.

1.4. Data & Methodology

1.4.1. Data

I visualize bank branch closings with a dataset on bank branch addresses, from Pipos, Tillväxtverket, (2025). This dataset has all addresses for bank branches in Sweden, 2011-2023. Year, county/ region and bank (example Nordea), is specified for each address. Amberg and Becker (2025) also uses this data, together with earlier data (as described). They report several Nordea bank addresses disappearing somewhere between 2012 and 2016 and then reappearing. They therefore fill in an address that disappears and reappears in the years between. I also do this interpolation. Further, if an address appears, disappears and reappears within two years, I fill in that address in the years between. Note that the data I acquired only reaches until 2023, so it is possible bank branches have closed after and not been recorded, and therefore those closings are not included in my analysis. This dataset is the base for calculating the change in number of bank branches per region and year, the main explanatory variable in the following model. The calculation of branch change is: branch change(t)=branches(t)-branches(t-1). So, if the branch change is negative, there are fewer branches year t compared to year t-1.

Reading the above-mentioned literature, I'm thinking that a region's economic activity might depend on access to bank branches, for example because Amberg and Becker (2025) describes negative effects for SME's (Small and medium sized enterprises) when a bank branch closes, and SME's are a large part of the Swedish economy. I find a measure of GDP per region (GRP – Gross Regional Product), from SCB, 2025, "Bruttoregionproduct (BRP), sysselsatta och löner (ENS 2010) efter region (län, riksområde) och näringsgren SNI 2007. År 2000-2023", SCB. Calculating the change of log(GRP)(r, t) between year t-1 and t gives me Δlog(GRP)(r, t), the dependent variable of interest in the model below. The dataset also has GRP divided into broad industries. I recreate the model on log GRP growth per industry.

I add a data set including revenues per industry (more specific than above industries), region, and year, from SCB (2025) "Lokal verksamhetsenhet – Regionala basfakta för verksamhetsnivå enligt Företagens ekonomi efter region (län) och näringsgren SNI 2007. År 2007-2021". Some industries are grouped together as one post in this dataset, and I count them as one industry for simplicity. From these revenues I calculate Δlog(Revenues)(i, r, t), percentage change in revenue growth for industry i, region r, year t, an independent variable I also aim to explain.

Amberg and Becker (2025) construct a local projections model, where branch change in a municipality explains how an economic outcome Y changes in the municipality. I create a similar local projections model, with the variables below.

1.4.2. Model specification

The variable branch change(t) is the change in number of local bank offices in a region. In my model this variable explains the region's Δlog(GRP)(r, t) (1). Δlog(GRP)(r, t) is calculated like this: Δlog(GRP)(r, t) = log(GRP)(r, t) - log(GRP)(r, t-1). The Δlog(GRP)(r, t) variable is therefore approximately the percentage change in GRP growth from year t-1 to year t. When a coefficient is estimated, it's therefore interpreted as how GRP growth changes in percentage if the variable increases with one unit. So, the coefficient of branch change(r, t) is how GRP growth changes in percentage if one local bank office opens the same year.

Like Amberg and Becker I add two branch change lags (branch change(r, t-1) & branch change(r, t-2)). Since the GRP data is not inflation corrected, I also control for year fixed effects (factor(year)) (like Amberg and Becker, 2025). Instead of firm fixed effects I have region fixed effects: factor(region). Because the regional economic output might influence next year's output, the model also has a GRP growth lag, Δlog(GRP)(r, t-1).

Local projections model

$\Delta\log(GRP)(r, t) = \beta_0 + \beta\_1$*branch change(r, t) + β_2*branch change(r, t-1) + β_3*branch change(r, t-2) + β_4* Δlog(GRP)(r, t-1) + β_region*factor(region) + β_year*factor(year) + ε_i (1)

Variables

- Δlog(GRP)(r, t) – Percentage change in GRP growth, from year t-1 to year t, in region r
- branch change(r, t) – difference in number of local bank offices of region r, from year t-1 to year t
- branch change(r, t-1) – difference in number of local bank offices of region r, from year t-2 to year t-1
- branch change(r, t-2) – difference in number of local bank offices of region r, from year t-3 to year t-2
- Δlog(GRP)(r, t-1) – percentage change in GRP growth, from year t-2 to year t-1, in region r
- r – denotes a region
- t – denotes a year
- factor(region) – region control, dummy variables
- factor(year) – year control, dummy variables
- ε_i – What the model cannot capture, the error term

Hypotheses for model estimation

Hypothesis 1: H0: The coefficient of branch change(r, t), β_1 = 0. H1 (Alternative hypothesis): The coefficient of branch change (r, t), β_1 ≠ 0 (2)

Hypothesis 2: H0: The coefficient of branch change(r, t-1), β_2 = 0. H1 (Alternative hypothesis): The coefficient of branch change(r, t-1), β_2 ≠ 0 (3)

Hypothesis 3: H0: The coefficient of branch change(r, t-2), β_3 = 0. H1 (Alternative hypothesis): The coefficient of branch change(r, t-2), β_3 ≠ 0 (4)

1.4.3. Identification problem

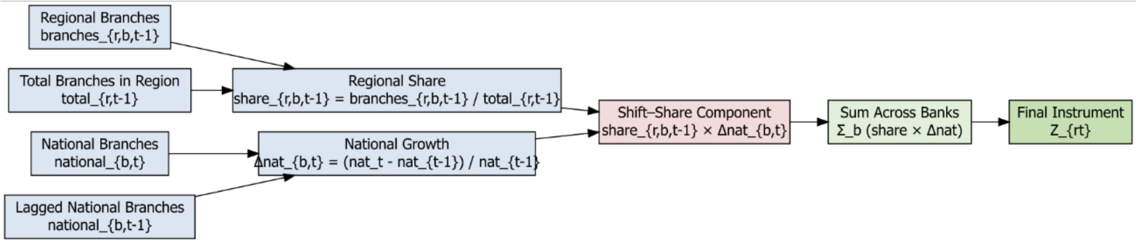
Amberg and Becker (2025) describes the identification problem: that it's not random where banks choose to close bank branches. Therefore, they create a two-stage least squares model (2SLS), and instrument branch number change in the first stage. They construct a shift-share instrument, $Z_{j,t}$, for explaining the bank branch change, in line with Bartik (1991), and in the first stage regression they estimate the instrument's explanatory power over branch change. The second stage regression estimates the effect of branch change on an economic outcome (their structural equation mentioned before).

To construct their instrument, they firstly divide each number of branches of a "non-savings bank" (b) in municipality (j), year t-1, with total number of all bank branches in the same municipality and year. In other words, they use the number of local bank offices of a large bank – "storbank" in the region, and divide it with all local bank offices, including those who aren't belonging to a large bank. Savings banks – "sparbanker" aren't included in the numerator as they often operate with fewer branches, and decisions to close a branch might be because of local conditions. The result (share) is then multiplied by the change in total number of the bank's branches in Sweden year t (the shift). The sum of all shift*shares for municipality j and year t is the instrument: $Z_{j,t}$. Because not all banks are included in the numerator of the share, Amberg and Becker (2025) also include a "sum of shares control", aligned with Borusyak, Hull & Jaravel (2022), "Quasi_Experimental Shift_Share Research Designs". This control is the sum of market shares of non-savings banks in the municipality.

1.4.4. Identification strategy

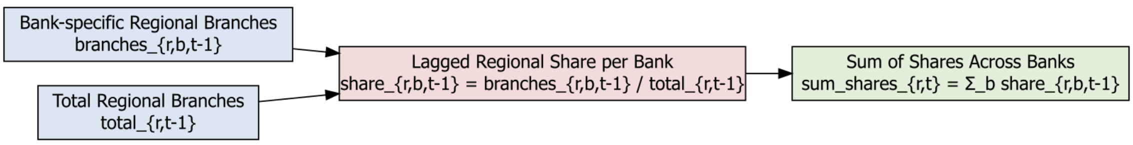
Since I'm testing regional effects, I also construct a shift-share instrument. I count local bank offices for each large bank in region r year t-1, and divide the number with total bank offices in region r, year t-1. The share is multiplied by national growth in number of bank offices for the large bank (the shift), year t (like Amberg and Becker (2025)). Following their instrument construction, I repeat this for all large banks in region r (share from year t-1 and shift from year t), add the shift-shares together, and the result is the instrument for region r year t (Figure 2). I define the large banks as Nordea, Swedbank, SEB and Handelsbanken.

Figure 2
Instrument construction



I then make a 2SLS model where the first stage equation shows how the instrument affects branch change ΔBranches(r, t) – change in number of local bank offices (6), and the second stage equation shows how branch change (here endogenous) affects GRP growth: Δlog(GRP)(r, t) (5). The second stage equation also includes two instrumented lags of branch change (ΔBranches(r, t−1), ΔBranches(r, t−2)), from 2 additional first stage equations. All equations have a GRP growth lag, Δlog(GRP)(r, t-1) and region controls (factor(region)). The equations also have sum of shares controls interacting with year fixed effects (factor(sum of shares))(r, t). Each sum of share control is calculated like this: number of total bank offices of bank b, region r, year t-1 is divided by total number of bank offices region r year t-1. That calculation is repeated for all large banks. Those shares are then added together, resulting in the sum of shares control for region r year t (Figure 3).

Figure 3
Sum of shares construction



1.4.5. 2SLS model equations

$\Delta\log(GRP)(r, t) = \beta_0 + \beta\_1 * \Delta Branches(r, t) + \beta\_2 * \Delta Branches(r, t-1) + \beta\_3 * \Delta Branches(r, t-2) + \beta\_4 * \Delta\log(GRP)(r, t\text{-}1) + \beta\_region * factor(region) + \beta\_year * factor(sum\ of\ shares)(r, t) * factor(year) + \varepsilon\_i$ (5)

ΔBranches(r, t) = β_0 + β_1*instrument(r, t)+ β_2*instrument(r, t-1) + β_3*instrument(r, t-2) + β_4* Δlog(GRP)(r, t-1) + β_region*factor(region) + β_year*factor(sum of shares)(r, t)*factor(year) + ε_i (6)

New variables

- ΔBranches(r, t) – difference in number of local bank offices in region r from year t-1 to year t, in this model instrumented in the first stage.
- instrument(r, t) – shift-share region r year t
- instrument(r, t-1) – shift-share region r year t-1
- instrument(r, t-2) – shift-share region r year t-2
- factor(sum of shares)(r, t)*factor(year) – control added because not all banks are included in the numerators of the shares (see the shift-share logic above), interacting with a year dummy variable.

1.4.6. Hypotheses for model estimations

Hypothesis 4: H0: The coefficient of ΔBranches(r, t), β_1 = 0. H1 (Alternative hypothesis): The coefficient of ΔBranches(r, t), β_1 ≠ 0. (7)

Hypothesis 5: H0: The coefficient of ΔBranches(r, t-1), β_2 = 0. H1 (Alternative hypothesis): The coefficient of ΔBranches(r, t-1), β_2 ≠ 0. (8)

Hypothesis 6: H0: The coefficient of ΔBranches(r, t-2), β_3 = 0. H1 (Alternative hypothesis): The coefficient of ΔBranches(r, t-2), β_3 ≠ 0. (9)

The model uses all years for GRP that has corresponding years for the explanatory variables, including the lags (recall that each grp growth is explained by several branch change variables, the earliest from t-2, that in turn is explained by three instruments (one the same year and two instrument lags, see first stage equation above), and each instrument needs prior year's branch data for the shift component. So, the model explains GRP growth change from 2016. This reduces the sample size used in the model, which can make the results less accurate. I still choose to include the two lags of the instrument, because I think that the national shifts last year and two years ago might influence decisions to close branches this year.

The model above is then applied on one broad sector at a time, to see if there are heterogenous effects on different type of production or operations.

To further test for heterogeneity in effects, I make a third version of the 2SLS, with Δlog(Revenues)(i, r, t) as the dependent variable in the second equation (from the third dataset)(10). These industries are more specific than the broad sectors in the model above.

$\Delta\log(\text{Revenues})(i, r, t) = \beta_0 + \beta\_1 * \Delta\text{Branches}(r, t) + \beta\_2 * \Delta\text{Branches}(r, t-1) + \beta\_3 * \Delta\text{Branches}(r, t-2) + \beta\_4 * \Delta\log(\text{Revenues})(i, r, t-1) + \beta\_\text{region} * \text{factor(region)} + \beta\_\text{year} * \text{factor(sum of shares)}(r, t) * \text{factor(year)} + \varepsilon\_i$ (10)

New variables

- Δlog(Revenues)(i, r, t) – Percentage change in revenue growth for industry i, region r, year t
- Δlog(Revenues)(i, r, t-1) – Percentage change in revenue growth for industry I, region r, year t-1

To make my analysis more robust, I also remake the local projections model, with Δlog(Revenues)(i, r, t) as the dependent variable, and apply it on 4 industries.

To make it clear, my models and data time window differ from Amberg and Becker (2025), so I assume my results can differ. Still their paper helped a lot in my data collection and model building, and I'm very grateful for that!

1.5. Main Empirical Analysis

1.5.1. Trends of Bank Closings and GRP

The timings of bank closings are different between regions (Figure 4). Also, the major banks have different closing timelines (Figure 5). GRP trends also vary for the regions, as shown in Figure 6.

Figure 4

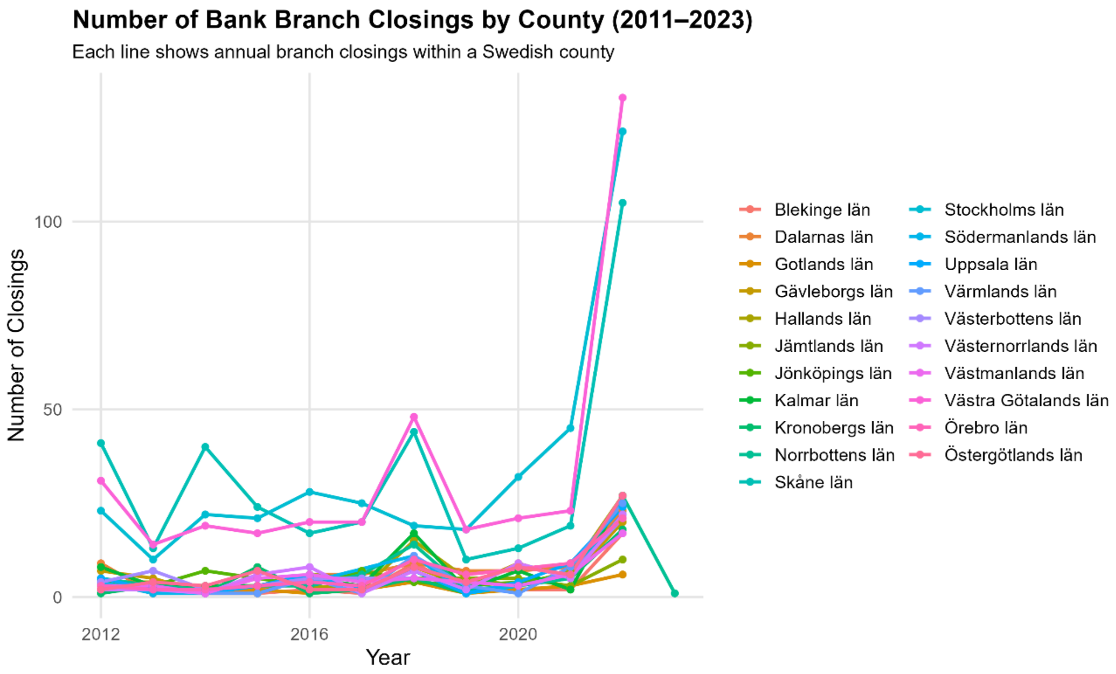


Figure 5

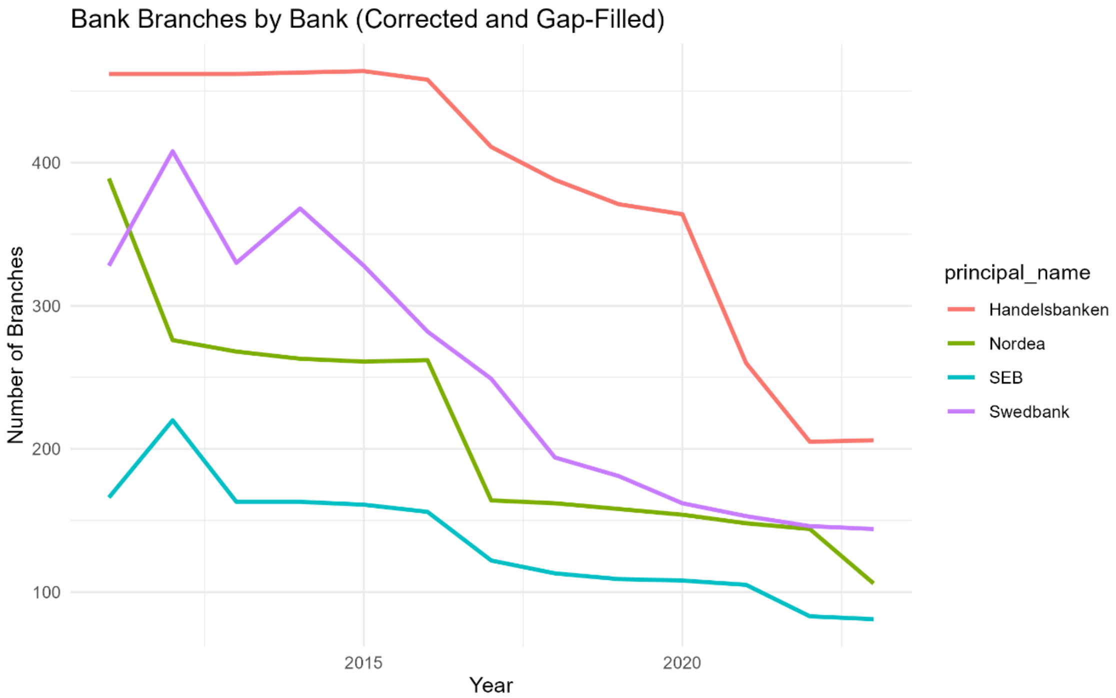
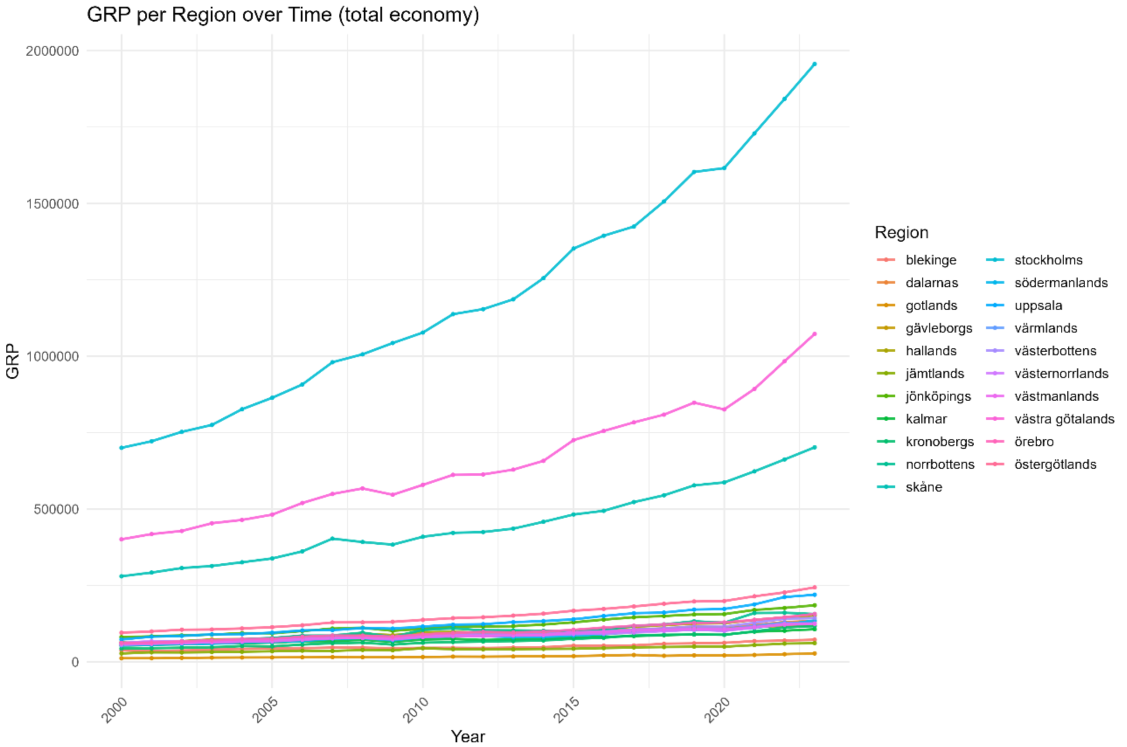


Figure 6



1.5.2. Local projections model

Branch change(r, t) has the coefficient -0.000, and I cannot reject the null hypothesis (2) that it doesn't explain Δlog(GRP)(r, t) (Table 1), at a significance level $p<0.10$. Branch change (r, t-1) has the coefficient -0.001., small, and I cannot reject the null hypothesis, that branch change has zero effect on Δlog(GRP)(r, t) (3) at the significance level $p<0.10$. I can reject the null hypothesis that branch change (r, t-2) doesn't explain Δlog(GRP)(r, t) (4), at the significance level $p<0.05$ (-0.001**). The local projections model therefore points to a positive lagged effect of a branch closing (since each coefficient explains Δlog(GRP)(r, t) change if one branch opens). The R-Squared result indicates 47.8 percent of the variation in GRP growth(r, t) is explained by the local projections model. In the next section I explore if my identification strategy (2SLS) shows the same results.

Table 1

Local Projection (h = 0) — Δlog(GRP)	
	Model 1
ΔBranches(t)	-0.000
	(0.000)
ΔBranches(t−1)	-0.001
	(0.000)
ΔBranches(t−2)	-0.001**
	(0.000)
Δlog(GRP)(t−1)	-0.163.
	(0.097)
Num.Obs.	209
R2	0.478
R2 Adj.	0.379
AIC	-860.1
BIC	-743.1
Log.Lik.	465.027
RMSE	0.03
Std.Errors	Custom
Cluster-robust SEs by region. Stars: *** p<0.01, ** p<0.05, * p<0.10, . p<0.1	

1.5.3. 2SLS

Also here are the coefficients small, close to zero, 0.002, -0.003 and 0.001, and cannot prove any effect (at a significance level p<0.10) of ΔBranches(r, t), ΔBranches(r, t-1) and ΔBranches(r, t-2).

However, estimating the instruments' effects on ΔBranches(r, t), instrument (r, t) has a large positive coefficient at a significance level p<0.01 (52.694***). Not all coefficients of the instruments show explanatory power at a p<0.05 significant level (table 2), but several pass that threshold.

Table 2

2SLS: Δlog(GRP) — All Years (Whole Economy)				
	2SLS: Δlog(GRP) — All Years	FS ΔBranches(t)	FS ΔBranches(t−1)	FS ΔBranches(t−2)
ΔBranches(t)	0.002			
	(0.003)			
ΔBranches(t−1)	-0.003			
	(0.002)			
ΔBranches(t−2)	0.001			
	(0.002)			
Z(t)		52.694***	12.297	-5.416
		(16.092)***	(16.632)	(14.299)
Z(t−1)		22.674	89.262***	-33.292**
		(43.154)	(25.605)***	(16.247)**
Z(t−2)		-46.629	-18.860	101.431***
		(48.586)	(20.971)	(25.490)***
Δlog(GRP)(t−1)	-0.149**	16.663	12.316	-10.702
	(0.072)**	(29.294)	(13.759)	(9.065)
Cluster-robust SEs by region. Stars: *** p<0.01, ** p<0.05, * p<0.10				

1.5.4. 2SLS four sectors

Running a regression of Δlog(GRP)(r, t) per sector (denoted as industry in the results) shows possible heterogeneity of the effects between industries (Table 3). Like previous second stage regressions, several variables have small coefficients that cannot prove an effect at p<0.10. However, when applying the model on Δlog(GRP)(r, t) from the goods industry (varuproducenter), ΔBranches(r, t-2) has a positive coefficient at a p<0.10 significance level (0.005*), indicating a bank closing two years ago negatively affect goods producers. Further, when looking at explanation of Δlog(GRP)(r, t) from the service industry (tjänsteproducenter), the coefficient of ΔBranches(r, t) is positive and significant (0.005*) suggesting a bank closure decreases GRP growth from service businesses the same year. In the regressions for non industry posts (ej branschfördelade poster) and public institutions and households' nonprofit organisations (offentliga myndigheter samt hushållens icke vinstdrivande organisationer), branch change has low explanatory power.

Table 3

2SLS: Δlog(GRP) — Individual Industries (Excl. Whole Economy)				
	2SLS: Δlog(GRP) — A01-F43 varuproducenter	2SLS: Δlog(GRP) — G45-T98 tjänsteproducenter	2SLS: Δlog(GRP) — ej branschfördelade poster	2SLS: Δlog(GRP) — offentliga myndigheter samt hushållens icke-vinstdrivande organisationer
ΔBranches(t)	0.001	0.005*	0.003	-0.000
	(0.006)	(0.003)*	(0.003)	(0.002)
ΔBranches(t−1)	-0.002	-0.006	-0.004	-0.000
	(0.003)	(0.004)	(0.003)	(0.002)
ΔBranches(t−2)	0.005*	-0.001	0.002	-0.000
	(0.003)*	(0.003)	(0.002)	(0.001)
Δlog(GRP)(t−1)	-0.097	-0.273**	-0.112	-0.181***
	(0.129)	(0.106)**	(0.074)	(0.057)***
Cluster-robust SEs by region. Stars: *** p<0.01, ** p<0.05, * p<0.10				

The AIC (Akaike information criterion) results for the goods industry, service industry and non industry posts are -437.816, -478.983 and -563.073 respectively (Table 4). These are higher than the local projections model AIC (-860.1), indicating the latter has better quality with using the data. However, the industry model for public institutions and households' nonprofit organisations has an even lower AIC (-947.440). The small RMSE (Root mean square error) results for the industry regressions (0.071, 0.065, 0.053, 0.021) indicates the data points are close to the model's predicted values.

Table 4

Diagnostics for Individual Industries				
Industry / Model	AIC	BIC	Log-Likelihood	RMSE
2SLS: Δlog(GRP) — A01-F43 varuproducenter	-437.816	-317.492	254.908	0.071
2SLS: Δlog(GRP) — G45-T98 tjänsteproducenter	-478.983	-358.659	275.491	0.065
2SLS: Δlog(GRP) — ej branschfördelade poster	-563.079	-442.755	317.540	0.053
2SLS: Δlog(GRP) — offentliga myndigheter samt hushållens icke-vinstdrivande organisationer	-947.440	-827.116	509.720	0.021

1.5.5. 2SLS industry revenue model

Running the regressions on the industry revenues, I find 4 regressions with at least one significant coefficient of branch change or a branch change lag (in the second equation, Table 5), (See appendix 1 for all 58 industries initially included, and how I interpret them in English). The estimation says if a bank closed two years ago, and everything else is constant, the revenue growth of the food, drink and tobacco industry increases with 2.3 percent. A bank branch closing last year makes revenue growth decrease by 1.4 percent in the water, water treatment, disposals, recycling and sanitation industry, and revenue growth of post offices decrease with 1.3 percent while there's a revenue growth increase in other companies in law, business, science and tech (3.2 percent).

Table 5

2SLS: Δlog(Revenue) — Selected Industries

	2SLS: Δlog(Revenue) — 10-12 livsmedels-, dryckesvaru- och tobaksindustri	2SLS: Δlog(Revenue) — 36-39 vatten- och reningsverk; anläggningar för avfallshantering, återvinning och sanering	2SLS: Δlog(Revenue) — 53 post- och kurirföretag	2SLS: Δlog(Revenue) — 74 andra företag inom juridik, ekonomi, vetenskap och teknik
ΔBranches(t)	0.032	-0.010	-0.005	0.012
	(0.028)	(0.011)	(0.009)	(0.017)
ΔBranches(t−1)	-0.022	0.014*	0.013**	-0.032*
	(0.018)	(0.008)*	(0.006)**	(0.018)*
ΔBranches(t−2)	-0.023*	0.002	0.006	-0.016
	(0.013)*	(0.005)	(0.006)	(0.015)
Δlog(Revenue) (t−1)	-0.390***	-0.003	-0.375***	-0.318***
	(0.074)***	(0.052)	(0.131)***	(0.088)***

Cluster-robust SEs by region. Stars: *** p<0.01, ** p<0.05, * p<0.10

These models on industry revenue have lower quality than previous models, according to higher AIC results (Table 6). The RMSE values are also higher, but still close to 0, indicating the actual data points are close to values predicted by the model.

Table 6

Diagnostics: Selected Industries (Revenue)

Model	AIC	BIC	Log-Likelihood	RMSE
2SLS: Δlog(Revenue) — 10-12 livsmedels-, dryckesvaru- och tobaksindustri	132.188	237.376	-32.094	0.295
2SLS: Δlog(Revenue) — 36-39 vatten- och reningsverk; anläggningar för avfallshantering, återvinning och sanering	-115.726	-9.511	91.863	0.140
2SLS: Δlog(Revenue) — 53 post- och kurirföretag	-235.146	-129.544	151.573	0.097
2SLS: Δlog(Revenue) — 74 andra företag inom juridik, ekonomi, vetenskap och teknik	41.893	140.352	12.054	0.223

1.5.6. Local projections industry revenue model

Estimating the local projections model on the selected industries, I cannot prove explanatory power of branch change on the food, drink and tobacco industry (Table 7). However, if a branch closed last year, the revenue growth of water, water treatment, disposals, recycling and sanitation industry decreases, like the previous model also predicts, here the decrease is estimated as 0.3 percent*. The revenue growth of post offices also decreases if a bank closed last year, according to the estimation (0.003***). Branch change cannot explain revenue growth change in other companies in law, business, science and tech, according to this model estimation. The AIC values are higher than the AIC for my initial local projections model (-860.1), indicating that model has better quality with the same data. However, this model doesn't use the exact same data (recall the initial local projections model have GRP and here I use Revenues). Also, this model has some significant coefficients of branch change, unlike the initial model. The AIC of the food, drink and tobacco industry is 38.4 here, lower than the second stage regression for the same industry, where the AIC value is 132.188. The local projections regression for water, water treatment, disposals, recycling and sanitation industry has AIC -196.4, lower than for the second stage regression on this industry, -115.726. The AIC value is -315.2 for this model on post offices and -235.146 for the second stage regression on the same industry. The regression on other companies in law, business, science and tech has the AIC -106.7, also lower than the second stage regression for the industry (41.893). The AIC therefore indicate the local projections model has better quality than the second stage model in regards to the data used (which is the same for both models). The RMSE values are close to 0, so the model's fitted values are close to the actual data points.

Table 7

LP (h=0): Δlog(Revenue) — Selected Industries

	LP (h=0): Δlog(Revenue) — 10-12 livsmedels-, dryckesvaru- och tobaksindustri	LP (h=0): Δlog(Revenue) — 36-39 vatten- och reningsverk; anläggningar för avfallshantering, återvinning och sanering	LP (h=0): Δlog(Revenue) — 53 post- och kurirföretag	LP (h=0): Δlog(Revenue) — 74 andra företag inom juridik, ekonomi, vetenskap och teknik
ΔBranches(t)	0.010	0.001	0.001	0.001
	(0.008)	(0.001)	(0.001)	(0.002)
ΔBranches(t−1)	0.003	0.003*	0.003***	-0.001
	(0.003)	(0.002)*	(0.001)***	(0.001)
ΔBranches(t−2)	0.001	0.001	0.002**	-0.000
	(0.001)	(0.001)	(0.001)**	(0.001)
Δlog(Revenue)(t−1)	-0.483***	-0.047	-0.216***	-0.318***
	(0.024)***	(0.066)	(0.077)***	(0.081)***
Num.Obs.	163	168	165	146
R2	0.346	0.297	0.411	0.339
R2 Adj.	0.191	0.137	0.274	0.167
AIC	38.4	-196.4	-315.2	-106.7
BIC	140.5	-93.3	-212.7	-11.2
Log.Lik.	13.788	131.191	190.612	85.354
RMSE	0.22	0.11	0.08	0.13
Std.Errors	LP (h=0): Δlog(Revenue) — 10-12 livsmedels-, dryckesvaru- och tobaksindustri	LP (h=0): Δlog(Revenue) — 36-39 vatten- och reningsverk; anläggningar för avfallshantering, återvinning och sanering	LP (h=0): Δlog(Revenue) — 53 post- och kurirföretag	LP (h=0): Δlog(Revenue) — 74 andra företag inom juridik, ekonomi, vetenskap och teknik

Cluster-robust SEs by region (when available).

1.5.7. Reverse causality check

As seen above, the estimation of branch change is sometimes significant. However, it's not certain that branch change affects Δlog(GRP)(r, t). Perhaps it's the other way around. To test for reverse causality, I return to the initial local projections model, but switch Δlog(GRP)(r, t) and branch change(r, t), to see if the branch change depend on regional economic activity. According to the model estimations, I cannot reject the null hypothesis that Δlog(GRP)(r, t) doesn't explain branch change(r, t) (Table 8). I cannot prove any effect of Δlog(GRP)(r, t-1) or Δlog(GRP)(r, t-2) either. However, the branch change lag has the coefficient 0.404*. So a branch closing this year might be partially explained by another closing last year.

Table 8

Causality Test: ΔBranches on Δlog(GRP) (t, t−1, t−2) — Year FE only	
	Causality: ΔBranches ~ Δlog(GRP) (3 lags)
Δlog(GRP)(t)	-37.128
	(37.844)
Δlog(GRP)(t−1)	-1.867
	(25.646)
Δlog(GRP)(t−2)	-11.102
	(25.148)
ΔBranches(t−1)	0.404*
	(0.205)*
Cluster-robust SEs by region. Model controls: ΔBranches(t−1) and year fixed effects. No region fixed effects. Stars: *** p<0.01, ** p<0.05, * p<0.10	

1.6. Discussion

Revisiting **"Do bank branch closings affect regional economic output?"**, I cannot answer yes based on my results. The local projections model estimates a significant, positive but small effect on GRP growth of a bank branch closing two years ago, but because of the identification problem described, I also conduct a 2SLS. The 2SLS for total GRP growth cannot prove an effect of a branch closing.

Also, I recognize GRP growth is a broad measure, and a product of many factors. So a significant coefficient of branch change in my analysis might not prove causality. This broadness is one reason why I also applied the models on industries. Still, a coefficient might be significant because of variables my models doesn't include, which is why I cannot confirm a causal relationship between branch closings and GRP growth.

To answer **“Are sectors affected differently by the branch closings?”** I divide the model into four broad sectors (industries), showing companies are affected differently depending on which sector they are in. According to the estimations, a branch closing negatively affects the total GRP growth of service companies the same year, and a branch closing two years ago negatively affects goods companies’ GRP growth in the region. Branch growth has low explanatory power in the regressions on GRP growth from non industry posts and public institutions and households’ non profit organizations. This could be because these types of businesses/ organizations are less dependent on bank financing (for example a leisure association that survives on membership fee financing). I also assume public institutions have different financing agreements than other organizations. Riksbanken (n.d.) reports that public institutions are financed by taxes, and with different interest-bearing securities, “Offentlig sektor”. Banks are some of the buyers of these securities, but are not a majority of the owners, indicating public institutions are less dependent on banks than private businesses.

I also test the question “Are industries differently affected by branch closings?”. So I apply the identification strategy on more specific industries (changing the dependent variable in focus to percentage change in revenue growth) and find a few industries affected by bank branch closings in different ways, positively or negatively. Since only 4 out of 58 regressions showed any significant effect of branch change, heterogenous effects seem low in the total economy. On the other hand, two industries with vital society functions are negatively affected according to the model (water, water treatment, disposals, recycling and sanitation & post offices), while another influential industry (food, drink and tobacco) is positively affected according to the model, showing it’s useful to look at the effects on an industry level.

I find it surprising that the food, drink and tobacco industry has a GRP growth increase if a bank closes, according to the 2SLS model. At first I’m thinking these businesses might have more hard information they can use to secure a bank loan, and therefore don’t need to visit a bank branch. However, I assume water, water treatment, disposals, recycling and sanitation are tangible asset heavy, and therefore have a lot of hard information for securing a loan. Still a branch closing is associated with revenue growth decrease for their industries. So, it doesn’t seem existence or lack of hard information can explain why branch change affect industry revenue growth differently.

Another possible explanation is that people switch from using banks for some money errands, to companies from the food, drink and tobacco industry. For example, if the last local bank office closes, a customer has to travel longer to withdraw or put in cash into their account. Instead, the customer can choose a local food store, and ask if they can withdraw or put in cash at the store, which sometimes is possible. The customer might shop a little extra while they’re in the store, increasing the revenue of the food industry, as the estimation says. Still, the local projections model doesn't show a significant positive effect of any branch change on the food, drink and tobacco industry.

Since the branch closing timings are spread out and different in my estimation window, it's difficult to estimate the effects of each branch closing individually. It's also not straightforward to estimate if one closing three years ago affected GRP growth, or if it was a closing one year ago in the same region that mostly affected GRP. Therefore, it would be interesting to see if some regions won't have any closings for 5 years, and then estimate the effects of closings in those regions, on GRP in the coming 5 years.

I'm also critical of the 2SLS models' results, as some of the instruments are weak (see the instrument coefficients), which is why I complement with the local projections model for the four industries with significant effects according to the 2SLS.

There are also welfare effects the data doesn't necessarily capture. If a region looses all bank branches, the residents loose possibility to access a bank in their local area. On the other hand, Handelsbanken (2022) reports about private customers choosing online banking today, ("Annual and Sustainability Report 2021"). They might benefit from branch closures, as lower office costs can trickle down to cheaper loans. However, they say some customers prefer a dual approach and want access to a physical bank office. In "Nedstängningar av bankkontor på landsbygden", the politician Gudrun Nordborg (2020) argues closings of local bank offices negatively affect a municipality's economy, for example because citizens must travel longer to make bank errands at a physical bank branch. Not all citizens are able to do this. Even if they are, when they need to travel longer to a bank office, they use more travel resources. This can be interpreted as negative, from a sustainability perspective, and private finance perspective.

Nordborg (2020) adds that even if there's an option of online banking, some groups don't have the same access, for example women who have protected identity that could be leaked when using an online banking service, and older people. In the npr radio episode "After The Bank Leaves", parish commissioner Steven Jackson (2021) describes how an older woman in his area has been going to a local bank office, even as it has changed to a new corporation owner. After that bank office permanent closing, she relies on somebody, like a taxi chauffeur, to pick her up. Jackson adds that he wouldn't ask a woman of her age to use her smartphone, indicating online banking is not an obvious substitute for physical banking.

Further, bank office closings can make it more difficult for citizens to acquire business knowledge, says Nordborg (2020) which might reduce the number of local startups. In other words, a local bank branch is a crucial institution not only practically, but also to facilitate business knowledge to help the local economy. This might explain why the revenues of other companies in law, business, science and tech are estimated to increase when a bank branch closed two years ago, according to the 2SLS. Because there's an empty hole that local banks filled with business knowledge. On the other hand, the local projections model doesn't prove branch change explain revenue growth in this industry.

She also points out that bank closings can reduce bank personnels' information of potential loan takers, when the distance between them increases. Amberg and Becker (2025) describes this as soft information, something vital for lending to firms, especially the businesses who can't show their reliability with "hard information" (easily written down, for example accounting numbers). For example: a small startup, with little tangible assets on the balance sheet, can find it hard to access a loan only through online banking. If the business owner meets a bank officer at a local bank branch, it's possible the bank grants a loan because the business owner and the officer's interaction generates "soft information", (in gen z language the bank officer "get's a vibe" that the business owner is trustworthy). Amberg and Becker explore this, and empirically shows that loans to small and medium size firms (SMEs) do decrease following bank branch closings. They also demonstrate other negative local economic effects, such as decreased employment, that can follow from reduced loan access, because a business don't access enough money to pay operations costs.

However, it's not certain a business can't pay it's cost if it doesn't get a loan. In "Determinants of SME Growth – The influence of financing pattern. An empirical study based on Swedish data", Kave Edin and Darush Yazdanfar (2015) explain a business isn't necessarily dependent on external financing, as they can use internal financing, for example by investing earned profits into the next year's operations. On the other hand, a business owner who just started a company can't use this type of "internal financing", as it requires earned profits.

Edin and Yazdanfar (2015) explores possible connections between types of financing, firm attributes (like size age and industry affiliation) and growth, which they define as the sales change (in percentage). Like Amberg and Becker (2025), they describe that it can be easier to secure external financing for a business owner who's able to show they have collateral, which owners of SMEs might not have. They also say a firm might gain this collateral after time, so firm age could be correlated with availability to external financing. Adding to this are positive correlations between long term debt and age, and long term debt and size, that they show in their paper. So they also show how useful hard information can be.

Ye Wang and Shuang Wu (2024) find mobile banking can be a substitute for physical banking when an office closes, and reduce negative effects, but that it's not always enough to provide financial services, *Impact of mobile banking on small business lending after bank branch closures*. For example, if a small business hasn't had a long time to establish a relationship with a bank, and a local bank closes, mobile banking might not be enough to mitigate the effects. One explanation is that there's large information asymmetry between the bank and the small business, and there's not enough hard information the small business can use, as discussed previously.

Additionally, Jackson (2021) explains if citizens notice a bank closes its branch in their region, and opens a bank in another region nearby, the citizens can become disheartened by this. The closing and opening can signal the other region is better than theirs. In the same radio episode, they describe effects on businesses. Bank consultant Steven Reiter says: "You can look at a rural small-town downtown or an urban neighborhood that maybe has seen better days, but as long as there's still a bank branch, the other retailers will hang on. Once you lose that, that's often the last thing standing between viability, survivorship and complete decay".

Marie-Claire Broekhoff and Carin van der Cruijsen (2025) test if bank branch closures affect overall trust in the payment system – broad-scope trust, and trust in payment services each customer's bank offers – narrow-scope, "The cost of closure: the relation between the presence of bank branches and trust". They use a survey with answers on broad-scope trust and narrow-scope trust, per municipality, from a sample of Dutch citizens, 2020 to 2024, and data on number of bank branches per municipality during the same period. They find that higher levels of broad-scope trust (on average) is associated with a larger number in bank branches. Also higher levels of narrow-scope trust (on average) are associated with more bank branches.

I'm thinking the reduced narrow-scope trust can be explained by soft information theory (Amberg and Becker, 2025). Because when a customer can meet a bank personel in a local bank office, the customer can form an opinion on the personel and the bank overall, for example based on how the bank personel behaves, how the office looks and so on. When the customer can't have such a meeting, because the bank office has closed, the customer can't access the soft information either, possibly reducing narrow-scope trust (trust in the specific bank).

So, from the banks' perspective, it's not necessarily beneficial to close a branch, even if it cut costs. Continuing from the bank's view, Alfredo Martín-Oliver, József Sákovics and Vicente Salas-Fumás (2025) shows if there are competitor bank branches in the same region, a bank company can decide not to close their own branch, because of strategic reasons, "Who closes first? The interaction of market structure and fall in demand in bank branch closures". If Nordea closes their only branch in a region, and there's a branch of another bank still operating (let's say Swedbank), some of Nordea's customers who want to visit a local branch might switch to Swedbank. This also has implications for the customers – it affects them more if the last local branch closes, compared to when there's another option left. As the npr program showed, in the US it can be important that there's one local physical bank office, even if it changes owners. This would be another interesting extension: Does existence of a physical local bank office weigh more than belonging to a specific bank company – in the Swedish banking setting? My hypothesis is that belonging to a bank company weighs more in Sweden, since swedes I've talked to continue using one bank corporation, even if their local bank branch closes, rather than focusing on a physical branch.

1.7. Conclusion

This thesis aims to answer three questions: "Do bank branch closings affect regional economic output?", "Are sectors affected differently by the branch closings?" and "Are industries differently affected by branch closings?".

My data analysis doesn't prove bank branch closings affect regional economic output (GRP growth). The local projections model estimation indicates a small positive lagged effect. However, applying the identification strategy (2SLS), I can't prove bank branch closings have any effect on the regional growth.

Two of four broad sectors are affected by branch closings, according to my models. Because GRP growth of goods producers and service companies decrease.

Four industries are somehow affected by branch change. If a branch closes, the identification strategy estimates increased revenue growth of the food, drink and tobacco industry and other companies in law, business, science and tech. Instead, revenue growth decrease from the water, water treatment, disposals, recycling and sanitation industry, and post offices. The local projections show similar results, except no significant effect of branch change on the food, drink and tobacco industry or other companies in law, business, science and tech.

According to my reverse causality check, percentage change in GRP growth doesn't explain branch change – There's not more closings where the economic activity is increasing or decreasing.

Bank branch closings can also have practical implications for a region, for example reduced access to banking services for older people, women with protected identity and overall increased travel costs when a citizen has to travel longer to a physical bank. Further, citizens can perceive a local bank closing as a signal that their neighbourhood is worse than another neighbourhood.

Additionally, a customer might loose trust – narrow-scope trust – in the bank when a branch closes. So an interesting extension would be to survey the levels of narrow-scope trust for Swedish bank customers from now and for five years. Also, if another company still operates a bank branch in the region, it's possible the customer switches to that company. This also implies if a bank office closes in a region with no other bank office, the effects might be worse for citizens, as there's no regional alternative. Another interesting extension would therefore be investigating if the effect is different depending on how many offices are left after one closing – if effects are larger when the last bank office closes compared to when there are alternatives left? Such analysis might need using more granular data like Amberg and Becker (2025), in order to further investigate the local effects.

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1.7.2. Appendix

Appendix 1. (Translations of industry names, for the 2SLS industry revenue model)

"01-03 företag inom jordbruk, skogsbruk och fiske" = "farming, forestry and fishing",
"05-09 gruvor och mineralutvinningsindustri" = "mining and minerals",
"10-12 livsmedels-, dryckesvaru- och tobaksindustri" = "food, drinks and tobaco",
"13-15 textil-, beklädnads-, läder - och lädervaruindustri" = "textiles, clothes, leather and leather goods",
"18 grafisk och annan reproduktionsindustri" = "graphics and other reproductions",
"19-21 kemisk industri, petroleumprodukter och läkemedelsindustri" = "chemistry, petroleum and drugs",
"22 gummi- och plastvaruindustri" = "rubber and plastic",
"23 industri för andra icke-metalliska mineraliska produkter" = "other non-metallic minerals",
"24-25 stål- och metallverk; industri för metallvaror utom maskiner och apparater" ="metals and steel, not including machines",
"26-27 industri för datorer, elektronikvaror, optik och elapparatur" = "electronics",
"28 övrig maskinindustri" = "other machines",

"29-30 transportmedelsindustri" = "vehicles",
"31 möbelindustri" "furniture",
"32 annan tillverkningsindustri" = "other manufacturing",
"33 reparationsverkstäder och installationsföretag för maskiner och apparater" = "reparations and installations of machines",
"35 el-, gas- och värmeverk" = "electricity, gas and heating",
"36-39 vatten- och reningsverk; anläggningar för avfallshantering, återvinning och sanering " = "water, water treatment, waste disposal, recycling and sanitation",
"41 byggentreprenörer" = "building contractors",
"42 anläggningsentreprenörer" = "site contractors",
"43 specialiserade bygg- och anläggningsentreprenörer" = "specialized contractors",
"45 handel med och serviceverkstäder för motorfordon och motorcyklar" = "mechanic shops",
"46 parti - och provisionshandel utom med motorfordon" = "wholesale and retail (not vehicles)",
"49-51 land-, sjö- och lufttransport" = "transportation",
"52 magasin och serviceföretag till transport" = "service for transport",
"53 post- och kurirföretag" = "post",
"55 hotell, semesterbostäder, vandrarhem, campingplatser m.m." = "accomodation",
"56 restauranger, cateringföretag, barer och pubar" = "restaurants, catering, bars and pubs",
"58 förlag" = "publishing",
"59 film-, video och tv-programföretag, ljudinspelningsstudior och fonogramutgivare" = "film, video, tv, sound and phonogram publishers",
"60 radio- och tv-bolag" = "radio and tv",
"61 telekommunikationsbolag" = "telecommunication",
"62 programvaruproducenter, datakonsulter o.d." = "data programming",
"68 fastighetsbolag och fastighetsförvaltare" = "properties",
"69 juridiska och ekonomiska konsultbyråer" = "consulting in finance, business, economics and law",
"70 huvudkontor; konsultbyråer inom pr och kommunikation samt företags organisation" = "head quarters of consulting in pr, communication and organization",
"71+72 arkitekter, teknisk provnings- och konsultverksamhet samt vetenskaplig forskning" = "architects, testing and scientific research",
"73 reklam- och marknadsföringsbyråer; marknadsundersökningsbyråer o.d." = "marketing",
"74 andra företag inom juridik, ekonomi, vetenskap och teknik" = "other businesses in law, business, science and tech",
"75 veterinärkliniker" = "veterinarian",
"77 uthyrningsfirmor " = "rental companies",
"78 arbetsförmedlingar, rekryteringsföretag, personaluthyrningsföretag o.d." = "employment facilitators",

"79 resebyråer och researrangörer; turistbyråer" = "travel and tourism",
"80 företag för bevakning och säkerhetstjänst, detektivbyråer" = "surveillance, safety and detectives",
"81 företag för fastighetsservice samt skötsel och underhåll av grönytor" = "property caretakers",
"82 kontors- och andra företagstjänstföretag" = "office and other accomodation for companies",
"85 utbildningsväsendet" = "education",
"86 enheter för hälso- och sjukvård" = "healthcare",
"87 vårdhem och bostäder med omsorg" = "care homes",
"88 sociala öppenvårdsenheter, socialkontor" = "social services",
"90 enheter för konstnärlig och kulturell verksamhet samt underhållningsverksamhet" = "art",
"91 bibliotek, arkiv och museer m.m." = "libraries, archives and museums",
"92 spel- och vadhållningsföretag" = "gambling",
"93 sport-, fritids- och nöjesanläggningar" = "leasure",
"94 intresseorganisationer och religiösa samfund" = "associations and religious organizations",
"95 reparationsverkstäder för datorer, hushållsartiklar och personliga artiklar" = "reparations of computers, household articles and personal items",
"96 andra konsumenttjänstföretag" = "other consumer service companies"

1.8. AI-disclosure

I have used AI – ChatGPT – to help my thesis coding.