What is the Impact of Unemployment on Firm Entry in the Context of Swedish Regions?

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AUTHOR: POLINA DOLININA, SUPERVISOR: PETRA THIEMANN

Abstract:

This bachelor thesis uses firm registration and unemployment data to see if unemployment has an impact on the rate at which firms are formed in Swedish regions in the years 2005-2023. This is done through econometric modelling, namely a linear regression model with region and time fixed effects. The results show that there indeed is a relationship between unemployment and firm formation and show that higher unemployment is associated with a decrease in firm formation.

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1. Introduction

The motivation behind the topic of this paper is twofold: on the one hand, the link between unemployment and firm entry is a topic that is still being debated and researched, because it has no clear answer. Research shows different, and at times opposing results. On the other hand, it is of great importance for policy makers to know how a rise in unemployment will impact the entrepreneurial climate in their region. Will a rise in unemployment cause stagnation which further exacerbates the poor economic climate, or will unemployment have no effect on, or even benefit firm entry? The answer is vital for the formulation of efficient policy.

This paper asks the question: "What is the effect of unemployment on firm entry?". This question has been asked (and answered) before. However, it has not been analyzed with Swedish data over as long and as recent a period as this one. It provides an econometric study of panel data from Swedish regions over the years 2005-2023, analyzed through an Ordinary Least Squares regression model with fixed time and region effects. The model accounts for inherent differences between the Swedish regions as well time specific effects from economic shocks that have occurred during this period.

Data from Statistics Sweden and the Swedish Companies Registration Office is used to construct the regression, which is then checked by complimentary data from the Swedish Agency for Growth Policy Analysis. It reveals that unemployment seems to be negatively associated with firm entry, and shows that other factors, such as the size of the service sector and the share of individuals with a higher education, are also of importance when explaining firm formation in Sweden.

The paper contributes to literature by showing that one can indeed find a link between elevated unemployment and reduced firm entry and is structured as follows: The topic will be introduced through a discussion of existing literature and of some features of the Swedish economic climate that make the country a particularly interesting case study. After that, the

data and the construction of the variables will be presented, after which three models with three iterations each will be derived and explained. Ultimately, the results will be presented last, followed by a discussion.

2. Previous literature:

There is an extensive list of literature debating the link between unemployment and firm formation, since there seems to be no easy answer as to what the causal relationship between the two looks like. The different and at times opposing results of empirical analysis indicate a need to refine the existing models and include circumstantial factors that are yet to be fully understood.

Furthermore, the link between entrepreneurial decisions and unemployment is of great importance in policy making. Is high unemployment ultimately a non-issue since it increases market dynamism, or is it a bigger issue than we think, since it prevents firm entry and results in economic stagnation? For these reasons, this elusive link is still a relevant topic today, despite the difficulty it presents for researchers.

2.1 Theory and working model

There are two recurring mechanisms that are referenced in the academic literature concerning this topic: the push and the pull effect. The two effects predict opposing outcomes but seem equally likely from a theoretical perspective and are thus at times referred to as the push-pull paradox. As such, a thorough understanding of these is a prerequisite for understanding the debate surrounding the relationship between unemployment and firm formation.

2.1.1 Push and Pull effect: the theory

The push effect describes the process by which individuals are pushed to start new firms out of necessity, when there are no better options available (van der Zwan, et al., 2016). This implies that the firms that are likely to be created through this process are in industries with

low entry barriers, i.e., firms that do not require a large start-up capital or highly specialized workers. Individuals who start these types of firms are also referred to as necessity entrepreneurs (van der Zwan, et al., 2016). This means that the push effect predicts an increase in firm formation from an increase in unemployment.

The pull effect refers to the process by which individuals are pulled into entrepreneurship when they perceive that there are high chances for return on investment, and by personal preference for entrepreneurship. These entrepreneurs are commonly referred to as opportunity entrepreneurs. Firms established by these entrepreneurs are more likely to be involved in more complex processes, such as product innovation (van der Zwan, et al., 2016). Survey data finds that opportunity entrepreneurs on average come from higher income households, and that their firms in general have higher growth expectations, as compared to firms established by necessity entrepreneurs (Stephan, et al., 2015). The opportunities exploited by opportunity entrepreneurs are more likely to occur in times of economic upturn, when unemployment is low and consumer demand is high due to higher average levels of household income (Wosiek, 2023). This means that the pull effect predicts a decrease in firm formation from an increase in unemployment.

2.2 Empirical approaches

There has been a range of empirical studies concerning this topic. Different studies have focused on different countries and regions, such as for example Germany, the US, Portugal, the Czech Republic, Belgium, Poland, Vietnam, South Africa, Argentina (Wosiek, 2023), Italy, France, Finland, the UK (Audretsch, et al., 2015), and so on. Yet, there are no consistent results. For example, some studies, such as Santarelli et al., find a negative effect of unemployment on firm formation in Italian provinces (Santarelli, et al., 2009), whilst some, such as Audretsch et al., find that the effect varies in German regions, depending on what type of firms are considered (Audretsch, et al., 2015). Others, such as Baptista & Preto, find that unemployment has a positive correlation with subsequent firm entry in Portugal (Baptista & Preto, 2007). And, as can be seen from the list of countries, these three studies are by no means exhaustive of the amount of literature and mixed results on the topic.

2.2.1 Empirical methods

The studies vary in their approaches to modelling. Some use vector autoregression models (for example (Baptista & Preto, 2007) (Wosiek, 2023)), some use fixed effects (for example (Santarelli, et al., 2009)), and some use random effects models (for example (Audretsch, et al., 2015)). Whilst the choice of model depends on the available data and the assumptions made about it in each individual case, the aim is ultimately to see the relationship between unemployment data and data on firm formation and entry.

Since this relationship remains ambiguous, some authors attempt to add more dimensions to consider. Such as:

Unemployment Level vs Unemployment Change: Hannu & Hannu differentiate between unemployment rate and the change in unemployment rate and find that whilst a high level of unemployment impedes firm formation, a rise in unemployment promotes firm formation (Hannu & Hannu, 1994). These results are echoed in Nyström's study of Swedish regions: "a reasonable explanation for this finding would be that the level of unemployment is a general measure of the state of the economy and the business cycle, whereas the change in unemployment rate actually measures the dynamic aspect of alternatives available to an employee who has lost her job" (Nyström, 2007).

Human Capital: Audretsch et al., separate the unemployed according to education level and duration of unemployment, and the new firms into two categories – knowledge-intensive startups and low-knowledge startups. They find that a high share of low-qualified unemployed does not affect firm formation, whereas a high share of highly qualified unemployed shows a positive association with knowledge-intensive startups. They postulate that this may be due to Germany's generous unemployment support, which means that the opportunity cost of remaining unemployed is low for those with a lower skill set (Audretsch, et al., 2015).

Sector: Wosiek separates the data according to sector and finds that a positive effect on firm formation from unemployment can only be found in three out of the eleven sectors included in the study, that uses data from 20 European countries. The three sectors are wholesaling,

retailing and repair services and can be linked to the Central Eastern European markets (Wosiek, 2023).

Once more, this list is by no means exhaustive. Some research has accounted for geographical proximity to urban areas (Shaoming & Huaqun, 2010), proposed to further investigate the impact of taxation and state benefits (Storey, 1991) on the dynamic, and much more.

In terms of the empirical approach, this paper mirrors the established methods by using panel data in a fixed effects model, with the two main variables of interest being Firm Formation rate and Unemployment Rate, as well as looking into the effect of Unemployment Change. However, the particularities of the data used and of the Swedish context isolate the pull effect to a larger extent, and so the literary contribution of this paper is the exploration of the relationship between opportunity entrepreneurship and unemployment.

3. Background

Sweden as a case study is obviously of interest for national policy and research, but it also makes for a particularly interesting case in the context of more general literature concerned with the unemployment – firm formation dynamic. This is because the Swedish economic climate has some features that make a potential pull effect much more likely than a push effect. Therefore, there is not the same concern that the two effects will cancel each other out and produce a net zero or inconclusive result. If the results are close to zero or inconclusive in the Swedish case, it could cast doubts as to if the pull effect is at all relevant when explaining the dynamics of unemployment and firm formation: is there really a causal relationship between an increase in unemployment and a decrease in firm formation?

3.1 Swedish particularities

A couple of notable factors make it so that the pull effect should in theory, dominate over the push effect in Sweden:

Unemployment benefits: Sweden has an extensive unemployment insurance program, which provides income loss insurance (Nordic Co-operation, 2025). Those who do not take part in the insurance program are eligible for the basic insurance, which provides compensation for up to 300 days (Arbetsförmedlingen, 2025). As discussed earlier, Audretsch et al. postulate that unemployment benefits may reduce the opportunity cost of necessity entrepreneurship. This provides support for the argument that the push effect should not be as strong in the Swedish context.

Higher education, and alternatives to unemployment: Tertiary education is free and widely accessible in Sweden, and a wide array of grants and loans for education and retraining are available (CSN, 2025). In the push model, entrepreneurship is seen as a response to the fact that there is no option for wage employment, but this effect should not be as strong if you have the extra option of re-education.

Ease of doing business: In terms of ease of doing business, Sweden ranked at place 10 out of 190 in the World Bank Group's 2019 Ease of Doing Business Ranking (The World Bank Group, 2019). This implies that entry barriers are relatively low, even for the more complex types of businesses, meaning that Sweden should be more favorable for opportunity entrepreneurs than many other countries, whilst the ease of establishing "low-knowledge-intensive startups" (as defined by Audretsch et al.,) may remain relatively the same.

Taken together these three features, unemployment insurance, education, and ease of doing business, fit into the theoretical framework of what creates an opportunity entrepreneur, and saves a necessity entrepreneur from being pushed into starting a business. Therefore, theory predicts that Sweden has a negative relationship between unemployment and the rate at which firms are formed. If such a relationship is found, then one can indeed say that there is a pull effect at play in the unemployment – firm formation dynamics.

4. Data

The data used for this paper comes from Statistics Sweden and from the Swedish Companies Registration Office and is sorted according to administrative region and year. Sweden has 21 administrative regions, and the data sets used for this analysis all cover the 19 years 2005-

2023, yielding a total of 21x19 = 399 observations per variable, with the exception of the unemployment change variable, that due to its construction only has 375 observations, and the alternative firm formation variable due to the data not covering as many years. The mean, standard deviation, min, and max of each variable used for the regression are represented in the descriptive statistics table below:

Table 1: Descriptive statistics table of variables used in the models

	mean	sd	min	max	observations
Firm Formation per thousand people in the labour force	10.9	2.3	7.5	21.3	399
Firm Formation per thousand people in the labour force (alternative data)	12.3	1.9	8.9	20	273
Unemployment Rate (%)	7.6	1.7	0	12.9	399
Unemployment Change (%)	0.002	0.188	-1	0.75	375
Share of labour force working in the service industry (%)	38.8	7.3	28.6	66.3	399
Share of labour force working in the manufacturing industry (%)	26.0	4.6	12.1	35.8	399
Share of labour force working in the public and non-profit sector (%)	35.2	4.7	21.0	45.4	399
Share of individuals having a higher education of 3 years or more (%)	18.1	4.2	10.9	32.6	399

Note: *all values are rounded for ease of reading. For unrounded values, see appendix.*

4.1 Dependent variable: firm formation

The firm formation variable has been constructed from two data sets. One being firm registration data from the Swedish Companies Registration Office (Swedish Companies Registration Office, u.d.). This data set includes a month-by-month account of firm registration in Swedish regions between 1988 – 2025, sorted by type of firm. For the purposes of this analysis, they have been aggregated into yearly values for all types of newly registered firms. It is the company's duty to register with the Swedish Companies Registration Office, and it is optional for firms that are classed as sole traders, unless the firm wants to protect the company name or fulfills two out of the following criteria:

1. The company has an average number of 50 employees.
2. The company has a reported balance sheet of SEK 40 million.
3. The company has a net turnover of SEK 80 million (Swedish Companies Registration Office, 2025).

This means that whilst the data includes sole traders, some may be missing from the set. Setting up as a sole trader requires less paperwork than other firm types and requires no startup capital (Swedish Companies Registration Office, 2025), i.e., has lower entry barriers and is likely more accessible to entrepreneurs with a lower household income. This means that the data may overrepresent opportunity entrepreneurs. Whilst this is not an issue for the aims of this paper, which are to find evidence of the pull effect associated with opportunity entrepreneurship, it is important to keep in mind when making policy inferences from the results of this paper. Entrepreneurs are not a homogenous group, and the trends amongst one part of them should not be used to make inferences about the other.

The number of newly registered firms has been divided by the size of the labor force to scale the firm data into a firm formation variable. The labor force data comes from Statistics Sweden (Statistics Sweden, 2024), and it includes the net number of people aged 15-74 between the years 2005-2024 in the categories employed, unemployed, not in the labor force and total. To limit the analysis to those in the labor force, a new labor force variable was constructed from the employed and unemployed category, by which the firm formation variable was scaled. Using the total population aged 15-74 would include people who are not facing employment decisions, such as students and retirees, making the firm formation rate seem smaller in regions where these groups constitute a larger share of the population. This issue is avoided by using the labor force variable.

Since the unemployment data is in thousands, the final dependent variable looks as follows:

$$firm\ formation\ per\ 1000\ people\ in\ the\ workforce = \frac{number\ of\ newly\ registered\ firms_{r,t}}{employed\ (thousand)_{r,t} + unemployed\ (thousand)_{r,t}}$$

Where the subscript r,t refers to region and time (year).

4.1.1 Robustness of the dependent variable

Whist the main firm-formation data has the benefit of spanning a longer time and potentially isolating the pull effect, an alternative data set has been used to verify the results. This is to check if the results are applicable overall, and that the sole traders missing from the original data set do not skew the results too much. The alternative data comes from the Swedish Agency for Growth Policy Analysis (Growth Analysis, 2025), and includes all newly registered firms between the years 2011-2024. This data has been used to construct an alternative firm formation variable, in precisely the same way as the main data:

$$firm\ formation\ per\ 1000\ people\ in\ the\ workforce = \frac{number\ of\ newly\ registered\ firms\ (from\ new\ data)_{r,t}}{employed\ (thousand)_{r,t} + unemployed\ (thousand)_{r,t}}$$

Where the subscript r,t refers to region and time (year).

The models have then been run with all variables and specifications are identical to the main model, except for the main firm formation variable having been replaced with the one constructed from the alternative data set. The results from this will be presented at the end of the results section.

4.2 Independent variable: Unemployment

There are two unemployment variables: unemployment rate, and unemployment change, both used in percentage form. The data on unemployment comes from Statistics Sweden which already provides it in percentage form (Statistics Sweden, 2024). The reason for using percentages rather than net numbers is for ease of comparison across regions, since they differ in population size, which would make absolute unemployment numbers misleading in this context.

The relative unemployment change variable has been constructed from the unemployment data by taking the change from the previous year, over the unemployment rate from the previous year:

$$Unemployment\ Change_{r,t} = \frac{Unemployment\ Rate_{r,t} - Unemployment\ Rate_{r,t-1}}{Unemployment\ Rate_{r,t-1}}$$

4.3 Industry shares

To account for omitted variable bias, industry shares have been included as control variables. If a larger share of the population is working in a certain type of industry, it may affect both unemployment rates and firm formation. For example, there may be more firms forming in the service sector than in the manufacturing sector, since providing a service may require smaller investments and be profitable for smaller scale firms than in the production sector, but it may also result in higher unemployment, if these firms have a more fluctuating labor demand, or workers view these jobs as short term and are thus more likely to be between jobs at the time of the collection of unemployment data.

The data on the average number of people employed in each sector comes from Statistics Sweden (Statistics Sweden, 2023), and is available for the years 2000 – 2023, and divided into the categories total, manufacturing, services, unspecified, and public and non-profit, with the unspecified category having no observations. This leaves three categories: manufacturing, services and public and non-profit, that have been scaled by the total number of employed individuals (from the same data set). This is done for internal consistency, since employment data mirrors the employment data in the unemployment data set, but is not completely the same in the two sets. This may be due to differences in measurement (average vs the labor surveys that are used for the unemployment data), or due to other differences in measurement. However, the difference is so small that it is negligible.

This yields the percentage variables used in the model:

$$percent\ in\ industry\ X = \left(\frac{workers\ in\ industry\ X_{r,t}}{employed\ workers_{r,t}}\right) \times 100$$

Where the subscript r,t refers to region and time (year).

4.5 Higher education

The rate of higher education may affect both the unemployment and the rate at which firms are formed and is thus included as a control variable. The data on education comes from

Statistics Sweden (Statistics Sweden, 2024), which sorts individuals aged 16-74 according to highest educational attainment. To construct a variable that represents the share of people with a higher education, the categories of post high school education of more than three years and PhD have been summed and then divided by all observations in the sample. This means that individuals with a graduate education of less than three years are not included in this share. The reasoning behind this is that an average diploma in Sweden requires three years of study, so assuming that there is a sheepskin effect on the Swedish labor market (i.e. that the attainment of a diploma itself has a larger impact on career prospects than individual years of study) three years seems to be the relevant number. Educational attainment affects both the career options of an individual and thus affects both the likelihood for unemployment, and the likelihood for entrepreneurial activity. However, shorter education programs, such as some Higher Vocational Education programs, end up being excluded from the set. Which means that a share of individuals with a completed education are not being included in the set.

Ultimately, the education variable looks as follows:

$$percent\ of\ individuals\ with\ a\ higher\ education = \left(\frac{individuals\ with\ 3\ or\ more\ years\ of\ higher\ education_{r,t} + individuals\ with\ \ PhD_{r,t}}{all\ individuals\ in\ the\ set_{r,t}}\right) \times 100$$

Where the subscript r,t refers to region and time (year).

5. Empirical model

5.1 The basic model

To capture effects both between regions and over time, the analysis uses panel data that is then estimated in a fixed effects OLS regression model. The reason for using fixed effects is to account for any differences in the data that may be affecting only particular regions due to their context, and to avoid capturing the effect of economic fluctuation. Not including the fixed effects would, for example mean that the coefficients include the effects of economic downturn (which is associated with both higher unemployment and lower firm formation) rather than reflecting the true relationship between the variables of interest.

The model looks as follows:

$$Firm\ Formation_{r,t} = \alpha + \beta_1 Unemployment\ Rate_{r,t-2} + \delta_t + \delta_r + \varepsilon_{r,t}$$

Model 1(1): Base model.

Where Firm Formation refers to the firm formation per thousand people in the labor force (constructed in the data section) in a certain region and year. The model uses standard errors clustered at the regional level to account for the fact that the errors may be different across observations but autocorrelated within regions.

The Unemployment Rate variable is also sorted according to region but has been lagged by two years. This is due to the assumption that firms do not form immediately from changes in unemployment structure, but rather in response to it over time. This also makes it more plausible, although of course not certain, that any potential relationship found between the variables is of a causal nature, since a firm cannot realistically set up business in the same time as the economic factor that it is responding to is happening – the path from a change happening in the economy, to entrepreneurs seeing a need and potential for a company to getting it of the ground takes time. Due to this lag, there are fewer observations in the model than are present in the actual data.

The model is also run with a three-year lag, to see if extending the time lag captures more of an effect, which makes the second model look like this:

$$Firm\ formation_{r,t} = \alpha + \beta_1 Unemployment\ Rate_{r,t-3} + \delta_t + \delta_r + \varepsilon_{r,t}$$

Model 2(1): Base model, with time lag adjusted to 3 years.

The interpretation of this basic model is that δ_t and δ_r are time and region-specific intercepts, meaning that they account for the base differences between different regions and years – they do not affect the slope of the regression line, which means that they do not say anything about the relationship between the two variables of interest.

The relationship between the two variables of interest, Firm Formation and Unemployment Rate, is represented by the coefficient β_1. It represents the change in firms per thousand individuals in the labor force associated with a one percentage point increase in the

unemployment rate. In terms of the push and pull hypothesis discussed earlier, a positive β_1 would imply that the push hypothesis seems to explain the Swedish context better, whereas a negative β_1 would mean that the pull effect seems to dominate.

This is mirrored in the third model, which differs only in the main independent variable. Instead of unemployment rate, this model uses Unemployment Change:

$$Firm\ formation_{r,t} = \alpha + \beta_1 Unemployment\ Change_{r,t-2} + \delta_t + \delta_r + \varepsilon_{r,t}$$

Models 3(1): Model with unemployment change.

In this model β_1 represents the effect on firm formation of one percents growth from the previous year.

5.2 Expanding the models

After the base regression, two extended versions of the models are set up to test if the control variables presented in the data section have an impact on the results. The first one looks as follows:

$$Firm\ formation_{r,t} = \alpha + \beta_1 Unemployment\ Rate_{r,t-2} + \delta_t + \delta_r +$$
$$\beta_2 Share\ of\ employed\ working\ in\ the\ service\ industry_{r,t-2} +$$
$$\beta_3 Share\ of\ employed\ working\ in\ the\ manufacturing\ industry_{r,t-2} + \varepsilon_{r,t}$$

Model 1(2): Second version of model one, controlling for sector shares.

Here, only two out of the three sector share variables are included. This is done intentionally to avoid multicollinearity, since the three variables together make up the total industry employment, i.e., 100%. The public and non-profit sectors are not as interesting when it comes to the formation of private firms and this variable is therefore the reference category that gets dropped. The remaining control variables are lagged by two years, just as the Unemployment Rate variable, to avoid post-treatment bias, which may occur if unemployment influences the share of the employed working in a particular industry.

The new coefficients β_2 and β_3 represent the change in how many firms are formed per thousand individuals in the labor force associated with a one percentage point increase in the

share of the service and manufacturing sectors, respectively. A negative β_2 means that if there is a higher share of workers sin the service industry in a certain region and year, one can expect that the number of firms per person formed will be lower two years later, if β_2 is positive it implies the inverse. The same interpretation applies to β_3 and the manufacturing sector.

The third version of model 1 looks like this:

$$Firm\ formation_{r,t} = \alpha + \beta_1 Unemployment\ Rate_{r,t-2} + \delta_t + \delta_r + \beta_2 Share\ of\ laborforce\ working\ in\ the\ service\ industry_{r,t-2} + \beta_3 Share\ of\ laborforce\ working\ in\ the\ manufacturing\ industry_{r,t-2} + \beta_4 Share\ of\ individuals\ with\ a\ higher\ education_{r,t-2} + \varepsilon_{r,t}$$

Model 1(3): Third version of model one, controlling for sector shares and education

It includes the sector shares as well as a new variable controlling for the education levels in the population, which is also lagged by two years.

The coefficient β_4 represents the change in the number of firms formed per thousand individuals in the labor force associated with a one percent higher share of people with a higher education. If β_4 is positive, this implies that a more educated population is correlated with more firms being formed, whereas a negative β_4 implies the opposite.

As before, a version with three-year time lags is tested, as well with the independent variable replaced by unemployment change. This means that nine separate regressions are run.

5.3 Expectations and potential weaknesses

I expect my beta values to capture some type of relationship between my dependent and independent variables. Since the main purpose of this paper is to see if unemployment influences firm formation, I expect my β_1 value to show some significant results. Specifically, I expect it to be negative, due to the factors outlined earlier. However, a weakness in the setup of this model is that I have not found a way to control for the push and pull effect, which means that both will be captured by β_1 to some extent. Since they influence firm formation in

opposite directions, there is a risk that they cancel each other out and make me underestimate my true β_1 value. Ideally, the model should disentangle the two effects, for example, by differentiating between entrepreneurs who are themselves facing unemployment and entrepreneurs with job security that just happen to be in an area with higher unemployment rates. But this is unfortunately not something I have been able to do, and so it remains a weakness of this paper.

6. Results

This section presents the results from the nine regressions outlined in the previous section. Whilst some significant results are found, many remain inconclusive, which will be discussed with more detail in the discussion section.

6.1 Unemployment Rate

Table 1: Effects after two years on Firm Formation

Dependent variable: Firm Formation			
	1(1) Base Model	1(2) With Sector Shares	1(3) With Education
Unemployment Rate (%)	-0.105**	-0.120**	-0.117***
	(0.0434)	(0.0484)	(0.0294)
Service Sector (%)		0.0480	0.0911
		(0.0693)	(0.0562)
Manufacturing Sector (%)		-0.0361	-0.0311
		(0.0806)	(0.0447)
Higher Education (%)			-0.690***
			(0.176)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	10.85	10.85	10.85
Constant	11.98***	11.35**	19.50***
	(0.424)	(4.421)	(4.019)
R^2 (*within, between*)	0.7012, 0.0846	0.7045, 0.8978	0.7429, 0.2321
Observations	357	357	357

Note: *This is a fixed effects OLS regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is defined as number of new firms per 1000 individuals in the labour force and has a mean of 10.85.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Effects after three years on Firm Formation

Dependent Variable: Firm Formation			
	2(1) Base Model	2(2) With Sector Shares	2(3) With Education
Unemployment Rate (%)	-0.0465	-0.0263	-0.0158
	(0.0555)	(0.0604)	(0.0475)
Service Sector (%)		0.132*	0.172***
		(0.0706)	(0.0599)
Manufacturing Sector (%)		0.0562	0.0606
		(0.0937)	(0.0626)
Higher Education (%)			-0.661***
			(0.174)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	10.85	10.85	10.85
Constant	10.99***	4.548	12.37**
	(0.459)	(5.014)	(4.581)
R^2 (*within, between*)	0.7146, 0.0980	0.7238, 0.7310	0.7552, 0.1289
Observations	336	336	336

Note: *This is a fixed effects OLS regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is defined as number of new firms per 1000 individuals in the labour force and has a mean of 10.85.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results show that the unemployment rate has a negative impact on the rate of firm formation. The results are significant when running a regression that is lagged by two years, where a percentage point higher unemployment rate is associated with roughly 0.1 fewer firms being formed per 1000 individuals in the workforce. When the lag is extended to three years, the coefficient remains negative, but the results are smaller and no longer statistically significant.

The service sector variable has a positive coefficient in both versions of the model but is only shown to be significant with the three-year time lag (as opposed to the unemployment variable). The coefficient of the manufacturing sector variable is negative in the first but positive in the second version of the model. This change in coefficients, as well as the lack of statistical significance, makes it hard to say if the size of the manufacturing sector has any impact on firm formation rates at all.

The size of the share of individuals with a higher education is significant in both versions of the model. A percentage point increase in individuals having a higher education is associated with roughly 0.7 fewer firms being formed per 1000 individuals in the workforce.

6.2 Unemployment Change

Table 3: Effects after two years on Firm Formation

Dependent variable:	Firm Formation		
	3(1) Unemployment Change Model	3(2) With Sector Shares	3(3) With Education
Unemployment Change (%)	-0.446**	-0.404**	-0.394**
	(0.188)	(0.189)	(0.177)
Service Sector (%)		0.0751	0.119*
		(0.0660)	(0.0572)
Manufacturing Sector (%)		0.0178	0.0360
		(0.0915)	(0.0574)
Higher Education (%)			-0.664***
			(0.184)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	10.85	10.85	10.85
Constant	10.56***	7.374	15.06***
	(0.121)	(4.504)	(3.792)
R^2 (*within, between*)	0.7188, 0.0189	0.7215, 0.7831	0.7530, 0.2324

Observations	335	335	335

Note: *This is a fixed effects OLS regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is defined as number of new firms per 1000 individuals in the labour force and has a mean of 10.85.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Similarly to the unemployment rate variable, the unemployment change is negatively associated with firm formation in a model lagged by two years. Furthermore, the effect is much larger: around -0.4 as compared to the unemployment rate effect of -0.1. The change in unemployment has a large negative correlation with firm formation. This contradicts previous empirical findings in the Swedish and Finnish context and will be discussed in more detail in the discussion section.

Both sector variables are in this model positively correlated with firm formation, but once again, only the service sector has any statistical significance. Higher education, as before, shows a negative association with the rate of firm formation.

6.3 Robustness

To verify that the results are consistent, all models were repeated using another data set on firm formation. This set is provided by the Swedish Agency for Growth Policy Analysis (Growth Analysis, 2025), and includes all newly registered firms. The weakness of this set is that it only stretches over the years 2011-2024, which means that there are not as many observations. Therefore, this data is used to verify if the trends observed in the main results are consistent, and not as data for the main analysis.

When the "alternative data" is used in the models outlined before, it yields the following results:

Table 4: Effect on Firm Formation after two years

	(1) Base	(2) With Sector Shares	(3) With Education
Unemployment Rate (%)	-0.157***	-0.186***	-0.165***
	(0.0528)	(0.0604)	(0.0366)
Service Sector (%)		0.0138	0.0786
		(0.0836)	(0.0777)

Manufacturing Sector (%)		-0.121	-0.0399
		(0.118)	(0.0855)
Higher Education (%)			-0.918***
			(0.301)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	12.25	12.25	12.25
Constant	14.61***	17.55**	27.39***
	(0.550)	(6.217)	(6.796)
R^2 (*within, between*)	0.6725	0.6797	0.7274
	0.0920	0.7467	0.2370
Observations	273	273	273

Note: *This is a fixed effects regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is here constructed from the alternative data set and is defined as number of new firms per 1000 individuals in the labour force. It has a mean of 12.25.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect on Firm Formation after three years

	(1) Base	(2) With Sector Shares	(3) With Education
Unemployment Rate (%)	-0.0515	-0.0584	-0.0246
	(0.0650)	(0.0745)	(0.0508)
Service Sector (%)		0.0813	0.139
		(0.105)	(0.105)
Manufacturing Sector (%)		-0.00900	0.0672
		(0.124)	(0.0735)
Higher Education (%)			-0.947**
			(0.341)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	12.25	12.25	12.25
Constant	13.56***	10.82	21.08**
	(0.493)	(6.629)	(7.533)
R^2 (*within, between*)	0.6486	0.6514	0.7046
	0.0822	0.6536	0.2462

Observations	273	273	273

Note: *This is a fixed effects regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is here constructed from the alternative data set and is defined as number of new firms per 1000 individuals in the labour force. It has a mean of 12.25.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Effect on Firm Formation after two years

	(1) Base	(2) With Sector Shares	(3) With Education
Unemployment Change (%)	-0.730***	-0.755***	-0.723***
	(0.174)	(0.209)	(0.172)
Service Sector (%)		0.00421	0.0730
		(0.0996)	(0.0932)
Manufacturing Sector (%)		-0.0478	0.0274
		(0.139)	(0.102)
Higher Education (%)			-0.968**
			(0.373)
Year fixed effects	*yes*	*yes*	*yes*
Region fixed effects	*yes*	*yes*	*yes*
Mean of dependent variable	12.25	12.25	12.25
Constant	13.51***	14.63*	25.44***
	(0.190)	(7.423)	(7.951)
R^2 (*within, between*)	0.6609	0.6621	0.7155
	0.1311	0.7275	0.2995
Observations	272	272	272

Note: *This is a fixed effects regression model using time and region fixed effects. The model uses standard errors clustered at the regional level, reported in parentheses. Firm Formation is here constructed from the alternative data set and is defined as number of new firms per 1000 individuals in the labour force. It has a mean of 12.25.*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As can be seen from these tables, the data reflects the same trends as the original one. Both Unemployment Rate and Unemployment Change are negatively correlated with firm formation. The results are significant when the variables are lagged by two years and become quite small and not statistically significant when the Unemployment Rate is lagged by three years. This is the same pattern as in the main results.

The new results show a larger negative effect than the original ones, but they also have a higher mean in the dependent variable, which means that this should be somewhat expected.

The coefficients of the control variables remain consistent: education shows a strong negative relationship with firm formation, whereas the sector variables yield consistent results in terms of the coefficients (positive for the service sector, mixed for the manufacturing sector), neither yields any significant results, unlike the original data.

Overall, this robustness-check strengthens the validity of the results provided in the main analysis.

7. Discussion

The results of this analysis show that there indeed seems to be a negative relationship between unemployment and the rate at which firms are formed in the context of Swedish regions. This finding is in line with the results predicted in the background section, and so the main finding of this paper is that he pull model does seem to be of relevance when discussing the dynamics of unemployment and firm formation. This has implications both for economic theory and for policy making.

In terms of significance for economic theory, these findings seem to indicate that unemployment is indeed correlated with firm formation. If they were purely reflections of the state of the economy, they would presumably have been absorbed by the time and region fixed effects. But the data yields statistically significant results even when region and time effects are taken into consideration, which implies that there is a more direct relationship between unemployment and the rate at which firms are formed. This gives credibility to the pull hypothesis.

In terms of policy, the results show that unemployment could negatively influence the dynamism of a region, but it also shows that this effect is relatively small. This means that policymakers working with policies aimed at reducing unemployment can rest assured that whilst unemployment undeniably has large scale effects on the economy, it does not seem to drastically reduce entrepreneurship. Whilst it does have a correlation with firm formation,

there is little to no risk that the effect is so drastic as to result in an unemployment – firm formation stagnation trap.

When compared to results from previous studies, the findings regarding the impact of unemployment change on firm formation are surprising. As mentioned earlier, in a study of Finnish regions between the years 1995-1982, Hannu & Hannu find that a positive change in unemployment is associated with a rise in firm formation (Hannu & Hannu, 1994). Similarly, in a study of Swedish regions between the years 1997-2001, Nyström finds that whilst a high unemployment rate is negatively associated with firm formation, a rise in unemployment is positively related to firm formation (Nyström, 2007). This contradicts the findings of this paper, which indicate that both unemployment rate and change are negatively associated with subsequent firm formation, when looking at the statistically significant results.

As stated before, the data is missing sole traders that do not self-report or fulfill the criteria of having to register with the Swedish Companies Registration office. If necessity entrepreneurs are overrepresented among the missing observations in the data set, it would make a potential push effect from the rise of unemployment difficult to observe and explain why the only statistically significant results show that unemployment change has a negative correlation with firm formation. However, to test this, all models were repeated using firm registration data from the Swedish Agency for Growth Policy Analysis (Growth Analysis, 2025), which is only available for the years 2011-2024, but includes all firms registered in Sweden during this period. When running the models with this alternative data, the results remain the same: the unemployment change variable shows a strong negative correlation with firm formation. This is not conclusive evidence, but it suggests that the missing data is not what is ultimately driving this surprising result. The difference between these results and the results of previous studies remain unexplained, and indicate that this is a topic that is of interest for further investigation.

For policy makers this means that they cannot rely on rising unemployment automatically mitigating itself. The data indicates that there is not a big enough effect for it to cause a stagnation trap, but there is no automatic remedy either. Active policy is needed if one wants to influence the entry rate of firms.

The results show that a larger service sector is associated with a higher firm formation rate. This has practical implications for policymakers and suggests that one should take industry structure into consideration when comparing your own firm formation rates with those of other regions. Not accounting for the size of the different sectors may mean that the firm formation rates are misleading.

Higher education is statistically significant in all models. Surprisingly, it is associated with a lower firm formation rate. One possible explanation for this is that education is an option picked by those who may have started their own business in other circumstances.

8. Conclusion

This paper has used a fixed effects model to estimate the impact of unemployment on firm formation rates in Swedish regions. The findings support the expected result: elevated unemployment levels and a rise in unemployment are negatively correlated with firm formation. This supports the pull hypothesis and suggests that firms in Sweden are formed more due to opportunity than necessity. The effect, however, is relatively small in terms of absolute numbers.

The results also show that the industrial make-up of a region, as well as the level of education in the population, plays a role in the number of firms being formed.

A caveat that remains is the difficulty in disentangling the push and pull effect, with the risk that their opposing directions may make us underestimate both. This could be avoided by, for example collecting survey data on motivation along with firm registration data.

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10. Appendix

The unrounded descriptive statistics table looks as follows:

Table 2: Unrounded descriptive statistics table of variables used in the models

	mean	sd	min	max	observations
Firm Formation per thousand people in the labour force	10.85145	2.348851	7.536842	21.27757	399
Firm Formation per thousand people in the labour force (alternative data)	12.25423	1.851066	8.852139	20.04824	273
Unemployment Rate (%)	7.568421	1.711344	0	12.9	399
Unemployment Change (%)	0.0023001	0.1880193	-1	.7540984	375
Share of labour force working in the service industry (%)	38.81588	7.253819	28.61272	38.81588	399
Share of labour force working in the manufacturing industry (%)	26.00333	4.620273	12.10853	35.8473	399
Share of labour force working in the public and non-profit sector (%)	35.18079	4.666875	20.97585	45.38813	399
Share of individuals having a higher education of 3 years or more (%)	18.06382	4.228688	10.86747	18.06382	399

11. AI Statement

Generative AI has been used for this paper in the following ways:

- Chat GPT has been used for working with and understanding commands in Stata and Excel.
- The final version has been passed through Grammarly for the purpose of checking for grammatical and spelling errors.