Investment behaviour among young farmers; the probability to invest after receiving the Setting up aid

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Investment behaviour among young farmers; the probability to invest after receiving the Setting up aid.

Investerings beteende hos unga lantbrukare; Sannolikheten att investera efter mottagit startstödet.

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Abstract

The lack of engagement from young people in agriculture presents a significant challenge to the future of the agricultural sector and of food security globally. Despite numerous studies focusing on the motivations and barriers for young individuals to enter farming, there's a gap in understanding their investment behaviour past entry. This study addresses this gap by empirically examining the factors influencing investment decisions among young Swedish farmers after they have received the Setting up aid, between the years 2001 and 2020. This study uses a dataset covering 4230 Swedish farmers aged 16 to 45 who all received the Setting up aid. The empirical analysis is based on logistic regressions and the purpose is to examine the factors that influence receivers of the Setting up aid to make additional investments. Results indicate that age is an important factor, suggesting a quadratic relationship and that the propensity to invest peaks at around age 30. Furthermore, individuals that received investment support in connection with the Setting up aid where associated with an increased probability of making future investments, but the magnitude of the initial investment support is indicated to decrease this probability.

This study contributes to the literature with empirical evidence on factors influencing young farmers investment behaviour, offering insights for policymakers to better design more effective supports for young farmers. Ultimately, by understanding and addressing the challenges facing young farmers, is crucial to ensure the sustainability and competitiveness of the agricultural sector in the face of evolving market conditions and environmental pressures.

Keywords: Young farmers; Investment behaviour; Ageing; Sweden

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Abbreviations

CAP	Common Agricultural Policy
SLU	Swedish University of Agricultural Sciences
EU	European Union
SJV	Statens Jordbruksverk (Swedish Board of Agriculture)

1. Introduction

The lack of involvement from young people in agriculture has garnered global attention, with numerous factors possibly discouraging their participation. This has placed young farmers and the issue of generational renewal at the forefront of research concerning the future of agriculture and food security (Żmija et al. 2020). The agricultural sector faces several challenges such as, the need of European countries to improve self-suffiency in response to increasingly volatile market conditions caused by geopolitical factors (Saâdaoui et al. 2022) and climate change (Muluneh 2021). In order to face these challenges and to reach the objectives of the rural development program, young farmers will play a vital role (European commission 2023).

Most of the existing studies focus on understanding the drivers for young individuals to enter farming as an occupation (Šimpachová-Pechrová et al. 2018; Coopmans et al. 2021). Nordin and Loven (2020) evaluated the Setting up aid and found a drop in income the years following a managerial change. They further found that if a farmer received the Setting up aid, the drop in income was mitigated. This was observed among farmers up to 15 years after they received the Setting up aid. As Nordin and Loven mention, the long-term impact on income suggests that the observed effect is not solely the direct result of monetary transfers. Rather, it is likely that the effect is influenced by other factors, such as the drivers of investment decisions. Therefore, the contributions of this study are to examine young farmers investment behavior past entry with the aim to provide empirical evidence on the factors that can affect young farmers investment decisions past entry. This perspective of the *young farmer problem* has received relatively little attention in the literature (May et al. 2019).

The significance of this focus is emphasized by the findings of multiple studies indicating that young farmers tend to operate more productive and efficient farms (Zagata & Sunderland 2015; Hamilton et al. 2015). It is shown that the factors underlying the economic motivations of young farmers are closely linked to their entrepreneurial and innovative motives (Hamilton et al. 2015). As noted by Hamilton et al. (2015) younger farmers also tend to be more environmentally conscious as they tend to engage more in agri-environment schemes. Further evidence supporting this statement can be found in Vanslembrouck et al (2005) where younger and more educated farmers showed a more positive attitude towards

agri-envirnomental policies and in Perez-Urdiales et al. (2016) where they found, among dairy farmers in Spain, that younger farmers were more eco-efficient.

Despite previous stated strengths of young farmers, the *young farmer problem* is very much present in the European Union. This is something that has been highlighted in previous reforms of the Common Agricultural Policies (CAP), with various supports for young farmers and generational renewal being a part of the CAP since the early 1990s (Hamilton et al. 2015). Even though policy attempts have been made, the average age of the farming population remains high. Among Swedish farmers in 2022, more than one third of sole proprietorship was above the age of 65, which was an increase compared with 2020 (SJV 2022). In the EU the age structure differ between countries and Sweden was one of the member states with a relatively high share of older farmers (Zagata & Sunderland 2015). The high average age is not only a problem in Swedish agriculture but also for Swedish business owners in general. Where 14% of business owners in Sweden are between the ages 65 and 74, while the European average is around 6% (Swedbank 2018).

Presented in a summary rapport for the rural development program (2007-2013), the objective of the Setting up aid is to promote long-term profitability and competitiveness by supporting generational renewal. In the rapport it is also mentioned that the Setting up aid increases the likelihood of getting approval for bank loans (SJV 2016). Between 2007 and 2021, the support provided a maximum of 250 000 SEK for farmers aged 40 or younger, who for the first time establishes themselves as a proprietor of a farm business (SJV 2019). However, if the farmer received the support between 2000 and 2006, the maximum amount was 100 000 SEK (Mattisson 2001).

The investment supports objective is to increase the competitiveness and profitability of farmers. While the setting up aid is specific for young farmers the investment support can be given to any farmer for a wide range of investments (SJV 2019). These objectives are also in line with the goal of the Swedish Food strategy to have a competitive food supply chain, while reaching relevant environmental goals (Regeringen 2017). Approval for the investment support is not a guarantee and application are ranked. It is important to note that the investment support has been approved for young farmers at a relatively high rate (SJV 2019).

The challenges faced by young farmers upon entering the industry is an important issue to address because of the need to make investments, particularly during the first couple of years, in order to develop the business and become competitive (Laure & Granier 2015). When considering the importance of investments alongside the CAP's objectives, it becomes clear that it is important to identify the factors influencing investment decisions among young farmers. Therefore, the research question that this study set out to answer is:

What factors affects the probability that young farmers make additional investments after receiving the Setting *up aid?*

In order to obtain estimations, a logistics regression analysis was conducted utilizing data from Swedish farmers aged 16 to 45, who received the Setting up aid between the years 2001 and 2020. The results indicate that age has a quadratic relationship and if a farmer received the investment support in connection with the Setting up aid it had a significant and positive effect. Furthermore, the total sum of the investment support also appears to be a significant factor, negatively affecting the probability of making additional investments. These results can potentially prove to be valuable information for policymakers in order to design more effective supports for young farmers.

2. Literature and theoretical argument

2.1 Previous literature

The young farmer problem in European agriculture is something that has been studied quite extensively over the last couple of decades. Many of the papers have conducted survey studies in order to gain an understanding of what factors influence generational renewal and young farmers to enter the agricultural sector. Šimpachová-Pechrová et al. (2018) surveyed 510 new entrants in the Czech Republic and examined the motivation and barriers to enter the agricultural sector. The main motivations were the desire to continue farming the family farm, have the possibility to work in nature and with animals. The main barriers were the administrative burden, difficulties to access land and finances. These last two barriers, access to land and finances, have consistently been found important constraints among respondents in several studies (Zondag et al. 2015; Coopmans et al. 2021).

It is important to understand the complexity of the *young farmers problem* and that it is not something that can just be boiled down to an issue with aging. The restructuring of the agricultural sector has resulted in decreasing number of farms (Zagata et al. 2017). In Sweden the number of farms has decreased by 40% from 1990-2022 (SJV 2022) and the average size of farms has increased as smaller farms are disappearing. This is because the size of the farm has a considerable effect on the efficiency of the farm (Manevska-Tasevska & Tabinowicz 2015).

In the report from Zagata et al. (2017), case studies were conducted with the intention of collecting data regarding the young farmer problem and its challenges. The report identified 4 different clusters and from each country one or two were selected. Access to land was consistently found to be the main barrier for new entrants. A reason for this is that the available land is too expensive and young farmers do not have the financial resources to get access to land. Other challenges that were mentioned in the report is that it is more difficult to get access to financing because of the lack of capital assets. The issues identified in this report aligns with the concerns raised by The European Council of Young Farmers (CEJA) regarding obstacles faced by young farmers. In a policy paper, the lack of access to capital was highlighted as one of the primary barriers limiting the ability to invest during the transition period (CEJA 2023). In a separate report, the capital-intensive nature of the agricultural sector and the challenge of accessing land were identified as significant obstacles for young farmers (CEJA 2022).

Olper et al. (2014) highlight that previous literature regarding subsidies effect on out-farm migration has both showed a negative effect, no effect and even

positive effect. In one of the papers, from Barkley (1990), it was found that subsidies did not have a direct effect on agricultural employment, although it indirectly causes land appreciation which has a negative effect on labor migration from the agricultural sector. Olper et al. (2014) concluded that the CAP Payments generally had a negative effect on out-farm migrations and the payments from Pillar I[1] had larger effect on out-farm migration compared to payments from Pillar II[2]. This effect could, in part, be attributed to subsidies that are coupled to land, where a large portion of the gains from the subsidies could turn into economic rent for land. This effect creates a financial incentive to retain ownership of land, consequently leading to reduced land mobility (Leonard et al. 2017).

Olsen and Lund (2011) examined the factors that influence investment behavior among Danish pig farmers. They found that farmers who prioritize economic incentives when making investments decisions were the ones who achieved the best financial results. Younger farmers and those operating larger farms were also more likely to make new investments. Additionally, according to a study by Hamilton et al. (2015), farmers in the age 35-45 showed the highest level of investments, whereas those under the age of 35 showed lower levels of investments. The age group between 45 and 55 showed better economic performance compared with the group bellow 35 and their level of investments were similar. While economic incentives remain an important factor, there are various internal and external factors influencing investment decisions, such as, farmers risk aversion, social influence from the community, as well as the farm size and type (Hallam 2012).

When discussing farmers risk aversion, factors such as price volatility and production uncertainties were identified as crucial sources of risk. In a paper from Brown et al. (2019), they found that younger farmers tend to be less risk averse. However, when looking at individual farm and farmer characteristics the perceptions of risk can vary a lot depending on the individual (Meuwissen et al. 2001).

The topic of generational renewal is a very complex subject, with many influencing factors. Therefore, it can be challenging to design effective policies to aid this problem. One significant concern revolves around whether a farm can generate sufficient income to support both the farmer and their successor. Additionally, the matter of residual income for the farmer arises if farmers choose to transfer the farm before their passing. Furthermore, the taxes associated with land transfer are seen as a significant financial risk (Leonard et al. 2017).

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[1] Pillar I is financed by EU and the Agricultural Guarantee Fund (EAGF), where a majority of the direct payments goes to income support schemes and eco-schemes. https://agriculture.ec.europa.eu/common-agricultural-policy/financing-cap/cap-funds_en

[2] Pillar II is co-financed by EU and the European Agricultural Fund for Rural Development (EAFRD). It is also financed by regional or national funds. The second pillar has more flexibility enabling countries to create their own rural development programmes based on the guidelines from EU. Second pillar of the CAP: rural development policy | Fact Sheets on the European Union | European Parliament (europa.eu)

2.2 Where does my paper fit?

Much of the previous literature on problems young farmers face has focused on generational renewal and the difficulties with entering or becoming a farm manager. Many of the research papers described above are based on survey studies in order to gauge the problems with generational renewal. One of the few papers to have done an analysis with a large dataset on the generational renewal and young farmer problem is the paper from Nordin and Loven.

In the article by Nordin and Loven (2020), they found that the Setting up aid had an effect in facilitating a lower age of transition to management. Furthermore, the support also had an effect on long-term income. They could not empirically explain the effect on income, although they speculated that it could be because the support affects investment decisions. Thus, this paper seeks to fill this gap and enable better understanding regarding which factors affect young farmers investment behaviour.

2.3 Theoretical framework

In order to understand the importance of the factors affecting young farmers investments behaviour, it is essential to delve into the underlying theory and key concepts. In agriculture, factors of production play an important role in determining the production output. The main factors are considered to be land, labour and capital (Tittonell 2023). From classical economic growth theory, Adam smith emphasises the role that capital accumulation has on labour productivity, which in turn leads to economic growth (Smith 2023). For young farmers, lack off access to financing can hinder or slow down the process of accumulating capital, which in turn limits labour productivity.

Expanding on the importance of labour productivity, the Kaldor-Verdoorn Law suggests a positive relationship between the rate of growth in labour productivity and output. This observed effect tends to be attributed to the existence of increasing returns to scale or changes in technology that are driven by shifts on consumer demand (Basu & Budhiraja 2021).

Based on the Klador-Verdoorn Law, an agricultural landscape with more young farmers may result in increased output from agricultural production. This is due to the fact that young farmers tend to demonstrate higher productivity and efficiency, which can be defined as higher labour productivity. Given that some of the effect can be attributed to technological change, coupled with the perception that young farmers are more innovative and entrepreneurial, it emphasizes the importance of

encouraging young farmers in order to achieve higher production and economic growth.

The Setting up aid is not directly connected to a certain investment. However, in an evaluation of the rural development program, higher total factor productivity from farmers who received the support was observed. This indicates that it is likely that the support often is connected to some sort of productive investment (Backman et al. 2016). In a paper examining the investment support, Nilsson (2017) makes a connection between the q-theory and firms investment behaviour. The q-theory assumes that besides the direct cost of an investment, there are additional expenses such as installation costs. With the presence of investment subsidies, firms are further incentivized to invest in capital, provided that the costs of capital do not supersede the value of the capital and the subsidy. Hence, in the context of this study this implies that the presence of the investment support should increase farmers propensity to invest.

3. Method and data

The data used in this analysis originate from the Swedish Board of Agriculture's statistical database and from Statistics Sweden. The study period spans from 2001 to 2020 and the datasets consist of repeated cross sections that covers 4230 Swedish farmers between the aged 16 to 45 who received the Setting Up Aid. These individuals are also observed after, if they received the investments support. Non-beneficiaries were excluded to avoid selection bias. Based on the effect the Setting up aid had on income (Nordin & Loven 2020), this support served as a clear inclusion criterion to exclude potential outliers that could skew the results.

The dependent variable is a binary variable equal to 1 if the farmer received the investment support in the years after they received the Setting up aid, 0 otherwise. If farmers receive the investment support it acts as an indication for investments past receiving the Setting up aid.

Because of confidentiality, the financial variable *capital*, has been aggregated to the municipal level. In a paper by Steel and Holt (1996), the authors mention that the utilisation of aggregated data in statistical analysis may potentially result in the occurrence of ecological fallacy. This implies that conclusions derived from analyses conducted on aggregated data may differ from analyses derived from individual data, potentially rendering the result invalid. Thus, the analysis is performed with this limitation in mind.

Furthermore, because of data availability and a limited timeframe, the variable for land prices is aggregated on production areas in Sweden. It would have been beneficial to also have this variable a municipal level. However, the main variable of interest *investatstart* and *age* are observed at the farm level.

In Table 1 below, all variables used in the analysis are displayed with descriptions

Table 1. Description of variables in performed regression

Variables	Description
acreage	Hectares of agricultural land
acreage(ln)	Logarithmic value of "Hectares of agricultural land"
gender	Genderdummy = 1 if male
SUA	Dummy=1 if farmer received setting up aid
age	Age when farmer received the Setting up aid
age(sq)	Squared age when farmer received the Setting up aid
genshift	Dummy=1 if farmer took over after a family member
suminvest	Sum of investment support
suminvest(ln)	Logarithmic value of "Sum of investment support"
investatstart	Dummy=1 if farmer received investment support in connection to the Setting up aid
investafterstart	Dummy=1 if farmer received investment support after start
capital	Capital per farm business in a municipality
capital(ln)	Logarithmic value of "Capital per farm business in a municipality"
CAP	Dummy=1 if farmer received Setting up aid in period 2007-2020
landprice	Price per hectare in thousands of crowns
landprice(ln)	Logarithmic value of "Price per hectare in thousands of crowns"
neverinvested	Dummy=1 if farmer never received investment support

3.1 Model Specification

Since, the dependent variable has a binary outcome, it is suitable to perform the estimation with a probability model. In this study, a logistic regression model was chosen to capture the factors affecting the probability of a farmer getting additional investment support. Logistic regression uses the sigmoid function to get probability in ranges between the values 0 and 1. Due to the sigmoid function linear nature around 0 and the gradual flattening towards the extremes the function has an advantage in dealing with outliers at the ends (Jurafsky & Martin 2024). From this it is possible to derive the probability of an event occurring given certain predictors, as in equation (1).

$$P(y_{it} = 1 | x_{it}) = \frac{1}{1 + e^{-(\beta 0 + \beta 1 x1_{it} + \beta 2 x2_{it} \dots + \beta n xn_{it})}} \quad (1)$$

The main predictor, *invstart*, is if the farmer received the investment support in connection to the Setting up aid. In the final regression, equation (3), the variable *invstart* is interacted with *suminv(ln)* in order to examine whether the size of the investments affects the probability of making additional investments. Other variables that are of interest when discussing investment behaviour among young farmers include, the age, agricultural land in hectares, capital, land prices and if the farmer took over from a family member.

In order to examine the factors influencing investment behaviour from young farmers a base model was specified in equation (2). Where y is the dependent variable *invafter*, measuring if the farmer received the investment support after receiving the Setting up aid. The main independent variable is if a farmer received the investment support in connection with the Setting up aid. Other important control variables added were gender (*gender*), if a farmer took over after a family member (*genshift*) and the average capital per farm aggregated on a municipal level.

$$P(y_{it} = 1 | x_{it}) = \frac{1}{1 + e^{-(\beta0 + \beta1 invstart_{it} + \beta2 genshift_{it} + \beta3 gender_{it} + \beta4 capital(\ln)_{it})}} \quad (2)$$

Subsequently, the model was incrementally developed by adding new variables in 4 steps until it reached the following configuration:

$$P(y_{it} = 1 | x_{it}) = \frac{1}{1 + e^{-\left(\substack{\beta0 + \beta1 invstart_{it} * suminv(ln) + \beta2 genshift_{it} + \beta3 gender_{it} + \beta4 capital(\ln)_{it} \\ + \beta5 CAP_{it} + \beta6 acreage(ln)_{it} + \beta7 landprice(ln)_{it} + \beta8 age_{it} + \beta9 agesq_{it}}\right)}} \quad (3)$$

The total sum of the Setting up aid for the period 2007-2020 was 250,000 Swedish crowns, while in the previous period the sum was 100,000 Swedish crowns. Consequently, the variable *CAP* was added in the second regression and can potentially prove to be an influential variable.

In the first regression, equation (2), *capital(ln)* was the variable to control for how capital intensive a farm is. For the third regression, *acreage(ln)* was also added to control for capital insensitivity. This variable becomes important to control for because land is a limited resource and is one of the main hinderance for young farmers. Also, previous literature has showed that the direct payments based on acreage, incentives farmer to hold on to land (Olper et al. 2014).

One of the key variables of interest is *age*, which was added in the third iteration of the model. From the findings in Hamilton et al. (2015) there seems to be a negative quadratic relationship between age and propensity to invest. In the study the age group 35-45 had the highest level of investments and the age group bellow and above had lower levels of investment. In order to test this relationship, the variable *agesq* was added to the fourth regression. Furthermore, in order to address

the issues with skewedness and heteroscedasticity in the data, *capital*, *acreage*, *suminvest* and *landprice* were log transformed.

When building upon the base model. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) value were used to check goodness of fit, post estimation. Each regression equation, adding variables to the specification, produced a lower value indicating a better model fit. Although, when adding variables, there were only incremental improvement until the last version where there was a large leap in improvement from the AIC and BIC values after adding *suminvest(ln)* and interacting it with *investatstart*. When adding this variable there was also a large improvement in the Pseudo R-squared value going from 0.0812 up to 0.5933. Indicating that regression 5 has the best model fit.

Other than this, a Pearson residual analysis was conducted and the results can be seen in *Appendix 1*. From this analysis there seems to be some clustering for regression equation 1-4. However, for the final regression the residual analysis looked much better. Another indication that regression 5 is the best model.

4. Results

The descriptive statistics are displayed in table 2. From this table it can be derived from the mean value (0.157) for variable *investafterstart*, that farmers do not tend to receive the investment support after receiving the Setting up aid. Overall the variable *neverinvested* indicate that a lot of farmers have never applied for the investment support. Furthermore, receiving the Setting up aid in connection with the investment support also has a relatively low mean value (0.136). Other noteworthy observations from the descriptive statistics is that the sum of the investment support has a very wide range of outcomes and that the size of the farm varies quite a lot. This can be seen in the acreage and capital variables, as they have relatively low mean values compared with its maximum value. Farm size is also skewed towards smaller farms and larger farms likely inflates the mean value upwards.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
investafterstart	4230	.157	.364	0	1
investatstart	4230	.136	.343	0	1
suminvest	4230	103386.98	273639.77	0	3040100
genshift	4230	.108	.31	0	1
gender	4230	.829	.377	0	1
capital	4135	2141.672	1305.187	101.4	31002.678
CAP	4230	.534	.499	0	1
acreage	4230	80.52	91.511	0	1443.73
landprice	4230	39.39	37.278	3	255.8
age	4230	31.102	5.251	16	45
age sq	4230	994.877	324.614	256	2025
neverinvested	4230	.694	.461	0	1

Five regression were performed in this study. The first regression acts as a base model and is later built upon in order to be able to compare different models. In the table 3, model (1) is represented by equation (2) and model (5) is represented by equation (3) in chapter 3.1 (Method and Data). In model (2) the variable *CAP* is added. Then in model (3) *acreage(ln), Landprice(ln)* and *age* are added. Futhermore, in model (4) *age(sq)* is added. Lastly, in model (5) *suminvest(ln)* is interacted with *investatstart*.

Table 3. Results from regressions

VARIABLES	(1) investafterstart	(2) investafterstart	(3) investafterstart	(4) investafterstart	(5) investafterstart
1. investatstart					3.783***
					(0.367)
suminvest(ln)					0.571***
					(0.0156)
0b. investatstart#co.suminvest(ln)					0
					(0)
1.investatstart#c.suminvest(ln)					-0.507***
					(0.0325)
genshift	0.247*	0.0135	-0.124	-0.128	-0.166
	(0.133)	(0.133)	(0.135)	(0.135)	(0.230)
gender	0.470***	0.220	-0.159	-0.183	-0.00995
	(0.128)	(0.134)	(0.142)	(0.142)	(0.192)
capital(ln)	0.0300	0.332***	0.104	0.0933	-0.127
	(0.0669)	(0.0868)	(0.111)	(0.111)	(0.157)
CAP		-1.105***	-0.663***	-0.656***	0.185
		(0.103)	(0.116)	(0.116)	(0.168)
acreage(ln)			0.351***	0.347***	0.0306
			(0.0350)	(0.0351)	(0.0436)
Landprice(ln)			0.112	0.113*	-0.0815
			(0.0685)	(0.0684)	(0.0992)
age			-0.00839	0.201**	0.0131
			(0.00856)	(0.1000)	(0.129)
age(sq)				-0.00337**	-0.000407
				(0.00161)	(0.00209)
investatstart	0.524***	0.643***	0.541***	0.542***	
	(0.114)	(0.118)	(0.122)	(0.122)	
Constant	-2.407***	-3.972***	-3.535***	-6.578***	-4.796**
	(0.527)	(0.650)	(0.758)	(1.636)	(2.145)
Observations	4,135	4,135	4,135	4,135	4,135
Pseudo R2	0.0103	0.0474	0.0800	0.0812	0.5933

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Something that holds true for all regression results is that if a farmer received the investment support in connection to the Setting up aid it increased the probability to receive the investment support again. In all regressions, this result was at a 1% significance level.

Additionally, from the first regression it can be seen that gender is significant at a 1% level indicating that there is a positive relationship between being a male and the probability to get the investment support after receiving the Setting up aid. This also applies for if a farmer is taking over after a family member. However, this is only significant at a 10% level.

In the second regression where the variable *CAP* was added. This variable is significant at a 10% level with a negative coefficient, indicating that if a farmer received the Setting up aid in the period 2007-2020 it had a negative impact on the probability to receive the investment support after. Compared with the base model,

the variable for amount of capital is significant and has a positive coefficient, indicating that more capital-intensive farms are more likely to receive the investment support after the Setting up aid.

In the third regression variables for acreage, land price and age were added. Here the variable for CAP periods were still significant. However, the variable for capital became insignificant and instead the variable for acreage became significant. This is likely because they both represent how capital intensive the farms are.

Later, in the fourth regression, the squared age of when a farmer receives the Setting up aid was added. This variable was significant and negative, which indicates that there is a negative quadratic relationship.

Given that age is related to investment propensity in a quadratic manner, there exists a point on the curve where the propensity to invest reaches its peak. In order to assess this point, a formula derived from Williams (2021) is used to identify where the sign of the curve changes.

$$Breaking\ point = \frac{-\beta 1}{2\beta 2} \quad (4)$$

From the regression output in table 3, β_1 represents the *age* and β_2 represent the age(sq) variable. When entering the value of these coefficients in equation (5), the breaking point becomes approximately at age 30.

$$29.71 = \frac{-0.200506}{2 * -0.0033739} \quad (5)$$

From these results it can be inferred that propensity to invest gradually increases until age 30 and after that gradually decreases as farmers become older.

Lastly, in the final regression the sum of the investment support was added and was interacted with the variable for if a farmer received the investment support in connection with the Setting up aid. From the regression output it can be seen that the sum of the investment support received in connection with the Setting up aid has a significant and negative relationship with the dependent variable. This result indicates that the probability to receive additional investment support decreases the larger the size of the investment support a farmer got in connection with the Setting up aid.

5. Discussion

The main results derived from this study is the significance of age and its impact on investment behaviour in the context of a large sample. A quadratic relationship, similar to that identified by Hamilton et al. (2015), was also observed, though the age group with the highest investment levels differs between the studies. Findings from this paper conclude that at around age 30 the propensity to invest is the highest, while Hamilton et al. (2015) found that the age group 35-45 hade the highest level of investments.

This difference could be attributed to a multitude of factors. This study is conducted on Swedish farmers, while Hamilton is in an English context. The methodology, time period and many more factors differ in the two studies. Nevertheless, the quadratic relationship observed in this study contributes to the existing body of literature.

Furthermore, if the results from this study proves to be correct in future studies it could give support for the idea of lowering the age in the Setting up aid.

Although age was significant in the fourth regression, the post estimation checks indicate that the fifth regression was the superior model, with age no longer being significant. Therefore, it is important to interpret these results with caution and keep in mind that farmers attitude towards risk and investments can vary a lot depending on the individual's characteristics and is not solely a result of a farmers age.

A similar argument can be made regarding the variables representing capital intensity for farms. Generally, if a farm is larger it requires more capital and hence more investments are required. However, investments are still very dependent on individual farm and farmer characteristics.

Furthermore, the results indicate that the probability of a farmer making additional investments decreased in cases where they received a substantial sum from the investment support in connection with the Setting up aid. Given that only a maximum of 40% of the investment is covered by the subsidy. This implies that it is highly probable that, following a substantial investment, farmers are unlikely to be willing to take on more risk by making additional investments. Additionally, if a farmer received the investment support in connection with the Setting up aid the probability to invest again increased. Even though *investatstart* significant, from the descriptive statistics it can be inferred that not a lot of farmers receive the investment support. Here it could be relevant to further prioritise young farmers applications for the investment support.

Due to the limitations of the data and the use of investment support as an indicator for investment, making definitive conclusion about investment as a whole from only these results, should be done with caution, as farmers make investment

without the support. Furthermore, to confirm these results, additional studies are needed not only from a Swedish perspective but also from other EU countries. It is also important to note that an application for the investment support can be rejected and that the support is not guaranteed. Meaning farmers in this study could have been willing to invest even though they did not receive the support.

In the results the acreage variable became significant when added and capital became insignificant. This could potentially be because capital was aggregated on a municipal level and acreage was on a beneficiary level. It would have been beneficial to utilise data at the firm level for all variables. However, because of the limited timeframe and data confidentiality this was not feasible. Furthermore, there are many factors, both internal and external, that affects investment behaviour among farmers. Some of these variables are hard to measure and can therefore not be accounted for in the context of this study. Nevertheless, variables that represent the overall financial landscape in the agricultural sector, such as settlement prices, could potentially contributed with further insights to this report. However, due to data availability and a limited timeframe, these were not included in the regression analysis. Despite the aforementioned limitations, insights can still be made and the results give support to previous findings while adding some new information.

6. Conclusion

This thesis aimed to examine the critical factors influencing the investment behaviour of young Swedish farmers. Through a logistics regression analysis, key variables affecting the probability to make additional investments were identified. It is important to note that the investment support in this study is used as a proxy for investments.

The main findings highlight the importance of receiving the investment support at the start, as it increased the probability of applying and receiving the investments support. However, if the investments support was large, it negatively affects the probability of making additional investments. The results also indicate the importance of age, demonstrating a quadratic relationship where farmers around age 30 show the highest propensity to invest.

These insights could be helpful for policymakers in order to design effective support that encourages continuous investments and development from young farmers. However, further research is needed to confirm the findings of this study. This paper focuses solely on the Swedish context. To make any definitive decisions on changing the current structure of the supports, similar studies should be conducted in other countries across the EU.

In conclusion, this study contributes to the literature on the young farmer problem by providing empirical evidence on the factors influencing young farmers decisions. It underscores the need for support to young farmers to help future generations of farmers in becoming more capable of addressing the challenges to agricultural sector face and will face in the future. By understanding the underlying factors influencing farmers investment behaviour, policymakers can better support young farmers, ensuring the sustainability and competitiveness of the agricultural sector.

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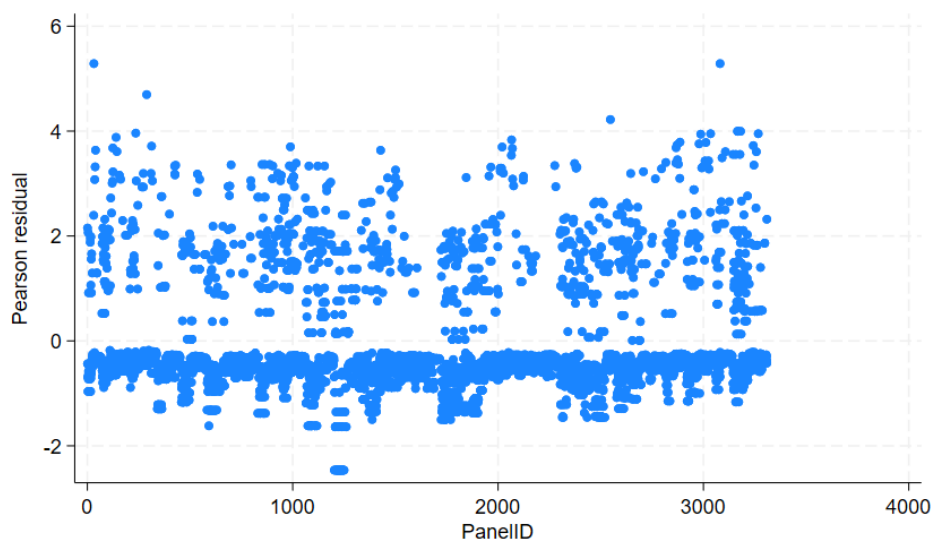
Appendix 1

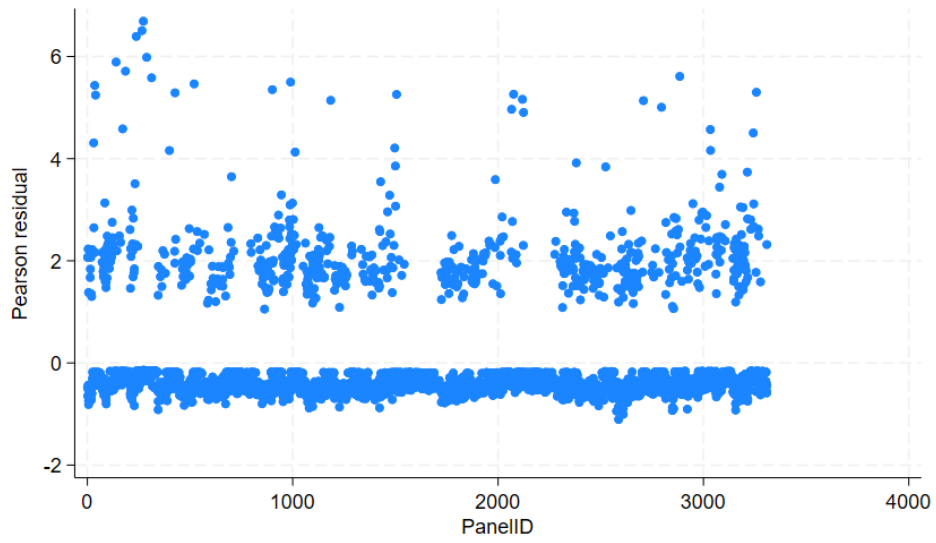Resutls from the pearson residual analasys for model 1-5
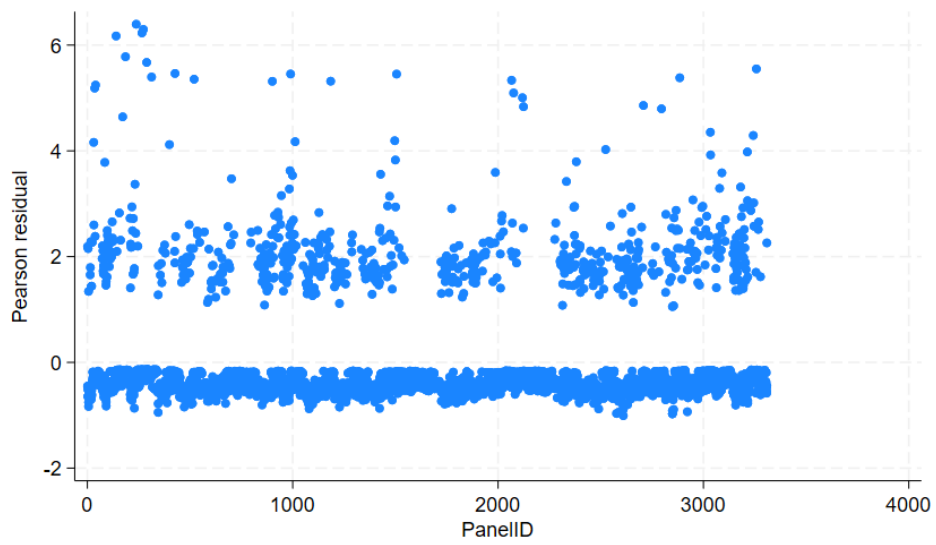
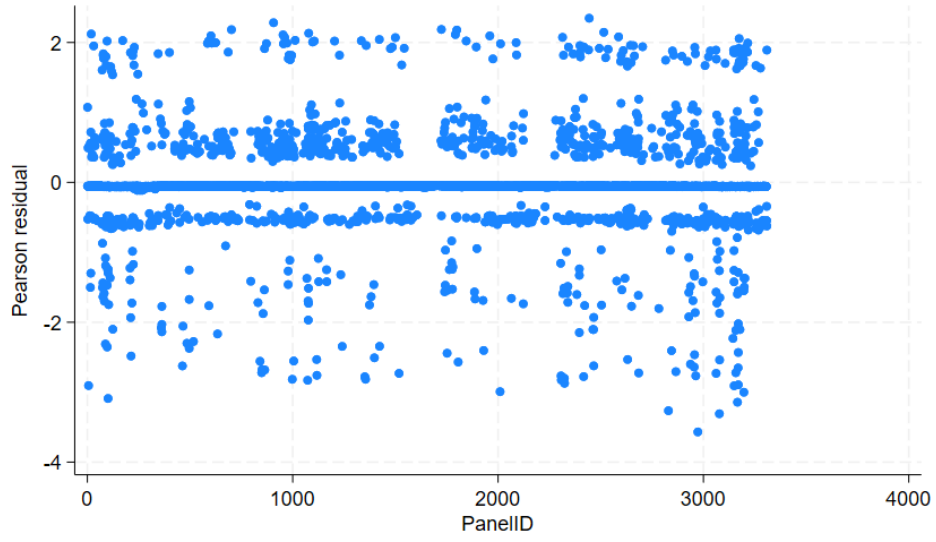*Pearson residual 1*
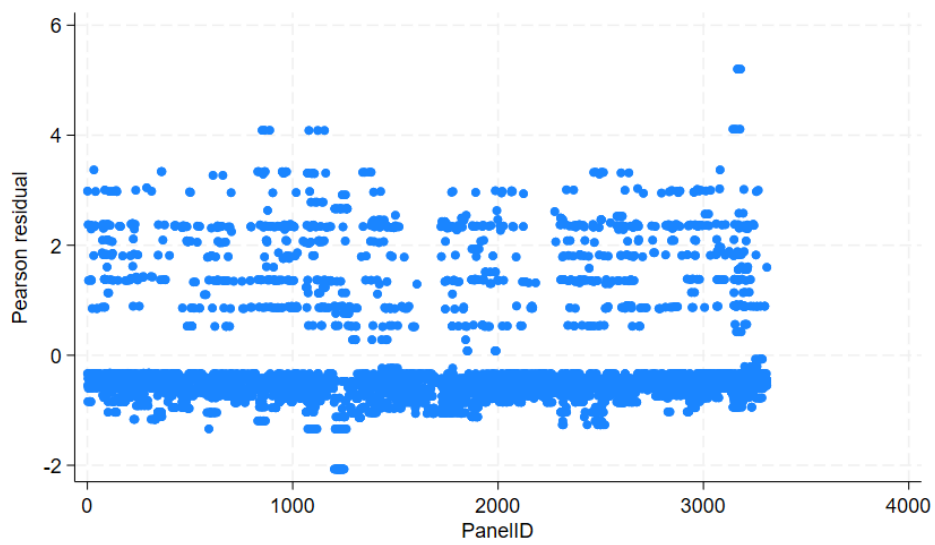
Pearson residual 2

Pearson residual 3

Pearson residual 4

Pearson residual 5

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