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Bachelor Thesis Economics & Business

Corporate subsidies and its effect on European agritourism

A study on EU financial policy

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ABSTRACT

Do European subsidies have a significant effect on the diffusion of agritourism? FADN panel data by the European Union is used to analyse this for the time period 2004-2020. Along with control variables, a performed analysis using a fixed effects model found no significant effect of the implementation of subsidies on the value of agritourism. However, a significant effect for the control variables Vineyards, Set-aside premiums and Economic size was found. Although this paper is unable to say anything about the effects of subsidies, it states the importance of regular assessments of the costs and needs of subsidies, especially with the merging of two different funding schemes from the year 2023 onwards.

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1   Introduction

Agritourism can be described as a type of rural tourism where a working farm or other agricultural setting is used to attract visitors to generate income for or add value to the farm (Phillip et al., 2010). The European Union (EU) supports rural development and gives financial subsidies for the development of agritourism to its member states under the European Agricultural Fund for Rural Developments (EAFRD). As farmers increasingly struggle to run their business operations, it becomes more important to find alternative sources of income. Agritourism could be one of those alternatives. The EU tries to promote the idea of agritourism with corporate subsidies, but it is unclear to what extent these subsidies influence the development of agritourism in the EU.

Previous research on the effect of corporate subsidies on agritourism found a direct correlation between those subsidies and the rise in agritourism operations for Italy in the 12-year period 2000-2011 (Galluzzo, 2017). Existing research on corporate subsidies and tourism is able to explain this to a certain extent. Research on corporate subsidies tell us that these subsidies are distributed to achieve different policy objectives. The idea is that subsidies are used to manipulate behaviour to a more favourable situation than otherwise would have happened (Schwartz & Clements, 1999). According to Li et al. (2018) efficiently guiding tourism investments can have a positive impact on the expansion of certain tourism operations. Other research identifies the importance of economic benefits obtained by agritourism (Che, 2008). This paper states that rather than more infrastructural investments, subsidies in agritourism could contribute more to the support and development of rural areas. Since farmers are in general not experienced with tourism activities, the nudge to bring them in the right direction could explain the results by Galluzzo (2017). My own research gives a broad and more in-depth perspective using more recent data on all EU member states to examine the relationship between subsidies and agritourism.

Galluzzo (2017) found a positive correlation between subsidies and agritourism for Italy. However, it is unclear whether this applies just to Italy or whether there is a common pattern for the rest of the European Union. This is crucial information when determining if we should use a common European policy or address the individual member states separately. That is the reason this paper examines all EU countries at once, with the goal to draw conclusions on European level. Differences between European countries could translate into deviant results in comparison with the Galluzzo study. That is why it is the primary goal of this paper to answer the following research question:

"Do European subsidies have a significant effect on the development of agritourism?"

This research focuses on the effect of subsidies on agritourism in the European Union. A multiple regression model using panel data at country level is used for the period 2004-2021. I decided to take the year 2004 as the first year because from this year on data is based on standard output, where in previous years standard gross margin is used for the data. Agritourism is operationalized as the value

of the national agritourism operations and subsidies are the subsidies for rural development, from which agritourism is a major part. This data on 80 thousand farms is made accessible to the public in the form of the Farm Accountancy Data Network (FADN), which gives us averages for every country. The dataset has the goal to display the impact of European agricultural policy and to simplify decision making concerning the agricultural sector.

I hypothesise that for a different period in all of the European Union states, the same applies to Italy and thus European subsidies have a positive effect on the value of agritourism. Although it may not apply for every EU member state, I do expect it will be the case for most of them. So, using this more recent and comprehensive dataset, it is my expectation that more results can be obtained than in previous research and we can extent conclusions to a broader spectre. In the case where subsidies and agritourism are positively correlated, I can conclude that it is acceptable to continue current European legislation concerning rural development and agritourism subsidies. However, this research does not focus on the exact details of the subsidies. It will not be able to give details on what kind of subsidy would be most suited and that is why this paper encourages future research on a more comprehensive study concerning for instance the effect of strict rules attached on granted subsidies.

The remainder of this paper is structured as followed. Section 2 discusses relevant literature and previous research. Section 3 consists of the data and a short explanation of all variables. Section 4 discusses methodology on the used model, whereafter the results and discussion are explained in section 5. The conclusion is discussed in the last section.

2   Theoretical Framework

2.1 Corporate subsidies and their impact

Since I focus on the effects of financial subsidies in this study, it is important to define the concept of subsidies. Therefore, we take the description by Schwartz & Clements (1999) and consider subsidies to be a form of government aid that ensures (a) goods and services to be less expensive for consumers than in a perfect competitive market and (b) from a producer's point of perspective, this means that income increases compared to a situation with no intervention. It can be a direct or indirect payment, concession or special arrangement given by the government. This paper focuses on European Union subsidies given to farms in its member states, and therefore component (b) of the explanation applies to subsidies in this paper. These corporate subsidies are nudges, implemented to reallocate resources and change economic activity and its behaviour to go to a situation that is more desirable than what would have occurred without the subsidy. Note that this definition of subsidies does not take tax reductions, deductions or credits into account. According to Schwartz & Clements (1999), there are three categories to justify the use of subsidies. These categories are overcoming market imperfections, increase benefits from economies of scale and achieving social policy goals.

Subsidies have a big history in all the world. Previous research shows that subsidies tend to get out of control. A Joint Economic Committee of the United States Congress found that subsidies that remain in existence for a very long time, tend to completely lose sight of their intended purpose (Houthakker et al., 1972). This implies that it is vital to have regular assessments on whether a subsidy can be justified or not. Starting in the 1980's, European institutions performed cross-country studies that imply this as well. Comprehensive surveys by the Commission of the European Communities (CEE), the European Free Trade Association (EFTA) and the Organisation for Economic Co-operation and Development (OECD), together with papers by Bruce (1990) and Hufbauer et al. (1990), focused on government subsidies. They found that when European subsidies were slowly ending, it's member states actually became more involved in maintaining financial aid. Besides this, the biggest claim against subsidies is that its intervention would create market failure. The disruption of prices and production costs can cause disruptions on competitive markets as a result of an inefficient allocation of resources and deadweight loss (Schwartz & Clements, 1999). Besides that, when both production and consuming are beyond the point where the marginal social benefits of consuming are equal or greater than the marginal social costs of production, subsidies on products will bring overproduction (Hyman, 2014).

Given that previous academic research on corporate subsidies is really dependent on the context in which the topic is studied, it is of importance to explain the impact and links from several points of perspective. First of all, focussing on promoting economic growth, there might be justification for market failure (De Long & Summers, 1991). Davidson & Segerstrom (1998) found that innovative

Research & Development (R&D) subsidies can lead to faster economic growth. This is given due to the fact that technological change is a big contributor to economic growth and by financial supporting innovations, governments can influence the pace of technological progress to a certain degree. A prime example is a Chinese study on 92 companies that specialise in sustainable energy. According to this study, these government subsidies had a major impact in the success of the Chinese sustainable energy market. Especially for companies of medium, small and micro size, they found that corporate subsidies have the greatest impact on developing new energy resources (Yang et al., 2019).

Another example is aviation subsidies, as Gössling et al. (2017) claim that they contribute to global economic growth. At the same time, side effects of certain subsidies should not be neglected either. These economic side effects are the result of government intervention and thus the existence of market failure. By strengthening the market position of individual airlines, aviation subsidies caused a disturbance of competition in global aviation markets. This resulted in conflicts between airlines and even between the countries in which they are situated. Besides the economic argument, there is an environmental one as well. The non-sustainable nature of the aviation industry and its negative effect on climate change causes more problems to justify subsidies. Studies on the economic effects should be critically examined, especially because the aviation industry is known for having a highly powerful lobby. The possibility of exaggerating proceeds and downplaying side effects show the need to be careful with examining both the role and the costs of subsidies (Gössling et al., 2017).

Although intentions are often good, corporate subsidies often turn out to be costly and fail to reach aimed groups (Schwartz & Clements, 1999). A recent study focusses on to what extent the implementation of subsidies raises costs of borrowing for local governments. Governments that need to raise more money to implement their financial policy could come into problems with their new underlying debt capacity, resulting in higher borrowing costs (Chava et al., 2023). Another finding by Schwartz & Clements (1999) is that subsidies are extremely difficult to measure. The increasing costs of borrowing money is a great example of an indirect cost of the existence of subsidies.

2.2 Farm tourism

While farm tourism has been around for over 100 years, it has changed in the last two decades from an extra commercial activity into a sector on its own (Frater, 1983). Where it was first called tourism on a farm, it is now widely known as farm tourism or, the more modern name, agritourism. This transition is due to the fact that tourism revenue has the potential to exceed farm revenue (Busby & Rendle, 2000). Since there has been a lot of discussion on the definition of agritourism in the academic world, Philip et al. (2010) dedicated their paper to the typology for defining agritourism. Agritourism can be seen as a way of agricultural diversifying that provides touristic opportunities on working farms (Wall 2000). The farm and its activities are used to attract visitors, so it can be classified as a form of

tourism. Agritourism is a portmanteau of agriculture and tourism, but the main focus of this paper will be on the agricultural perspective.

Ever since the industrial revolution, rural areas struggle with many difficulties, such as poor selling prices for their products, increasing input costs and environmental problems. People in rural communities often have no other option than leaving the farm and moving to the city. This urbanisation means a decline of economic activity and population in rural areas, leaving it exposed to economic, social and environmental reduction (Lupi et al., 2017; Phelan & Sharpley, 2011). That is why the European Union addresses this issue under their rural development program, which aims to improve both economical as social welfare in rural communities and their environmental surroundings (Valdivia & Barbieri, 2014). Promoting agritourism has become a major part of that program, since there are numerous perceived benefits. Agritourism gives the opportunity to diversify and stabilise revenue, since it would make farmers less dependable on the relatively fluctuating yield of stock and crops. Besides that, rural communities could benefit from positive side effects that could revitalise rural economies. For example: extending business operations with agritourism could provide more labour opportunities for local residents and would make rural areas more attractive. So agritourism can really be a possible solution to economic, social and environmental decline in these areas (Tew & Barbieri, 2012).

2.3 Corporate subsidies: the case of agritourism in Europe

Agricultural subsidies have always been a major part of the European Union budget. Although the share has been moderately declining last years, Common Agricultural Subsidies (CAP) still account for 31 percent of EU budget (Financing of the CAP, 2023). Since agritourism can be a major factor in the United Nations' agenda for sustainable development, understanding the relationship between corporate subsidies and agritourism can help policymakers and researchers to improve subsidy programs, advance rural development and promote the sustainable nature of agritourism. There have been multiple country specific analysis on the relationship between subsidies and agritourism. Bhatta & Ohe (2020) found that a lack of available credit in developing countries caused slower development of agritourism. This implies that subsidies could have a positive effect on agritourism operations in countries where funding is scarce. A study in Romania found a positive correlation between rural GDP levels and financial subsidies allocated by the CAP. According to the paper, this was partly due to the growth in agritourism operations and its social economic effects (Galluzzo, 2021)

Cross country studies have similar conclusions. Che (2008) found that large farms could benefit from focussing more on agritourism and addresses the need for support. While he states that subsidy payments could possibly help, he really expresses the need for guidance in the form of EU/government support of strategic partnerships and marketing coordination. This applies to developing countries as well, as Bhatta & Ohe (2020) state that guiding and monitoring the planning and development of

agritourism is crucial. Although these papers really address the need for proper guidance, I still think it is crucial to have sufficient funding as well. Since farming is a completely different profession than working in tourism, farmers could be hesitant to make the necessary investments completely reliant on their own funding. That is why I hypothesise that subsidies have a positive effect on agritourism in the member states of the European Union.

3   Data and methodology

3.1   Sample

Using the Farm Accountancy Data Network (FADN), I collected yearly data on the economic activities of approximately 80 thousand farms in Europe. The FADN database is based on a European Union (EU) yearly sample survey of market orientated farm populations, which are specified as farms from a minimum economic size. This threshold lies between 2 thousand and 25 thousand, depending on each country. The results are made public after the FADN database aggregates individual data into standard results. I use the aggregate data of all EU countries for the time period 2004 to 2020. The available data from 2004 onwards is based on standard outputs, which makes it suitable to use for this research. Although data for 2021 is available as well, I decided to ignore this last year. This because preliminary data is published in the spring of year N+2, with the final version published at the end of the year. Since I only want to have closing statements, I decided to take 2020 as endmost year. The farms itself operate in all kinds of different types of farming, from which on average the biggest in economic size are the granivores and horticulture industry. If we look at the average economic size of the member states of the EU for the period 2004 – 2020, The Netherlands and Slovakia are the largest.

3.2   Variables

Agritourism. This is my dependent variable, described in the FADN database as the value in euro (€) of all receipts from agritourism, including returns from board and lodging, cottages, riding facilities, hunting and fishing. Thus, the average value of agritourism operations by country and year.

Subsidies. This is the part of Common Agriculture Policy (CAP) that applies to subsidies for rural development. Note that these subsidies are not only to support agritourism, but also rural development in general. This so-called second pillar of CAP contributes for roughly 25 percent of the entire CAP fund. The reason for this large share of the fund lies in the European Union its desire to tackle problems in rural areas. Their policy is that by focussing on the growth of agritourism and rural development on itself, the socio-economic situation in these areas will strengthen. So, although this variable is described in the FADN methodology as rural development subsidies, I still consider it to be representative to describe as agritourism subsidies in my own paper. This because the focus on the development of agritourism is the fund its core value. These subsidies are measured in euro (€).

3.3   Control variables

Land. This control variable describes the value of agricultural land, permanent crops, improvements to land, quotas and other prescribed right (including acquisition costs) and forest land in euro (€). Bagi & Reeder (2012) did research on factors that affected farmer participation in agritourism in the United States. One of their findings was that the number of acres of land was positively correlated with farmer participation in agritourism. Where they looked at the number of

acres, I will be looking at the monetary value of the amount of land, permanent crops and quotas. Keeping in mind that the price of land differs across Europe, I still think the value of land, permanent crops and quotas will have its effect since it means a farm has simply more to offer.

Net income. This variable describes the aggregate annual net income of a farm in euro (€), where both net income of production of the farm (work, land and capital), as the income from entrepreneurs' risk are taken into account.

Economic size. This measure describes the economic size of the farm holding, expressed in a value of 1000 euro (€) of the standard output. This variable is a good representation of the value of a farm, which would help determine if the monetary value of a farm would influence agritourism participation.

Vineyards. This variable describes the size of vineyards in hectare (ha). Having vineyards is a great possibility to offer agritourism, think of wine tasting and vineyard bike rides.

Orchards. Just like previous variable, orchards are measured in the amount of hectare (ha). In the FADN data, orchards are classified are fruit trees and berries (including tropical and subtropical fruits) and citrus fruits.

Buildings. This variable describes the monetary value in euros (€) of buildings belonging to the farm whatever the type of occupancy of the land. A study in New Zealand found that many farms are using old buildings for different purposes, preserving rural cultural heritage. Particularly old agricultural and other rural buildings are re-used for diversifying purposes, including agritourism operations (Mackay et al., 2019).

Total crop output / ha. Bagi & Reeder (2012) found that the percentage of land that is unsuitable for crops affect participation in agritourism in the US. Since the FADN does not offer this variable, I decided to include a variable that describes the total output of crops divided by the number of hectares. A lower yield on land could imply that a farm has land that is relatively unsuitable for crops, thus less fertile.

Set aside premiums. This variable represents the amount of premium in euro (€) given for land that is obliged to be withdrawn from production under agricultural policy measures and may not be cultivated. This 'set aside' land may, however, be used for non-farming operations. This, and the given premiums, could make it appealing to use for diversifying purposes, such as agritourism.

3.4 Descriptive statistics

Table 1 shows the descriptive statistics of the variables included in this research. Every variable has 486 observations, where especially the high means of *Land* and *Buildings* stand out. The same applies to their standard deviations, which implies that the differences between farms concerning the value of *Land* and *Buildings* are relatively high. Furthermore, we see high standard deviations for *Agritourism* and *Subsidies* as well. This gives the impression that there are big differences between agritourism participation across farms.

Table 1

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Agritourism (€)	486	419.942	770.932	0	8107.33
Subsidies (€)	486	6459.255	9245.857	0	65562
Vineyards (ha)	486	.521	.735	0	4.23
Orchards (ha)	486	.584	.645	0	3.75
Land (€)	486	299815.9	439758.34	5812	2276297
Totalcropsoutputha (€/ha)	486	1326.358	1415.676	87.72	7850.81
Netincome (€)	486	22752.01	20218.762	-112033	113475
Buildings (€)	486	100016.88	131518.83	5339	1151011
Setasidepremiums (€)	486	29.944	190.047	0	1840
Economicsize (€*1000)	486	122.373	121.676	7.1	587.3

Table 1: Overview of the descriptive statistics (2004-2020) for member states of the European Union. Apart from Vineyards, Ochards, Land and Country, all variables are measured in euro.

4 Methodology

For my quantitative research on the effects of European Union subsidies on agritourism, I use data with a panel structure. This means that my regression will use both time-series as well as cross-sectional elements. So, this longitudinal data will embody information across time and space. Panel data has several advantages over conventional time-series or cross-sectional databases, such as that a wider range of complex problems can be solved. Besides that, panel data is suitable to study how variables and the relationship between them change over time. It prevents the possible problem of multicollinearity that can arise when time series are examined separately. Moreover, using panel data is a great way to get rid of the impact of some forms of omitted variables bias (Brooks, 2002).

After making my data eligible for panel data, I performed a Hausman test to determine whether the fixed- or random-effects model would be more appropriate. The fixed-effects model is characterized by a regression with variation in the intercept of the cross-sectional data, but not over time. The random-effects model on the other hand, assumes that the intercepts for each cross-sectional unit arise from a combination of a common intercept α and a random variable ε. Note that the intercept α is the same for time and all the cross-sectional units, and that ε is constant over time but varies cross-sectionally (Brooks, 2002). The Hausman test has as null hypothesis that the preferred model is the random effect model, while the alternative hypothesis states that the fixed effects model is preferred. The Hausman test showed that the random effects model was inconsistent and thus, the null hypothesis should be rejected. This means that the fixed effects model shall be employed. Moreover, to address the problem of heteroscedasticity, robust standard errors are used. These standard errors are also known as Huber-White standard errors. All things considered; I will be using the following generalised equation for a fixed effects model:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \upsilon_{it}$$

Where y_{it} is the dependant variable, α is the intercept term, x_{it} is an independent variable considered in the time t per unit of investigation n, β is the coefficient for the independent variable, μ_i sums up all of the variables that effect y_{it} cross-sectionally but do not change over time and υ_{it} is the error term. In total, I will be conducting 3 different models. This stepwise estimation of my models allows me to see the effects of adding more control variables. The first model only consists of my main variables, *Agritourism* and *Subsidies*. The following equation applies to model (1):

$$Agritourism = Constant + \beta * Subsidies + \upsilon_{it}$$

Moreover, I also analyse two more comprehensive models. In model (2), I take the variables *Vineyards* (in ha), *Orchards* (in ha) and *Total Crop Output / ha* (€/ha). All these variables have in common that they include measurements in hectares. I examine this group of variables in my 2nd model, since Bagi & Reeder (2012) expected that a farm with more hectares could influence participation in agritourism as well. I decided to exclude the variable land, since this variable is

expressed in euro and the value of a hectare differs greatly between locations. Last of all, model (3) includes all my control variables and thus can be seen as my most extensive model. In this model, the several variables expressed in monetary value are included as well. For all these models, I performed an F-test as well, to see whether all the coefficients in the model are jointly different that zero. All in all, both model (2) and model (3) are expressed in the following equation:

$$Agritourism = Constant + \beta * Subsidies + \boldsymbol{Control\,Variables} + v_{it}$$

Since the emphasis lies on my main variables and this gives a clearer overview, the relevant control variables in model (2) and (3) are classified in the equation as *__Control Variables__*. After the analysis of my main regressions, I conducted another regression to do a robustness check. This is done to check whether my result is robust in comparison to the alternative model. I decided to take a model that includes more variables and includes the year 2021, since this could give more recent information on even more data. All the variables in my main regression are included as well.

5 Results

In this section, I present the results obtained from my quantitative research. The model was estimated using a fixed effects model with panel data, since the Hausman test showed that the preferred model was the fixed effects model. My main variables, *Subsidies* and *Agritourism*, are both expressed in monetary value in Euro's. This means that a raise of *Subsidies* by 1, the change of the dependent variable *Agritourism* would be the coefficient value of *Subsidies*. The results of the effect of *Subsidies* on *Agritourism* are showcased in model (1), while the results of the more comprehensive regressions are displayed in models (2) and (3).

Table 2: Regression results

VARIABLES	(1) Agritourism	(2) Agritourism	(3) Agritourism
Subsidies	0.003	0.002	-0.005
	(0.020)	(0.012)	(0.012)
Vineyards		257.6***	252.1**
		(93.1)	(101.1)
Orchards		-77.6	-29.3
		(207.9)	(177.0)
Totalcropsoutputha		0.693*	0.342
		(0.346)	(0.254)
Netincome			-0.002
			(0.002)
Land			0.001
			(0.001)
Buildings			0.000
			(0.001)
Setasidepremiums			0.140**
			(0.067)
Economicsize			3.7***
			(0.865)
Constant	403.3***	-599.9	-669.7**
	(127.4)	(449.0)	(305.0)

Observations	486	486	486
R-squared	0.000	0.189	0.313
Prob > F	0.268	0.060	0.000

<div align="center">Robust standard errors in parentheses</div>

<div align="center">*** p<0.01, ** p<0.05, * p<0.1</div>

Table 2: The regression results of the fixed effects model using panel data on the effects of corporate *Subsidies* on *Agritourism* in the European Union its member states. Multiple control variables are added in models (2) and (3).

My main interest lies in determining the effect of *Subsidies* on *Agritourism*, but I also want to take control variables into account. That is why I choose for this hierarchical approach with two more added models containing those control variables. Since I am mainly interested in the effects of Subsidies on *Agritourism*, I will address the results of model (1) first. If we look at the performance of the model, we see that the value of R^2 is 0.000. This gives the first impression that the model is not very powerful. Besides that, there is the F-test. This is another indicator on the model performance, because a rejected F-test means that all of the coefficients in the model are jointly different than zero. I need this for my model to run and as the results show is the value of Prob > F 0.268. This means that the corresponding F-test shows us that not all the coefficients in the model are jointly different than zero. Although there are only the coefficients of the constant and the *Subsidies* variable, these results still help me conclude that model (1) is not very powerful. Besides, *Subsidies* has a coefficient with a very low value 0.003. This implies that an increase of European Subsidies by €1, would result in an increase of the value of *Agritourism* operations by €0.003. However, the corresponding p-value is insignificant, which means that the effects of *Subsidies* on *Agritourism* cannot be interpretated.

In model (2) I am also interested in the effect of *Subsidies* on *Agritourism*, but now I incorporate my first three control variables as well. The higher R-squared (0.189) and the obtained p-value of the F-test (Prob > F = 0.060) show that this model is relatively more powerful in comparison to model (1). The coefficient of the main variable *Subsidies* remains insignificant, but made a small decline to a value of 0.002. This decline could be caused by two of the added control variables, because both the variables' *Vineyards* and *Total crop output* are significant and positive. When all control variables are added to the regression in model (3), it is clear that the effect of *Subsidies* on *Agritourism* changes. Where the sign in the first two models was slightly positive, the effects in the third model changes sign to a negative number. A possible explanation for this is that I added more control variables that came out of the regression with a positive sign. Model (3) consists of three different positive and significant coefficients. The change of sign for *Subsidies* could definitely be caused by that. However, the coefficient of my main variable remains insignificant which means that we cannot interpretated it. Concerning the powerfulness of model (3), it is clear that both the results from the goodness-of-fit test as the results of the F-test improved. The value of the R-squared has increased to 0.313, which means

that 31.3% of the variation in the value of *Agritourism* is explained by the independent variables included in the model. The F-test results (Prob > F = 0.000) show that all the coefficients in the model are jointly different than zero, which I need for my model to run.

Based on the results of model (1), (2) and (3), I reject my hypothesis that European subsidies contribute to the development of agritourism. My analysis could simply not show a significant effect between my main variables. However, several control variables did give some clarity. First of all, *Vineyards* (in ha) has in both model (2) and (3) a positive effect on *Subsidies*. *Totalcropsoutput*ha has a significant positive effect in model (2), but not in my most comprehensive model. Model (3) contains the variables *Setasidepremiums* and *Economicsize* that are both significant and positive. If I examine all the control variables that are significant in one or more models, it is clear that their sign is all positive. This implies that the growth of any of the significant variables ensures a growth in the value of *Agritourism*.

The additional robustness check is available in Appendix A. The same regression as model (3) was estimated with additional control variables and included the year 2021. This allowed me to compare my own results with the results of an even more comprehensive model. Although the robustness check results changed the significance of some control variables slightly, this alternative analysis showed the same results concerning my main variables in my main regression. That is why I conclude that my results are robust against the alternative analysis.

6 Discussion

In this section, I provide a comprehensive discussion on my findings. Although some previously discussed papers showed that financial aid had its effects on the diffusion of agritourism (Galluzzo, 2017), the results of this paper cannot verify this. Although I found several control variables with a positive significant effect, I could not find any significant effects between my main variables *Subsidies* and *Agritourism*. In the field of corporate subsidies, my results are somewhat similar to the discussed literature. Given the enormous amount of European agricultural subsidies and the lack of evidence from my research that subsidies have positive effects, it could be true that subsidies tend to remain in existence, even though the intended goal has been forgotten. This means my paper connects closely with the finding of Houthakker et al. (1972). An argument in favour of subsidies is that they are initiated to reallocate resources and change economic activity to achieve a more desirable situation (Schwartz & Clements, 1999). Since my results showed that the effects of European corporate subsidies on the value of agritourism cannot be proven, my paper implies a different finding by Schwartz & Clements (1999), which states that an inefficient allocation of resources causes a disruption on competitive markets.

Bhatta & Ohe (2020) found that a shortage of financial resources in development countries caused slower development of agritourism. Although my results cannot verify this, I do think funding can be important to a certain degree, especially for development countries. My research focussed on member states of the European Union, countries that can be seen as relatively wealthy. The choice of sample could be the reason for the difference between my findings and the findings on developing countries by Bhatta & Ohe (2020).

One of the variables with a positive significant effect is *Economicsize*. This means that my analysis shows that if the economic size of a farm grows, the value of *Agritourism* grows as well. This is somewhat in accordance with the results of Che (2008). He found that especially large farms could benefit from diversifying with agritourism operations. He also states the need for support, although his focus is not on financial aid, but more on guidance, cooperation and strategic development. This because offering agritourism involves very different challenges than farming. According to his findings, most of the farmers are reliant on this extra guidance and agritourism as a sector could benefit from cooperative marketing as well. His conclusions could explain my findings on vineyards to a certain extent. My results showed a positive effect of *Vineyards* (in ha) on *Agritourism*. Vineyards are one of the oldest and most popular forms of agritourism and a possible explanation for my results is that the farmers of these vineyards are simply more experienced and do not necessarily need that extra guidance.

My results are also in line with literature that focusses on the fact that that effects of subsidies can be exaggerated (Gössling et al., 2017). While this research focusses on subsidies in aviation, I still see similarities. Both the aviation- as the farm industry are very large sectors, which also have strong

lobbies. The domination of stakeholder can influence decision making by downplaying side effects and overstating the benefits of a possible subsidy. Since the results of this paper could not verify a positive effect of subsidies on agritourism, I emphasise the need to be extremely careful in considering the role and the costs of corporate subsidies.

7 Conclusion

This research does research on the effects of financial subsidies on agritourism in member states of the European Union. Farm tourism has changed in the last 100 years from strictly tourism on a farm to a whole sector on its own. This is mainly due to the current problems in rural areas. These areas have been struggling for ages where urbanisation is one of the biggest problems. The outflow of people to the city causes economic, social and environmental decline. The European Union founded the rural development program to help rural areas grow and raise employment and living standards. Since a major part of EU funding falls under this program, it is important to see how effective it truly is. I examine this by doing research on the influence of the rural development program on agritourism. Therefore, the question that was studied in this paper was: "Do European subsidies have a significant effect on the development of agritourism?".

A quantitative study of the FADN panel data has been performed to assess whether there was a positive effect of subsidies on agritourism. This data contains details on farming statistics across the EU its member states for the time period 2004-2020. This individual data is made into aggregates so it can be used as standard results, while the nature of panel data ensures research on both time-series as cross-sectional elements. The Hausman test showed that a fixed effects model was preferred, so that is why the method used was a fixed effects model using panel data. I included my main variables *Agritourism* and *Subsidies* in model (1) and added several control variables such as the area of *Vineyards* and *Orchards* in hectares in model (2), while I added my monetary variables in model (3).

The analysis of model (1), (2) and (3) showed that there was no significant effect of European Union subsidies for support for rural development and the value of agritourism. This means that the results of this research cannot verify the EU claims that financial aid for rural development promotes agritourism. A joint F-test showed that all the coefficients in models (2) and (3) are jointly different than zero. The only significant variable in both the more extensive models is *Vineyards*, while *Total crop output / ha*, *Set aside premiums* and *Economic size* are all significant in either model (2) or (3). Since the significance of my main variable *Subsidies* cannot be verified, I reject my hypothesis that subsidies for rural support have a positive effect on the diffusion of agritourism in the European Union its member states.

Due to the fact that I cannot prove anything on the effect of the European subsidies for rural development, my results align with previous research on subsidies. We need to be careful in examining the role and the costs of subsidies. Houthakker (1972) implies that it is important to have regular assessments on the needs and the effects for particular subsidies, something that my results underline as well. In the context of agritourism subsidies, it could be useful to focus more on investing in intensive guiding rather than financial aid, something with potential benefits for society. Furthermore, in the current EU agricultural funding scheme, funding for rural development and

income support for farmers are two separated programs. From 2023, new rural development plans will be included into national strategy plans, which is a good first step to make better plans. Countries have room to develop their own plans and I would strongly advise them to come to a region/type-of-farming specific plan concerning the support of agriculture, because every region/type-of-farming has its own challenges.

As the funding program for rural development is somewhat changed from 2023 onwards, it is important to make the 'regular' assessment on whether the subsidies target their intended goals. This paper really looks at the effects of financial subsidies on agritourism. Since proper guiding the development of agritourism is crucial, this should also be taken into account in academic research. I think it is vital to have an assessment on to what extent and what form of guidance suits this sector most. Research based on a questionnaire on this matter could help find an answer to this. In conclusion, I think it is important that future research focuses not only on the effects and costs of the somewhat new subsidy program, but as well on determining how to best guide farms through the process of setting up and developing their agricultural tourism businesses.

7 Limitations

Unfortunately, the data from the Farm Accountancy Data Network (FADN) is not fully available until 2 years after the relevant year. Until then, preliminary data is made public. Since the COVID pandemic had its effects on society, it would be of interest to see whether a post-COVID analysis would give similar results. Besides, the European Union has made public that they will change the subsidy program and combine the income support element with the rural support program. This would definitely be interesting to look into for future researchers. Especially because the total support for farms in the European Union is of incredible magnitude.

Furthermore, data on the exact value of agritourism subsidies is not available. To assume that the total subsidies for rural support were representative as the subsidies for agritourism was a big assumption in this paper. That is why it is crucial that the FADN specifies certain variables more extensive. Further research could definitely benefit from a farm database that consists of a much more comprehensive set of variables.

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Appendix A: Robustness check

Table 3: Regression results for robustness check

Agritourism	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Subsidies	.024	.021	1.13	.268	-.019	.067	
Vineyards	740.229	300.907	2.46	.02	124.804	1355.654	**
Orchards	665.631	425.928	1.56	.129	-205.49	1536.751	
Totalcropoutputha	.461	.32	1.44	.161	-.194	1.116	
Netincome	.001	.002	0.25	.804	-.004	.006	
Land	.001	0	2.23	.033	0	.002	**
Buildings	.001	.001	1.58	.125	0	.002	
Setasidepremium	.16	.078	2.06	.048	.001	.319	**
Economicsize	2.525	1.776	1.42	.166	-1.108	6.157	
Arableland	1044.302	1106.042	0.94	.353	-1217.808	3306.412	
Permanentcrops	518.619	1037.331	0.50	.621	-1602.96	2640.199	
Permanentgraslan d	1044.157	1103.023	0.95	.352	-1211.778	3300.093	
Energycrops	-25.833	19.678	-1.31	.2	-66.079	14.412	
Vegetables-and-flowers	599.034	450.25	1.33	.194	-321.831	1519.9	
Olivegroves	222.887	304.438	0.73	.47	-399.759	845.532	
Agriculturalarea	11.139	15.42	0.72	.476	-20.4	42.677	
Woodlandarea	49.233	58.531	0.84	.407	-70.477	168.943	
Usedagriarea	-1058.148	1106.257	-0.96	.347	-3320.698	1204.402	
Constant	-555.371	411.76	-1.35	.188	-1397.515	286.773	

R-squared	0.428	Number of obs	513
F-test	259.070	Prob > F	0.000

*** p<.01, ** p<.05, * p<.1*

Table 3: The regression results of a fixed effects model using panel data on the effects of corporate *Subsidies* on *Agritourism* in the European Union its member states. This regression is performed using all the variables of model (3), the year 2021 included and several extra added variables to check the robustness of my main regression.