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Investments financing at farm level: A regional assessment using FADN data

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Abstract

This article presents the results of an ex-ante evaluation exercise on the financial instruments adopted under the rural development policy. Using FADN data, during a ten-year time span, the study estimates the investments and their financial covertures made by a sample of farms in the Abruzzo region. The balance sheets of the farms were analysed in order to quantify the investments made by the farms in one year and the related financial coverage. The main results show that the propensity to invest is, on average, of 0.27 and it varies according to the characteristics of the farms; while on average 90% of farm investment value is self-financed. These results provided some interesting policy implications, highlighting either or both, a latent need for farms for external financial funds and/or an ineffective financial management of the business activity.

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Introduction

This article presents the main results of an ex-ante evaluation on the public support for investments, available under the Rural Development Programme (RDP) and implemented using financial instruments (FIs).

The term FIs refers to various measures of support for investments which, differently from the traditional straight grants, provide the repayment by the beneficiary of the sums received as a support of their investments. These measures concern: interest subsidies, subsidised loans, loan guarantees, etc.

The activation and management of these interventions takes place with the participation of various public and private actors: on the one hand, the European Commission, Member States, Regions that adopt the laws, regulations and administrative provisions to ensure their proper functioning; on the other hand, financial institutions such as banks, credit consortia or other institutions that physically manage the funds (guarantee and credit, in particular) for the disbursement of contributions to beneficiaries who request them. The reasoning behind these interventions is to face the more or less manifested difficulties that farms encounter in accessing private external financing to support their investments, and more specifically to help beneficiaries to find the coverage of the private share of those investments which are co-financed by the European Agricultural Fund for Rural Development (EAFRD).

In the context of rural development policies, the use of FIs is not new, the so-called financial engineering instruments were already programmed during the period 2000-2006 and substantially confirmed in the subsequent programming periods.

In the present programming period of the European Structural and Investment Funds these instruments have been strengthened and represent support measures to achieve one or more specific objectives of the European Union (Reg. (EU) no. 37-46). This because, according to the European Commission (EC, 2014), FIs can represent a more efficient method of disbursement of aid to the beneficiary than traditional forms of non-repayable support. They guarantee greater efficiency in the use of public resources, especially in cases of economically and financially important projects but with low returns and long repayment periods, and they help to improving access to finance by supporting the working capital of firms with medium-long term loans. These theses are also found in various researches and articles (among others, Wishlade & Michie, 2014, 2017; D'Auria & Guido, 2016; Núñez-Ferrer *et al*., 2017).

During the various programming periods the FIs were largely unsuccessful, generally motivated by issues linked to both the supply and demand side of such policies (Licciardo, 2020). On the supply side, these

measures have not been widely adopted by the Managing Authorities of rural policies, for example in 2007-2013 only 14 RDPs in 7 Member States included them in their programmes, allocating a total amount of resources of 531 million euro, which represents only 0.3% of the total EAFRD budget (Tropea and de Carvalho, 2016). On the demand side, there was a restricted use of such interventions by the potential beneficiaries to finance their investments.

In this regard, an assessment of the European Court of Auditors highlighted that the scarce recourse of that measures by the beneficiaries of the RDPs would be due to erroneous budget forecasts by the individual managing authorities, which made inaccurate ex-ante assessments, allocating an excessive amount of funding with respect to the potential needs of the RDPs beneficiaries (ECA, 2015; 2016).

Based on what has been described and considering the methodological indications of the European Commission (2014, 2015), several evaluation studies (Kollatz-Ahnen, 2014; Guido *et al.*, 2015; Nucera *et al.*, 2018; Fi-compass, 2018) have focused on analysing the characteristics of credit demand from farms, highlighting the real difficulties encountered by them in accessing external funds for their investments and/or to cover the private share of co-financed investments.

About the frictions that farms could face in accessing bank credit, many analyses evidenced difficulties for farms trying to highlight the possible underlying reasons (Carillo, 2013, 2014, 2015; Kim and Katchova, 2020; Guido *et al.*, 2015; Nucera *et al.*, 2018). The authors generally argued that as consequences of the new credit access rules, imposed by the Basel III Accords, the banks reduced the volume of loans to farms and their exposure to agricultural loans. More specifically, the Italian debate on the agricultural credit for investment (medium-long credits) verifies its reduction (Carillo, 2014, 2015) and raises the problem of farm projects which, despite receiving public support, fail to meet the selection criteria of banks and consequently fail to access credit for their co-financing and implementation (Guido *et al.*, 2015).

This is the background of the evaluation exercise proposed here, which has been carried out by an independent evaluator (Institute of Industrial Relations Studies - ISRI) for the Abruzzo Region RDP 2014-2020. The main objective of the work was to analyse the potential interest of RDP beneficiaries in FIs, starting from the estimated number of regional farms and their characteristics, the possible difficulties encountered in accessing bank credit, highlighting the probable motivations which could explain the frictions present on the local credit market. The exercise was conducted, first through the reconstruction of the preferences expressed by regional farms for the various forms of financing to support their investments and subsequently,

with a survey, through the analysis of the possible reasons explaining the failure of farms to access at bank lending to finance their investments. This last part of the analysis is not illustrated in this article.

The study was conducted through the Farm Accountancy Data Network (FADN), utilising data of a sample of more than 500 farms, which operate in the Abruzzo region. Through the analysis of the farm balance sheets over a period of ten years, the differences between one year and the consecutive year were calculated for each asset and liabilities items, to evidence the changes in fixed assets and the capital and financial components. The objective of analysis was to estimate at the regional level, the size and the characteristics of farms investments and how farms have financed them.

The rest of article was structured as follows. The first section describes the data and methodology used, while the second one illustrates and discusses the results. The last section concludes by making some considerations on the strengths and weaknesses of using data from official statistics, such as FADN data, as a part of the evaluation of the rural development policies.

1. Materials and methods

The study here proposed aimed at exploring a sample of regional farms in order to assess their propensity to invest and the prevailing ways to finance their investments. The analysis was based on the computation of the changes in the financial statements components of the farms, that occurred between an accounting year and the next one. The data used come from the regional FADN, taking as a reference the period between 2008 and 2018. The FADN sample relating the Abruzzo region consists annually of over 500 farms that have been statistically designed to consider the main typologies of regional population of farms. To proceed with the comparison of the balance sheets of two consecutive years, only farms present in the sample for at least two years were included in the panel, then reaching a total number of 1,153 farms. The balance sheets of year *n* and year *n-1* of the same farm were then compared by calculating the differences even on multiple pairs of balances belonged to the same farm, when the farm was present for more than two years or for the whole analysed period. In this way, an overall number of 4,164 balance sheets was compared.

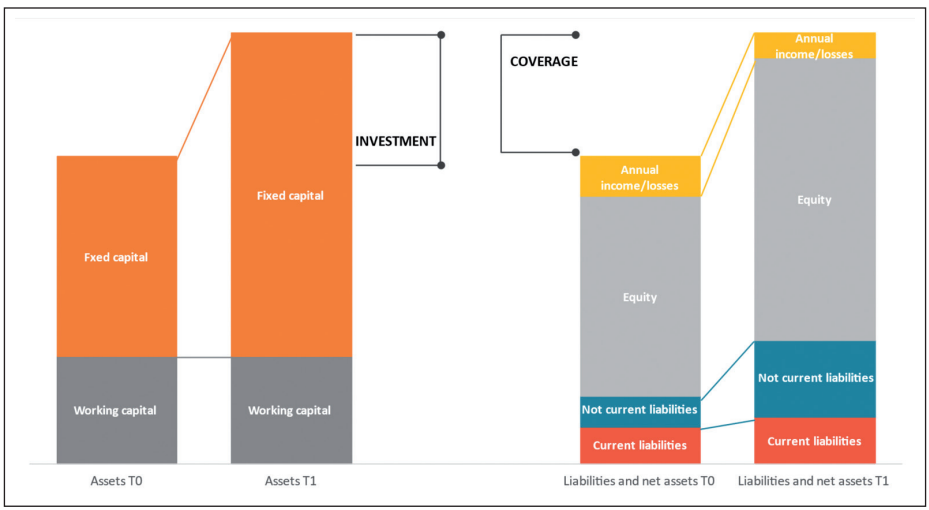
From a methodological point of view, the comparison between the balance sheets allowed us to calculate the differences between the various items of assets and liabilities, through which to estimate both the amount and type of investments made by the farm and the ways in which they have been funded. According to the definition of Begg *et al.* (1991), in this work the investment represents «the purchase of new durable capital goods by the firm» and so it

has been estimated by the amount of positive[1] changes in the capital stock. So, through the changes that occurred during the year in the fixed assets present in active of the balance sheet, we identified the new acquisitions, consisting of land, plantations, buildings, machines, equipment and so on, and estimated the investments made by the farm in the year.

The calculation of the changes in the passive balance components on the other hand, allowed us to estimate the most probable ways utilised by the farm to finance their investments, for example through the reduction of farm liquidity, the increase in short or long-term debts, the increase of equity, etc.

The logic of the analysis is summarized in Figure 1, while Table 1 shows and describes the balance sheet items which were compared.

Figure 1 - Conceptual scheme of the comparison methodology



Source: authors' own elaboration.

According to the previous schemes, the increase in active components that we associate to the investments can be balanced by:

- a decrease in other items of fixed or working capital (for example through the sale of land or stocks in the warehouse),

1. The farm's decision could also lead to a reduction in capital, thus causing a negative variation. The FADN data does not allow us to establish whether the investment made is intended to replace an existing capital, which is, among other things, not relevant for the purposes of this study.

- an increase in profit or a reduction in losses compared to the previous year.
- a decrease in deferred or immediate liquidity (for example by using an availability accumulated in the current account),
- an increase in short or medium and long term debts,
- an increase in equity (for example retaining the profit from the previous year, or to a contribution of new capital by the owner or shareholders),
- an increase (but it would be better to say a smaller decrease, since it is always negative) of the entrepreneur's self-consumption and withdrawals, which occurs to the extent that the owner renounces the withdrawals that he makes every year for his own livelihood, becoming a self-financing from private resources.

Table 1 - Structure of the balance sheet in the FADN survey

Assets	**Liabilities**
Fixed	Debts
– Land and buildings	– Current liabilities
– Agricultural land	– Operating debts
– Forest land	– Not current liabilities
– Plantations	– Medium-long term debts
– Buildings	– Severance indemnities provision
– Intangible assets	– Other creating provisions
Fixed working capital	Equity
– Machineries and equipment	– Total net capital
– Livestock	– Net capital
– Concessions, licences and trademarks	– Entrepreneur contributions
– Furnitures and furnishings	– Capital reserves
– Current	– Retained earnings
– Current assets	– Accumulated other comprehensive loss
Inventories	Self-consumption and abductions of entrepreneur
– Liquid assets	– Self-consumption
– Operating credits	– Abductions
– Cash and cash equivalent	– Annual income
Total Assets	Total liabilities and equity

Source: authors' own elaboration on FADN methodology.

We emphasise that, for an amount of investments less than 20 thousand euros, the analysis of the balance sheets collected through the FADN survey does not allow us to identify significant differentials in the balance sheet liability items which could be reasonably linked to the specific financing requirement. For this reason, we only have considered investments exceeding this amount, in order to verify their possible financial coverage.

As this regard, we are still aware that the ordinary management of a farm – even a small one – determines a large part of the movements in the balance sheet and that, consequently, attributing specific movements to the financing used for investments is a probabilistic exercise. It is however clear that the greater the size of the investment the more the other changes of opposite sign are connected to it.

Finally, once we have computed for each farm the investments and the financial sources used, we were able to estimate a sort of "propensity to invest" for regional farms. This propensity was estimated using a Probit model, accounting for farms heterogeneity and for time. Specifically, the Y variable of the model is a dichotomous variable that takes value 1 if farm made investment and 0 otherwise. Two categorical variables, which represent the economic size and the productive specialization of farms, as regressors are used to take account the effects of farm characteristics that could condition the likelihood to invest of farm. The years in which investments were made are included, to take into consideration the contingent influence on the propensity of farm to invest. Model is formalising as follows:

$$\Pr(Y = 1|X = x) = \beta_0 + \beta_1 X$$

where

- $\Pr(Y)$ is the probability that farm invests (the first model) or the probability that farm uses external financing (the second model);
- $\beta_0, \beta_{1,\ldots.}\beta_n$ are coefficients which we are interested in;
- X is a vector of x_i which are categorical variables representing the characteristics of the farms and the years.

The variable used as regressors are relative to a measure of Economic Size (ES) and the Type of Farming (TF) that are used for the classification of FADN sample. To represent the ES we use a categorical variable, representing five classes of ES, built on the basis of the standard output (SO) of farm. SO is a measure of the value of total production, calculated starting from the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock. These variables are described in Table 2.

Table 2 - Variables and number of observations

Accounting year	Frequency	Percentage	Cumulated
2009	504	12,1	12,1
2010	353	8,48	20,58
2011	407	9,77	30,36
2012	284	6,82	37,18
2013	384	9,22	46,4
2014	319	7,66	54,06
2015	445	10,69	64,75
2016	480	11,53	76,27
2017	487	11,7	87,97
2018	501	12,03	100,00
Economic size (classes of standard output in euros)			
Small (>= 4,000; < 25,000)	689	16,55	16,55
Medium-small (> =25,000; < 50,000)	1.051	25,24	41,79
Medium (> =50,000; < 100,000)	999	23,99	65,78
Medium-large (> =100,000; < 500,000)	1.161	27,88	93,66
Large (> =500,000)	264	6,34	100,00
Type of farm			
Field crops	1.177	28,27	28,27
Horticulture and floriculture	89	2,14	30,4
Permanent crops	1.532	36,79	67,2
Grazing livestock	532	12,78	79,97
Granivores	96	2,31	82,28
Mixed crops	453	10,88	93,16
Mixed livestock	86	2,07	95,22
Mixed (crops and livestock)	199	4,78	100,00
Total	4.164	100,00	

Source: authors' own elaboration on FADN data.

2. Results

Typologies of investments and propensity to invest

The reduction of sample only to farms which are present in two or more consecutive years, could affect the representativeness assured by the full FADN sample. In order to check if the selection problem arises from this reduction and to measure the extent of the probable distortion of the sub-sample used, we ran the statistical test of Kolmogorov-Smirnov (K-S). The non-parametrical K-S' Test tests a null hypothesis of a common population distribution given samples from two groups. Using the yearly distribution of "type of farming" variable, we tested the equality of distributions resulting from the two samples: the selected sub-sample, that is what we used for analyses, and the full FADN sample, designed to be representative of the regional farms population.

Results of test showed that the combined K-S statistic is relevant for our hypothesis of equal distributions between samples, while we reject the null hypothesis for the year 2012, due to the low p-value (.004), showing a distortion of the sample representativeness only for this year (see Table 3).

Table 3 - Two-sample Kolmogorov-Smirnov test for equality of distribution functions: type of farming annual distributions

Accounting year	D	p-value
2009	0,02	1,00
2010	0,04	0,95
2011	0,01	1,00
2012	0,13	0,00
2013	0,04	0,83
2014	0,05	0,65
2015	0,01	1,00
2016	0,02	1,00
2017	0,06	0,40
2018	0,03	0,99

Source: authors' own elaboration based on regional FADN data.

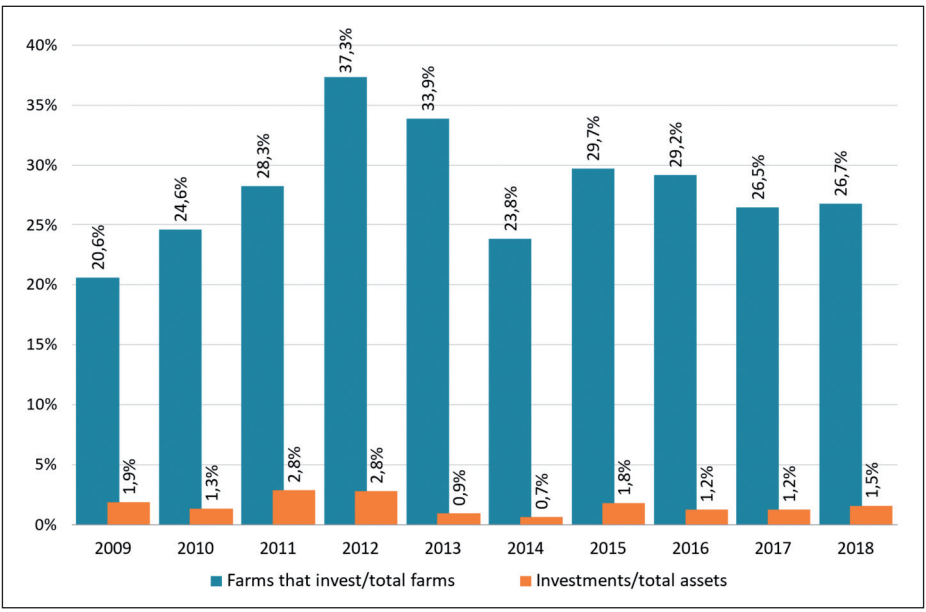
The analysis of balance sheets showed that of among the 4,164 pairs of financial statements observed, there were approximately 1,400 cases in which one or more items of asset had increased in value. Then, about one third of

the balances showed that an investment and its amount were, on average, of about 16,000 euros.

Looking at the data by farm and year, it is possible to highlight that, among the 1,153 farms included in the sample, about one half of them made an investment every two years and that this investment is, on average, about 20,000 euros per farm and per year.

On the yearly basis, a considerable variability is observed in the predisposition to invest of farms. For example the ratio between the value of the investment and that of the of total asset is, on average, of 2.8% in 2011 and 2012, but it decreases to 0.7% in 2014. Similarly, the portion of farms that make an investment over the total farms also varies significantly, moving from 20% in 2009 to 37% in 2012 (Figure 2).

Figure 2 - Fixed investments in agricultural farms 'assets (in %)



Source: authors' own elaboration based on regional FADN data.

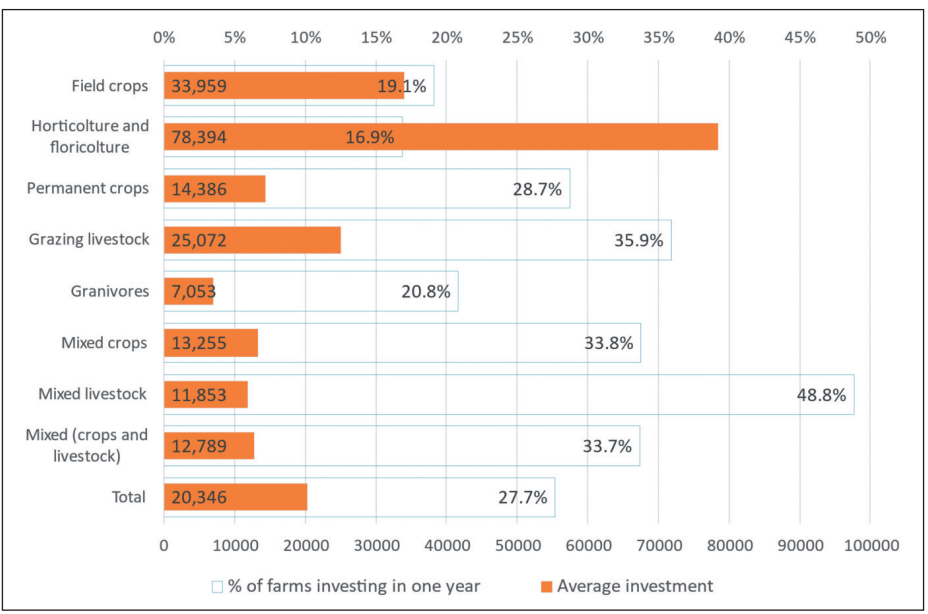
It is also evident that the extent to which farms are involved, not varying over the years in proportion to the overall intensity of the investment effort, implies a high variability of the average annual investment, which in fact varies, in the years considered, from a minimum of 10 thousand euros (in 2013) to a maximum of 32 thousand euros (in 2011). We should highlight

that the significance of variables related to different years may be influenced by the transition from the rural development programming period of 2007-2013 to the one of 2014-2020. In this sense, the lack of significance of the year 2014 might be indeed due to the traditional lag in calls' preparation and technical procedures for assessing financing requests. In addition, during the years 2017-2019 the investments behaviour might be affected by relevant state aids related to earthquake recovery funds.

The description of farms characteristics associated with the various amounts and types of investments allow us to illustrate the underlying determinants of farm choices.

As regard the TF it should be noted that, on average, the highest investments concern farms specialized in horticulture and floriculture, with a value of about 80,000 euros (Figure 3), followed by farms specialized in arable crops (34,000 euros) and grazing livestock farms (25,000). All the other TFs have values below the average (equal to about 20,000 euros).

Figure 3 - Average annual investments and type of farms (data in value and %)

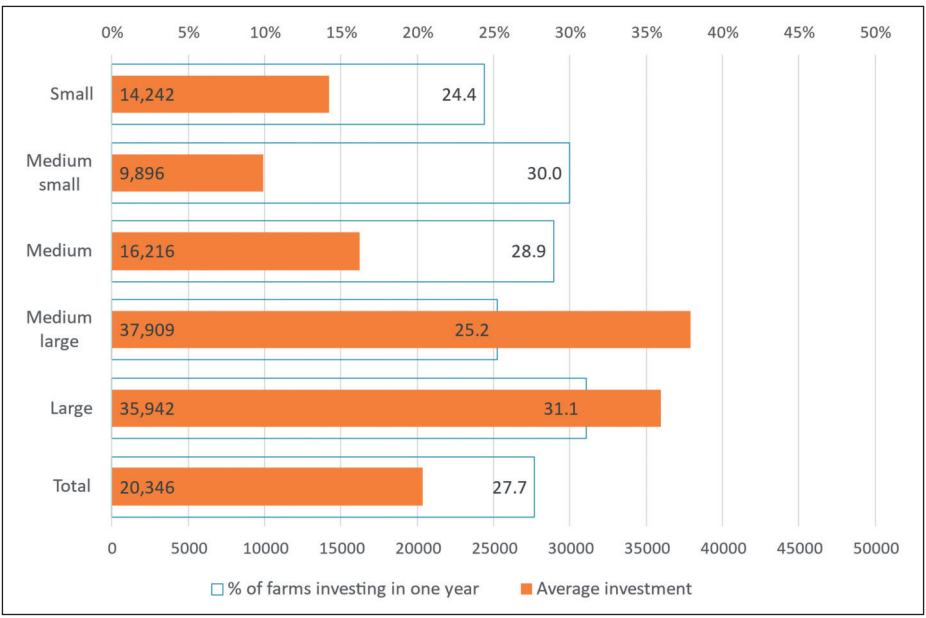


Source: authors' own elaboration based on regional FADN data.

As it is logical to expect, the economic size of the farm is another determinant of the propensity to invest conditioning the average value of the investment. However, by descriptive analysis it emerges that the percentage

of farms investing in a given year does not vary significantly between the different classes of ES; while the average investment amount for medium-large and large farms, coherently with the expectations, is substantially greater than the average investment of small farms (Figure 4). It should be noted that the new investments in relative terms could be low due to the high value of the land in the denominator, or else it could appear high in the case of farm with leased land.

Figure 4 - Average annual investments and economic size of farms (data in value and %)



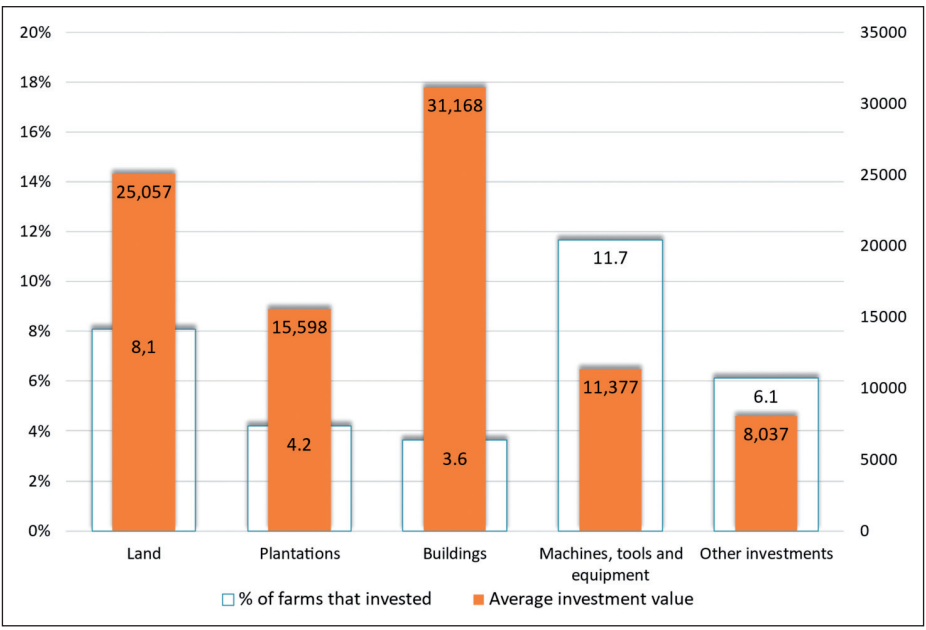
Source: authors' own elaboration based on regional FADN data.

Taking into account the typologies of investments, it can be seen that more frequently they concern the purchase of machines, tools and equipment, with a frequency of 12%, and an average value of approximately 11,000 euros (Figure 5). A higher frequency than average is also evident for investments in land, with about 8% which, of course, are averagely more costly than other categories (25,000 euros). The highest average values are however investments in buildings, exceeding 31,000 euros, while the frequency of such investments is the lowest compared to the others (3.6%).

Looking at the distribution of values associated with investments, it is possible to highlight that the percentage of investments that are above

100,000 euros in the case of buildings and manufactured is 10%, while in the case of machines, tools and equipment it is below 2% (Figure 6). We would like to underline that low investments do not necessarily imply a low endowment of machinery or other fixed capital, given that the farms analysed could have hired machinery or other assets that do not appear in the balance sheet.

Figure 5 - Average annual investments and type of investments (data in value and %)

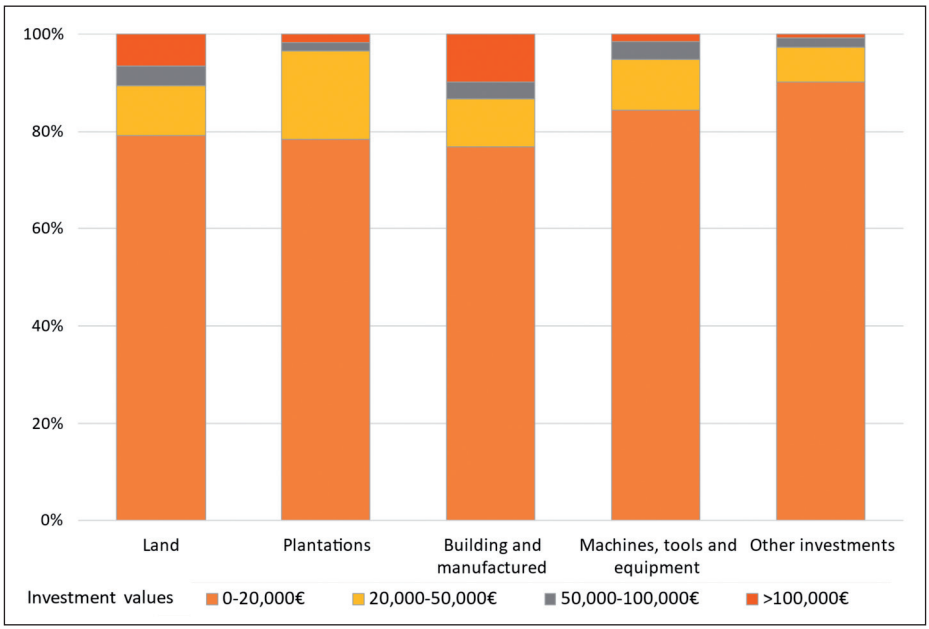


Source: authors' own elaboration based on regional FADN data.

As mentioned in the paragraph on methods, by utilizing the investment data calculated for each farm and using a Probit model, we estimated the likelihood of farms to invest by farms characteristics and times in which investments are made. The results of the model are shown in the following table (Table 4).

To illustrate this point, we can first of all see that the model fits well: the likelihood ratio chi-square of 157.38 with a p-value of 0.0000 tells us that our model as a whole is statistically significant, that is, it fits significantly better than a model with no predictors. The column two of Table 3 shows the

Figure 6 - Investment size by type (in %)



Source: authors' own elaboration based on regional FADN data.

coefficients associates with each mode assumed by the categorical variables, while the stars indicate the significance of associated p-values, so we can see that all predictors are statistically significant, although with different levels. Therefore, our results show evidence of a significant propensity change of farms over time, and in relation to their specialization and economic size.

More in details, as regard to the ES, results show that for each one unit increase in the rank, the z-score increases (see column 2 of Table 3). As for the various TFs, we can see that all the coefficients are positive and significant, except those that are associated to the arable crops and granivores, which have negative signs although not significant. In particular, the coefficient is relatively high for the livestock farms (both herbivores and mixed), while permanent crops shows the lowest coefficient. Finally, we can observe that the years in which the investment is made have a positive effect respect to the base year, increasing the z-score. However, the years that determine a greater increase in the propensity to invest are 2012 and 2013.

Relating to the coefficients estimates, we must emphasise that while the sign of the coefficient gives the direction of the effect, their magnitudes are in units of the standard-deviation of the errors, so it is not the marginal effect.

Table 4 - Probit regression results

Accounting years	**Coefficient**	**P-values**
2009	0	(.)
2010	0.14	(0.14)
2011	0.28**	(0.00)
2012	0.51***	(0.00)
2013	0.45***	(0.00)
2014	0.13	(0.21)
2015	0.32***	(0.00)
2016	0.32***	(0.00)
2017	0.24**	(0.01)
2018	0.26**	(0.00)
Economic size (classes of standard output in euros)		
Small (>= 4,000; < 25,000)	0.18**	(0.01)
Medium-small (> =25,000; < 50,000)	0.10	(0.16)
Medium (> =50,000; < 100,000)	0.16*	(0.02)
Medium-large (> =100,000; < 500,000)	0.38***	(0.00)
Type of farms		
Field crops	0	(.)
Horticulture and floriculture	–0.11	(0.50)
Permanent crops	0.29***	(0.00)
Grazing livestock	0.51***	(0.00)
Granivores	–0.14	(0.39)
Mixed crops	0.48***	(0.00)
Mixed livestock	0.85***	(0.00)
Mixed (crops and livestock)	0.48***	(0.00)
Constant	–1.26***	(0.00)
Observations = 4,164		
LR chi^2 (20) = 157.38		
Prob > chi^2 = 0.00		
Pseudo R2 = 0.03		

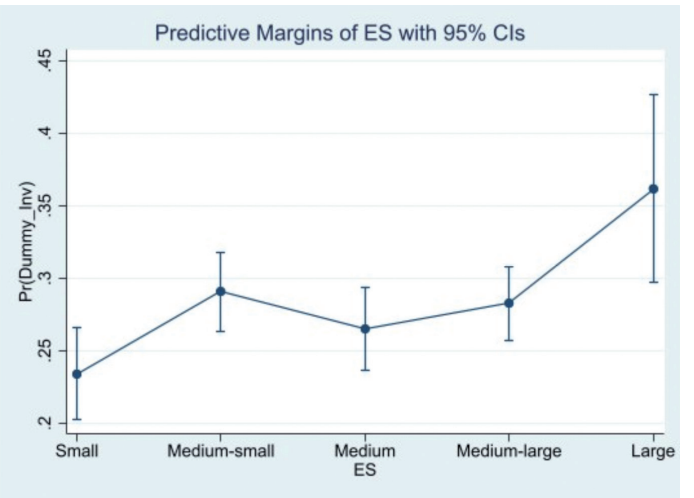
* p<0.05; ** p<0.01; *** p<0.001.

Source: authors' own elaboration based on FADN data.

More interestingly, we can analyse the margins of response for probabilities and linear predictions, reported in the following figures, which inform us on the partial effects on the "propensity to invest" for each factor variable, holding all other variables in the model at their means.

In Figure 7, we can see that being "small farms" makes the probability of farm to invest of 0.23, while being a "large farm" makes a probability of 0.36. On the other side, a medium sized farm has the smallest probability to invest (0.26).

Figure 7 - Margins of Economic Size



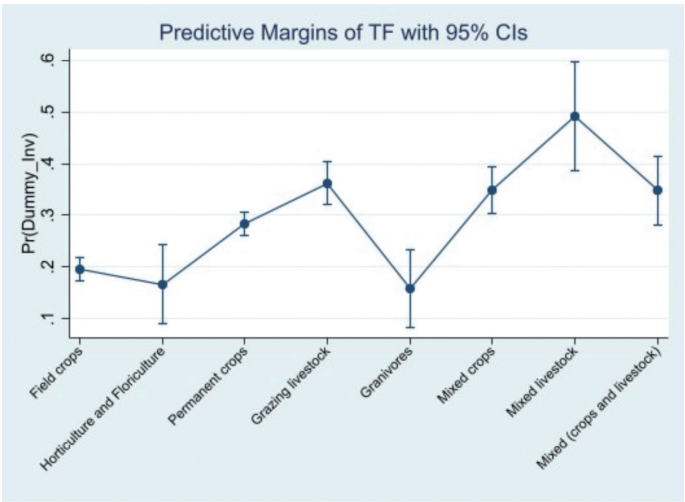
Source: authors' own elaboration based on regional FADN data.

Also belonging to different TF determines a dissimilar probability to invest for the farms (see Figure 8). The lowest probability is associated with granivorous and horticultural-floricultural, respectively of 0.15 and 0.16; while the highest are associated with Mixed farms (0.49 and 0.35) and with Grazing livestock (0.36).

At this regard, we point out that what emerged by model is in contrast with the results of descriptive analysis, where it was highlighted that the granivores and horticulture farms had the highest propensity to invest. The use of a multivariate model, allowing us to evaluate the coefficients of net variation of the coefficients associated with other variables, gives us a more correct evaluation of the different propensities of the farms.

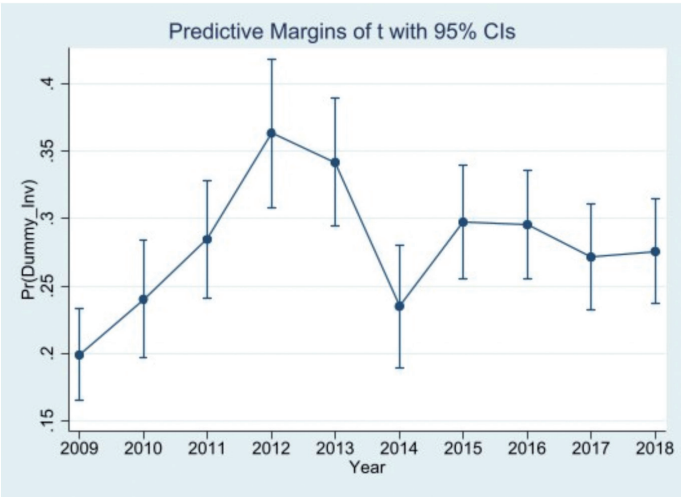
Finally, we can see that, the years in which the probability of farm to invest reaches the highest values are 2012 and 2013, all other things being equal (Figure 9).

Figure 8 - Margins of type of farm



Source: authors' own elaboration based on regional FADN data.

Figure 9 - Margins of time



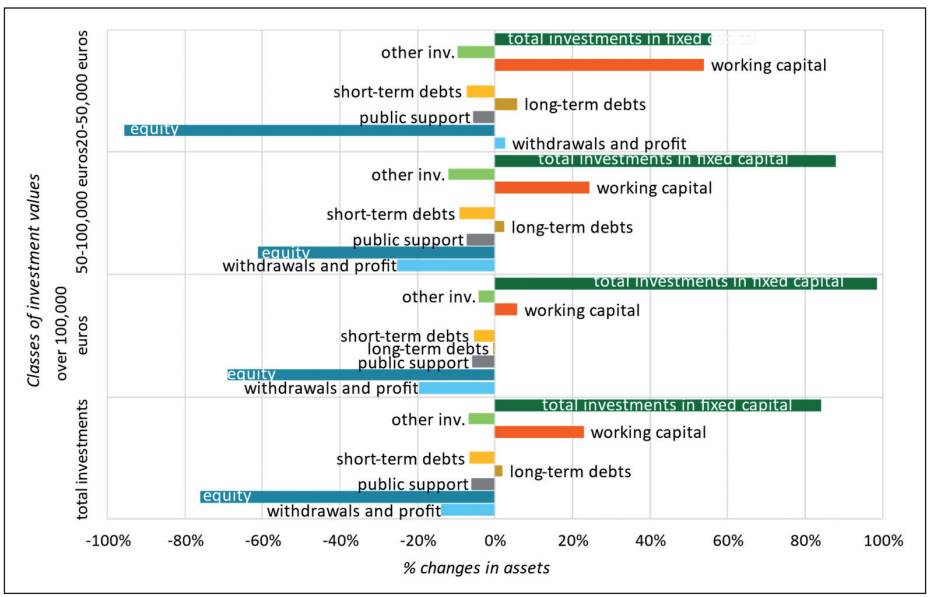
Source: authors' own elaboration based on regional FADN data.

The sources of financial baking

The variations in the financial statements, which correspond to an investment of at least 20,000 euro, have been identified and represented graphically as a percentage of the total change in assets (see Figure 10)[2].

In the selected years, there is a significant fluctuation in the balance sheet which is determined by the observed fixed investment (highlighted in the graph by a dark green bar). The greater the value of the investment, the greatest the observed variation: in the case of investments of over 100 thousand euros, almost 100% of the variation depends on the investment itself (see Figure 10). When the value of the fixed investment does not reach 100% of the variation, it means that further, independent increases in the balance sheet have taken place: for example, it can be observed that, when there are investments between 20 and 50 thousand euros, the positive variations in working capital are almost equivalent.

Figure 10 - Changes in assets by investment size



Source: authors' own elaboration based on regional FADN data.

2. These variations are represented as a percentage of the total change in assets, in positive values in the case of assets (i.e. investments themselves, other changes in fixed assets, working capital) and in negative values in the case of liabilities (i.e. debts, capital grants, equity, self-consumption and profit).

The analysis shows that, in general, the main item of compensation for investments is represented by an increase in net capital which is greater than the value of the investment if the latter is less than 50 thousand euros, while for investments higher than this amount, net capital covers 50-60% of investment value. In addition, for investments that are larger in size, there is also a significant contribution from self-consumption and profit, which means that, in the year of the investment, the owner uses a large part of the profit he has earned in the previous year to cover investments.

On the other hand, the coverage of public capital transfers is very low, about 6% of the total change in assets. This occurrence may be due to the late reception of public support compared to the time the investment was made.

The overall contribution to the financing of short-term debts is also of 6%, while the contribution of medium and long-term debts has an insignificant percentage in the sample of farms considered.

The coverage through short-term debts assumes non-negligible values both in the case of investments in buildings and manufactured goods, which are those with a higher average amount, and in the case of investments in machinery, tools and equipment, which show smaller investments.

For these two types of investment (see Figure 11), the contribution of capital aid is more significant, whereas it is very modest for investments in land.

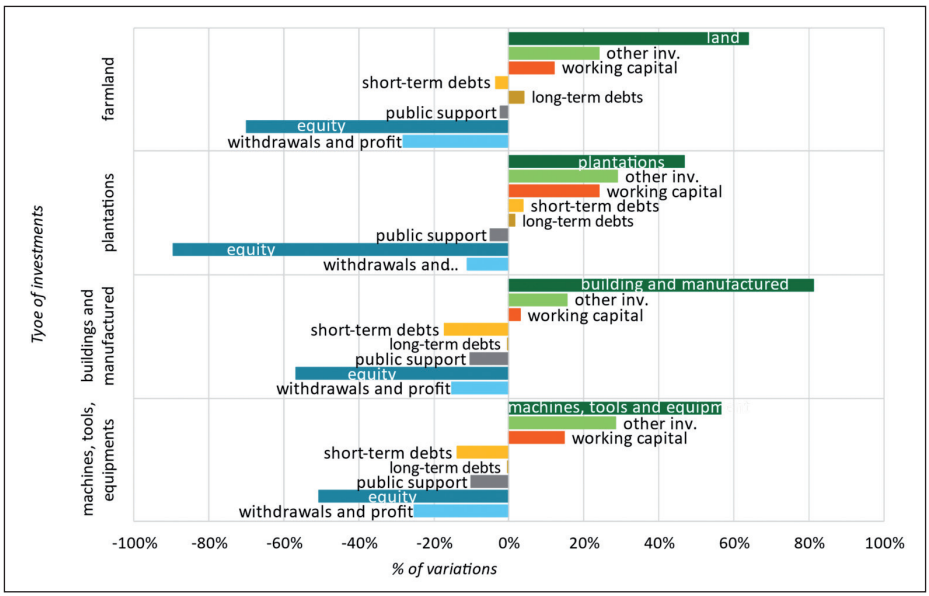
Another aspect we emphasise relating to the different types of investments by years is that the plantations and in machinery, tools and equipment are contextual to a further 30% of increases in other asset items, due probably to complementary investments.

Summarising, the analysis carried out on the balance sheets of the farms in the FADN sample can help us to understand some of the mechanisms for financing investments in agriculture, while it fails to capture the sources of financing.

In particular, it can be seen that investments are covered almost entirely by own capital and financial sources. In fact, increases in equity capital covered on average 76% of the changes in assets, and self-consumption and profit covered a further 14% of investments. However, FADN balance sheets does not provide information on the nature of these capital equity injections (e.g. the entrepreneur's personal loans, including bank loans) which balance the investments. Moreover, the almost total absence of medium to long-term debts in the farm balance sheets suggests that any loans needed by the activity are taken out personally by the respective owners.

What we can say is that 14% (average figure) covered by changes in self-consumption and profit is self-financing, while 76% linked to changes in net capital may come, to an undetermined extent, from bank or other loans through the farmer.

Figure 11 - Changes in assets by type of investment



Source: authors' own elaboration based on regional FADN data.

3. Conclusions

The objective of the study carried out in this article was to estimate the sources of financing for investments that farms use most frequently. To do this, we proposed an analytical approach based on a panel of data, coming from the FADN sample of the Abruzzo region. More in detail, our investigation considered the information related to the balance sheet of the farms in the period from 2008 to 2018.

This analysis allowed us to estimate the amount of average investments made by regional farms and the sources of coverage used for them.

Indeed the statistical analysis performed over a significant time horizon was developed with respect to yearly current investments' value, while the real values would have been more appropriate when a comparison among years is discussed referring to a long period. However our analysis is mainly based on the variations in the value of the assets of a single farm from one year to the next one, and, since in FADN the values of capitals are reported at the historical cost, the variations observed are certainly not derived from the revaluation of assets. Furthermore, for greater caution, in analysing the financial sources used to cover the investments, we do not consider the changes in the assets below 20,000 euro.

The main results show a high variability of the average investments and of the propensity to invest of farms, which can be associated with farm characteristics (economic size and type of farm). We have also shown that in almost all cases farms use equity capital to finance their investments. It is important to consider that the high use of equity to finance investments could be partly made of private financial advances of future investment subsidies, for which the authority's authorization has already been obtained, but the subsidy not released yet.

Such a low recourse to external financing may be due either to an ineffective financial management of the farm (i.e. as it does not adequately exploit the positive effects deriving from the so-called "financial leverage" that would increase its Return on Equity (ROE)), and/or it may be caused by a real difficulty of the farms to receive external financial funds. In fact, the low financial leverage could be explained by the higher cost of borrowing external financing rather than the return on investment (ROI). This would highlight a latent need for public interventions to support investments also through financial instruments, which are aimed at reducing the cost of bank loans (for example contributions on interest rates, provision of collaterals, etc.). To reinforce this last hypothesis we can refer to other studies (Carillo, 2014, 2015, 2017; Guido *et al.*, 2015) which highlighted difficulties of Italian farms in the access to bank loans. This argument suggests the need for policy interventions to facilitate the relationship between farms and lenders.

We would finally emphasise the importance of using statistical data (such as those from the FADN) for public policy evaluation, highlighting what we consider to be the strengths and weaknesses of utilising these sources.

Strengths can be related to the fact that these sources have statistical robustness in sampling, accuracy in data collection methodology and database archiving, allowing to have information over a long period of time and containing a lot of information on the structural characteristics of farms.

Weaknesses may be mainly related to the difficulty to identify the group of beneficiaries (actual or potential), and to make counterfactual evaluative comparisons between "treated" and "untreated" groups in order to estimate policy impacts.

Therefore, microdata from statistical sources (FADN or similar accounting data) can be very useful in structuring the evaluation background, both to better target the necessary ad hoc surveys of actual beneficiaries and to enrich the final considerations of the evaluation itself.

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