Forest profitability measurement: a pilot project to extend FADN to forestry sector in Italy

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Outline

Introduction

The Italian forestry sector represents a controversial reality in the national rural context. While the forest area covers almost one third of the Italian surface (10.4 million ha according to INFC 2005), the sector has a marginal economic role in the country: it contributes only 1.0% to the total production of the primary sector and some 1.5% to the generated value added. Such marginality is due to different reasons.

One of them is the localization of forest resources in mountain and hilly areas. According to data on Italian forest surface distribution (INFC 2005), around 85% of woodlands are located in mountain and hilly areas (above 300 m a.s.l.).

Furthermore, almost 80% of Italian forests are situated in steep slope areas (>20%). This makes the forest access very difficult and the logging operations cost very high. The consequent low productivity (among the lowest in Europe) explains the process of abandonment: timber harvest slowed down from 2.5 cm/ha in 1953 to 1-1.5 cm/ha in 2005.

The reduction of the active management is confirmed by the forest analysis of Italian semi-natural forests, characterized by an advanced ageing process: overmature stages represent 89.0% of coppice stands, while in high stand forests mature and overmature stages share 35.1% of the total (Pettenella 2009).

As concerns the market, a study on trends in sales of woodlots in Comelico (a county of Belluno Province, in the North-Eastern Alps) shows that over the last fifty years the stumpage price in real terms changed from an average of 276.5 €/cm in 1955 to 52.0 €/cm in 2005 (-81.2%). This decline had effects more pronounced also in following stages of the forest-wood value chain (Pettenella, Ciotti 2008).

The structure of Italian forests is characterized by a significant dualism (Pettenella 2009). On the one hand a couple of thousand public companies (0.6% of the total number of owners) controls 43.9% of forests with a relatively large individual surface which allows profitability and continuity of management. On the other hand a huge, not well identified, number of private small holdings allow only harvesting of firewood and poles for home consumption.

Over the recent years, the EU enhanced the forest related policies in the Rural Development Plan (RDP). The EU Forestry Strategy and Agenda 2000 state that incomes from forests can play an important role in maintaining a good social structure, improving

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the economic development of rural areas (Sekot, Niskanen 2001). The implementation of such policies depends on the presence of forest enterprises and on their capacity to be competitive. Moreover, woodlands are recognized as an important factor for biodiversity conservation, climate regulation, soil and water resource protection. The enlargement of the forest area, occurred during the last decades due to abandon of traditional activities, may be now a potential factor of production of biomass for renewable energy. Such condition increases the strategic importance of sector also in energy policies, in particular after the adoption of the Commitment for Greenhouse Gas Emission Reduction up to 2020 (European Parliament 2008).
The increasing policy importance is reflected by the growing share of the European financial budget addressed to forestry measures: it rose from 9.7% in the period 2000-2006 to 12-14% in the present implementation period (2007-2013).
The new orientation of European Rural Development policies is summed up in the first two axis of the RDP 2007-2013, concerning the purposes of the forest related measures which are:

i) to improve the competitiveness of forest enterprises, mainly co-funding structural investments (forest structural measures);
ii) to enhance the sustainable use of woodlands supporting forest management practices oriented to environmental, protective or tourist services provision.

Together with the large acknowledgement of the objectives, there is a growing interest in monitoring the results and in evaluating the socio-economical effects of the measures and related disbursement. This explains the increasing demand by Regional Administrations for data on forestry sector. In Italy, the authorities in charge of the RD plans implementation are the Regional Governments (corresponding to NUTS2[1]) and they are responsible both for the implementation of the measures and for their assessment.
The National Institute of Agricultural Economics (INEA), already responsible for the Italian Farm Accountancy Data Network (FADN) and the Italian National Rural Network, provides methodological support to regional administrations on evaluation processes. The main problem regards the lack of economical data due to the absence of a systematic investigation on the forest enterprise performances at national level.
In such context, the Forest Observatory of INEA, is developing the project “Forestry FADN”. The objective is to extend the accounting survey to forestry owners and logging enterprises, in order to provide statistically significant data, useful for the evaluation. Accounting results at farm level are considered as “target variables” in the measurement of RD measure impact indicators, outlined by the EC (as listed in paragraph 4).
A pilot survey has been carried out in Veneto region for the year 2010. The forest context in this region, located in the northern part of Italy, is characterized by the presence of most of the Italian forest typologies and of several operators categories. These features make it an interesting test bench for the investigation.

The main aim of this paper is to present the project and the software which will be used to collect the accounting data. In the first paragraph the characteristics and the composition of the population will be illustrated. It has been the first step of the survey, useful to understand the type of Veneto forest companies, and estimate their size. The second paragraph will describe the software GAIA® used in Italy to collect data for the national FADN. The system has been developed for agricultural context so it has required an harmonization process to adapt the multi-annual scheme of forestry production with the accounting annual scheme of agriculture. These changes are illustrated in the third

[1] *Nomenclature of Territorial Units for Statistics*

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paragraph which explains how emerging problems (inventory and asset evaluation) can be solved in GAIA® system. The forest accounting data developed with forestry FADN could be useful for different purposes as, for instance, for the evaluation of rural development policies. This specific application is illustrated in the fourth paragraph, where a theoretical and methodological scheme is illustrated. At the end some final remarks invite discussion.

1 Features and characteristic of the population

The population of a survey is the whole of units on which the variables of interest are observed and on which the obtained results refer to. For this specific investigation on forest accounting, the units are commonly identified as forest companies. A common definition of forest company does not exist, both at EU and at national or regional level (Sekot, Niskanen 2001). Moreover, a forest owner is not necessarily a forest farm. In the reality, the major part of them owns only a small woodland, often abandoned or used only for self-consumption of firewood. Generally speaking, the forestry sector within the Alps is characterized by the presence of two typologies of actors:

iii) forest and agro-forestry farms (public or private), represented by owners and managers of a forest area, sellers of standing trees or producers of a certain amount of forest products per year;

iv) logging enterprises, which do not own a forest area but buy standing trees and sell roundwood or firewood after logging operation, or which operate on behalf of a forest owners (as contractors).

For the specific case of Veneto, the population has been defined starting from an administrative database[2] containing all the regional logging authorizations released from 2000 to 2009. Using this source, a population of about 500 forest farms[3] and 350 logging enterprises has been defined. These units are considered as representative for the evaluation of the forest RD measures, since they are the main potential beneficiaries.

2 Description of the software GAIA®

INEA is responsible for the Italian FADN data collection process since 1968. After the proliferation of informatics supports, INEA started the survey with a software (named CONTINEA and running in MS-DOS™) with the double intent to provide a decision supporting tool for farmers and to create regional databases. With the important changes in farm management caused by different market and structural dynamics, INEA perceived the utility to have a more complex decision support tool to fulfill new needs of agricultural entrepreneurs (Bodini, Marongiu 2009). Over the last years, INEA introduced a new software, named GAIA® (*Gestione Aziendale delle Imprese Agricole* - "Farm Management in Agricultural Enterprises"), running in Microsoft Windows environment. Starting from the accounting year 2008 GAIA is used in all Italian regions both to collect and process data and to produce regional-national data sets. The FADN accounting methodology is based on double-entry book-keeping system and it comes into line with the National and International Accounting Standards (IAS). In particular, it can provide the practical tool to make operational in agriculture the adjustments on fair value valuation (Argilés, Josep M. Slof 2001) as required by the new accounting system introduced by the EU Directive IV

[2] All the logging operation in Italy need a specific authorization from the Regional Forest Services. The Veneto forest service have implemented a database named "G*estione Utilizzazioni Forestali*" (logging operation management) in order to manage and control all the requests. Data ownership rights are reserved by Veneto forest service.

[3] The regional database provides the registration of any single logging operation, recorded – in general - under the name of the forest owner. In order to identify real forest farmers among those, a minimum threshold of 25 cm/year of logged wood per forest owner was set

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and the indications of IASB (International Accounting System Board). Different innovative elements represent the strengths of the new tool: the combination of technical information with assets management, the calculation of financial ratios and economic indicators and the opportunity to perform farm economic and financial efficiency analysis. To satisfy the information demand coming from agricultural research and from policy makers, GAIA® has increased the details of some farm management aspects like labour (family workers and contract workers) and off-farm activities (including forestry). In order to make possible the balance-sheet analysis, GAIA® allows to obtain immediately the economic results and indicators. Moreover it provides assistance in the allocation of variable costs among farm processes and activities. GAIA® scheme is structured on the basis of a flow of data input, which the operator have to follow. The logic sequence of the operations are summarized in these points:

I. farm context: general data on the farm (address, localization, farm type, classification, economic size, information on farm holder, etc.);
II. opening stocks: buildings, machinery, storage, land, breeding livestock, labour force, certifications, agricultural products, debts and credits at the beginning of the year;
III. technical management of land, agricultural permanent crops, storage, labour, breeding and fattening livestock;
IV. accountancy management: double-entry registration of receipts (sales and purchases), National and European payment and subsidies, other financial accounts (loans, interest payments, taxes);
V. closing procedures: allocation of operational costs (calculation of gross margins), allocation of structural and investment costs (for permanent crops and unrealized crop production, e.g. durum wheat), allocation of extra ordinary maintenance, VAT.

The output of information on farm management and organization is one of the main objective of GAIA®. Within the farms belonging to primary sector, the land is one of the most peculiar component, consequently, a specific way for the inventory of these assets has been designed. The current system provides two further levels of detail for the agricultural, forestry and other kind of surfaces. The first level classifies the “land” taking into account the Italian cadastre classification which differentiates among general classes as “Arable”, “Orchards“, “Wooden Arboriculture” (i.e. forest plantation over agricultural surfaces) and “Forest” (i.e. semi-natural forest land). The second level specifies the further division of Utilized Agricultural Area (UAA) in smaller plots taking into account the existing crop or plantation. For instance, in the first level a surface is classified as “Arable Land” while, in the second level, different crops (“Durum Wheat”, “Maize”, etc) are specified. Similarly, if at first level the surface is classified as “Wooden Arboriculture”, it is possible to specify at the second level the different plantation depending by the age, the density of trees and/or the species composition (monoculture or mixed plantations); the data collection includes the hectares covered, while does not include the volumes of the growing.
The inventory of farm assets requires the specification of the land monetary values. While in the first level, the indication of the bare soil market value is sufficient, for the plantation over the agricultural land included in the second level, the evaluation is made considering the “historical value” method (see more details in the paragraph 3.2).
Following the EU standards, forested areas are not classified as UAA, likewise forest related economical activities are considered off-farm. This means that in the FADN survey it is possible to collect only few structural data about forest stands and none economical data about forest costs and revenues.

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The “technical management” section of GAIA® can be considered as the most flexible and innovative element, allowing the monitoring of the technical decisions taken by the farmer and their economical implication for the farm. For the purposes of the present paper, we are going to describe only the operations regarding the agricultural and timber production. The section consists of a specific window (i.e. the farm storage) in which the productions (in quantities and value) coming from the different kind of crops are registered. Similarly, it is possible to register the volume of timber harvested (both from the single plantation and from the forest land)[4]. The “technical management” section is strictly connected with the “accountancy management” one. As a consequence, it keeps track of every accountancy operation (sales or purchases) related to farm production. When the timber stored in the farm is sold, using the accountancy management section, automatically the quantity registered in the technical management window is updated (decreased in this case).

Another important aspect of GAIA® system is the data management. The Italian accounting survey is made at a regional level. The regional offices of INEA have the task to collect data, to run data controls and to create the regional database. After that, all the data are transferred to national and European level to update the FADN data warehouse. Statistical queries and national reports are possible. Furthermore, INEA is planning to create a centralized data warehouse with the possibility to address figures at different levels.

3 Forest FADN and GAIA®: adaptation to meet forest accounting needs

“Forestry FADN” project takes advantage of the accounting scheme and the functionalities of GAIA® system to produce data about forestry sector. Therefore, we have mentioned some lacks not allowing a complete representation of forestry and agro-forestry farms. Concerning the forest related activities, at present the information produced refers only to the revenues coming from the wood sales (or from whatever non-wood forest products sales or other forest related activity done by the farmers), while any value about the uncut annual increment of trees is accounted. This means, in more general terms, that GAIA® methodology ignores completely the value of the growing stock and its variation over the time.
To achieve the objective of a more complete description of forestry and agro-forestry farms and to make accountancy an increasing effective instrument for farmers, it is necessary to include these *phenomena.* The present paper contributes on such issue describing two modification of GAIA® system:

i) a new classification for the inventory of “forest” and “wooden arboricultural” land followed by an enrichment of the information collected;
ii) the inclusion of a monetary evaluation of the growing stock that updates the value of the asset at the end of every year.

3.1 The inventory of agricultural and forest land

As above mentioned, the forest land is excluded by the UAA and the process of inventory is different comparing with that one for arboriculture. On the contrary, the current way to outline plantation within arboriculture land is not still well-defined and very few information about the stands are required. The proposed adaptations are designed to harmonize in a single process the inventory of these kind of land uses. Contemporary, including more data about the stands, a reliable picture of the actual consistence of the growing stocks and their productive capacity is obtained.

[4] The consequent decrease of growing stock volume is not a implemented mechanism simply due to the fact that the entry of the growing stock volumes are not provided by the current version of the software.

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The scheme of the modifications starts from the analysis of how and which stands records are collected for planning purposes within forestry farms of Veneto region[5]. The subdivision system of a forest property is basically the following: forest is firstly divided in working circles according to the function (i.e. productive, protective, environmental etc.); then, every working circle is sub-divided in more homogeneous portions, called compartments, representing the forest management unit.
Being a two-level structure, the classification of land in GAIA® is already coherent with those one used in forest management plans. To set the adaptation, the classification of forests and wooden arboricultural land is made by the following steps: within the first level of inventory these forested surfaces are differentiated according to their function, while, within the second level, the inventory procedures requires the entry of each single compartment and existing plantation. The additional information regard: the surface of the compartments, the consistence in terms of number of trees per species (i.e. the species composition) and per diameter class, the consistence in terms of volume per diameter, the annual increment. This modified inventory has been expressly designed to deal with largest forestry farms in Veneto region, where management plan is mandatory (for property larger than 30 ha). In any case, this mapping system of forest land and the consequent data collection represents an historically tested system to provide reliable picture of the actual consistence of uneven-aged forests. The inventory is similarly applicable to even-aged stands rather than wooden arboriculture. In fact, the differentiation based on the function is extendable also to those stands, while within the second level classification the reference unit corresponds to even-aged plantation.
Choosing the compartment (or the even-aged plantation) as reference unit for the inventory, it becomes the reference unit also for the technical management section, wherein a specific window for the growing stock monitoring should be added (similar to that one for farm storage). In this way, the annual updating of the volume of the growing stocks could be performed automatically, keeping into account any positive (i.e. the annual increment or new plantation) and negative (removals and natural losses) volume variation occurred over time within a single compartment.

3.2 The forest assets evaluation

The second adaptation concerns the inclusion in the accounting methodology of an evaluation method of forest assets.
The current approach towards monetary evaluation in GAIA® is differentiated between arboriculture and forest land. In the case of forests, a single value of the asset is assigned because the evaluation procedure considers conjointly the forested (bare) soil and the stand. The value is recorded within the first level of farm land inventory. In the case of arboriculture, the approach is the same of that one used for whatever plantation on agricultural land (i.e. orchards, vineyards, olive etc.): the bare soil and the stands are evaluated separately. The bare soil value is estimated considering the actual marketable price of the land over which the plantation is placed. The procedures of evaluation of the stand is more articulated. During the planting phase (i.e. the years before the farmer starts to sale some products coming from the plantation) the stands must be assessed with the method of the historical value, that is the actual net capital expenditure spent on the farm for the plantation. When the plantation production starts to be sold, the historical value became the total amount invested by farmer and, consistently to the accrual principle, it starts to be depreciated as any other investments on the farms. In wooden plantations a starting year of production does not exist. As well known, cultivated forest and plantation

[5] Our argumentation refers to Veneto region situation because is the one, we have observed more. Therefore, we think the aspects described can be generalized among the realities of forestry farms of other regions and countries.

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are characterized by a multi-annual production. So, arboriculture is considered as being permanently in the planting phase in GAIA® system. Throughout its production cycle all the expenditures afforded are cumulated and the asset value updated each time; no allowance is made for natural growth.
From an accounting point of view, at the cutting time the value of plantation should be equal to the costs afforded by the farmer to establish it. So, theoretically the value of the removals, registered as farm storage, should be equals to the historical value of plantation. Because, in the reality, there are no reasons why this occur, there is not balance in the accounts and depending by the case a capital gain or loss is accounted for. It is important to remark here that the software permits to make annual or periodical asset revaluations to take into account of inflation.
The proposed approach for adapting the accountancy scheme of GAIA® introduces the following changes:

i) a common procedure for capital evaluation of the productive forest and arboricultural land, wherein the stand is assessed by means of its realization value (also named net realizable value) and the stands value is always separate from the bare soil one;
ii) the systematic application of the accrual principle both to multi-annual costs (i.e. those one that would compose the historical value) and to the yearly variations in value characterizing the forest (or arboriculture) asset.

The two modifications are strictly related one to each other: while the first defines a common procedure of evaluation of these particular kind of assets, the second operationalizes the procedure in a consistent way with the accounting rules.
The aim of those changes, in particular the latter one, is also to harmonize the forest production period (which lasts over many years) with the annual agricultural one.
Such decision implies the resolution of a well known issue: the need to update every year the value of the assets. Unfortunately the cost of an annual inventory and valuation of timber stocks exceed any reasonable amount. Some analysts (Borchers et al. 2002) propose to perform it indirectly according to the well known scheme of commercial double-entry book-keeping, by deriving the closing stock through the difference between the opening stock and retirements and adding the accrual of assets (i.e. closing stock = opening stock – removals + annual increment).
The application of this concept to the forest-enterprises of the ”Klosterkammer Hannover” in Lower-Saxony, is a convincing and easy way to overcome the problem (Tzschupke 2009). Table 1 shows briefly the scheme of the mechanisms of annual updating.
The idea is to calculate the stock value on the basis of the theoretically achievable contribution margin of each diameter class to total timber production. These estimates must be supported by the results of a well established ten-years timber inventory, that in the case of forestry farm of the Veneto region are the stands records of the management plans.
The adaptations of inventory system and technical management section described in the paragraph 3.1, play a key role: calculating the mass balance of the growing stock, it provides data necessary for forest capital evaluation at the end of each year. Anyway, these sources are not sufficient, because monetary data must be collected to obtain the forest asset value.
The assessment of stumpage value is done in analytical way at compartments level and its implementation, although not still completed, is part of the adaptation project.

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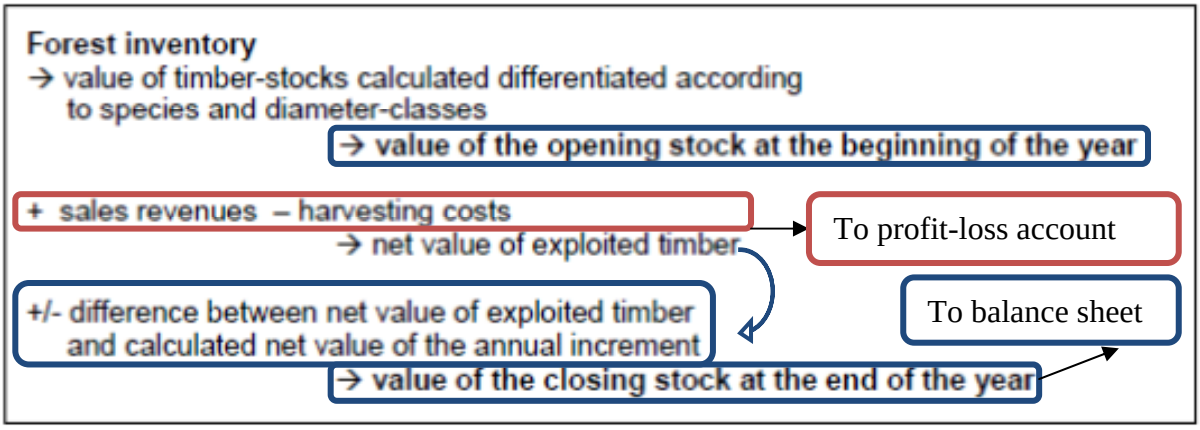
Table 1: Scheme of annual updating of the value of the timber-stocks according to the proposal of Borchers et al., 2002.



Source: Elaboration based on Tzschupke (2009)

Although sometimes fragmentary, the historical record on cuts that generally are kept by forest owners is the most reliable source to obtain timber market values and harvesting costs. The sequence of data input and the further elaboration of the software can be synthesized in the following operations:

i) to attribute a list of timber products to each productive working circles (or arboricultural land) based on those ones usually produced (or expected to be produced) by the farmer;
ii) to input the historical series of price of those wood products;
iii) to estimate for groups of compartment with similar harvesting condition the harvesting cost per cubic meter
iv) to calculate the stumpage price per cubic meter (we suggest the use of a average value of the last three years) and multiply it by the volume of timber products that the growing stock at compartments level can realize in that year
v) to apply a precautionary reduction coefficient, for instance 0.5, as suggested by (Merlo, Ruol 1994).

Strictly linked with the forest asset evaluation there is another important issue to face that is the growing stock revaluation gain or loss due to changes in price. The suggestion mentioned within the point iv) to use average value of the last three years period represents a first step towards a methodological proposal in this sense. In any case, whatever decision taken on that, will need a protracted testing period over a certain number of forestry farms, better if over a representative sample of forestry sector within a region.

4 Usefulness of Forestry FADN results for policy impact evaluation

Over the last 10-15 years, EU regional policy has brought the idea of evidence based policy making and evaluation to quite a wide audience. For the present RD programme period, the EC defined a common framework for monitoring and evaluation (EC Reg. 1974/06, Allegato VIII). In particular, the document provides information on how to measure different kinds of indicators to assess the effectiveness of the policies. Regarding the measurement of impacts of the competitiveness enhancement measures, the EC proposes accounting results at farm level as proxy of three socio-economic indicators (see Table 2).

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Thanks to Forestry FADN investigation, it is possible to measure average values of such target-variables before and after the implementation of forest RD measures, or among farms with and without funding.

Table 2: List of the common impact indicators for RD competitiveness enhancement measures and the corresponding accounting results outlined by EC as proxy.

Impact indicators	**Accounting results (target-variables)**
Economic growth	Added Value
Employment creation	Net additional full-time equivalent created job
Labour productivity	Gross added value per full-time equivalent job

Anyway, extreme caution is needed to interpret the observed differences - over the time or among the individuals - as "effects" of the policies (EVALSED development 2006). In fact, what the impact evaluation is interested in, are not only the differences, but to what extent the measures have contributed to create these differences.
The following sub-paragraph provides some basic information on the theoretical approach suggested by statistical-economical literature and an example of application in the context of forest related measures.

4.1 The counterfactual approach

Within the European Commission website, the on-line resource EVALSED, provides guidance on the evaluation of socio-economic development with particular focus to structural and cohesion programs. For policy impact evaluation, the guide defines as "counterfactual" those groups of methods "primarily" devoted to understand whether a given intervention (or policy) produces the desired effects on some pre-established dimension of interest (EVALSED development 2006).
The significant concept underlined by these methods is the notion of "causal effect" as difference between the actual outcome after an intervention has taken place (the factual) and the outcome that would have occurred in the absence of the intervention (the counterfactual).
The analytical formalization of the approach is ascribed to (Rubin 1974). The fundamental point, upon which the counterfactual approach insists on, is the fact that the "causal effects" between two events are not directly observable because it would means to compare a real condition and a potential one. This is known as the "fundamental problem of causal inference" (Holland 1986): if a certain event occur (ex. a new policy) data may be collected on the "factual" (i.e. what happen after policy application), but it is impossible to observe the counterfactual that is, what would have happened if the event had not happened. To overcome the problem, it is necessary to outline "counterfactual" by means of a proper research design and appealing, in general, to assumptions that are not verifiable. In this sense statistics can be helpful in making the assumptions more credible. Several strategies have been argued to build the counterfactual. They can be divided according to the kind of used data: "experimental" or "observational" ones (not experimental). In the literature on policy impact evaluation it is possible to find both strategies, although the application of the experimental one is often not practicable; this is also the case for the mentioned RD measure.
To better understand the counterfactual approach in the context of forest related measures, a stylized example is reported in Box 1. The example aims to highlight one of

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the main issues the researchers have to face, when infer on causality of RD measure with observational data: the bias in the selection process of the beneficiaries.

Box 1: The counterfactual approach applied to a hypothetical forest related measure.
A structural measure (e.g. to enhance the competitiveness of logging enterprises), funds the purchase of new machinery for forest operations. To access the financing, the enterprises have to answer to a call and demonstrate the economic sustainability of the investments. After the call deadline, the administration defines a rank of requiring enterprises, on the base of prefixed features, and allocates the specific funds until the budget is spent.
In this case the evaluator is asked to prove to what extent the measure has contributed to increase the competitiveness of beneficiary enterprises, in terms of Net Added Value (Y).
The average net contribution of the intervention over beneficiaries is the difference between the average (Y) over the population of beneficiaries and the average (Y) over the same population of beneficiaries as they have not been financed. Since it is not possible to find enterprises that are at the same time "beneficiary" and "non beneficiary", it is necessary to define a population that can be a credible alternative to the counterfactual population. A viable way is to measure the average (Y) over the population of logging enterprises that have not been financed. But, is it reasonable to assume that the two populations are equal? A common problem in policies which select the beneficiaries on a call base, it is the existence of factors moving the decision of subjects to answer to this call (e.g. young age of entrepreneurs, the large economic dimension of the enterprise, etc.). The existence of these factors makes the previous assumption less acceptable. The selection bias of beneficiaries represents one of the main issues that have to be faced in impact analysis. Increasing the available data over the statistical units it is possible to apply statistical matching methods that reduce the bias and allow to achieve a more accurate quantification of the impacts.
The intent of the authors is not to go in deep on the statistical-economical methods able to deal with and to reduce this selection bias. Therefore, here we mention the main ones suggested by literature: (1) the difference-in-difference (Campbell, Stanley 1995) and (2) the statistical matching through the propensity score (Rosenbaum, Rubin 1983); (Sasha, Ichino 2002); (Rubin, Waterman 2006)

5 Final remarks

Accounting schemes and procedures for forest management have been scarcely developed, especially in Italy, for rural context as in other productive sectors. As a consequence the ever-present dilemma about the role of wood (product and capital asset at the same time) had been managed with different approaches, depending on the forest type (high stand, coppice or plantation), the frequency of logging and the national economic context. Moreover accounting data about forest sector are required to investigate the impacts of the RDP 2007-2013.
This project, carried out by INEA, aims to establish accountancy procedures for collecting accounting data of forest enterprises and forestry farms in Italy. The availability of a new software for agriculture (used to collect data for national FADN) makes possible an adaptation in line with the theoretical principle of accounting in forestry.
The main problem, we have faced, is to adapt the annual accounting scheme of agriculture to the multi-years scheme of timber production. The evaluation of forest assets is an important research issue, because of the difficult task of taking into account the variation in value, due to forest growth or, natural losses rather than changes in timber prices. While adapting the inventory procedures has been easy, in case living capital evaluation there are theoretical issues to take into account. Several method for growing stock valuation have been outlined and arguments can be made to justify each of them (for an overview see Openshaw, 1980). Although the "actual value" method[6] is more accurate, we assert

[6] The actual value method differs from the realization one by the fact it includes an evaluation of young and immature phase. This make the implementation of the actual value easier for even-age stands than uneven-age ones.

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the “realization value” method is, currently, the most feasible solution for managerial accounting in forestry farms in Italy, where un-even aged stands and semi-natural forests are the most common situation. This method allows the provision of estimates of the growing stock value and indication of its variation over the time.
In any case, the use of appraisal to evaluate an asset is *a priori* seen with skepticism by strict accountants who emphasize, instead, the role of actual transactions as evidence of reliability. This is the reason why the evaluation of forest, as other living assets (i.e. agricultural land, living animals) are generally based on the historical costs or on the current market price. Making a parallel with accounting in agriculture, several authors concluded that historical cost are generally not very informative for the users (Argilés, Josep M. Slof 2001). We think that a similar conclusion should be extended to the forestry context. Then, if accountancy does not begin to include the evaluation of growing stocks, its developments as managerial tool for forestry farmers will be reduced.
The implementation of this kind of accountancy requires still the resolution of several problems, among which we mentioned the issue of capital revaluation. Such issue open to discussion the assertion that revaluation due to change in prices seems to affect predominantly the net profit of period, whereas management activities seems to be insignificant. Starting from this plausible conclusion, we break down the problem analyzing the causal relationships deduced; this way, we would like to provide a different perspective on the issue and to foster the importance of the research concerning forest evaluation for accounting purposes.
The process of cause-effect between changes in timber price and changes in net profit of forestry farmers appears quite obvious. For example, if a raise in timber price occurs, it is reasonable to expect the revenues of an hypothetical forestry farms to go up and—*ceteris paribus*—that the capital gain by revaluation of growing stock will determine an increase of net profit over the time. On the contrary, the causal relationships among investments on management activities (i.e. reforestation, timber stands improvement, planning activities etc…), growing stock value variation and change in the net profit generation are less evident. The mechanisms of reaction of forest are still not completely known. An actual manifestation of effects on growing stock value usually takes several years and before that time only additional cost are supported by farmers. Besides, from a logical point of view, the linkages among some kind of management activities (e.g. draft of a management plan) and forest values can be too complex to be outlined. In any case, the key concept that make true the initial conclusion, is represented by the *ceteris paribus* clause. In fact, deducing the effects of change in prices on net profit trough the asset revaluation, other factors affecting growing stock value are kept fix. While some of them depend on the market, such as harvesting costs over the time, the most important factors depends by previous entrepreneurial choices: the harvesting conditions across different portions of forest, the kind and quality of timber production realizable within forest property, the presence/absence of venture capital risks and others. In conclusion, the revaluation of growing stock represents only an accounting procedure to deal with normal market changes over the time. Instead, the research on capital valuation focused more on the causal relationship among management choices and changes in growing stock value could lead to more interesting development.
An accountancy scheme widely used among forestry farms could result as an important factor fostering a more evidence-based policy decision within forestry sector. In this context, the policy impact evaluation, by means of counterfactual impact analysis, represents one of the main pillars (Gertler et al. 2011). The public administrations will need increasingly accounting data, because the variables on which an impact is expected, especially in structural policies, derives only from income and financial reporting. Therefore, Forestry FADN may be useful in this sense.

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To make operative an accountancy data system on forestry sector, a lot of work remains to do. The Forestry FADN will be initially implemented in a pilot area (Veneto, Northern Italy) to analyze different forest companies. This system does not yet permits to give a value to un-prized products and services, although they could became predominant on generation of farmer net returns in the near future. Therefore, the problem of defining and standardizing an accountancy scheme comparable in space and time stands again in similar terms, so these first steps could contribute indirectly to make the inclusion of evaluation of non-marketable forest environmental goods and services easier at low book-keeping level.

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