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Are Italian farming households actually poorer than other non agricultural households? An empirical analysis.

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Summary

*Provide here a summary of your paper no longer than **300 words**. (Times New Roman, 10, italic)*

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Are Italian farming households actually poorer than other non agricultural households? An empirical analysis using different sources of microeconomic information

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1. INTRODUCTION

The ongoing debate on the CAP reform after 2013 is more and more challenging the current form and the rationale of direct support to agricultural incomes. The policy ground for the Single Farm Payment Scheme (SFPS) is increasingly contested. After the 2003 Fischler's reform, in many countries the decoupled payments are locked in the distribution shaped by previous distorting measures, showing a bias towards larger farms and more advantaged agricultural regions (Harvey 1997; Tracy 1997). Furthermore, the existence of structural trade-offs between equity and targeting of direct payments is likely to strengthen this bias via the circular flow in the whole economy (Rocchi, 2009). Moreover, increasing constraints in using EU financial resources for direct payments are also likely to emerge as the share of EU budget devoted to Agriculture, although, decreasing is still considered too large with respect to emerging policies and competencies of the EU.

Such a policy scenario calls for a renewed interest towards the size of European agricultural policies. In a contest of decreasing resources and during the worst macroeconomic crisis from decades, the efficiency goals become less important, despite the degree of decoupling of payments cannot yet be considered complete (OECD, 2005). A reformed policy to support agricultural incomes will need to show desirable features in terms of equity and targeting to be accepted by the European taxpayers (European Commission, 2010). Noticeably, it will need to address only actual and verifiable income disparities between farm vs non-farm households.

Whatever the tool applied, the 2011 legal proposal for a reform of the PAC is still locked in a "holding" view of the equity of support; extra-farm source of income are not taken into account to qualify beneficiaries from a distributive point of view (European Commission, 2011). Conversely, the cross sectoral income comparisons (as well as the distributive features of support) may be better assessed from a "total household income" perspective (UNECE, 2012), particularly in the European Union where farming is no longer the main source of income for a relevant share of agricultural households.

According with the last survey on total income of agricultural households in Europe (Eurostat, 2002) the average income of agricultural households in the narrow sense (income from farming > 50% of total household income) is likely to be comparable with the average income of total population (Ciaccia, 2009). In other words, no longer the "farm problem" (Gardner, 1992) seems to be a primary "problem" for agricultural policy in Italy. Conversely, the evidence shows a distribution of farm support biased towards affluent households (Rocchi, 2008 and 2009, Rocchi, Pizzoli e Sacco, 2012).

The aim of this paper is to supply empirical evidence on the relative income of farming households within the overall population in Italy. The analysis relies on elementary data from three nation-wide surveys

carried out by ISTAT: the Households' Budget Survey (BF), the European Survey on Incomes and Living Conditions (EUSILC) and the Farm Business Survey (REA). The three surveys supply alternative views (and different statistical coverage) of the agricultural households institutional sector. Despite substantial differences in their design, a triangulation across these sources could be conducive to a more reliable assessment of income disparities (if any) between farming and non-farming households within a "total household income" perspective.

Two main research question will be addressed by the analysis:

a) are Italian farming households actually poorer than other non agricultural households?

b) which form of income support may still find a good policy justification according to statistical evidence?

The paper is set out as follows. Secrion 2 describes the three sources of microeconomic information and assesses their comparability with reference to the object of the study. A homogeneous set of definitions for the relevant variables in the three surveys is designed accordingly. In section 3 a set of income level, inequality and poverty indicators to be used in the analysis is defined. The income level and relative position of agricultural households within the overall income distribution is assessed in the fourth section.

Results are discussed and assessed both from a statistical and an economic point of view.in the last section

2. DATA

2.1. Microeconomic information on agricultural households

In a National Accounts context the expression "Agricultural Households Sector" (AH) define a partition of the households institutional sector including only units where farming represents one of the sources of family income. More precisely, a "narrow" concept of AH includes only households where incomes from self-employed labour in agriculture accounts for more than 50% of the total household income (THI) whereas a "broad" definition includes all the households earning at least a share of their THI through farming (United Nations, 2012: chapter 8).

The choice of the concept to adopt in the analysis largely depends on data availability. The "agricultural" criterion used in defining the AH institutional sector suggests that useful information may be drawn both from "sector (household) oriented" and "industry (agricultural) oriented" surveys. On the one hand agricultural households are included in surveys on the whole household sector, such as households budget or living standard surveys; on the other hand surveys designed to describe agriculture as an industry, such as censuses of agriculture or surveys on farm accounts, are likely to gather information also on the institutions, including households, managing agricultural holdings.

The two typologies of surveys show different pros and cons to the study of household's incomes. Sector oriented surveys allow the researcher to properly study the relative position of agricultural households within the overall income distribution; however, in developed countries they may show problems of feeble statistical coverage, mainly due to the small dimension of AH sector within the whole population (United Nations, 2012). Industry oriented surveys although likely to better represent the AH sector from statistical point of view but, given their focus on farming activity, usually supply poor information on extra-farm sources of income.

The paper will compare information on agricultural households' incomes supplied both by "sector" and "industry" oriented surveys carried out by ISTAT. The Households' Budget Survey and the European Survey on Incomes and Living Conditions are sampled from the whole Italian population; conversely, the Farm Business Survey is a sample of holdings representative of Italian agriculture. The rest of the section will provide some basic information on the three surveys.

2.2. Italian Households' Budget Survey (BF)

The Italian Households' Budget Survey (BF) carried out by ISTAT (Italian Institute of Statistics) is one of the main sources for estimation of consumption in national accounts, weights in consumer price indexes as well as poverty lines. The survey is based on a probability sample with two-stage stratification at the municipality (first stage) and household (second stage) levels. The sample size is about 30 thousand and each household is sampled only once. Data on expenditure and own production relating to 276 items are collected through a questionnaire and a household diary. Further information is provided on possession of durable, housing, expenditure habits and socio-demographic characteristics.

The datasets employed in this research refer to years 2005 to 2007. We employ socio demographics to estimate the number of equivalent component per household consistently with the OCSE modified equivalent scale. In the analysis Agricultural Households are defined in the "narrow" sense. Agricultural household are defined according to the employment status of the reference person, usually adopted as a proxy of the "prevalence of agricultural incomes" rule when detailed information on THI composition is not available (United Nations, 2012). In particular the reference person must be self-employed in agriculture although not as consultant or on term contract. We consider three household types: Agricultural (defined above), Other Employed and Others. The second type relates to households with reference person employed other than agricultural self-employed. The third type collects the remaining households, mainly with reference person unemployed or retired.

The actual size of the sample and the corresponding expansion to the universe broken down by type of household (agricultural vs. other types) is illustrated in table 1.

Table 1. Characteristics of the BF – ISTAT sample

	N of Sampled Households			N of estimated Hous in population			N of Eq components per household		
	Agricultural	Other Empl.	Others	Agricultural	Other Empl.	Others	Agricultural	Other Empl.	Others
2005	341	12 078	11 688	295 976	11 740 597	11 231 137	1.96	1.83	1.49
2006	271	11 856	11 512	240 280	12 060 908	11 265 871	2.04	1.81	1.49
2007	325	12 176	11 899	265 719	12 254 266	11 361 238	2.02	1.81	1.48

Source: own elaboration on BF data

We aggregated the 276 consumption items in order to estimate 12 expenditure divisions according to the COICOP classification (ISTAT, 2000), as shown in table 2:

The overall monthly consumption figure for each household is given by the sum of the 12 consumption categories. Figures are consistent with the definition of consumption given by the European System of Accounts (ESA, 1995) and can be employed to estimated the empirical distribution of consumption and related poverty lines.

Table 2. Expenditure divisions according to COICOP classification

F1	Food and non-alcoholic beverages
F2	Alcoholic beverages, tobacco and narcotics
F3	Clothing and footwear
F4	Housing, water, electricity, gas and other fuels
F5	Furnishings, household equipment and routine household maintenance
F6	Health
F7	Transport
F8	Communication
F9	Recreation and culture
F10	Education
F11	Restaurants and hotels
F12	Miscellaneous goods and services

However, income and consumption classes are different and a direct comparison with results from surveys on incomes, such as the EUSILC one, would not be feasible even if in other datasets that provides information on both consumption and income (such as the one by Bank of Italy) we can observe some degree of correlation between the two measures.

Consumption is determined by permanent income rather than by temporary income variations that can be compensated either by resorting to loans or by saving. Moreover, a household may be collocated in different income and consumption classes because of wealth variations that affect consumption but not necessarily income (such as capital gains).

In order to partially mitigate the discrepancy between the distribution of households by income and by consumption we calculated an expenditure aggregate that encompasses all ordinary expenditures (both consumption and not) having characteristics of continuity over time.

An approximation of routine expenditure was obtained adding to consumption the following items which are not part of the ESA definition (ISTAT, 2004):

- package holidays abroad
- expenditure for religious ceremonies
- mortgage and loan rates
- payment to others of lifelong rents.

Similarly we subtracted these items already included in the consumption categories:

- purchase of new vehicles (Division 7)
- purchase of furniture and major appliances (Division 6)
- purchase of jewellery (Division 12)

To test the degree of consistency between routine expenditure and income we compared the two measures estimated from the Bank of Italy Household Budget Survey. Results are reported in appendix A1.

2.3. European Survey on Incomes and Living Conditions (EUSILC)

The Survey on Incomes and Living Conditions (EUSILC) is a pan-European survey carried out by Istat from 2004 according to the EU Regulation 1177/2003. The aim of the survey is to gather information on

income level and composition as well as on welfare indicators on a representative sample of European Households.

As in the BF survey, the Italian survey is based on a probability sample of the Italian population with two-stage stratification at the municipality (first stage) and household (second stage) levels. The sample include a panel component with a 25% annual turnover rate. The sample size is about 20.000 units.

The size of the sample and the corresponding expansion to the universe broken down by type of household (agricultural vs. other) is illustrated in table 2 for the years of interest. For comparability purposes the identification of the AH group, as in the BF case, is carried out again the "reference person" approach. The estimates of total number of and average household sizes clearly show the substantial identity of the reference universe in the two surveys.

Table 3. Characteristics of the EUSILC – ISTAT sample: AH sector according to the reference person approach

	N of Sampled Households			N of estimated Hous in population			N of Eq components per household		
	Agricultural	Other Empl.	Others	Agricultural	Other Empl.	Others	Agricultural	Other Empl.	Others
2005	260	10 086	11 152	281 921	11 648 760	11 973 222	2.04	1.80	1.52
2006	226	9 993	10 763	262 630	11 923 350	12 096 506	1.92	1.80	1.50
2007	257	9 987	10 684	288 718	12 215 652	12 136 830	1.92	1.78	1.50

Source: own elaboration on EUSILC data

However the EUSILC survey gather detailed information of incomes earned by each household member, allowing the researcher to identify AH according to the actual composition of THI. In table 4 the sub-sample of households earning at least some income from self-employed labour in agriculture ("broad" AH sector) are classified according to the "prevalence of income rule" between agricultural households in a narrow sense and all the others. The subsample referred to the "broad" concept includes 384 units, showing how the "reference person" approach is likely to include in the AH sector the largest part of Type A (narrow concept) and a variable share of Type B households.

Table 4. Characteristics of the EUSILC – ISTAT sample: broad concept of AH sector

	N of Households		N. of Components		N Eq Comp per Hous.
	Sample	Population	Sample	Population	Population
Type A (Agr. Narrow)	98	116 029	184.2	212 538	1.83
Type B	286	274 416	611.3	570 342	2.08
All Agricultural (Broad)	384	390 445	795.5	782 880	2.01

Source: own elaboration on EUSILC data

In the analysis of EUSILC data we considered the household's disposable income, net of taxes, including imputed rents and other non cash forms of income (corresponding to the variable fytot_imp in the original database).

2.4. Farm Business Survey (REA)

The Farm Business Survey (REA), designed to supply information for national accounts, yearly surveys a sample of agricultural holdings representative of the Italian agriculture. The database includes a detailed set of variables on farm structures (such as cultivated area, livestock number, labour employment)

and on costs and revenues from farming. Using these information a good estimate of income from farming can be obtained. Furthermore, for the family farms (the largest part of the sample) a small set of variables on household's composition as well as on extra-farm source of income (classes of income by four types of sources) is available, allowing for an estimate of the total household income.

The survey is based on a probability sample stratified by regions, farm types and economic size of the holdings. The largest part of surveyed farms is family managed. As a consequence the sub sample of family farms can be considered also as a sample representative of the AH sector in the "broad sense", including all the households with at least some incomes from self-employment in agriculture.

Information collected with the REA survey does not allow a precise estimation of the family size. Indeed, only members working in the family farm or earning some extra-farm income are recorded. As a consequence the equivalent family size cannot be used in estimating the per capita total household incomes. Due to the nature of the available data, the total income concept adopted in analyzing the REA survey is slightly different from the EUSILC case, excluding imputed rents and including the value of self-consumed productions. In the analysis we used the estimation of total income for the observed statistical units carried out by Pizzoli et al. (2012), jointly using REA and EUSILC data through statistical matching techniques.

Some figures on the 2007 sample considered in this paper are shown in table 5.

Table 5. Characteristics of the REA – ISTAT sample: 2007

	N of Households		N of components		Components per household in population
	Sample	Population	Sample	Population	
Type A (Agr. narrow)	6 790	681 883	11 531	1 049 191	1.54
Type B	3 068	904 310	5 954	1 790 411	1.98
All (Agr. broad)	9 858	1 586 193	17 485	2 839 602	1.79

Source: elaboration on REA data

The estimates of population clearly show that the REA sample covers the AH institutional sector in a more complete way than the "institutional sector oriented" surveys presented above. The estimated population is larger than 1.5 Mio of households. The subsample for "Type A" households, corresponding to the "narrow" definition of the sector, accounts for almost 700.000 farming households, about three times the population accounted for by BF and EUSILC applying the "reference person" rule (tables 1 and 3) and 50% larger than the "broad" AH sector as represented by the EUSILC sample (table 4). The under representation of the AH sector in the EUSILC survey is probably due also to the way individual data on occupation and incomes are collected: for example part-time farmers with earnings also from larger self-employed activities other than farming are likely to be classified as employed in other industries than agriculture.

The estimates on average family size confirm the incomplete coverage of the REA survey on this item; indeed, the average size of "broad" agricultural households is far smaller than the one estimated from EUSILC (using the "income composition" rule).

3. METHODS

We compare income and expenditure across household types employing both synthetic measures of location of the distribution, inequality and poverty as well as graphs. In the case of BF survey, since routine expenditure – as defined in section 2 above – could be considered a proxy for income, we mainly focus on this measure rather than on consumption. All measures are estimated with the appropriate sample weights.

As measure of location we provide both mean and median. To compare income or expenditure the latter appears more sensible given that the distribution is positively skewed with few very high values in the right tale. Income or expenditures are computed (where possible) either per capita or per capita equivalised according to the OECD modified equivalent scale.

We also provide a bootstrapped distribution (Efron and Tibshirani, 1994) for medians since sample size varies considerably across household types and we expected to find higher variability for the measure taken on the Agricultural Household sub-sample in the two "sector oriented" surveys. We take 500 sample with replacement from the complete dataset, each time recalculating the medians for the three household types. Then the estimated density functions of the three measures are plotted to provide a visual account of their variance.

As a measure of inequality within each household group and for the overall population we employ the classical Gini coefficient defined as twice the area between the 45 degree line and a Lorenz curve:

$$G = 2\int_0^1 (p - L(p)dp \tag{1}$$

were p is the bottom proportion of the population and L(p) is the Lorenz curve that measures the share of income or expenditure accruing to the p poorest proportion of the (household) population (Xu, 2003).

To assess the incidence of poverty across different household groups we estimate the poverty indices of Foster, Green and Thorbecke (1984):

$$P(\alpha) = \int_0^z (1 - x/z)^{\alpha} f(x)dx \tag{2}$$

where x is the (per capita) income or expenditure and z is a poverty line .We calculate the poverty line as the 50% of the median value of the relevant measure.

The parameter is a sort of poverty aversion measure. The larger α the larger the weight given to the poorest in the population. By setting its value to 0,1 or 2 we obtain a family of poverty indices. With $\alpha = 0$ the formula gives an head count ratio that measures the share of population (in our case of households) under the poverty line. This is a measure of poverty incidence but does not provide any information about the intensity of poverty which is instead measured by P(1).

The index obtained setting α to 1 is a poverty gap measure where the contribution of a household to the value of the index is larger the poorer the household. The index satisfies the principle of transfers being reduced by monetary transfers from rich to poor although it is not sensitive to transfers among the poor, a property that accrues to P(2) which is an index of poverty severity (Haughton and Khandker, 2009). Being linear, all FGT indices are decomposable, that is the value for the overall population can be recovered by a weighted mean of the indices calculated over the sub-groups.

Finally for income expenditure and consumption we estimate the density function non parametrically with a Kernel estimator (Venable and Ripley, 2002):

$$\hat{f}(x) = \frac{1}{nb}\sum_{j=1}^{n} K\left(\frac{x - x_j}{b}\right) \tag{3}$$

where K is the kernel function, *x* is the central value of the window *j* with bandwidth *b*. We choose for K the standardised normal density while the bandwidth is estimated with the Sheather and Jones (1991) method. The smoothed density functions for each household type are than plotted together to facilitate a visual inspection of income, expenditure or consumption distributions across groups.

4. RESULTS

4.1. Households' Budget Survey

Estimates from BF were used to compare routine expenditure and consumption across household types for three waves of the survey, notably 2005, 2006 and 2007. Comparison were based on per capita and equivalised measures and focussed mainly on expenditure. Non reported estimates for total consumption provided similar results.

Overall, the small size of the Agricultural Household subgroup resulted in higher variability of the relative measure across years. However, some stylised fact can be inferred from the analysis as illustrated below.

Table 6. Basic statistics: Routine Expenditure

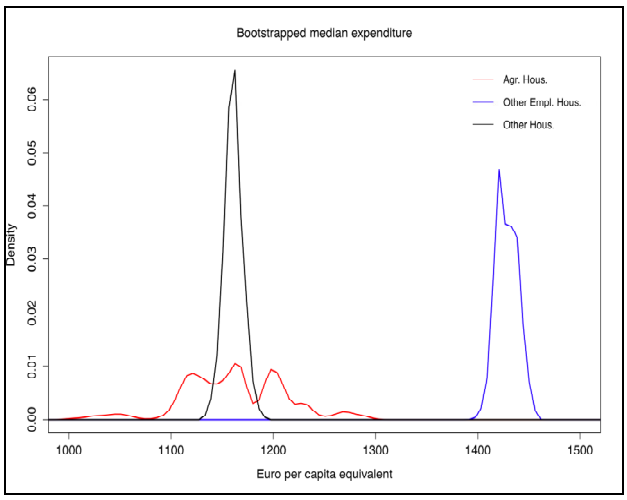
	Per capita Routine expenditure			Equivalised routine expenditure		
	Mean	Median	Gini	Mean	Median	Gini
			2005			
Agricultural	981	817	0.34	1 445	1 278	0.29
Other. Empl.	1 106	900	0.34	1 544	1 361	0.28
Others	1 044	878	0.32	1 283	1 122	0.30
All	1 074	890	0.33	1 417	1 243	0.29
			2006			
Agricultural	1 006	764	0.38	1 456	1 214	0.32
Other. Empl.	1 161	934	0.35	1 608	1 401	0.29
Others	1 060	892	0.32	1 302	1 133	0.29
All	1 111	911	0.33	1 460	1 270	0.30
			2007			
Agricultural	969	738	0.37	1 383	1 162	0.31
Other. Empl.	1 180	951	0.34	1 626	1 427	0.28
Others	1 095	921	0.32	1 341	1 161	0.30
All	1 137	932	0.33	1 487	1296	0.29

Source: own elaboration on BF data

The picture we gain comparing measures of location for the distribution of per capita and equivalised expenditure is somewhat blurred. We find a high sensitivity of the ordering of household types with respect to the equivalent scale. Simple per capita (which correspond to equivalence elasticity equals to 1) data depict Agricultural households as the poorest among the three types. Again the larger size of AH seems to negatively impact on their welfare. The adoption of the modified OECD scale partially mitigates this aspect with the bottom position occupied by households whose reference persons are mainly unemployed or retired.

However, when compared with households whose reference person is employed, Agricultural ones always lag behind. Similarly, they appear poorer than the overall population average with the sole exception of the 2005 wave. In Figure 1 we provide a graphs of the boot strapped distribution of the medians . The graph refers to 2007 but similar pictures can be obtained for the remaining years. Although the median expenditure estimate of Agricultural Households is overdispersed, there is no overlapping with the median for the Other Employed group.

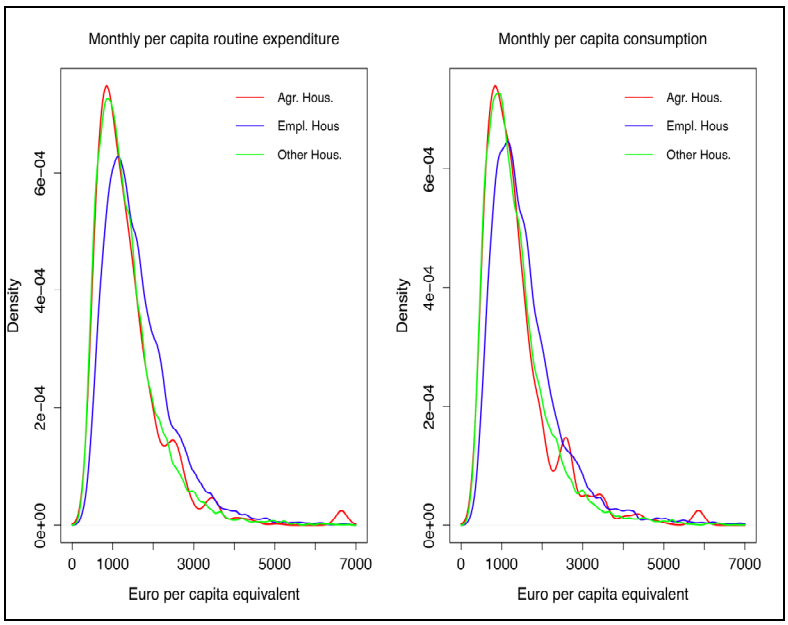
Figure 1: Median expenditure estimates 2007.
Bootstrapped distribution (500 replicas)



Source: own elaboration on BF data

As far as inequality measure are concerned (see the values for the Gini index in table 6 above), within the Agricultural Household sub group the expenditure levels are distributed more unequally than in the Other Employed households.. This can be appreciated also by the visual inspection of the distribution estimates of both expenditure and consumption (Figure 2).

Figure 2: Equivalised Expenditure and consumption distribution.



Source: own elaboration on BF data

A secondary peak for agricultural households can be observed around 6000 Euro /month probably accounting for the inequality figure. The peak is observable also in 2005 and 2006.
Poverty measures are illustrated in table 7. It is worth noticing that all poverty measures refer to a relative poverty line calculated as half the median value of the expenditure over the whole population.

Table 7. FGT poverty Indices: Routine Expenditure

	Equivalised Routine expenditure			
	P(0)	P(1)	P(2)	Poverty line
		2005		
Agricultural	8.51	1.82	0.65	621
Other. Empl.	6.80	1.31	0.40	621
Others	14.39	3.23	1.11	621
All	10.49	2.24	0.75	621
		2006		
Agricultural	12.75	2.56	0.80	635
Other. Empl.	6.19	1.11	0.32	635
Others	13.91	3.06	1.03	635
All	9.95	2.06	0.66	635
		2007		
Agricultural	13.40	2.15	0.51	648
Other. Empl.	6.10	1.14	0.35	648
Others	14.41	3.11	1.03	648
All	10.13	2.09	0.68	648

Source: own elaboration on BF data

When it comes to poverty, Agricultural appear in a better position than the "Others" households, that is the group whose reference person is not employed. This results is stable across both measures and years. However, both the head count ratio and the average poverty gap are higher in the agricultural group if compared with the "Other Employed" or the overall population, with the exception of the P(2) index. In other words poverty incidence and poverty intensity are higher for agricultural households while the degree of poverty severity is lower at least in comparison with the overall population and the "Others" group.

4.2. European Survey on Incomes and Living Conditions (EUSILC)

The basic statistics estimated from EUSILC data (Table 8) show similar levels for the main indicators (slightly higher as expected, moving from expenditure to income). In this case the "Agricultural" group has always per capita values lower than average, even when equivalised measures are considered. Data show a similar, although lower, sensitivity of the estimates to the way components are weighted in calculating the per-capita measure. The distance between "Agricultural" and "Others" is systematically reduced for equivalised measures, but the agricultural group show a higher value only in the case of mean income in 2007.

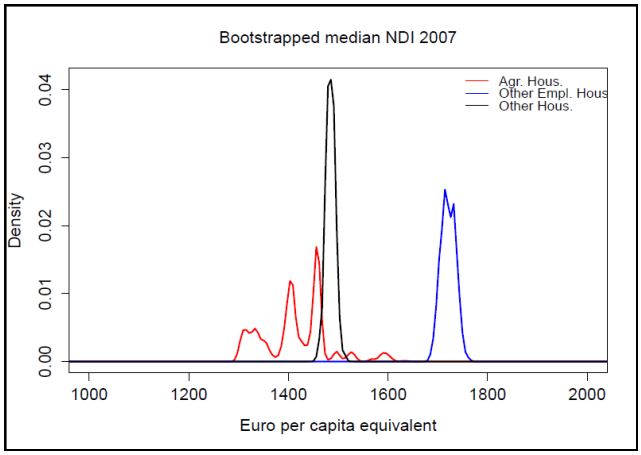
Table 8. Basic statistics: Total Net Disposable Income

	Per capita NDI			Equivalised NDI		
	Mean	Median	Gini	Mean	Median	Gini
			2005			
Agricultural	1 032	833	0.40	1 470	1 266	0.36
Other. Empl.	1 325	1 087	0.36	1 834	1 616	0.31
Others	1 222	1 091	0.30	1 527	1 370	0.29
All	1 270	1 086	0.33	1 676	1 473	0.30
			2006			
Agricultural	1 002	921	0.36	1 424	1 230	0.34
Other. Empl.	1 363	1 121	0.35	1 877	1 656	0.30
Others	1 248	1 124	0.29	1 548	1 406	0.28
All	1 302	1 120	0.32	1 708	1 514	0.30
			2007			
Agricultural	1 178	946	0.37	1 657	1 407	0.34
Other. Empl.	1 413	1 166	0.35	1 936	1 719	0.29
Others	1 308	1 198	0.28	1 623	1 484	0.27
All	1 359	1 183	0.32	1 778	1 586	0.29

Source: own elaboration on EUSILC data

Mean and median values for "Agricultural" and "Others" are in any case not so distant,. Looking at the variance of estimates (Figure 3), the bootstrapped median of Net Disposable Income for "Agricultural", over-dispersed as in the BF case, shows an overlapping area with those for "Others" that increases moving from 2005 to 2007. Conversely, in all the three years, the median of income for households employed in other industries is higher and well beyond the upper limit of variation of the estimates for the Agricultural group.

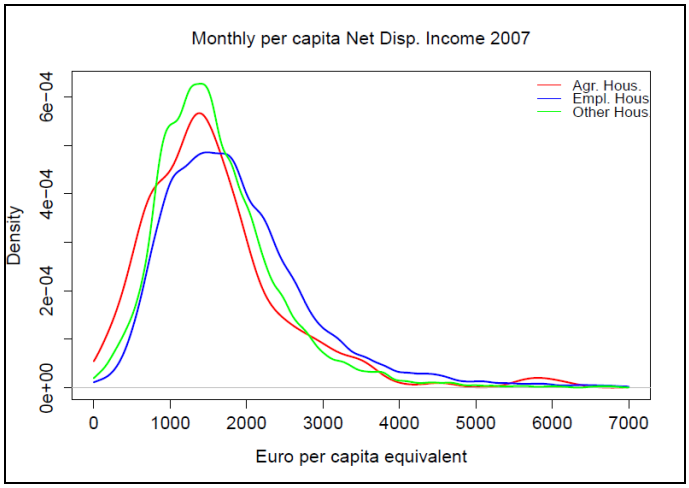
Figure 3: Net Disposable Income estimates..
Bootstrapped distribution for median (500 replicas).



Source: own elaboration on EUSILC data

Looking at the distributive profile, EUSILC data confirm the presence of a larger inequality within the "Agricultural" group. The plot of density functions for the three groups (Fig.4) depicts a distribution of households along income levels similar to those obtained using BF data (Fig. 2). Again a secondary peak around 6.000€, even if more smoothed, is present for Agricultural Households.

Figure 4: Equivalised Net Disposable Income distribution.



Source: own elaboration on EUSILC data

Looking at poverty indicators, while the headcount ratio (P(0)) for the whole population calculated on EUSILC data is in line with estimates based on BF data, the indexes for poverty intensity (P(1)) and poverty

severity (P(2)) show higher (even if small) values. Conversely, poverty indexes are worst in all cases for AH, even when compared with figures for the "Others" group.

Table 9. FGT poverty Indices: Net Disposable Income

	Equivalised Routine expenditure			
	P(0)	P(1)	P(2)	Poverty line
		2005		
Agricultural	19.44	8.08	5.41	736
Other. Empl.	9.43	2.79	1.75	736
Others	12.58	4.15	2.40	736
All	11.13	3.53	2.12	736
		2006		
Agricultural	23.17	9.16	4.56	757
Other. Empl.	8.36	2.34	1.62	757
Others	11.08	3.77	2.06	757
All	9.88	3.13	1.87	757
		2007		
Agricultural	18.74	5.87	3.13	793
Other. Empl.	8.38	2.32	1.42	793
Others	10.60	3.41	1.98	793
All	9.60	2.90	1.71	793

Source: own elaboration on EUSILC data

4.3. Farm Business Survey

The REA data are not suitable for a direct comparison between agricultural and non-agricultural households. As explained in section 2, REA is a sample representative of the sole "Agricultural Households" sector, according to the broad definition. In table 10 the basic statistics on Net Disposable Income are disaggregated between Type A households, corresponding to the "narrow" concept of the sector, and type B, including households managing farming as a secondary source of income.

Table 10. Basic statistics: Net Disposable Income

	Net Disposable Income		
	Mean	Median	Gini
	Gross of Single Farm Payment		
Type A (Agr. narrow)	1 788	1 143	0.52
Type B	1 122	979	0.33
All (Agr. Broad)	1 409	1 028	0.45
	Net of Single Farm Payment		
Type A (Agr. narrow)	1 584	1 041	0.53
Type B	1 097	958	0.33
All (Agr. Broad)	1 306	980	0.44

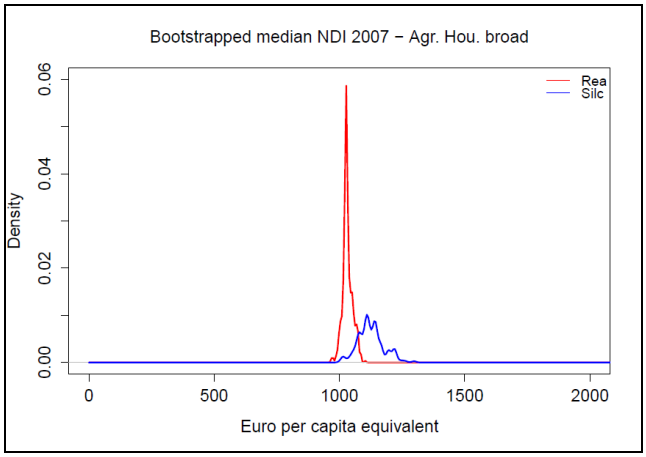
Source: elaboration on REA data

On average agricultural households in the narrow sense show higher income levels (both considering mean and median) but also more internal inequality. Interestingly, inequality does not seem to be affected by CAP payments: the values for Gini index are almost identical when incomes are calculated gross or net of Single Farm Payments.

The results based on REA data can be compared with harmonized estimates based on the EUSILC survey. Applying the "broad" definition of the AH sector, i.e. including in the analysis all the EUSILC observations with at least some incomes from farming, and harmonising the way the number of components are included in family size with the limitations of REA survey, a sub sample of 384 households can be extracted from the EUSILC dataset and used for comparison. The estimated mean Net Disposable Income in

the "broad" AH sector according to EUSILC data is equal to 1 353 €/pc while the median is equal to 1 116€/pc. Both figures are lower but quite close to the estimates from the REA dataset (table 10). The boostrapped value of Medians for the estimates from the two datasets (Fig.5) shows a relevant area of overlapping of the two density curves.

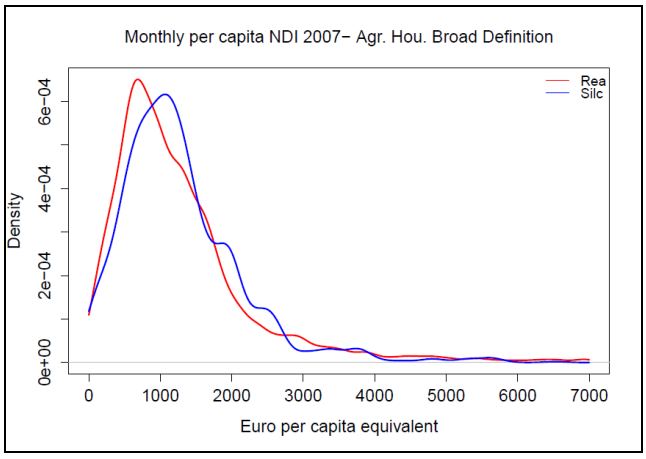
Figure 5: Bootstrapped distribution for median.
Net Disposable Income estimates. 500 replicas



Source: elaboration on REA data

The good degree of comparatibility of the two source of information, at least for the broad definition of AH income sector, is confirmed also by the distribution of households among income levels, as shown in Figure 6. This is a key result since it "justify" the use of general purpose household surveys to make inference about the income or welfare of agricultural households, a policy relevant and sensitive issue.

Figure 6: Equivalised Net Disposable Income distribution.



Source: elaboration on REA data

5. CONCLUDING REMARKS

The paper assess the available empirical evidence to answer the question: Are Italian farming households actually poorer than other non agricultural households ? This research goal implied: first, the adoption of a "total income" approach, including in the analysis the whole set of income sources of

agricultural households, beyond their farming activities; second, an economy-wide perspective, to compare agricultural families with the rest of the national household sector.

The three source of microeconomic information analyzed in the paper show a good degree of comparability. Income distributions and inequality measures across household types are quite similar in the two "sector oriented" economy-wide surveys (BF and EUSILC). At the same time, when a "broad" definition of the AH sector is adopted, the results based on the REA, an "industry-oriented" survey, validate the evidence based on EUSILC data. In our opinion the analysis shows how surveys on the households institutional sector may supply a valuable information in studying the relative position of AH sector, adding an interesting analytical dimension to the analysis supported by traditional, industry specific source of information such as REA and FADN.

The evidence supplied does not provide a simple answer to the two research questions proposed in the introduction. With reference to the main question stated in the title of the paper, there is no conclusive statistical evidence of a lower income level for the AH sector in the broad sense in comparison with the whole population: from this point of view the "farm income" problem would no longer sound as an acceptable justification of support. However, when compared with only households whose members are "active" in other sectors, AH still show a lower income level. How this difference is "industry specific"-thus requiring specific policies- or determined by other covariates is an empirical question. We simply note that the relative positions of households groups is sensitive to the way the family members are weighted.

Moving to the way income support is provided, empirical results shows that the current income measures leave the AH with a degree of internal inequality higher than in the rest of the population. The Gini index for the AH group (whatever defined) is systematically larger across all the three surveys. Furthermore, our figures suggest the presence of a residual, though small, problem of relative poverty among agricultural households. Finally the available evidence from the REA sample, shows that inequality is even stronger within the "narrow" AH sector (Type A agricultural Households), although combined with average income higher than in the Type B group and comparable with income for other employed households. Therefore, there is still room for policy measures aiming at reducing inequality and poverty among agricultural households.

It is widely accepted that the current policy measures justified as "income support" (such as SFP under the current CAP) are biased towards larger farms and richer households, missing to a large extent their target. A reform of the "first pillar" of the CAP after 2013 may in theory improve its targeting. Anyway, taking into account the last decades of agricultural policy, one may challenge the idea that inequality and poverty problems could be properly addressed within a "industry specific" policy.

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REFERENCES

Efron, B. and Tibshirani, R: (1994). *An Introduction to Bootstrap*, Chapman, New York.

Foster, J.; Greer, J. and Thorbecke E.(1984). A class of decomposable poverty measures. *Econometrica*. 81(2): 761–766.

Hyndman, R. J. and Fan, Y. (1996) Sample quantiles in statistical packages. *American Statistician*, 50: 361–365.

ISTAT (2000). Le nuove stime dei consumi finali delle famiglie secondo il sistema europeo dei conti SEC95. *Collana Metodi e norme*, 7, Roma.

ISTAT (2004), Metodologie di stima degli aggregati di contabilità nazionale a prezzi correnti,Collana metodi e Norme, 21, ISTAT: Roma.

Sheather, S. J. and Jones, M. C. (1991). A reliable data-based bandwidth selection method for kernel density estimation. *Journal of the Royal Statistical Society series B*, 53: 683–690.

Venables, W.N. and Ripley B.D. (2002). *Modern Applied Statistics with S*. Springer: New York.

Xu, K. (2003). How has the Literature on Gini's Index Evolved in the Past 80 Years? *Dalhousie University, Economics Working Paper*. Available at SSRN: http://ssrn.com/abstract=423200.

Haughton, J. and Khandker S. R. (2009). *The Handbook on Poverty and Inequality*. World Bank: Washington.

Ciaccia, D. (2009). *I redditi delle famiglie agricole: obiettivi vecchi e nuovi degli utilizzatori istituzionali in ambito europeo*. Atti XLV Convegno Sidea, Politiche per i sistemi agricoli di fronte ai cambiamenti: obiettivi, strumenti, istituzioni. Portici, 25-27 settembre 2008.

European Commission (2010). *The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future*. COM(2010) 672 final, Brussels, 18.11.2010.

European Commission (2011). CAP Reform – an explanation of the main elements. *Background memo*, MEMO/11/685, Brussels, 12 October 2011, http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/685&format=PDF&aged=1&language=EN&guiLanguage=en.

Eurostat (2002). *Income of the Agricultural Households Sector – 2001 Report*. Lussemburgo.

Gardner B. (1992). Changing economic perspectives on the farm problem, *Journal of Economic Literature* 30: 62-101

Harvey, D. (1997). Extensions and political analysis of the CAP. In Ritson, C. and Harvey, D. (eds.), *The Common Agricultural Policy*. Wallingford (UK): CAB International, 2nd edition: 163 – 186.

ISTAT, 2010. *La distribuzione del reddito in Italia*. Roma, ISTAT, collana Argomenti n.38.

Hyndman and Fan (1996) Sample quantiles in statistical packages, *American Statistician*, 50, 361–365.

Organisation for Economic Co-operation and Development (2005). *Decoupling – Policy implications*. OECD Working Party on Agricultural Policies and Markets, AGR/CA/APM(2005)22/FINAL. http://www.oecd.org/dataoecd/17/12/36298853.doc. Accessed 18 August 2008.

Rocchi, B. (2008). *Targeting "real farmers" with reformed CAP payments: and analysis for Italy*. Paper prepared for the 109th EAAE seminar " The CAP after the Fischler reform: national implementations, impact assessment and the agenda for future reforms".Viterbo, Italy, November 20-21st, 2008. ageconsearch.umn.edu/bitstream/44817/2/3.1.5_Rocchi.pdf, accessed October 2008

Rocchi, B. (2009). The CAP reform between equity and targeting: a structural policy analysis for Italy. *European Review of Agricultural Economics*, 36(2): 175–201.

Tracy, M. (1997). *Agricultural policy in the European Union and other market economies*. Genappe, (B): APS, 2nd edition.

United Nations (2012). *Statistics on rural development and agricultural household income*. *The Wye Handbook Second Edition*. New York: United Nations. http://typo3.fao.org/fileadmin/templates/ess/pages/rural/wye_city_group/StatisticsOnRuralDevelopmentAndAgriculturalHouseholdIncomeFeb92012inAcrobat5compat.pdf. Accessed 1 May 2012.

Pizzoli, E., Rocchi, B. and Sacco, G. (2012) An application of statistical matching techniques to produce a new microeconomic dataset on farming households' institutional sector in Italy. In *Proceedings of Annual Conference of the Italian Statistical Society*, Bologna, forthcoming.

ESA (1995). *Council Regulation No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the Community*. OJ L 310 of 30.11.1996.

Appendix. Income vs routine expenditure quintiles: a comparison within the Bank of Italy Dataset

To test the degree of approximation between income and routine expenditure quintiles we estimate both measures from the Bank of Italy survey (BdI). Notably, BdI provides a measure of net disposable income along with several variables related to routine expenditure.

We first calculated a measure consistent with the routine expenditure derived from BF. To this purpose we considered the following variables:

- consumption of non durables
- House Rents
- Mortgage repayments
- Loan repayments
- Insurance premiums

Even in this case we excluded items related to consumption of durables and non routine maintenance of households. Then we estimated the per capita equivalent figure for both income and routine expenditure and calculated the corresponding quintiles of the distributions.

To estimate percentiles we interpolate the order statistic for weighted data employing method 7 by Hyndman and Fan (1996). Cross tabulating the distribution of households by quintiles we obtain the following correspondence table.

Table A.1. Classification of households by income and routine expenditure quintiles

		Routine Expenditure quintiles				
		1	2	3	4	5
Net Disposable Income quintiles	1	232	127	59	29	17
	2	106	166	104	74	36
	3	59	126	143	120	41
	4	51	97	120	174	130
	5	24	28	77	142	313

Source: own elaboration on BdI data

About 40% of non weighted observation lie on the main diagonal, almost 80% on main , super and sub diagonals. The Chi square test with 16 degree of freedom does not accept the hypothesis of independence of the two distributions at the 0.001 level.

An increase in the matching between the two distributions can be obtained regressing the classification by income quintiles on the log of the per capita routine expenditure, the share of mortgage repayments and the share of food on expenditure. An ordered logit model provides the results in table A.2.

Table A.2. Ordered Probit with independent variable Income quintiles

	Value	Std. Error	t value
log(EXPEND)	3.64	0.06	56.14
MORT_SHARE	-6.12	0.18	-34.49
FOOD_SHARE	1.09	0.16	6.73

Source: own elaboration on BdI data

All coefficients are significantly different from zero. Noticeably, the share of mortgage repayment over expenditure shows a negative marginal impact. In other words, the higher the share of expenditure the lower -ceteris paribus- the probability to belong to an higher income quintile. This is probably due to net disposable income including imputed rents that cancel out with actual mortgage repayments.

Using the fitted income quintiles, the matching between actual net disposable income classes and the ones simulated from expenditure variables improves (tab A.3).

Table A.3. Classification of households by actual and simulated income quintiles

		Simulated Net Disp. Income quintiles				
		1	2	3	4	5
Actual Net Disp. Income quintiles	1	268	145	38	9	4
	2	89	192	142	52	11
	3	44	108	172	139	26
	4	40	89	111	203	129
	5	14	37	51	146	336

Source: own elaboration on BdI data

This time about 84% of sampled households lie on main, super and sub diagonals. The model however is not transferable to BF data as expenditure variables are not defined and collected consistently with those of BdI.

Table A.4. Thresholds for Routine expenditure quintiles in BdI and BF

Tresholds		
BdI	BF	Bdi/BF
594	834	71%
768	1,165	66%
1,000	1,532	65%
1,317	2,075	63%

Source: own elaboration on BdI and BF data

Table A.4 shows how differences between corresponding quintile thresholds increase for higher quintiles, suggesting a non linear relationship between the routine expenditure calculated from BdI and the one obtained from BF.