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# Farmers' earnings and disposable incomes for Sweden in 1997-2012

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**Abstract**

This study is probably the most comprehensive analysis of farmer incomes for a EU member state. We use longitudinal register data to evaluate the dynamics of earnings of Swedish farm households for 1997 to 2012. Individual data allow division of household earnings into farm- and non-farm earnings and, using the *Multigenerational register*, we allocate household earnings between family members. Our results indicate that, from a standard of living perspective, farm households do well, but from a return to skills perspective, farming is still a low paid occupation. Nevertheless, farm earnings increase faster than earnings in the general population. A significant increase in farm household earnings over the period is equally caused by operators' farm earnings and higher off-farm earnings for the spouse. Since the farmer and the spouse often have their own distinct careers we conclude that it is problematic to evaluate farmers' income from mainly a household perspective.

**JEL classification:** J43, Q12

**Key words:** farm income, earnings off-farm income, disposable income, inequlity, Gini, poverty

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## Introduction

In 1992, the seminal paper by Gardner states that the *farm problem* of having low incomes has disappeared. Since then, evidence continues to show that farm households have a similar economic well-being as nonfarm households (Hill and Bradley, 2015; Katchova, 2008; Mishra et al., 2002; OECD, 2003). However, this is primarily because farm households – and particularly the operator's spouse – devote more to time to off-farm labour work (Hanson and Spitze, 1976; Ahearn, Johnson, and Strickland, 1985; Findeis and Reddy, 1987; Gardner, 1992; Mishra et al., 2002; Ahearn et al., 2006; El-Ostra et al., 2008; Hill and Bradley, 2015).

Recent changes in farm household incomes in EU are poorly documented however, as there is since 2002 no system for measuring agricultural household income statistics in the EU (Hill, 2012, Hill and Bradley 2015). The main problem is that off-farm incomes are not collected, implying that the household's living standard is underreported. Hence, whereas the "production objective" in The Treaty on European Union is well evaluated (detailed longitudinal production data is available for most member countries) the "standard of living objective" is difficult to evaluate. The European Court of Auditors (2016) stressed that the "statistical data used to analyse farmers' incomes has significant limitations".

This study is probably the most comprehensive analysis of farm household incomes for a EU Member State. We use longitudinal register data to evaluate the dynamics of earnings of Swedish farm households for the period 1997 to 2012. Individual data allow separating household earnings into farm- and non-farm earnings, and using the *Multigenerational register,* we allocate household earnings between family members. Earnings of farm household members and farm households are then compared to average individual- and household earnings in the population. Also, by comparing household earnings to household disposable incomes – which adds non-labour market transfers, capital returns, and deducts taxes – we compare results from a (labour market) productivity perspective to a living standard perspective.

Generally, when comparing incomes between men and women, between races or ethnic groups, or between sectors, the level of comparison is typically the individual level. This is, however, not the case when analysing farmers income. For example, when a recent study by the European Parliament (Hill and Bradley, 2015) proclaims "evidence points to farmers NOT being a particularly low-income sector of society in most Member States judged on the basis of their household disposable incomes." the statement mainly refers to the living standard of farm households, not the returns to farming (skills). Measuring income at the household level overlooks problems at the individual level. First, we implicitly presume that household incomes are shared equally between spouses something that is highly sensitive from a gender perspective, and not necessarily true. Second, when the earnings gap decreases between farm and non-farm households due to a higher off-farm labour market supply by the spouse, we partly rely on the marriage market to solve the *farm problem*. Also, the income and living standard of single-household farmers are rarely examined.

There are also problems that are overlooked when one aggregates farm and off-farm incomes. A good living standard may rest on having dual (or even multiple) job holdings. For other occupations dual jobs is rarely necessary: for US about 5% of the population have multiple job holdings and the number is declining (Hirsch et al., 2016). Kimmel and Conway (2001) find that multiple job holdings are, generally, undesirable and the main motive for taking a second job is economic hardship. On the other hand, high off-farm income may be efficient for risk-spreading, and individuals may use multiple job holdings as a way to obtain new skills (Panos et al., 2014).

**Previous research and the measurement of farm household incomes**

In the US 80% of the total household incomes are from off-farm incomes[1], more than half of the operators work of farm, and 60% of the operators of small farms (<5 ha UAA) work less than a quarter of their time on the farm (El-Ostra et al., 2008). Furthermore, a substantial part of household incomes are provided by the farm operators' family members and spouses devote more time to off-farm work over time (Hanson and Spitze, 1976; Mishra et al., 2002). Mishra et al. (2002) report for the US that almost half of the spouses work off-farm and that the share has increased with 65% between 1969 and 1999.

In the EU, off-farm labour supply seems to be smaller – around a third of the operators have off-farm incomes and about 50% of household incomes derive from off-farm sources – but as for the US the share seems to be increasing over time (OECD, 2003; Barthomeuf, 2008; Hill and Bradley 2015).

In Sweden, 50% of the operators had off-farm work in 2005 (Barthomeuf, 2008). A Swedish survey, using firm level data, shows that 30% of the farms engage in diversification – however, income from paid employment outside the farm is not collected (Swedish Board of Agriculture, 2007). A Finish study using tax register data for 1986 finds that farmer household income per family unit amounted to 71% of the household income per family unit of industrial workers, but 95% when disposable income per family unit was compared (Puurunen, 1990).

*Measuring earnings*

As noted, from the early 2002 there is no system for measuring agricultural household income in the EU. The Eurostat's IAHS (Income of the Agricultural Households Sector) statistics

[1] However, two-thirds of the US farms are small farms (sales less than $40,000) and contribute only 10% of the total farm production but earn more than three-fourths of the off-farm income (Ahearn, Johnson, and Strickland, 1985).

started in the late 1980s and terminated in 2002;[2] but the quality of the IAHS was a problem much earlier (Hill, 2012, Hill and Bradley 2015). Currently, the EU uses two systems to measure returns from agriculture: Economic Accounts for Agriculture (EAA) at the Member States level (see EUROSTAT, 2002 and 2010), and the Farm Accountancy Data Network (FADN) at farm level. In FADN, farm family income is measured per farm or per work unit of family. However, both the income indicator in the EAA and the FADN excludes off-farm income.

Only the 2005 Farm Structure Survey (Barthomeuf, 2008) collects off-farm income for the EU – but spouses' off-farm incomes are not included. The 2005 Farm Structure Survey includes farm income and the operator's incomes from Other Gainful Activities (OGA). OGA includes income from farm diversification activities such as tourism and refining processing, and income from paid employment outside the farm. Note, in comparison to our definition of farm income – which is based on the total returns from ones agricultural human capital – the 2005 Farm Structure Survey classifies paid *farm* work outside the farm as off-farm incomes.

The Swedish Board of Agriculture (2007) merges micro level register data with a survey on off-farm incomes. From this data they identify off-farm incomes at the farm level (i.e. farm diversification), but exclude paid employment outside the farm. Instead, total individual returns from business, work and capital are collected, but these total returns cannot be separated into remunerations from farm and off-farm activities. Also, the data is for a single year, 2005, and farms' household earnings are not compared to population averages.

To measure the living standard of agricultural household the preferred income measure is net disposable income, which was collected in the IAHS (Hill, 2012). However, with the aim of examining differences in labour market returns between agricultural household members and

[2]Hill and Bradley (2015) list a number of reasons why adequate agricultural household income statistics is lacking for the EU; a consistent feature is that such statistics may be politically sensitive and may show that farmers are in a relatively favorable income position.

the population at large, earnings are preferred. Inequality in disposable income relies on labour market factors, but also on the tax system, capital returns and non-labour market transfers (i.e. child support, housing benefits and social security benefits). Earnings include income from business and work, and labour market transfers. Labour market transfers are conditional on labour market participation and they provide income support while absent from work, i.e. it includes parental leave payments, sickness payments and unemployment benefits.

For the present study, we have generated data on all these variables by merging information from several Swedish registers. Thus, with unusually good data this study contributes with a broad socioeconomic overview of Swedish farmers. In the next section we describe the data.

**Data and descriptive statistics**

For this study, we utilise the *Longitudinal Integration Database for Health Insurance and Labour Market Studies* (LISA) which includes a broad range of indicators on demographics, labour market status, income, and education for the entire Swedish population (16 years and older). From LISA we have a full sample of i) individuals receiving income from business or work from an agricultural business in 1997 to 2012,[3] and ii) their children and spouses. In this study we restrict the sample to farm households that contain an operator, i.e. employees and their family members are excluded.

The analysis is carried out at the individual- and the household level and these units are followed over time. By using the household indicator in LISA and linking LISA to the *Multigenerational Register* we have detailed information about household-composition. We use a "broad" definition of farm households – at least one household member earns a farm income from business or work. Sometime a "narrow" definition is used (e.g. in the IAHS). In the

[3]The Swedish Standard Industrial Classification (SNI) code, is used for classifying the firms as agricultural businesses.

narrow definition an agricultural household is a household where the reference person's main income is from agriculture. However, with a narrow definition, a longitudinal analysis would eventually lose those individuals that are most successful in gaining off-farm incomes (Hill, 2012). The farm operator is defined as the household member with the highest mean farm earnings during 1997 to 2012 even if some other household member, e.g. a child or a spouse, may be the listed farm operator.

We include only farm households where the operator has farm earnings for at least five years during 1997 to 2012. Without this restriction we would include a substantial number of households who primarily receive income from CAP subsidies. With the decoupling reform in 2005, several persons having some agricultural land became eligible for single farm payments and, thus, registered as having agricultural earnings. However, from 2007, four hectare of land was required for receiving single farm payment, which decreased the number of "farmers" substantially. The five year restriction removes most of these "pure" subsidy farmers which constitutes almost a third of the sample in 2004-2006. However, some of these farmers are probably still included which has some impact on the results for off-farm incomes.

Earnings from forestry and extension services are included in farm earnings. For Sweden, where forestry and farming is closely linked, this is reasonable. As the data only indicate if the main income is from farming or forestry, we cannot separate income from these two sources unless the farmer has two different firms, one for farming and one for forestry, which is uncommon. But since we restrict the sample to farm operator households we know that some part of the income is from farming. About 14.7% of the operators have earnings mainly from forestry and about 2.9% of the operators have earnings mainly from extension services.

With a return to farming perspective we choose to analyse the working farm population (ages 20-64). A household is removed from the sample when the operator reaches the legal retirement age of 65 or if the household stops farming, i.e. if household farm income is zero. If

another operator takes over the farm (e.g. a child), it is classified as a new household. We have 42,898 households and farm operators in our sample. The sample also contains 34,396 partners and 48,063 children (16 years and older).[4] 91% of the operators are male, and 68% of the operators have a partner. The sample decreases substantially over time: it is 37% smaller in 2012 than in 1997. The main reason is retirement: 67% (25 out of 37) of the decrease is due to retirement. On average, the operators have farm earnings for 10.5 out of 16 years. Importantly, the results in this study are basically the same irrespectively if we use a balanced sample (farmers who report farm income for all years) or an unbalanced sample where there is an in- and outflow of farmers.

From Statistics Sweden (SCB) we also have individual and household earnings at the aggregate level for the Swedish working age population (20-64).[5] In the analysis we define households as family units with at least two adults, i.e. single adult household are not analysed as households in this study, and this definition is used for both the farm population and the total population.[6] The single farmers, *operators without a spouse*, are analysed separately.

Agricultural households are not excluded from the total household statistics, but because agricultural households constitute only around 2.4% of the total number of households the contribution from agriculture to the total population statistics is minor.

**Structure of the analysis and the method for comparing earnings**

Because the age composition of farmers and the total population differs this has to be considered when comparing the groups. Thus, our approach for calculating the mean individual and

[4]However, the total number of individuals in the sample is smaller than the sum of operators, partners, children and other family members, because an individual can start out as a child and later become an operator or a partner in another household.

[5]Average earnings at the individual level is downloadable from Statistics Sweden's homepage, but earnings at the household level was ordered separately.

[6]Also, non-married cohabiting couples without children in common are defined as singles in Swedish register data and are, therefore, included as singles in our analysis.

household earnings of farmers is to estimate (with OLS) the earnings on time dummies, $\beta_t$, and age dummies, $\delta_i$:

$$Earnings_{it} = \beta_t + \delta_i$$

By excluding a constant and using the age 37 as the reference category, $\beta$ shows the yearly average earnings for the age group 37. The reference age is chosen to be the same age as the average age in the total working-age population. When comparing households the reference age is 47, i.e. the average age of the oldest working-age adult in households is higher than the average age in the total working age population. This model removes an age bias in the results. All earnings variables are measures in 2012 prices.

The comparison of earnings – $\beta_t$ to the average earnings in the population – has an individual, or household, perspective and not a farm perspective, per se. This implies that the main findings are separated on household type, and not on farm business type or farm size. Thus, we divide the household into those that have a male and those that have a female operator, and households where the operator has a partner and households where the operator is single. For the total population the households are not divided on gender[7]. Special interests are on the comparison of household earnings and disposable incomes, and the households' off-farm incomes. For 70% of the sample we are able to match the data to farm level data which allows us to explore the impact of farm size on the dynamics of earnings.

A next step is to use the individuals' SNI codes and classify the household into different types of agricultural households: (i) crop, ii) milk, iii) beef, iv) mix, v) forestry, and vi) extension services). Inequality is anlysed by calculating the Gini coefficient and the at-risk-of-poverty rate.

[7]To divide the households on gender, we have to designate the head of family. However, in a gender equal society as Sweden with family tax splitting, designating a head of family is both difficult and outdated.

This study has mainly descriptive ambitions and the findings may be caused by selection i.e. that farmers possess different skills than the general population. In Nordin et al. (2016) it was found that there is positive selection into farming in Sweden. A sibling approach was used to compare the earnings of farm siblings (sharing the same farm background) who choose different career paths – i.e. one sibling chooses farming and the other chooses a non-farming occupation. Because a sibling fixed effect model reported a larger penalty to farming than a OLS model, positive selection into farming is likely. Hence, from the findings in Nordin et al. (2016) the farmers earnings are from a return to farming perspective rather underestimated than overestimated.

It is also important to point out that in this study we, intentionally, use a simple model and choose not to control for other factors (than age). From a living standard perspective this is plausible (a low-living standard is low even if it can be explained by e.g. education), but from a return to farming perspective one could consider controlling for e.g. education. However, since education is an endogenous variable (choosing farming and one's education level is a joint decision) is it ambiguous if controlling for education is the correct choice. Hence, is a low return to farming caused by a low education level of the farmer, or is the education level low because one chooses to become a farmer. Besides, we also favor having the same specification is all comparisons.

## Results

*Household earnings and disposable incomes*

Figure 1 and 2 show, for the period 1998-2012, average household earnings for agricultural households and the total household population. The left y-axis shows household earnings and the right y-axis show the gap in household earnings between agricultural households and the total household population. For the total household population, earnings have increased with

33% between 1998 and 2012, while for agricultural households, earnings have increased with 56% and 53% for households with a male and a female operator, respectively. The larger increase in earnings for agricultural households implies that the gap in earnings between agricultural household and the total household population has decreased with around 12 percentage points between 1998 and 2012. Though difficult to deduce from the figures, female operator households have around 3% higher earnings than male operator households; later we show that this is due to high off-farm earnings for the female operator's spouse.

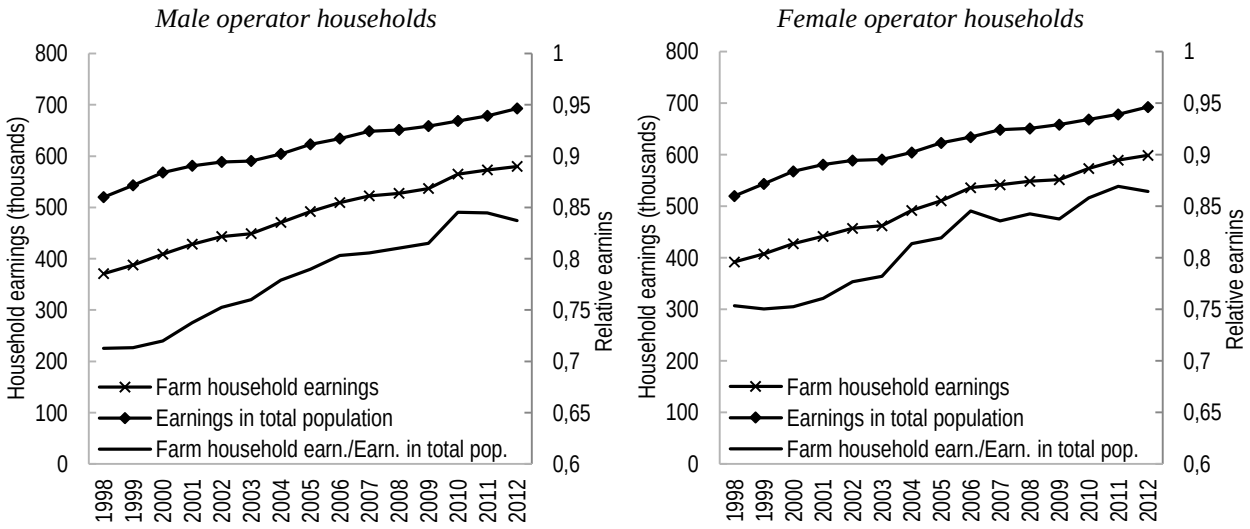


**Figure 1 and 2.** Household earnings for farm household and the total population of households. 1998-2012.

Figure 3 and 4 show the same statistics for disposable income. Disposable incomes are similar for agricultural households and other households – the gap changes from somewhat negative (around 2-5 percentage points lower in agriculture) to somewhat positive (around 2-5 percentage points higher). Thus, whereas the gap in earnings is substantial between agricultural households and other households, even in 2012, the gap in household disposable incomes is small and in favor of agricultural households in 2006-2012. In other words, for the total population disposable incomes are about 20% lower than earnings, but for farm households disposable incomes are about 5% lower in the beginning of the period and similar in the end of the period.

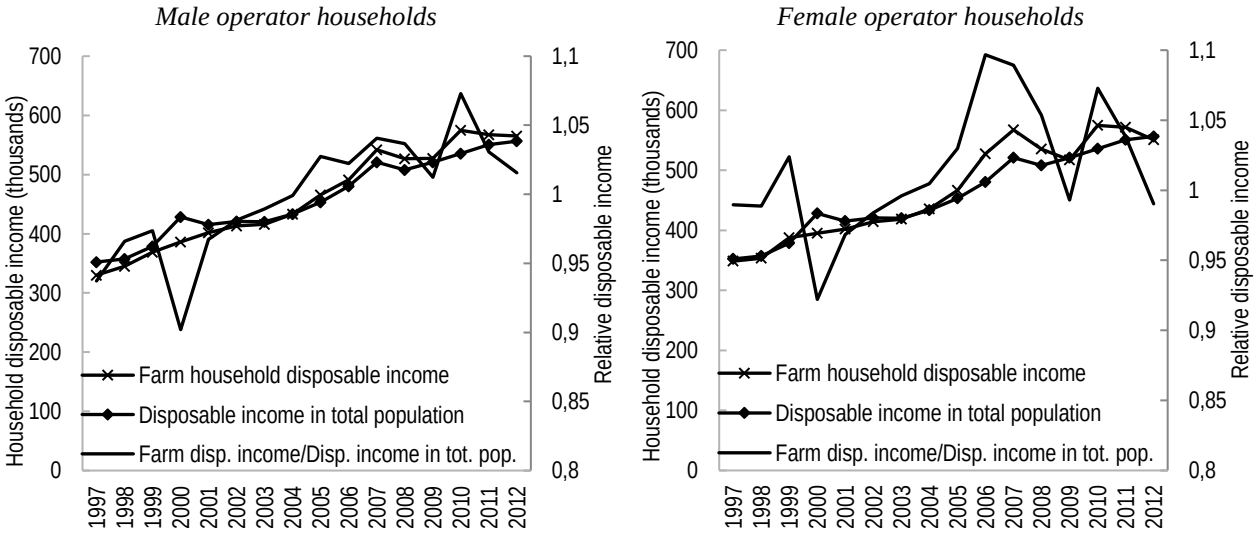


**Figure 3 and 4.** Household disposable incomes for farm households and the total population of households. 1997-2012.

What could explain the agricultural households' relatively high disposable incomes? Compared to earnings, disposable income includes capital returns and non-work related transfers, and deducts taxes. Since farm households possess significant wealth (OECD, 2003), high capital returns might be an explanation. We are able to compare differences in capital returns for the year 2002[8]. In 2002, annual net capital returns were about SEK 5,000 higher for farm households than for the total household population. Farm household net capital returns were in 2002 around SEK 40.000. The gap in household earnings between agricultural household and total household population is, in 2002, around SEK 140,000 (see Figures 1 and 2). Hence, higher capital returns for agricultural households can only explain about 3.5% (SEK 5,000 of SEK 140,000) of the relatively high disposable income for agricultural households (in relation to earnings for agricultural households).

[8]Individual capital returns for the agricultural population is available in LISA for the entire period, but for the total population aggregate capital returns is only available for 2002. The capital returns is collected from a Government proposition (2004). To confirm that the capital returns for 2002 is representative for the entire period we compare total capital taxes, which are available for the entire period, with the return to capital for farm households. Total capital taxes and the return to capital for agricultural show a similar pattern over the period (see Figure A1 which shows, in comparison to 1997, the percentage change in total capital taxes for the total population and the return to capital for farm households).

Moreover, non-work related transfers[9] (mainly child allowance, but also social assistance and housing benefits) are similar for farm households and other households: the non-work related transfers make up about 4.9% (Swedish Board of Agriculture, 2007) and 4.5% (Government proposition, 2004) of the disposable incomes for farm households and the total population, respectively. Our data lacks information on taxes so we cannot investigate the taxes paid by agricultural household. On the other hand, the only remaining explanation to the relatively high disposable incomes for agricultural households is substantially lower taxes. Lower taxes are expected – farmers are able to take out a part of the farm income as income from business activities, which is taxed lower than income from work – but it is surprising to find that it has such a large impact. Thus, our conclusion is that the tax- and the tax deduction system results in a standard of living for farmers that is comparable to the rest of the population.

*Does farm size matter?*

For 70% of the farmers[10] we can match the individual data with farm level data from the Swedish Board of Agriculture. The farm level data is available for the years: 1999, 2003, 2005, 2007 and 2010. Based on the farms' hectares of arable land and their number of animal units, we divide the farms into large- mid- and small-sized farm. Each group contains a third of all farms. Figure 5 shows that large- and mid-sized farms have about 17% and 4% higher household earnings than small sized farms, respectively. The absolute increase in household earnings between 1999 and 2010 is almost the same for large and small sized farms; the relative increase is, however, larger for small farms. For middle sized farms both the absolute and the relative increase in household earnings is smaller than for large sized farms. The findings above

[9]Note: CAP subsidies are recorded as incomes.

[10]To be able to match the individual data with the farm data, the individual's main income has to be from agriculture. For the match sampled, the farm income is 18% higher than for the unmatched sample (i.e. the matched farmers have a somewhat higher agricultural commitment), but, over time, the matched and unmatched farmers earnings develop the same.

are for households with a male operator, but the findings are similar for the total sample of farmers. Also, separate analyses for different production areas in Sweden (northern Sweden, woodlands and flatlands) show similar results as for the aggregate (not reported).

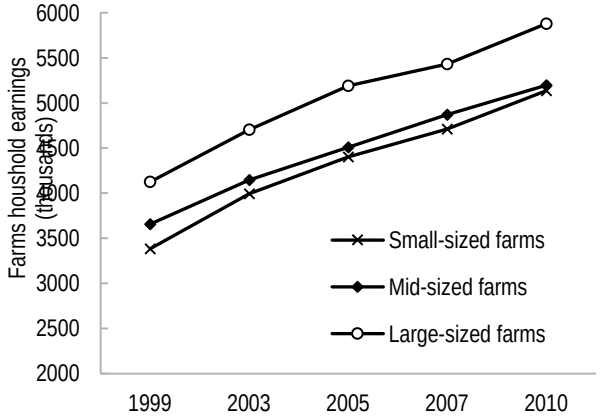


**Figure 5.** Farms household earnings for small- mid- and large-sized farms. 1999-2010.

*Individual earnings*

We divide the sample into male and female operators, with or without a spouse (i.e. if the operator lives in a household containing two adults or if he/she is single). For the total population, the sample is not divided conditional on having a spouse. To have a complete picture of the total household earnings, the children's earnings should have been separately reported as well, but to focus the analysis we merely report that they earn around 8% of the total household earnings and most of the earnings are from off-farm sources.

Figure 6 shows that earnings for male operators with a partner have increased from 68% to 85% of the male population average. For male operators without a spouse the relative earnings have increased from 61% to 77% of the male population average. The earnings of single male operators are around SEK 27,000 lower than for male operators with a spouse; in absolute terms the difference increases over time, but in relative terms the difference is almost the same in 1997 as in 2012. Higher individual earnings for operators with a spouse may be because of selection (the same factors determine earnings and success on the marriage market)

or labour division within households – if the wife devote more time to household work the husband may devote more time to farm or off-farm work.

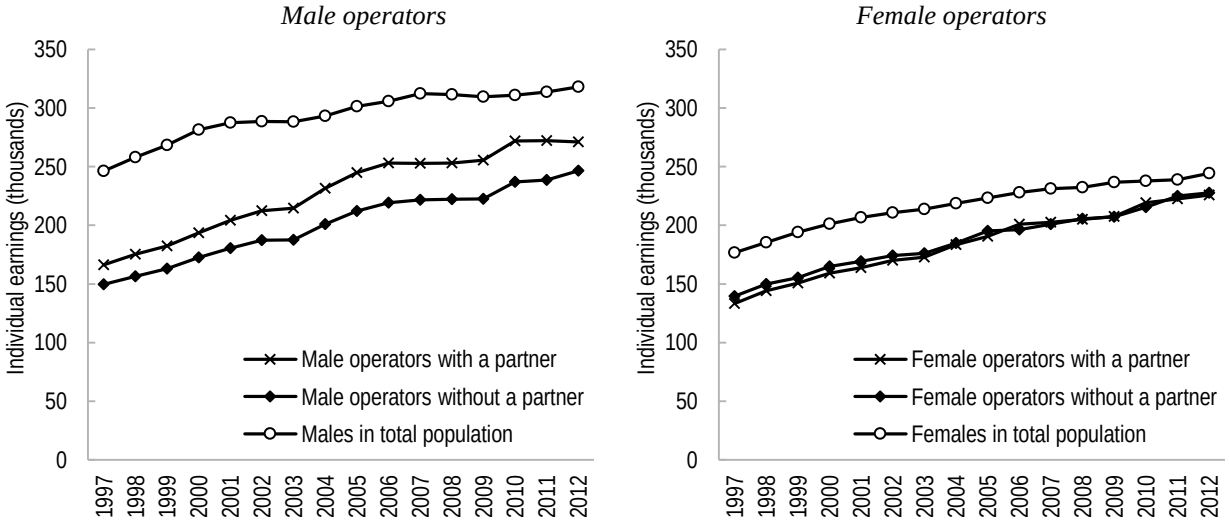


**Figure 6 and 7.** Individual earnings for the total population and farm operators with-and without a partner. 1997-2012.

For female operators (Figure 7), earnings have increased from about 77% to 93% of the female population average. Thus, the gap to the population average is smaller for women and there is no major difference in earnings between female operators with or without a partner.

So far we have not divided the earnings into farm and non-farm earnings. In Figure 8 and 9 we report the household earnings separated into the operator's farm and non-farm earnings, and the spouse's farm and non-farm earnings, for male and female operator households with a spouse, respectively.

First, the relatively large increase in earnings for agricultural households (Figures 1 and 2) can be explained by a large increase in the operator's farm earnings and the partner's off-farm earnings. The annual growth rate in farm earnings is 3.1% and 2.85% for male and female operators, respectively. An even higher annual growth rate is found for the spouse's off-farm earnings, which is around 4%. For the total population the growth rate in earnings is 1.74% and 2.20% for men and women, respectively.

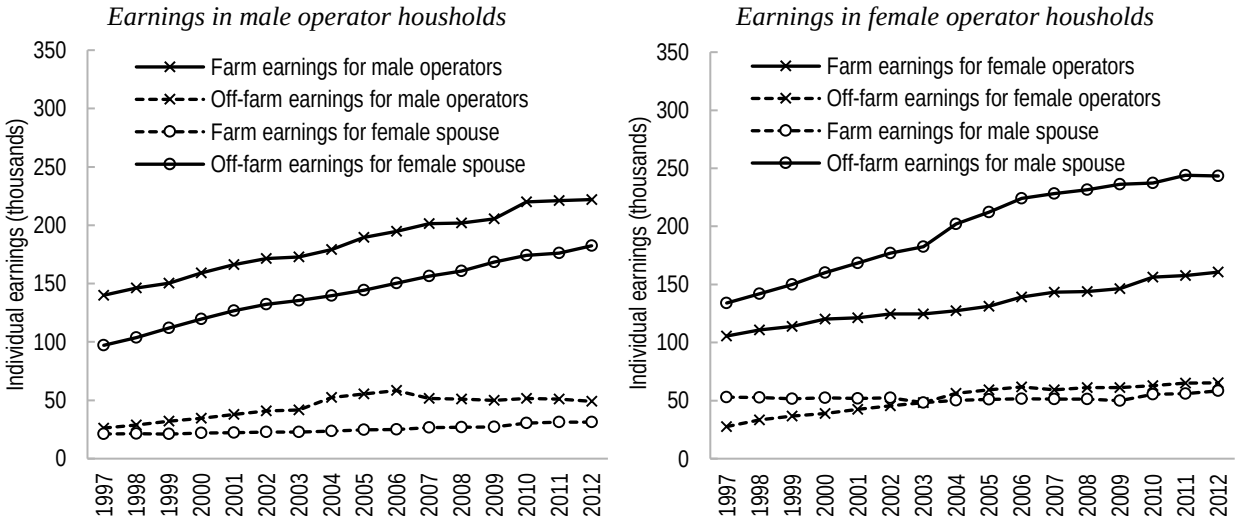


**Figure 8 and 9.** Dividing the earnings into farm and off-farm earnings for operators and their spouses. 1997-2012.

Moreover, in absolute terms, male operators increase their farm earnings with the same amount as spouses increase their off-farm earnings, around SEK 80,000 (Figure 8). This differs from female operator household: Figure 9 shows a much larger absolute increase in the male spouses' off-farm earnings (around SEK 110,000) than the female operators' farm earnings (around SEK 55,000).

The most important findings from Figures 8 and 9 are the low off-farm earnings and the low farm earnings of operators and spouses, respectively. This indicates a clear division of labour within households –operators work mainly on the farm and spouses mainly off-farm. This is particularly clear in male operator households where the spouses' farm engagement is very low. Also, whereas operators' off-farm earnings are increasing – although from a low level – the spouses' farm engagement hardly increases at all.

These last findings are central for understanding the household earnings of Swedish farmers – the low off-farm earnings for operators and the low farm earnings for spouses – indicating that the division of labour in Swedish agricultural households is substantial.

We have also examined if the findings above vary with farm size (Table A2-A4[11]) and found that the division of labour is similar for small- mid- and large sized farms. The main difference is that both the operator's and the spouse's farm earnings (off farm earnings) increase (decrease) with farm size. This implies that for small sized farms the female spouse's off-farm earnings is higher than the male operator's farm earnings – actually, up until 2003 she had higher total earnings than her husband, as well.

*Operator's off-farm labour market supply*

Below, we examine the variation in off-farm earnings and the relationship between off-farm earnings and total earnings for male operators (results for female operators are available upon request). Figure 10 shows household and individual earnings for male operators (with partner) with different engagement in agriculture. The x-axis shows the agricultural earnings as a share of total earnings, i.e. 100% means that the operator lacks off-farm earnings. The bars (measured at the right-hand y-axis) show the share of farmers in each "engagement group".

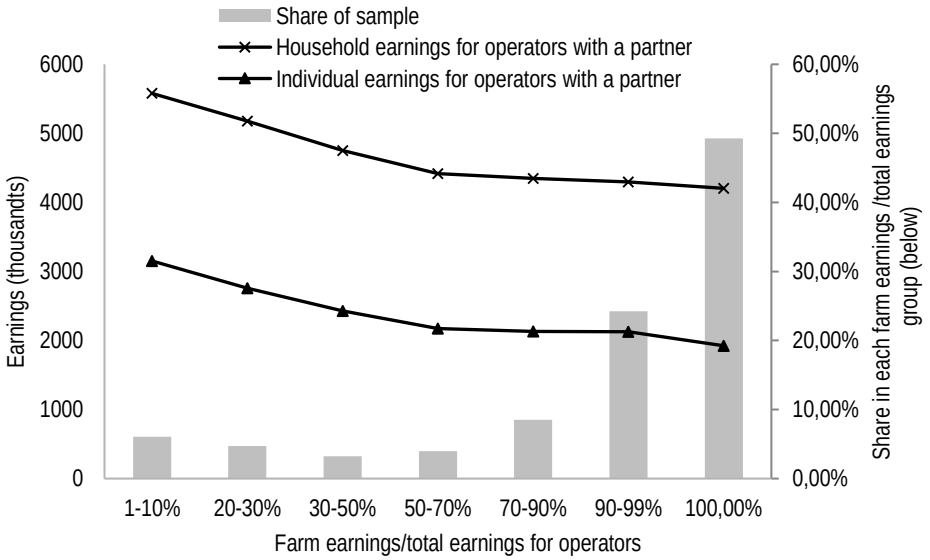


**Figure 10.** The relationship between male operators (with a partner) household and individual earnings and his engagement in farming.

[11]This is done only for male operators with a partner. There are too few female operators with a partner to divide the data on farm size.

Thus, almost 50% of the operators have zero off-farm earnings, and 20% have less than 10% off-farm earnings. A relatively balanced engagement (i.e. 30-70% earnings from agriculture) is rare (only 7% of the operators). For male operators without a partner (not shown), 64% lacks off-farm earnings.

Moreover, Figure 10[12] shows that both household and operator earnings decrease with the engagement in agriculture: operators with 100% farm earnings have around two thirds of the earnings of operators with small farm earnings (i.e. 1-30% farm earnings). Over time the difference decreases somewhat (not reported), but in 2012 operators with 100% farm earnings still have 30% lower earnings than those with a small engagement in agriculture. At the household level, earnings are around 20 to 25% lower for households with operators having 100% farm earnings than for operators with a small engagement.

*Spouses' labour market supply*

Next we investigate the female spouses' labour market supply. Figure 11 shows that around 65% of the spouses have only off-farm earnings and the share has increased with more than 7 percentage points since 1997. Another 5 to 10% are outside the labour force and have zero earnings; about half of these are retired or early retired.

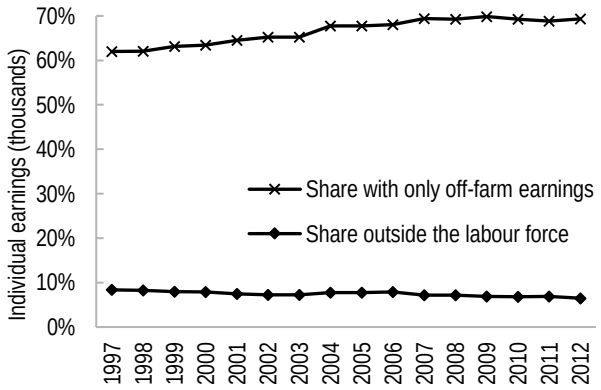


**Figure 11.** The female spouse's labour supply. 1997-2012.

[12]Our results may seem to contradict each other. In Figure 5 we showed that small farms have the lowest household earnings and here we show that farmers with a low engagement have the highest (household) earnings. However, farm size and the engagement level are only marginally correlated. A low engagement is mainly an indication of "hobby farming" and most small farms have a relatively high engagement.

The likely explanation to decreasing farm incomes for spouses is related to investments in higher education. Figure 12 shows that the female spouse is more likely to invest in higher education than the male operator, and that the within household gender gap in higher education increased largely between 1998 and 2012: the gap was 13 percentage points in 1997 and has increased to 22 percentage points in 2012. In comparison, for the total population the gender gap in higher education is about 10 percentage points in 2012. In terms of years of schooling, the female spouse has 1.5 more years of schooling than the male operator. Since education investments generally precede matching at the marriage market, higher educated spouses have probably chosen a career path that makes dual work less likely – a higher education increases the probability of having zero farm incomes with 25% (not reported). Regarding the female spouses' career choice: more than 50% of them work as teachers or in health care.

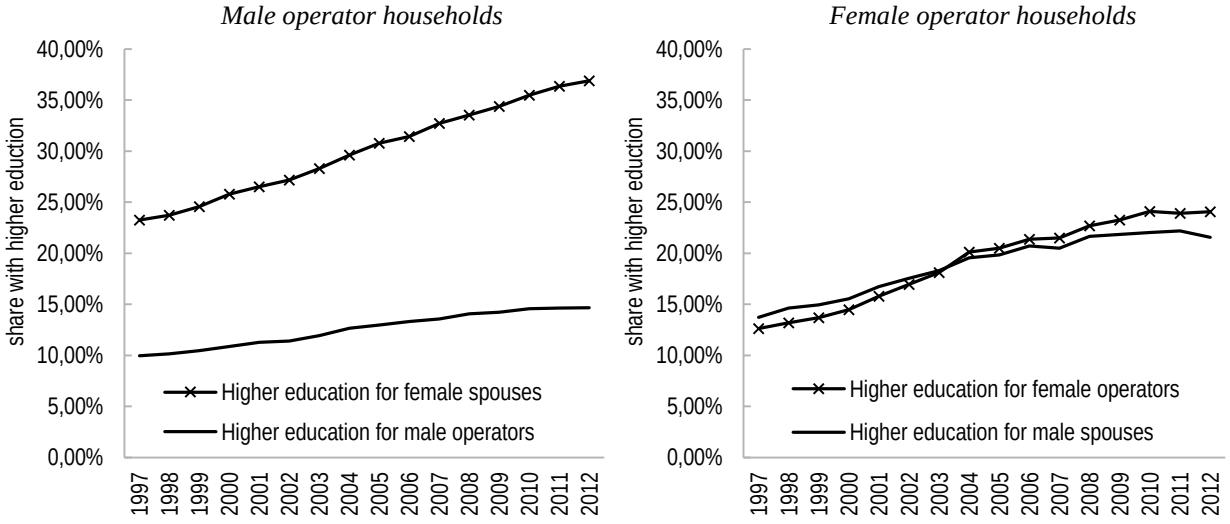


**Figure 12 and 13.** The share with higher education (>12 years of schooling). 1997-2012.

Figure 13 shows the same educational statistics for households with a female operator. Here, the gender gap in higher education is small: only 2.5 percentage points in 2012.

*The incomes in different branches*

Figures 14 and 15 show farm and off-farm earnings for different branches of agriculture.[13] Figure 14 shows that farmers with mainly incomes from forestry have the largest farm earnings. The lowest farm earnings are found for animal/meat farmers. Crop and mixed farmers have also relatively low farm earnings. The largest variation in earnings is found for milk farmers: between 1997-2006 their annual growth rate in earnings was 5.0%, but in 2006-2012 their annual growth rate was only 0.5%. Farmers engaged in extension services have the lowest annual growth rate in earnings, 1.4%.

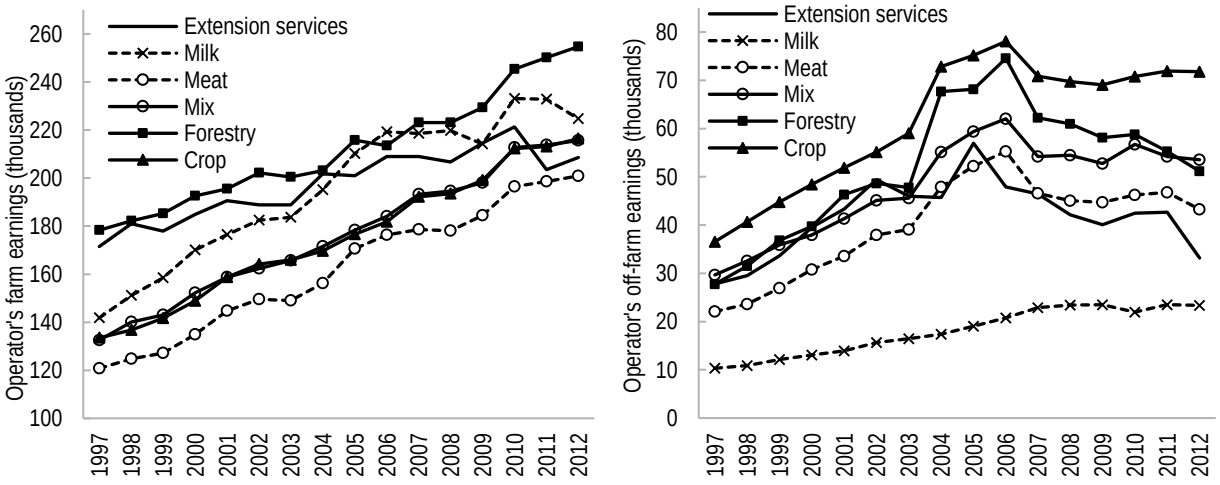


**Figure 14 and 15.** Operator's farm and off-farm earnings for different agricultural branches. 1997-2012.

Figure 15 shows that the large earnings for milk farmers have a negative impact on off-farm earnings: milk farmers have particularly low off-farm earnings. The largest off-farm earnings are found for crop and forestry farmers. Note: in 2004-2006 we see that there are still some "subsidy farmers" in the data (see the data section for an explanation), and these increases the off-farm earnings in 2004-2006.

*Inequality in agriculture*

Income inequality in farming has fallen in the US (Gardner, 1992), and in 1987 the incidence of poverty was for the first time lower among farm household than among non-farm household

[13]A few farms change branch over time (mainly from a mix to a specific branch), then we use the mode branch.

(U.S. Department of Commerce, 1990). Appropriate inequality and poverty data for the EU is not available (Hill, 2012).

Thus, we examine inequality in two dimensions: the Gini coefficient and the at-risk-of-poverty rate. Usually, the Gini coefficient is calculated for household equivalised disposable income. This means that the household disposable income is divided by the number of 'equivalent adults', using a standard (equivalence) scale.[14]

Figure 16 shows the Gini coefficient in household equivalised disposable income for farmer households and the total population. For farmer households we also show the Gini coefficient in household equivalised earnings. As in most other European countries (Roine and Waldenström, 2015), inequality in the total population has increased in Sweden: for 2006-2012 the Gini coefficient is about 7% higher than around the turn of the millennium.[15] An increase in the earned income tax credit in 2006 is the main explanation to the increase in the Gini coefficient. For farming households there is no visible trend in the Gini coefficient for equivalised disposable income, it fluctuates around 0.33. Thus, in 2007-2011 overall inequality in Sweden is about the same as inequality within the farming population.

For household equivalised earnings, the Gini coefficient is decreasing for farming households. We lack the Gini coefficient in household equivalised earnings for the total population, but Bengtsson et al. (2014) reports that it is stable over the period.

[14]SCB 's gives the following weights to the members of the household: 1.0 to the first adult; 0.51 to the partner; 0.6 to each subsequent person aged 19 and over; 0.52 to the first child aged under 19, and 0.42 to each subsequent child aged under 19.

[15]The Gini coefficient for the total population is without an age restriction, but Bengtsson et al. (2014) shows that the Gini coefficient is similar for the entire population and the working population.

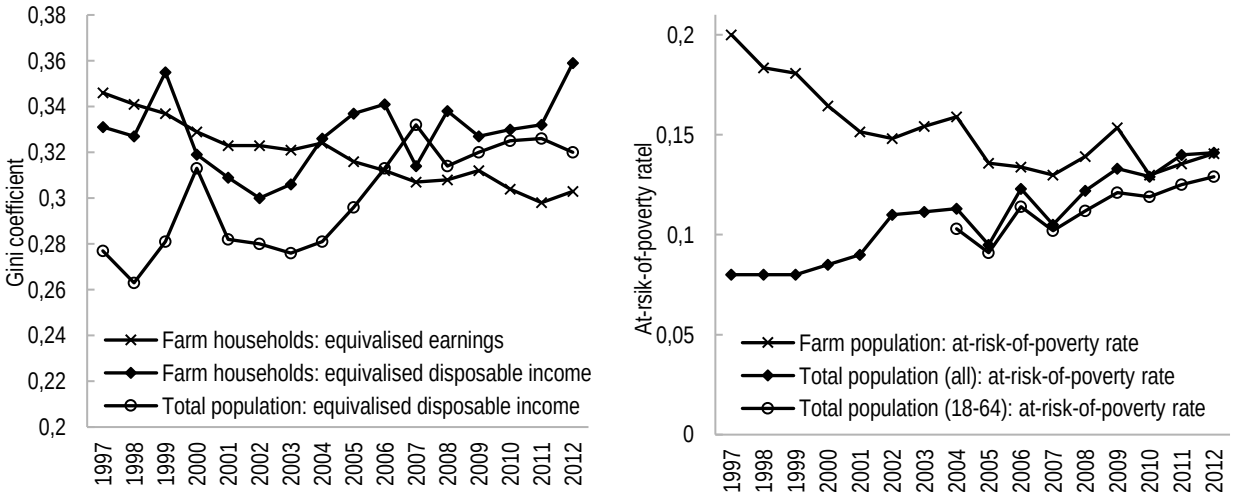


**Figure 16 and 17.** The Gini coefficient and the at-risk-of-poverty rate.1997-2012.

The at-risk-of-poverty rate is the share of people with an equivalised disposable income below a standard threshold, which is set at 60% of the national median equivalised disposable income. Since we use the yearly national median, it is the *relative* at-risk-of-poverty rate that is calculated, not the *absolute* which uses the national median for a base year. Figure 17 shows the at-risk-of-poverty rate for the total and the farmer population. Before 2004, the at-risk-of-poverty rate for the total population is only available[16] for all ages, but Figure 17 shows that the rate is similar for the working population (here 18-64) and all ages after 2004, particularly for the period 2004-2007.

Figure 17 shows a clear difference in trends for the farming population and the total population; whereas poverty increases in Sweden in general, it decreases in the agricultural population. The different trends imply that the rate is almost the same in the total as in the farming population in 2010-2012, around 13-14%. To test if the decreasing poverty rate in farming is due to retirement of low income farmers, i.e. due to a cohort effect, we calculate the at-risk-of-poverty rate for the age group 20-55. However, for the age group 20-55, the decrease in the at-risk-of-poverty rate is almost the same as in Figure 17.

[16]The at-risk-of-poverty rate is taken from the Eurostat database.

## Conclusion

A main contribution of this study is that we have farm and off-farm earnings for all farm household members, which other European studies lack, and only a few US studies have.

The difference in earnings between the farm and the total household population has decreased with around 12 percentage points between 1998 and 2012 and is around 15 percent in 2012. For farmers without a partner the earnings are particularly low.

However, farm household's disposable incomes are similar to those of the total household population. The relatively high disposable incomes for farm households are not due to high capital returns or high non-work related transfers, but rather a favorable tax system. Thus, from a living-standard perspective farm household do well, but from a return to farming perspective farming is still a low paid occupation.

Nevertheless, the returns from farming have increased substantially since the end of the 1990s (measured as the operators farm earnings), but the large increase in farm household earnings is equally caused by higher off-farm earnings for the partner. The partner seems to choose a career path that makes dual work less likely; partners' relatively high education reduces the probability of having farm incomes. Hence, there is a clear division of labour within households – the operators work mainly at the farm and the spouses work mainly off-farm. When examining farm earnings from a household perspective we implicitly assume that the farm and the family are the same unit of observation, but our findings show that the farm and the family are, often, two distinct units. Finally, whereas inequality in Sweden has increased, within-farming inequality has either decreased (household equivalised earnings) or remained stable (household equivalised disposable income) over the period. Also, the at-risk-of-poverty rate has decreased in the farming population.

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## Appendix

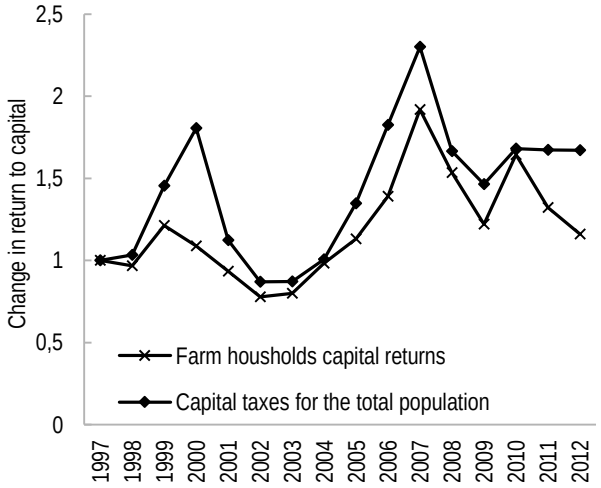
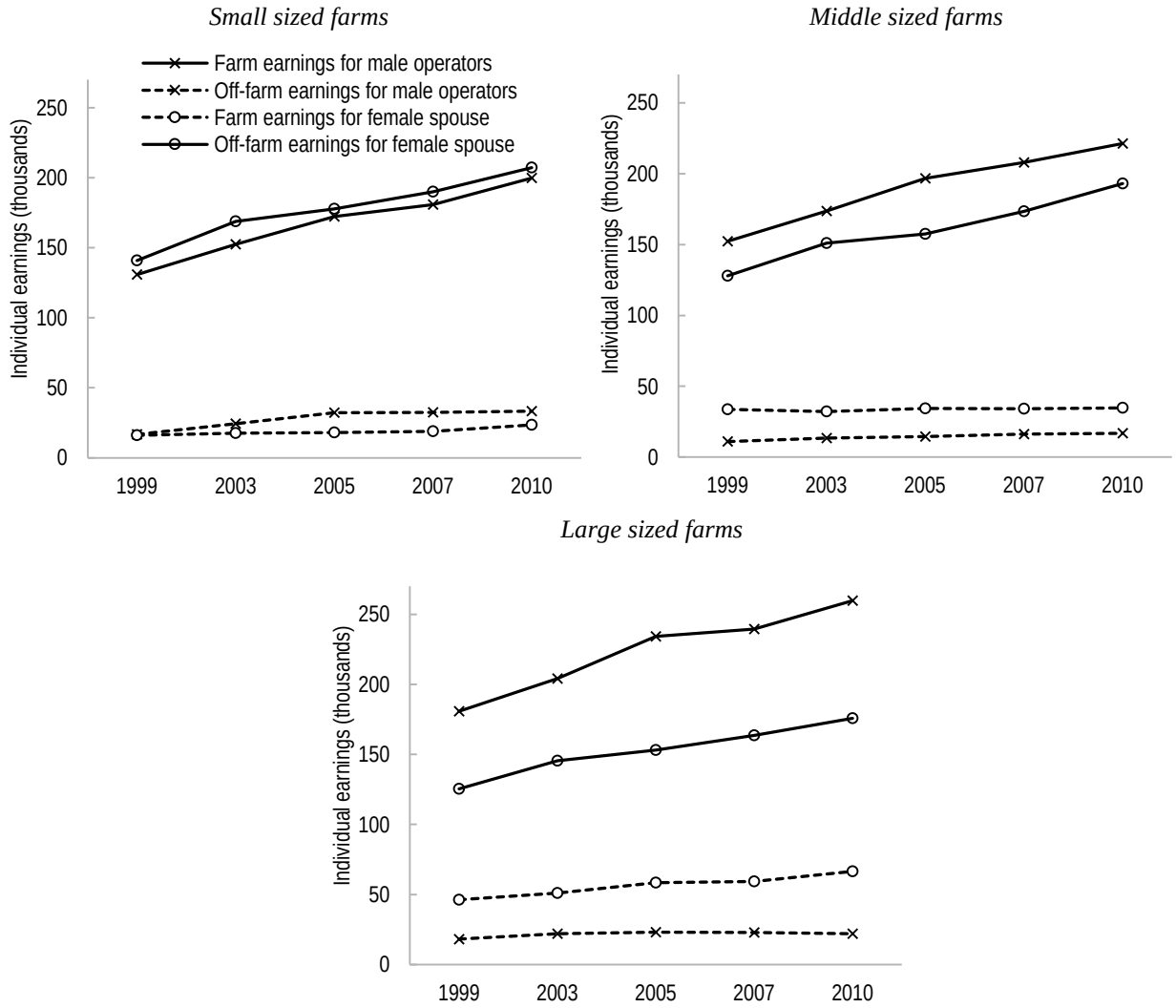



**Figure A1.** Change in capital returns for farm households and change in capital taxes for the total population. 1997-2012.




**Figures A2-A4.** Dividing the earnings into farm and off-farm earnings for operators and their spouses. For small- mid- and large-sized farms.1999-2010.