

4.4. Agricultural income: concepts and developments

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4.4.1. Introduction

Article 39 of the Treaty of Rome, the wording of which has been transposed into the Treaty on the Functioning of the European Union,¹ states that one of the objectives of the CAP (Common Agricultural Policy) is to ensure a fair standard of living for the agricultural population, especially with the increase in the individual income of agricultural workers. This initial objective was restated in Agenda 2000 by the European Council as follows: Ensuring a fair income for farmers. The 2013 reform also focused on agricultural income, in line with the goal of sustainable food production, thus helping to ensure a fair standard of living for farmers.² The future CAP (2021-2027) focuses on nine general objectives, among which is the support of sustainable agricultural income (European Commission, 2018).

4.4.2. Statistical framework for income in the agricultural sector

Assessing farmers' incomes is a key element of EU agricultural policy, aiming to ensure a fair standard of living for the rural community, thus helping farmers cope with the risks posed by their business. For the measurement of income, the Commission is based on two main statistical tools (statistical sources): first, the Economic Accounts of Agriculture (EAA), a key tool for analyzing the macroeconomic situation of a country's agricultural sector as well as for comparing countries, and, second, the Farm Accountancy Data Network (FADN), a micro-economic tool whose target is to evaluate the income and business activities of commercial agricultural holdings.

In the EAA, we have defined the following measures: Production minus intermediate consumption, minus the consumption of fixed capital is the Net Value Added (NVA). The NVA minus workers' compensation, minus other taxes on production, plus other subsidies

on production, minus the interest paid, minus the rent paid is the Net Entrepreneurial Income.

Based on these measures, three indicators emerge:

Indicator A: Index of real income of factors in agriculture per annual work unit (AWU). This is calculated by taking the NVA at basic prices shown in the production account and adjusting it by adding "other production subsidies" (containing direct payments), subtracting "other taxes on production", and dividing by the labor input and expressing a deflated and in index form. The NVA in this form is referred to as the factor cost. It measures the remuneration of all factors of production (land, labor, capital) used.

Indicator B: Index of real net agricultural entrepreneurial income per unpaid annual work unit. This is suitable for countries where agriculture is almost entirely organized on non-corporate farms (family holdings). It counts the compensation for paid family work, owned land and equity capital.

Indicator C: Net entrepreneurial income of agriculture. This is given in absolute terms, but can also be expressed as an index. It is important that it is not calculated per unit of unpaid work and thus is suitable for uses involving countries where production from corporate holdings is an important part of the total.

It is clear that the approach taken to each of the indicators is essentially an attempt to measure the remunerations of the factors of production. Indicator A is far from the personal income of the agricultural community (unless there is no borrowing, no land rent, no employment and no other source of income for the household). While entrepreneurial income generally coincides with what can be considered as profit, it relates only to that which comes from agricultural activity and excludes that which may come from other activities that continue within the agricultural enterprise (OECD, 2015).

The above aggregate indicators cannot, by definition, describe developments in subgroups (economic size and specializations of holdings). Such an analysis must be carried out using the data at the level of holdings from FADN.

At the microeconomic level, the two main sources of information on agricultural incomes are agricultural accounting surveys and rural household budget surveys.

1. Official Journal of the European Union C326/26, 10.20.12.

2. See the preamble of Commission Regulation (EC) No1308/17.12.2013.

This article will describe the approach of the concept of agricultural income based on FADN.

At the EU level, surveys of agricultural accounts in all member states are focused on the coordination of the Directorate-General for Agriculture and Rural Development (DG AGRI) as an accountancy data network (FADN). It was founded in 1965 with the specific aim of obtaining data that allow for income changes in the various categories of farms that need to be properly monitored.

FADN's rationale was based on the policy that "...the development of a common agricultural policy requires the availability of objective and relevant information on income in the various categories of agricultural holdings and the business operation of holdings falling into categories requiring special attention at the Community level" (EEC Regulation 79/65). Therefore, FADN

is not a survey, but a fusion of national surveys conducted by member states.

At EU level, FADN collects data on agricultural activities and provides two main measurements of income: a measure of the NVA of the farm expressed by type of holding or per AWU (i.e., the total value of production minus the intermediate consumption and depreciation plus subsidies and taxes) and Net Agricultural Income (NAI) or Family Farm Income (FFI) (i.e., the NVA of the holding minus wages, rents and interest paid).

FFI is often expressed per AWU of unpaid (family) work, including farming, in order to reflect the various amounts of family work used. It is a very useful measure because, firstly, it represents what would generally be accepted as income from agriculture and, secondly, excluding the employed workforce, it covers

FIGURE 4.4.1
Comparison of NVA/AWU versus Index A (2010=100)

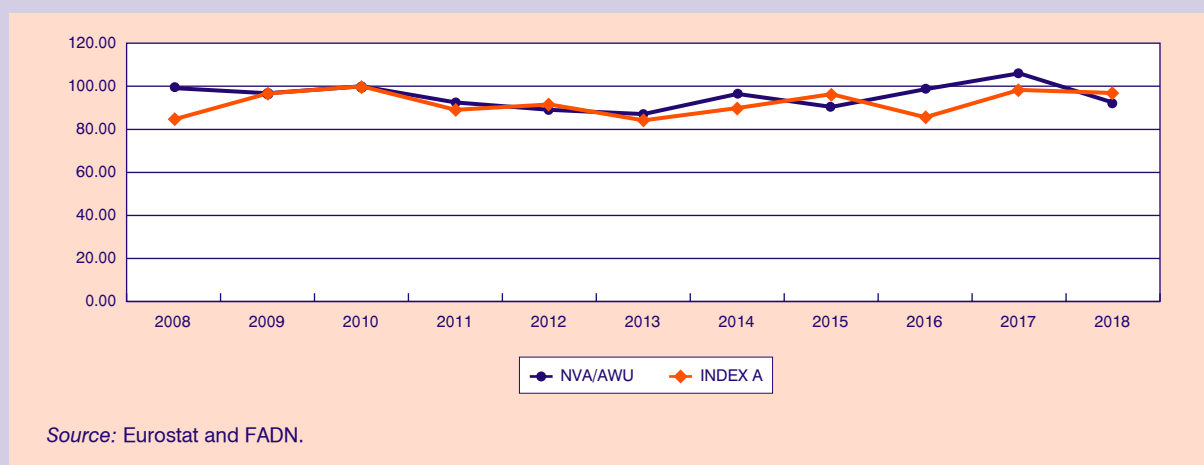
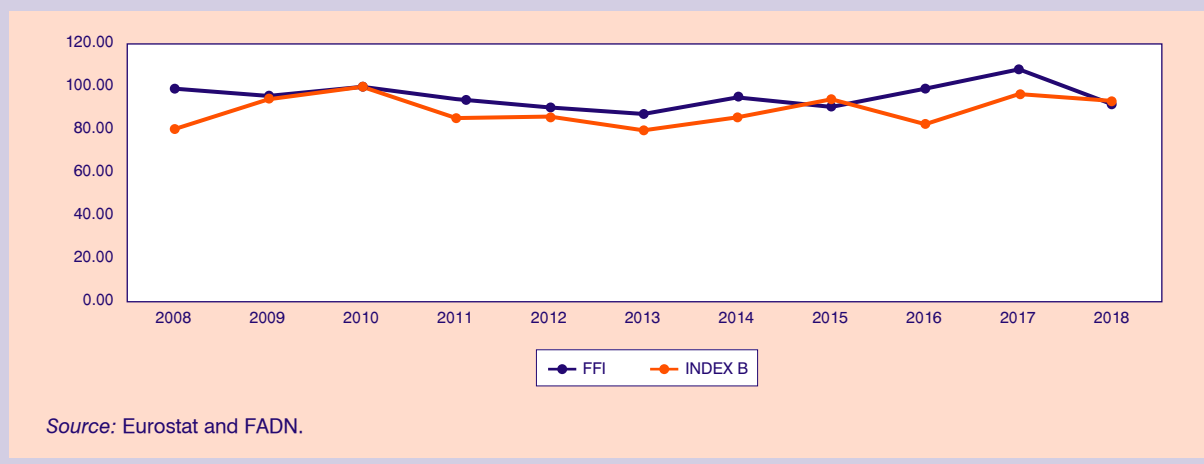


FIGURE 4.4.2
Comparison of FFI versus Index B (2010=100)



only those affected by the CAP, a practice that mainly targets farmers and their families.

FFI is theoretically close to the entrepreneurial income of the EAA and, when expressed per unit of family work, is close to indicator B.

Below, we will compare the income indicators from the two different data sources for Greece, and this will be done between the income³ indicators we mentioned:

- FADN: NVA/AWU compared to Index A (EAA);
- FADN: Family Farm Income (FFI) of unpaid labor compared to Index B (EAA).

From the comparisons of Figures 4.4.1 and 4.4.2, we observe that the two series follow the same trend in the period 2009-2013, making both major reductions due to the economic crisis. In Figure 4.4.1, NVA/AWU and index A decreased by 10% and 13%, respectively, and in Figure 4.4.2, FFI and index B decreased by 9% and 15%, respectively. After 2014, the series show opposite trends: indices A and B increased by 8% and 9%, respectively, while NVA/AWU and FFI decreased by 4% and 3%, respectively. In the decade 2009-2018, indices A and B increased by 14% and 16%, respectively, while NVA/AWU and FFI decreased by 7%. In conclusion, the two statistical sources that measure agricultural income give different results in terms of annual changes. However, it is common in the empirical applications that refer to the whole agricultural

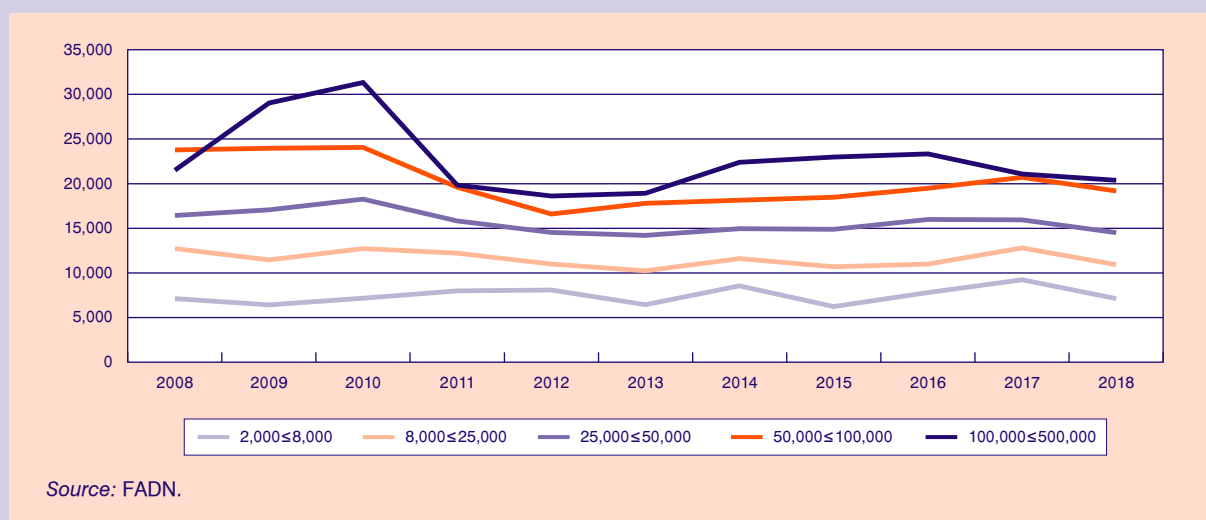
sector of a country to use the indicators from the EAA, while, as we will present below, in holdings level and economic size, they use the FADN database. FFI is the preferred income concept because it corresponds more to the concept of profit from agriculture that is available to support the living standards of farmers (OECD, 2015).

4.4.3. Size of agricultural holdings

When examining the economic size of the holdings, it is important to keep in mind that the scope of observations of FADN does not cover holdings under 2,000 euros of standard output. Having this in mind, it is clear, however, that there is a strong relationship between the size of farms and the level of income generated (OECD, 2015). This is evident in Figures 4.4.3 and 4.4.4, which illustrate that both NVA/AWU and FFI increase according to size, with large farms (€100,000 ≤ €500,000) having the highest income level. Also, large farms, as we will examine below, show greater income variability because they are highly dependent on hired labor.

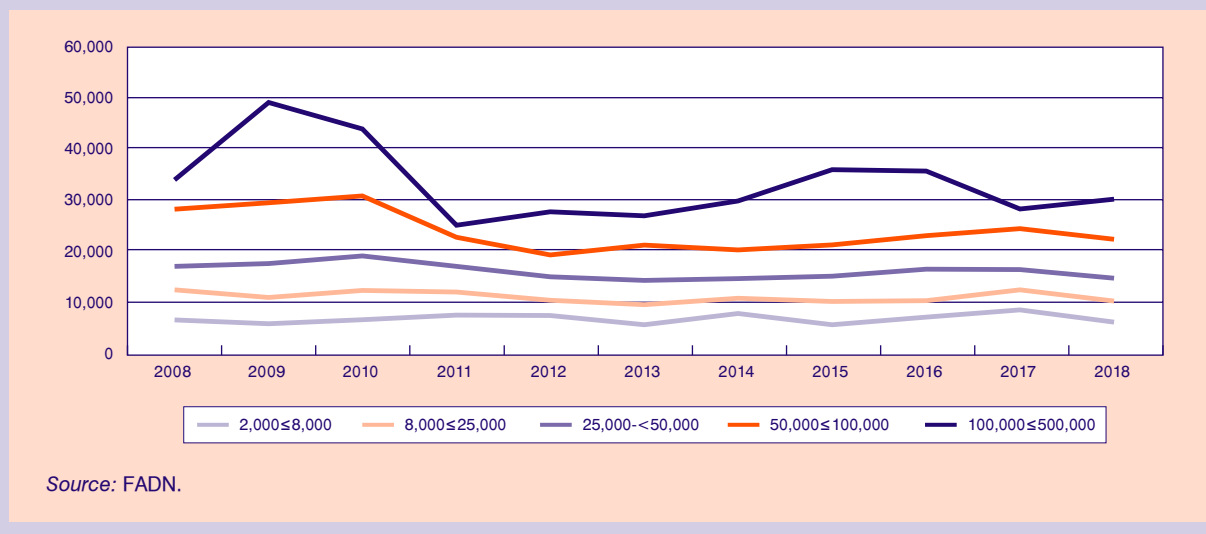
During the period 2009-2018, both indicators showed reductions in all categories of holdings except very small holdings (2,000 € ≤ 8,000 €), where there was an increase of NVA/AWU and FFI by 11% and 5%, respectively. A larger decrease (38%) is presented in the FFI of large holdings (100,000 € ≤ 500,000 €) and

FIGURE 4.4.3
Evolution of NVA/AWU per size classes, 2008-2018



3. In the EAA, the income indicators are expressed in real terms, while in FADN, these are expressed in nominal terms. For comparison, we have converted the FADN data into real terms using the consumer price index.

FIGURE 4.4.4
Evolution of FFI per size class, 2008-2018

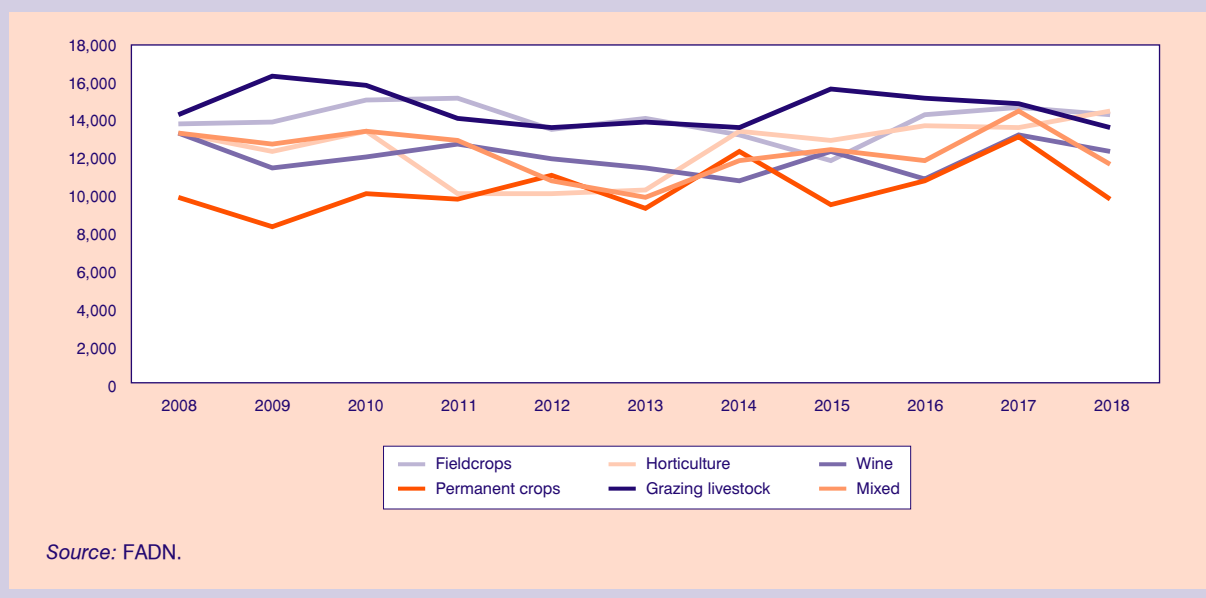


a respective decrease (30%) in NVA/AWU. In the period 2009-2013, all holdings show reductions in both income indices, with the largest one being in large farms. From 2014 onwards, there was a decrease in FFI in very small and medium/small farms by 21% and 5%, respectively, while the medium/large farms increased FFI by 10%.

4.4.4. Types of agricultural holdings

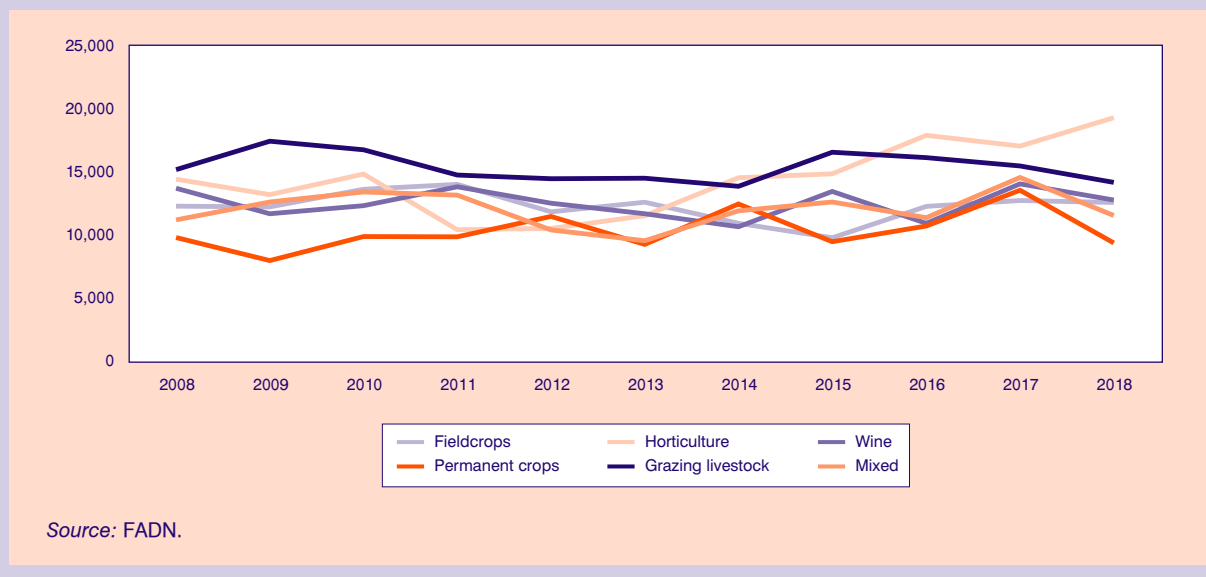
Figures 4.4.5 and 4.4.6 show the NVA/AWU and FFI, respectively, by crop type using the FADN classification (T8).⁴ Based on both income indicators, grazing livestock have the highest income with an average of €15,000, and permanent crops the lowest, with

FIGURE 4.4.5
Evolution of NVA/AWU per type of holdings 2008-2018



4. The classification of European Regulation 1242/2008 includes eight general categories of holdings: 1. Fieldcrops (cereals, oilseeds, protein, rice, tobacco, cotton), 2. Horticulture, 3. Wine, 4. Other permanent crops (olive growing, fruit trees, citrus), 5. Milk, 6. Grazing livestock (cattle, goats), 7. Granivores (pigs and poultry) 8. Mixed crops.

FIGURE 4.4.6
Evolution of FFI per type of holdings 2008-2018



an average of €10,000. During the examined period, both income indicators showed large reductions in mixed farms and grazing livestock with 19% and 8% in FFI, respectively, and with 17% and 8% in NVA/AWU. However, horticulture showed the largest increase of FFI, by 46%, and 18% in NVA/AWU. During the period 2009-2013, only fieldcrops and permanent crops showed an increase in both indicators. According to FFI, after 2014, the permanent and mixed crops showed a decrease in income by 25% and 3%, respectively, while all the remaining crops had a large increase in income, such as horticulture 33%, wine 20% and fieldcrops 15%.

4.4.5. Agricultural income volatility

Agricultural incomes are volatile due to fluctuating yields and input and output prices. Yield variability is mainly related to weather, pests and diseases, while commodity prices are set internationally, based on annual global production, changes in demand and stocks, and other market factors, which are hardly affected by individual farmers' decisions.

Income volatility is higher in some agricultural sectors than in others. One reason for this may be the dependence of the farm on certain specific inputs, such as compound feedingstuffs for granivores and energy for horticulture. Fluctuations in the prices of these inputs

result in large changes in the income of these sectors rather than others, such as granivores and fieldcrops. Apart from this, differences in income volatility between farms are also caused by income margins. In general, the most specialized large farms have a smaller margin than the traditional family farms. Such farms with a high percentage of labor (horticulture, granivores) have greater variability than the smaller ones (Vrolijk et. al., 2009).

To measure the volatility of income in Greek holdings, we use the Coefficient of Variation (CV),⁵ where the higher the CV, the greater the relative variation from year to year. The analysis is performed for size classes (Figure 4.4.7) and by type of holdings (Figure 4.4.8). In general, there is not a high degree of variability in either case, with a maximum value of CV: 0.20. In Figure 4.4.7, higher income volatility is observed for large holdings and less for medium/small holdings, according to Vrolijk et. al. (2009). However, the categories of medium-sized holdings show the same volatility.

Regarding the type of crops, high income variability is observed in horticulture due to seasonality and perishability, while fieldcrops have less volatility in crop production.

Also grazing animals holdings have the lowest income instability due to support from the CAP through the coupled aid.

5. It is defined as the standard deviation to the mean.

FIGURE 4.4.7
Coefficient of variation per size class

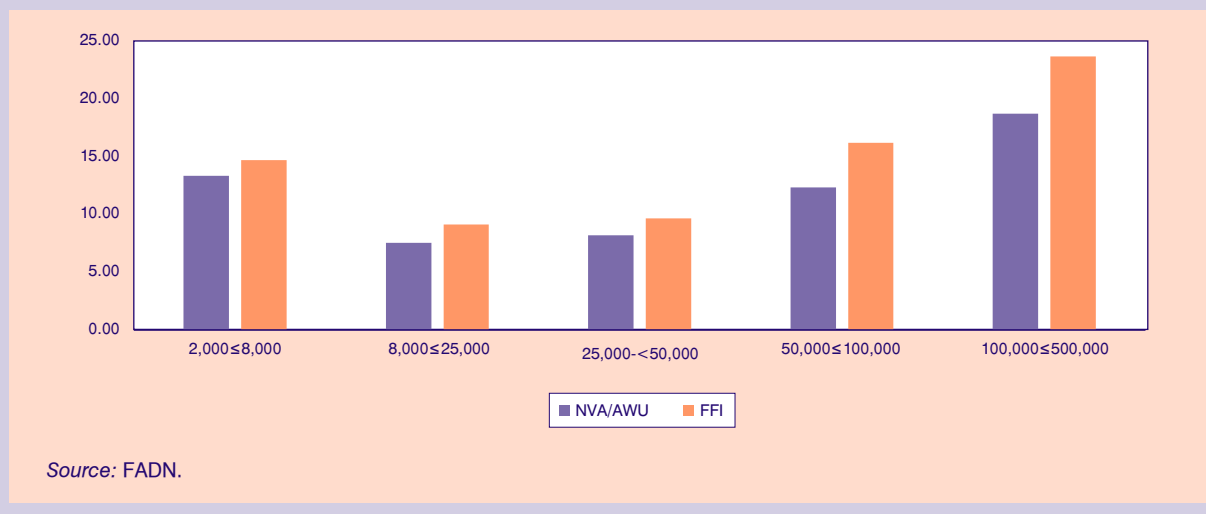
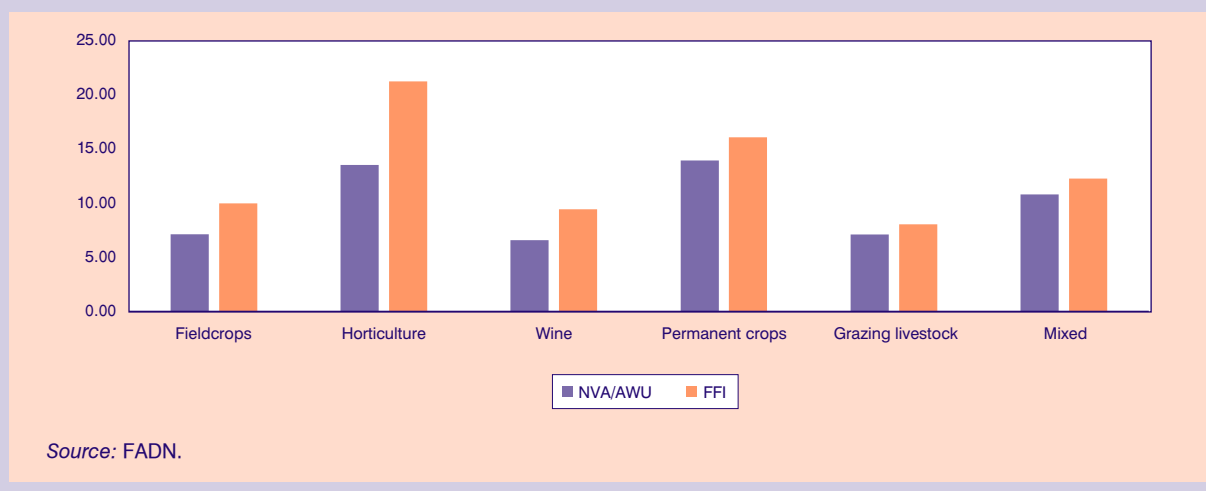


FIGURE 4.4.8
Coefficient of variation per type of holdings



4.4.6. Conclusions

The main statistical sources available for the valuation of incomes in the agricultural sector are the EAA (indicators A and B) and the FADN (NVA/AWU and FFI). EAAs are the main source for analyzing the macroeconomic situation of a country's agricultural sector and the change in income. The FADN is an important source at the microeconomic level, which aims to assess the incomes and economic activities of agricultural holdings. In the above analysis, we examined the evolution of agricultural income in Greece during the period 2008-2018, according to the two approaches of calculating income, (NVA/AWU and index A) and (FFI and index B), where they provided opposite results in

terms of annual fluctuations of income. Therefore, we conclude that at the country level, the two sources are not comparable; we prefer the use of EAA and, especially, index A. However, over time, indicators A and B move in a similar way. The analysis suggests that there is a strong correlation between FADN-based income and the economic size of farms. Very small farms have the lowest income, and this increases with the size of the farms. Also, the income differs between the different types of farms, with horticulture having the highest income and permanent and mixed crops having the lowest. Income volatility is high mainly in horticulture, permanent crops and mixed farms. There is a steady income for grazing livestock due to their dependence on the CAP through direct payments. For eligible farm-

ers, direct payments⁶ contribute to stability by ensuring a stable source of income, while other CAP measures strengthen the stabilization of agricultural incomes, such as diversification and risk management tools.⁷

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6. Commission Regulation EC(1307/2013).

7. Commission Regulation EC(1305/2013).