

The economic impacts of direct payments on agricultural income – A Literature Review

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The economic impacts of direct payments is a widely studied field in the literature related to the Common Agricultural Policy. This article aims to provide a systematic review of the income-related impacts of direct payments. In doing so, the article screened the academic literature on the impacts of direct payments and identified 150 relevant ones, out of which 41 were written directly on income-related effects. Relevant articles can be classified into four groups: general, distributional, stabilisation and other impacts. Most of the literature criticised the ongoing system of direct payments and their effectiveness in producing income-related policy goals. We believe that our results can be useful for researchers and policymakers in better understanding the income-related impacts of direct payments.

Keywords: CAP, impact, income, agriculture, direct payments

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1. Introduction

The Common Agricultural Policy (CAP) is one of the European Union's key policies, using its diversified support system and market regulation instruments to encourage the development of the European agricultural economy, the catching-up of rural areas, and the achievement of certain environmental and climate protection objectives.

CAP resources accounted for about 36% of the EU budget in 2018. The most significant of the CAP subsidies are the so-called direct payments, which are

generally available to farmers based on the size of their land or livestock. Direct payments are income supplement measures aimed at strengthening agricultural production, stabilising farmers' incomes, contributing to the production of safe food, and compensating farmers for the production of certain public goods (such as nature and countryside conservation, care).

In the 2018 grant year, a total of €41.74 billion of CAP direct aid was disbursed to 6.38 million beneficiaries across Europe. These figures well reflect the importance of direct payments in the life of the European agricultural economy. The subsidies have also had a significant impact on agricultural activity in Hungary since the 2004 accession.

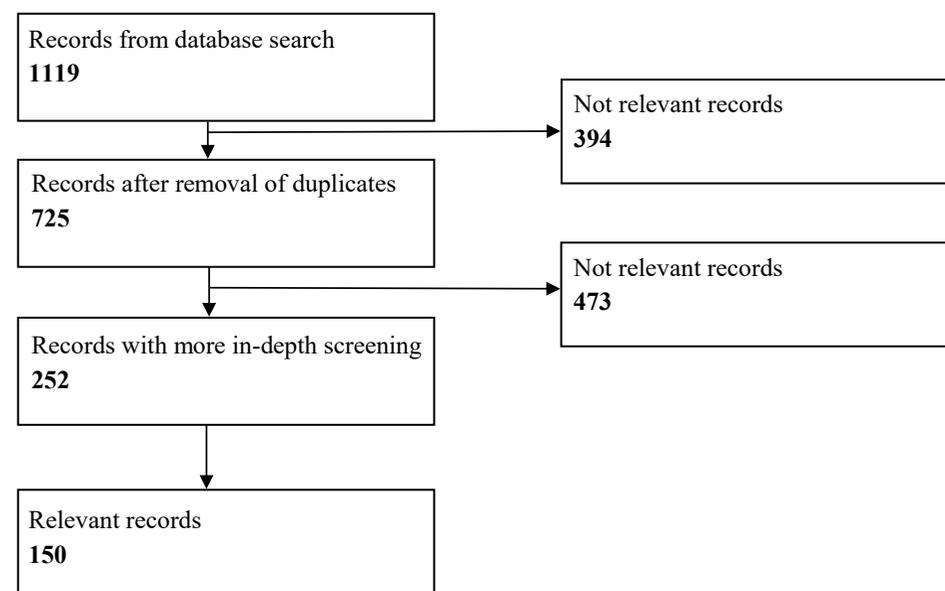
This paper aims to review the economic effects of CAP direct payments on agricultural income, through the review of the scientific knowledge accumulated in this field. The research articles in question are categorised and presented thematically by the type of economic effects they seek to explore.

The paper is structured as follows. The second chapter shows our methodology in collecting the articles, while the third chapter shows our results by different categories. The last chapter concludes.

2. Methodology

To get a complex picture of the income effects of direct payments, an online search was conducted using the Web of Science and Scopus databases. We first started with a broader picture searching for the economic impacts of direct payments. Our keywords were “direct” and “payment” and “impact” - these search items had to appear in the title, abstract, or keywords of the sources. The initial search resulted in 1119 findings, and after removing duplicates, 725 entries remained. The Covidence software was used to ensure that only relevant articles were included in the final analysis. Both authors have read and evaluated the abstract of each article and classified them into three categories: “yes”, “maybe,” and “no”. If both authors gave “yes” to an article, it became part of the review (with two “no” answers, it was excluded). In any other possible cases, the authors personally discussed why and on what basis an article should be part of the review. The whole screening process is illustrated in Figure 1. All articles were screened independently by each author, and possible conflicts were then discussed personally. In the end, 150 articles remained.

Figure 1: Process used to identify studies written on the economic impacts of direct payments

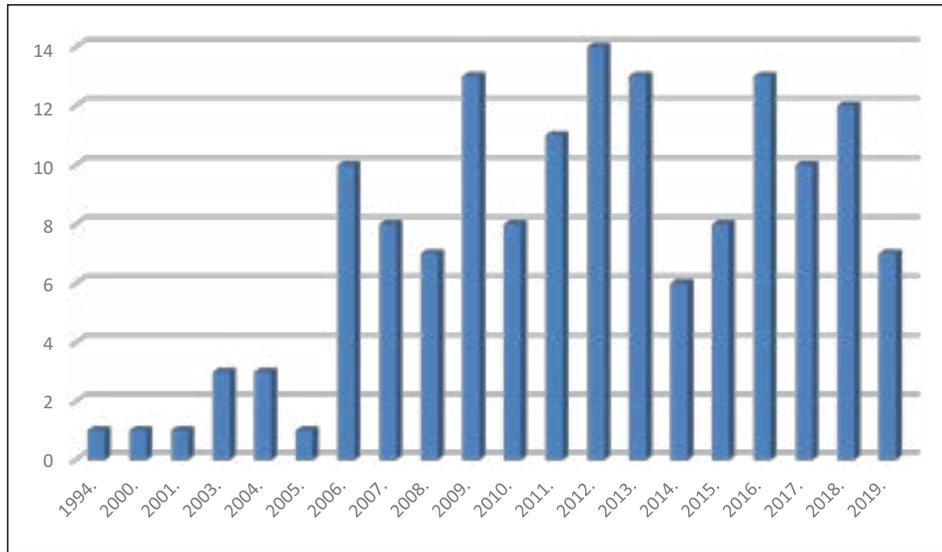


Source: Own composition

We needed to be strict and consistent in our selection. A vast number of articles have been written on the topic with only marginal relationships with direct payments, consequently omitted in the end. There was also much general reflection on agricultural policy among the articles on the expected impacts and challenges, but these were not focusing on the topic either. There have also been many articles on the reforms of the Common Agricultural Policy, which we also did not consider to be relevant. Besides, there were articles in the search results that did not specifically address economic but environmental or sustainability impacts, which was also not part of the topic in the narrower sense.

By analysing the descriptive statistics of the studies, it turns out that the topic is analysed by relatively up to date studies. Most studies were written in 2012, with a growing interest in time, especially after 2006 (Figure 2). Overall, the figure is a good reflection of the ongoing scientific interest in the topic, confirming the scientific relevance of the topic.

Figure 2: Relevant literature by publishing year

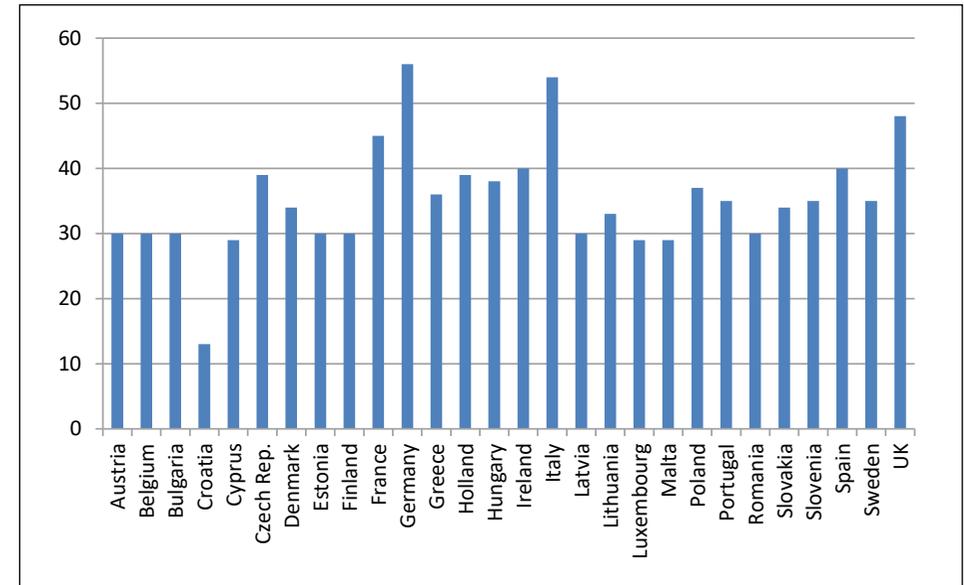


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Countries covered by the studies are observable in Figure 3. The variance in the number of countries examined is not unusually large, since a significant proportion of the articles contain findings for all Member States or a larger group of Member States. An average of 35 articles deals with a given country (of course, it should be borne in mind that an article may deal with several Member States where appropriate). There was an unusually high level of interest in Germany, Italy, the United Kingdom, and France in the articles examined, but the number of articles analysing Hungary was also above average. Based on all this, it can be said that the studies included in the literature review provide a balanced, complete picture of all the Member States of the European Union regarding the topic.

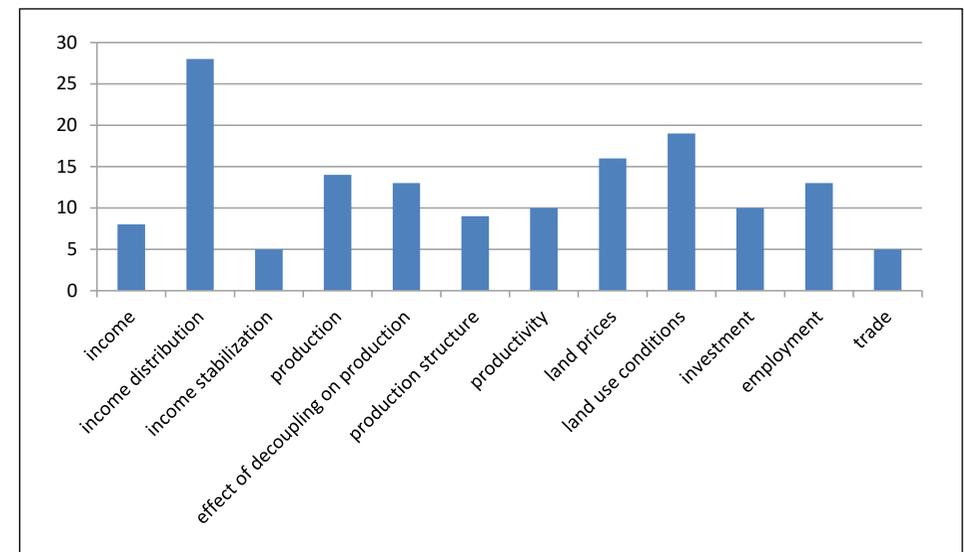
Regarding the topics of the articles written on the economic impacts of direct payments, we made a coding without any predefined categories. When we processed half of the literature items, we reviewed the categories, consolidated them, filtered out duplications, and continued working based on them. Figure 4 shows the main topics of the articles.

Figure 3: Relevant literature by countries studied



Source: Own composition

Figure 4: Relevant literature by topics studied



Source: Own composition

As evident from Figure 4, most articles were written on the income-related impacts of direct payments, so we focus on this angle in the rest of the article.

3. A systematic review of the literature

3.1. General impacts of direct payments on income

CAP direct payments are income-type subsidies by nature. This is especially true in case of decoupled payments, where the support is only loosely linked to actual production activities (although they are still linked to one of the production factors, i.e., agricultural land). Therefore, it is hardly surprising that direct payments are generally considered to raise gross farm incomes. This is reflected in the study of Boysen et al. (2016), who analysed the impact of the 2003 CAP reform on, *inter alia*, Irish farmers' income by applying a CGE model on Irish farm data. The authors found that besides small GDP gains, more efficient and targeted direct payments would increase farmers' real income by 7% in the medium and 10% in the long run.

Ciaian et al. (2015) also investigated the income effects of coupled direct payments, the single payment scheme, and rural development programme. By using a broad set of cross-country farm-level data between 1999 and 2007, the authors found that farmers gained 66–72%, 77–82% and 93–109% income from these programmes, respectively. This means that there is a sizeable positive income effect of direct payments. On the other hand, rural development support seems to be more efficient in income transmission in this sense. This result is in line with the Commission's intention to shift the CAP from a production-based to a rural development and public goods-based policy.

Income effects of direct payments were also studied in the new Member States. Drenková et al. (2009) studied the utilization of direct payments in the Slovak Republic after the 2003 CAP reform. Using industry reports, information from the Paying Agency, and other sources, the authors made a comparative study of direct payments before and after the country's EU accession. It was found that there was a significant increase in the level of subsidies after joining the EU, whereby Slovakia opted for the use of the Single Area Payment Scheme (SAPS), which is a decoupled basic income payment. To compensate for the phasing-in mechanism, Slovakia decided to apply complementary national payments for specific sectors of the agriculture. As a result, Slovakian farmers could access funds that were 53.1% of the average funding in the old Member States in 2004. The incrementally growing subsidies in the phasing-in period had a positive effect on agricultural income.

Kozar et al. (2006) examined different CAP policy options after the accession of Slovenia and their effects on agricultural income. A survey was carried out with 120 farmers for the year 2001, and on this basis, a static deterministic total income model was utilized on different scenarios: a baseline pre-accession scenario from 2001; a post-accession scenario with coupled payments from before the 2003 reform; a scenario with flat-rate decoupled payments (SAPS); with regionalized decoupled payments differentiated for arable land and permanent grassland (SPS); a scenario with SPS complemented by certain coupled payments. It was found that the overall farm income situation would improve under all post-accession scenarios.

In another study on this topic, Fragozo et al. (2011) analysed the economic effects of the CAP on the Alentejo region of Portugal by applying a positive mathematical supply model. They concluded that agricultural income increased with Single Farm Payments (though foreseen price increases did not compensate for the loss of the Agenda 2000 area payments with regards to competitiveness).

Galluzzo (2018a) also found positive effects of the CAP on farms' income in Slovenia and Romania, respectively, especially in less favoured rural areas, by applying SEM models on FADN data over 2007 and 2015. Galluzzo (2018b) reached similar conclusions when analysing the role of CAP in Irish farm income by applying a multiple regression model and DEA analysis on Irish FADN data.

3.2. Impacts on the distribution of income

The uneven distribution of direct payments among beneficiaries is also a debated subject by policymakers, farmers, and the general public alike. This is also reflected in the scientific literature, which analyses the effect of direct payments on income distribution extensively. The question here is not whether the subsidies have a positive effect on income, but rather if they are distributed justifiably (so that the result is economically reasonable and socially acceptable).

3.2.1. External convergence

One of the main criticisms concerning CAP direct payments is that they do not allocate financial resources equally between the Member States. This is due to many historical reasons; one of the most important is the differing negotiating positions of the new Member States compared to the old Member States, and compared to one another during the accession procedure. As a result, a few countries (notably the Baltic States) receive a substantially lower unit amount of payments than the EU-average. To alleviate this situation, a so-called external convergence procedure needs to be put in place, whereby support intensity differences are eliminated or reduced. Volkov et al. (2019) state that the unit value of direct payments (i.e.,

euro per hectare or euro per animal) is significantly lower in the new Member States than in the old Member States. From time to time, the European Commission attempts to reduce these inequalities in its legislative proposals on the CAP, but the study argues that these measures are not sufficient to achieve real convergence between the Member States. The authors propose an alternative way of allocating direct payment amounts based on production cost ratios. Based on Eurostat data from 2014–2016, the cost of producing agricultural commodities with a value of 1 euro is calculated for all Member States. Where the costs are higher (the efficiency of the agricultural sector is lower), a higher amount of direct payments is allocated. The method would result in a significant restructuring of direct payments, with the Baltic States, Slovakia, and Finland receiving significantly higher amounts of direct support, while Malta, Greece, Cyprus, and the Netherlands receiving significantly lower amounts.

Rumanovska (2016) examined the same question on the example of Slovakia by looking at the effects of the 2014–2020 CAP reform on the Slovakian agricultural sector. Despite the policy efforts on converging the level of support per hectare, Slovakian farmers were still less intensively subsidized than their counterparts in several Member States. Because of this, the author argues that CAP direct payments should be much more in favour of less productive and less intensive regions – this is the only way for the CAP to reach its economic and social goals throughout the EU.

Furthermore, Ackrill (2003) showed that direct payments should be reduced if all member states wanted to receive the same level of payments. By using a CAP-CEE model based on 1995–1999 data, the author called for a change in the system of direct payments to be financially fair and socially equal.

Erjavec et al. (2011) took a different approach to the same problem by investigating the possibility of introducing an EU-wide flat area payment system and their impacts. Using the AGMEMOD 2020 combined model, the authors concluded that some minor adverse impacts on production would occur, though impacts varied by sector, and especially beef turned out to be an exception. It was found that the introduction of a flat-rate payment would result in a significant change in budget allocation between the Member States, which might help to mitigate the existing budget tensions.

The focus of the study of Gocht et al. (2013) was similar. They investigated the farm-type effects of an EU-wide decoupled payment harmonisation by using different scenarios in the CAPRI model. In the scenario where equalised per-hectare rates are given inside each Member State together with a partial harmonisation of the SPS, the new Member States were found to gain and the old Member States to lose, implying a severe redistribution of existing payments. However, losses were found to be partially offset by lower land rental costs.

The study of the accession procedure of Member States in 2004 yielded further results in the topic of external convergence. For a period after their accession, new Member States did not immediately have access to the level of direct payments of old Member States; instead, support amounts started from a reduced level (25%) and were increased year-by-year until it reached 100% (phasing-in). To compensate for this, new Member States could introduce complementary direct payments financed by the national budget. Rednak et al. (2003) analysed the potential effects of phasing-in on farm income by utilizing the extended economic account for agriculture (EAA) model and a partial equilibrium sector model (APAS-PAM). It was found by both models that the reduced amount of direct payments (even when complemented by national funds) is simply not sufficient to compensate for the expected drop in agricultural prices after accession; therefore, a significant decrease in farm income would be likely to take place. The authors argued that the new Member States should have been able to access 100% of direct payments directly after accession, to prevent deterioration in important agricultural sectors. From this finding, we can also conclude that external convergence procedures were hindered by the phasing-in mechanism put in place.

Rancheva et al. (2012) studied the impact of the CAP on Bulgarian farm development through a survey completed by 65 experts on agriculture. The participants had to rank the perceived effect of different aspects of the CAP on main economic indicators like income, competitiveness, market orientation, and employment. The results were then analysed by statistical methods to identify rank correlations, concordance coefficients, and to check their significance. It was found that the most significant effect of the CAP was the improvement of the competitiveness of farms. The experts pointed out that the CAP can only be effective if a simplification of procedures and the increase of the amount of direct payments were to take place in the future. This also hints at the need for further effort in converging payment levels among the Member States.

3.2.2. *Internal convergence*

An old criticism concerning CAP payments is that 20% of the beneficiaries get 80% of the total funds spent on agriculture. Direct payments are highly concentrated; most of the payment amounts is collected by a few large-scale producers. The situation was not alleviated by the accession of new Member States, either. During the recent history of the CAP, several attempts have been made at the internal convergence of payments, but these instruments seem to have had only partial results so far. The highly skewed distribution of payments hinders desirable structural change processes, limits the efficiency of income transfer, and constitutes a sensitive social issue which is not only a subject of scientific enquiry but also of often emerging public criticism.

Trnková et al. (2012) analysed the distribution of the economic results of 140 Czech arable farms in the period 2005–2010, and the effect of CAP subsidies on the inequalities of economic results. The quantification of inequalities was performed with the utilization of the Gini coefficient. The effect of subsidies was measured by calculating its elasticity. The results show a high level of inequality of economic results across the farms in question. CAP support did not appear to have a significant redistributive effect on the economic result, therefore failing to reach its objective in this respect.

Other studies have also shown the limits of the CAP concerning the achievement of a fairer distribution of funds. Severini and Tantari (2015b) examined the distribution of direct payments among farmers in different Member States. Data were drawn from the Commission publication on all payments of direct support from 2005 to 2010, as well as Eurostat structural farm data. Concentration ratios were then regressed against policy, structural, and economic variables (like labour intensity, gross output per hectare of land, the intensity of decoupling, the model of SPS utilized in the given Member State, etc.). It was found that the concentration of direct payments is very heterogeneous among the Member States, and it can reach very high levels in some of them. Payment concentration is mainly driven by land concentration, and it does not seem to be in correlation with direct payment policy choices. Therefore, the available policy tools (for example, level of decoupling and other measures) could not affect the distribution of funds in a significant way.

Allanson (2006) arrived at a similar conclusion concerning the redistributive effects of the Common Agricultural Policy on Scottish farm incomes, by measuring differences of the Gini-coefficients of pre-support and post-support incomes on-farm survey data. Results suggest that the distribution of support in 1999/2000 in Scotland was regressive concerning pre-support farm incomes. Consequently, direct payments were ineffective and inefficient as redistributive instruments because of the re-ranking of farms. The decoupling of payments can be a much better instrument in this regard, according to the author.

Some studies focused on the introduction of direct payments into the toolkit of the CAP. Keeney (2000) analysed the distributional effects of the MacSharry reform on the income of Irish farmers. The Gini Coefficient was decomposed by different components of income, based on national farm survey data from 1992 to 1996. It was found that direct payments introduced by the MacSharry reform had a small but beneficial effect on the distribution of farm income in Ireland, in a sense that they channelled more funds towards less well-off farms (compared to previous CAP market interventions). The share of market income reduced, but it was still the largest single income component in the study period. Although the distribution of farm income became a little bit less asymmetric with the introduction of direct payments, the situation was far from settled (the top three deciles of

farms received more than 98% of market incomes). To tackle the issue of disproportional incomes, a more targeted payment system should be called for.

Deppermann et al. (2016) took a different approach. The authors used an ex-ante policy model to analyse the redistributive effects of CAP liberalisation. They found that the abolishment of the main components of the CAP, including direct payments, resulted in a more unequal distribution of income in relative terms but a more equal distribution of income in absolute terms. These results call for more targeted policy instruments, according to the authors.

Spatial analysis of direct payment distribution also yielded exciting results. Bonfiglio et al. (2016) analysed the distributional effects of CAP payments by applying a multiregional input-output model on the European space and found that CAP expenditure redistributes its effects towards more affluent and urban regions. However, the magnitude largely depends on intersectoral and interregional linkages. This is contrary to the fundamental goal of the CAP to support and develop rural regions and economies.

3.3. *Income stabilisation impacts*

Another critical part of the articles analyses the income stabilisation effect of direct payments.

As a relatively stable source of financial support, direct payments are generally expected to reduce fluctuations in agricultural incomes. In practice, research has failed to confirm this supposed theoretical effect of direct support on several occasions. Severini et al. (2017) conducted a study on the income stabilizing effect of direct payments. Being a relatively stable source of revenue, direct payments aim at reducing the variability of agricultural incomes. The article analysed balanced panel data on Italian farms from the period 2003–2012, with non-linear regression techniques in order to measure the effects of direct payments, farm size, specialization, labour intensity, and other factors on income variability. The results show that on each subsample, direct payments increased (and not reduced) income variability. This may be the case because direct payments reduce the risk farmers perceive and prompt them to engage in riskier activities. All in all, direct payments are not that effective in stabilizing agricultural income. Moreover, they partially collide with the risk management instruments of the CAP, reducing their basis and efficiency.

In a similar study, the authors (Severini et al., 2016) analysed the data of all Italian farms in FADN from 2003 to 2012, with a mean of variance decomposition by income components. The results show that income variability is high in the agricultural sector, particularly in the case of smaller farms. The primary source of variability comes from the revenue component. In contrast to this, subsidies are stable parts of agricultural income. However, direct payments do little to reduce

the volatility of *other* income components, and their effect is highly dependent on farm size. Because of this, the targeting of direct payments is not efficient in terms of income stabilization.

Bojnec and Ferto (2019) arrived at a similar conclusion. They analysed the role of direct payments in stabilising Hungarian and Slovenian farmers' income, and by applying a panel regression model on national FADN data, they found that although direct payments represented a stable source of income, they had limited countercyclical role. These subsidies were not found to be well-targeted and thus inefficient in stabilising farm income.

Further study on the subject was performed by Judez et al. (2001), who analysed the possible effects of the „Agenda 2000” reform of CAP on arable and beef producers with Positive Mathematical Programming methods in the study region of Navarra, Spain. The model considered three different size categories of farms, both in the arable and the beef sector. The results showed that the increase of unit values (euro per hectare, euro per animal) of direct payments proposed by the reform is not sufficient to compensate for the drop in prices assumed by the model. Therefore, the revenues of farmers were likely to drop after the reform took place. The authors speculate that the fluctuations of income may somewhat be reduced because of the subsidies, but revenues following market conditions are not sufficiently affected.

As researchers realized the limited effects of direct payments on income stabilization, they also came up with alternative policy tools. Möllmann et al. (2019) explored the possibility of substituting the income stabilization effect of direct payments with subsidized agricultural insurance. A survey was conducted among German farmers to measure their willingness to pay for agricultural insurance in a scenario where direct payments would be significantly reduced. The focus of the study was on whole-farm income insurance and single-crop revenue insurance, which were more cost-effective than simple yield insurance. A generalized multinomial logit model was applied to the gathered data, whose results showed a positive willingness to pay for subsidized agricultural influence, even if direct payments were abolished (to finance insurance premiums). Farmers would pay more for whole-farm insurance than for single-crop insurance; publicly administered insurance policies would be more popular compared to those of the private sector; insurance with broader coverage would also be more sought after. The results suggest that insurance subsidies could be used to offer an alternative to direct payments in agriculture, although whether the farmers' expected payments could cover the costs of such insurances remains to be seen.

3.4. Other income-related impacts

3.4.1. Decoupling and reforms

From the studies mentioned above, the conclusion can be drawn that direct payments have no or low income redistributive effect. But does the situation change with the decoupling of direct payments and further reforms of the CAP? Relevant studies present that the income effect, in this case, is ambiguous, or its magnitude is small. Therefore, it could not solve the distributional problems associated with CAP direct support.

For example, Viaggi et al. (2010) investigated the effect of the decoupling of CAP direct payments on farm income and investment. It was found that decoupling can have a negative or a positive effect on income, depending on the variable reactions of different farms to decoupling. Furthermore, Vosough Ahmadi et al. (2015) analysed the impacts of greening and found that changes in the CAP had no major impact on the net margins of Scottish beef and sheep farmers. By using an optimising farm-level model, they also showed that all farm types analysed were better off by adopting new greening measures than not qualifying for the green payments.

The income effects were also found to be ambiguous in the case of the study conducted by Gelan and Schwarz (2008), who analysed the effects of the decoupled Single Farm Payment on Scottish farms by using a CGE modelling framework. A special emphasis was put on farms characterised by low productivity because of unfavourable natural conditions. Results suggest that decoupling affected farms from the least favoured areas (LFA) negatively and non-LFA farms positively. This is contrary to the cohesion and environmental goals of the CAP, which aim at the heavier subsidization of marginal areas.

Rednak et al. (2006a and 2006b) studied the redistributive effect of the 2003 CAP reform on farm income in Slovenia. They utilized a static deterministic model on a large sample of farms, comparing the income distribution of the pre-2003 period to different options set out by the 2003 CAP reform. The results showed that the introduction of a fully lump-sum decoupled payment would cause a significant drop in payments for 23% of the farms. Since these farms had been paid nearly half of all direct payments before the reform, this would clearly be a sensitive issue. Moreover, the adverse effects would be concentrated in the beef and milk sectors. To alleviate the negative redistributive effects, the Member State should make use of the partial coupling options of the reform, introduce the new decoupled schemes gradually over time, or opt for a mixed-model of decoupling whereby a part of the amount of payments is determined by the farm subsidy level of a prior reference period.

The study conducted by Solazzo et al. (2014) on the 2013 reform of the CAP yielded somewhat similar results concerning the Italian tomato sector. The impact of dividing direct payments into a basic support and a greening component was analysed, with a focus on the convergence of payments and the possible effects of greening on production decisions of farms. They analysed data from Italian tomato farms, using Positive Mathematical Programming methodology to run different scenarios. They found that greening – as proposed originally by the Commission – could have a major impact on production by significantly reducing cereal production and agricultural income. The version proposed by the Council (which prevailed later) would only have a minor impact. Later criticism of the greening instrument often pointed this out as a shortcoming of the policy in the field of environmental protection and climate change. The study furthermore found that tomato farms would not change their land-use conditions, but the convergence of basic payments would cause reducing levels of income in the sector.

Ciliberti and Frascarelli (2018) analysed the redistributive effects of decoupled payments and their impacts on farm income in Italy by using a model based on Italian FADN data from 2014 to 2020. Results suggest that CAP reform somewhat decreases the concentration of direct payments. However, the reform is also expected to limit the reduction in farm income inequality generally.

3.4.2. *The issue of entitlements*

Another policy tool to tackle the problems of income distribution is the (somewhat misleadingly) so-called regionalization of the Single/Basic Payment Scheme. During the 2003 decoupling, Member States could opt for different models of the Single Payment Scheme (the basic direct income support to farmers). Under the historical model, payment entitlements for individual farmers were fixed based on the amount of support received in a previous reference period. The utilization of this payment model led to disproportionate differences in the levels of payment of different farmers. Under subsequent policy reforms, the Commission, therefore, sought to review the allocation of payment entitlements to converge payment amounts towards a uniform intensity. A move towards the equally distributed regional model of SPS (whereby payment entitlements are equal for the whole region or country) is beneficial in this regard, as documented by Severini and Tantari (2013a and 2013b). They examined the effects of the 2013 CAP reform on income distribution. Their most important finding was that the regional implementation of the Single Payment Scheme seems to lower the level of concentration of direct payments and household income, as opposed to the so-called historical model (whereby previous years' reference data served as a basis for the calculation of support amounts). On the other hand, converging payments involve the reallocation of funds between regions and sectors, which lead to tensions and

may contradict other policy goals. Therefore, the convergence of payment entitlements has been a rather slow-going process in several Member States.

The convergence of payments can move the focus of the CAP to less intensive sectors. Matthews et al. (2013) set up a spatial analysis framework from both biophysical and socio-economic data to model the effects of CAP policy changes on Scottish farms. The focus of the study was on the possibility of Member States to depart from the former, historic entitlement-based direct payments towards a flat-rate area payment in the course of the 2013 reform. The analysis showed that such a move would result in smaller income gains for a large number of farms, while a few farms would be negatively affected to a great extent. Crops with a high significance in the agri-food industry (cereals, dairy, livestock) would experience reduced amounts of support, as would regions where agriculture played an important part. Generally, funds would be redistributed from intensively managed farms to extensive holdings, a fact worthy of the attention of policymakers.

Vosough Ahmadi et al. (2015) arrived at similar conclusions. They examined the possible impacts of the 2013 reform of direct payments, particularly the regionalization of the basic payment scheme. The study used data on 247 Scottish cattle on sheep farms, which were analysed by an optimizing linear programming farm-level model. It was found that moving from a payment scheme based on historic payment entitlements to a regional flat-rate payment decreased the net margins of most farm types, except for extensive sheep farms (those were unfavourably affected by the previous historic model). The regionalization of payment had a much more critical impact on farm margins than the introduction of greening, which did not affect farms fundamentally.

The convergence of payments can put specific agricultural subsectors in an unfavourable position. Instead of fixing payment entitlements for farms based on a previous reference period (whereby the payment intensity differs for individual farms), the Health Check proposed to converge the level of individual payments to a uniform per hectare amount. Roselli et al. (2009) studied the possible effects of such an approximation process on the olive growers of Apulia province in Italy. The authors set up a simulation of farm economic balance, which was based on representative olive-growing farms. The data was gathered from official statistics and a structured survey conducted in the region. Based on this, olive growers were classified into representative categories. Three policy scenarios were analysed: no changes in payments, 50% approximation of payments, 100% convergence of payments. The results showed that maintaining the status quo would be the best scenario for olive farmers, while a total convergence of payments would cause significant income losses, especially for middle-sized farms and farms located in the most productive areas.

Kozar et al. (2006) also identified undesired side-effects in connection with regionalization. In their study, they found that a strong redistribution effect charac-

terised the SPS regionalization scenarios towards less intensive farms, and therefore deemed to be an economically risky instrument.

Chatellier (2004) analysed the impacts of the 2003 CAP reform on French farms by using simulations on FADN data and found that regionalisation without a transitional period would decrease farmers' income specialised in field crops and those located in diversified areas (beef, sheep or extensive dairy production).

3.4.3. Modulation

Regarding modulation, during the Health Check process, it was agreed that direct payments over EUR 5000 would be reduced by 10%, and payments above EUR 300 000 would be reduced by 14%. The corresponding amounts would be transferred to the second pillar to fund rural development measures. The so-called modulation seems to have had a beneficial effect in terms of uniform distribution of payments, but the magnitude of the effect could only be called slight at best.

This was established by Medonos et al. (2009), who made an ex-ante impact assessment of the compulsory modulation of direct payments in the Czech Republic. Based on data on support amounts from the Czech paying agency, the authors modelled the possible effects of modulation, taking certain regional aspects also into consideration. The results showed that modulation would have a significant effect on direct payment levels, mainly because of the large average size of Czech farms. Mountainous regions with grasslands, environmentally sensitive areas, and a high share of family farms were least affected by modulation, while agricultural landscapes with large corporate farms were more heavily influenced. On the whole, modulation could be an excellent tool to channel funds from direct payments to more targeted rural development measures, but its effects could, in practice, be limited by the artificial splitting-up of farms to avoid reduction of support.

A further study on modulation by Sinabell et al. (2013) examined the distribution of direct payments in 27 Member States of the EU from 2000 to 2010. Based on statistical data on subsidy amounts in different EU-countries, they calculated different indicators of distribution (mean/median ratio, concentration ratio, Lorenz curve, Gini index). Based on the results, the concentration of direct payments is high in Malta, Slovakia, Portugal, and the Czech Republic, and it is low in Luxembourg, Finland, Ireland, and Slovenia. It was expected that the concentration would decrease in the studied period, because of the decoupling of direct payments and the introduction of modulation. Contrary to this, the study failed to find a definite pattern for the change in the distribution of payments (in some countries it increased, while in others it decreased). It seems that the dynamics of distribution issues is highly country-specific and is not sufficiently influenced by modulation measures.

Further articles reinforce this finding. Severini and Tantari (2015a) examined inequalities in the distribution of support by analysing a large sample (9722 units) of Italian family farms from the FADN in 2011 with Gini index decomposition by income source. It was found that direct payments can somewhat mitigate the unequal distribution of funds, and particularly modulation can be a beneficial instrument in this regard, although its effects are limited by relatively low financial weight it represents. Transferring funds between direct payments and rural development, however, does not influence the concentration of support (contrary to the beliefs voiced in this regard). The article also points out that a uniform approach to the subject may not be correct, because significant differences were found between plains, hill, and mountain farms' subsamples.

3.4.4. Degressivity and capping

From 2013, the Commission attempted to alleviate the inequalities by introducing a compulsory reduction of certain high-amount direct payments. Furthermore, Member States have the option to put in place an absolute threshold (cap), beyond which no payment can be made to the beneficiary concerned. Szerletics (2018) examined whether the results of capping are in line with the original goals of the CAP, based on data on Hungarian beneficiaries. It was found that capping often leads to artificial splitting of large farms, which prevents the desired redistributive effects from taking place. On the other hand, capping may harm competitiveness and productivity. Therefore, the future utilization of capping instruments must be carefully evaluated in this regard.

In a study on the same subject, Sahrbacher et al. (2012) examined the possible effect of capping by using a spatial-dynamic agent-based model of structural change and policy response (Agricultural Policy Simulator, AgriPoliS) on a study region in East Germany dominated by large farms. In the model, individual farm decisions are simulated as a response to policy change. Two scenarios were implemented and then compared (a reference scenario and a scenario with capping). The results showed that capping causes far a smaller redistribution effect than expected by policymakers. Furthermore, in the long run, it causes losses in profits that are far greater than the redistributed amount 'gained'. Capping can be a burden on the growth of the most efficient farms, may cause intra-sectoral distortions, and promote inefficient but labour-intensive production.

3.4.5. Redistribution impacts

Regarding redistributive payments, the 2013 reform of the CAP gave the Member States the option to introduce a redistributive payment, whereby direct payment funds are reallocated from large farms towards smaller ones. Severini and Tantari

et al. (2014) analysed Italian FADN data from 2011 on all individual farms. They defined different measures of concentration and looked at their decomposition by income types. It was found that redistributive payments may help in reducing inequalities (because they allocate higher amounts of support to relatively smaller farms). On the other hand, defining a 'strong' active farmer condition (whereby many previous beneficiaries would be excluded from payment) usually increases concentration and contributes to further inequalities.

Potori et al. (2013) were more critical about redistributive payments. They examined the implications of the 2013 CAP reform, particularly the economic effects of the redistributive payment and the capping of payments. These can be considered as somewhat overlapping policy tools because both aim at redistributing funds from larger enterprises towards smaller ones. The authors presented six policy scenarios, in which redistribution and capping are used to a different extent. These scenarios were then modelled in an agent-based simulation, using subsidy data from the Hungarian paying agency and the FADN. The evidence coming from the model suggested that the application of capping can be preferable compared to redistributive payment because the latter draws funds away not only from bigger farms but also from middle-sized family enterprises. Furthermore, the simulation did not show any considerable restructuring effect of the redistributive payment on farms' arable production or livestock farming.

Hansen and Offermann (2016) examined the effect of the 2013 CAP reform on the distribution of direct payments among beneficiaries. By analysing the components of the Gini-index and other concentration indices based on FADN data on German farms, they found that the introduction of the so-called redistributive payment (whereby funds are directed towards beneficiaries with fewer hectares at the cost of large-area farms) did decrease the inequalities in the distribution of direct payments. However, it could only marginally influence income inequalities. This is mainly due to the limited budget allocated to redistributive payment in Germany. The simulations also showed, however, that if the full budget was utilized for this instrument, the distribution of income would only slightly improve. The reason for this is probably the limited correlation between the size of the agricultural area and the income level of a farm. Therefore, the redistributive payment is not a very efficient tool for redistributing income.

4. Conclusions

This article aimed to review papers written on the income-related impacts of direct payments so far in the literature. In doing so, articles can be grouped into four main categories: general impacts, distributional impacts, stabilisation impacts, and other impacts.

As for overall impacts, it can be stated that all relevant articles found a positive relationship between direct payments and farm income levels. Being income subsidies by nature, direct payments raise the income of agricultural producers, although there are some doubts as to the efficiency of this income transfer. A few studies suggest that direct payments should be better targeted to have more impact on raising agricultural income.

Regarding distributional impacts, studies showed that there were significant differences in the unit amount of direct payments among the Member States. The total elimination of such differences would result in serious budget reallocation between countries, which is a politically sensitive issue; therefore, the convergence procedure moves forward slowly. Another aspect of income distribution is the disproportionate allocation of direct payments between farmers of a given country. Almost all relevant articles established that the concentration of direct payments could reach very high levels in several Member States. Consequently, CAP support has none or shallow income redistributive effects.

As for stabilisation impacts, the scientific literature on the subject usually concludes that while direct payments constitute a stable part of agricultural income, they have little influence over other income components; therefore, they have little income stabilisation effect. More targeted support is called for in this matter, which aims explicitly at mitigating risks (insurance premiums, mutual funds, income stabilization tools).

As to other impacts, it was shown that decoupling had no major income effect, or its effect varies from sector to sector. Regionalisation of the basic direct payment (SPS/BPS), on the other hand, was an effective tool in reallocating subsidy funds. However, it came with certain unwanted side-effects by causing serious budget tensions and shifting funds towards less intensive sectors, raising questions of competitiveness. Modulation was also beneficial in reallocating agricultural income, but its effects were limited in practice by the relatively low financial weight it represented and the artificial splitting-up of farms to avoid modulation. The same could be stated about redistributive payment and partly for capping as well.

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