Regional Welfare Effects of the Common Agricultural Policy

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Abstract. The aim of this paper is to develop a theoretical framework to analyse regional welfare effects of EU’s Common Agricultural Policy. Given the mix of agricultural policy measures on the one hand and the differences in the agricultural production structure on the other hand the question how regions are affected is crucial for analysing the overall welfare effects arising from the CAP. For this reason the composition of transfers, the program design and the financing of the measures are on the focus of this paper for regions in the federal state of Hesse, Germany. The analysis wants to contribute to the relevant literature in a twofold way. Firstly, the federal structure of Germany is taken into account explicitly. This has important aspects in regard to the different co-financing rules as well as to the financing of the measures or funds. Secondly, much smaller regions – the Hessian communities – are considered in this study to obtain exact welfare effects at the regional level. The theoretical framework of this study shows that for rural regions the overall CAP generates positive welfare effects while it generates negative effects for urban regions.

Keywords: Common Agricultural Policy, regional effects, welfare analysis

1. Introduction

The EU’s Common Agricultural Policy (CAP) is characterized by a pool of different instruments to support farmers. Given the heterogeneous conditions both naturally and structurally within agriculture in the EU, individual regions are affected in a very different way. Differences do not only exist between countries. Even within the member states and at the regional level structures are often very unequal. Hence, the question how support is allocated across regions is a continuous research area. In recent years direct payments and environmental programs are heavily emphasized but market price support still remains an important instrument of support.

In order to compute welfare effects at the regional level arising from the CAP it is necessary to consider the financial organization of the EU’s agricultural policy – especially with the different co-financing rules for second pillar programs – as well as national tax systems of the member states for the financing side. In the seminal work by Koester (1977) a general framework to measure welfare economic effects of the CAP at the national level was developed. His model is a starting point for the underlying analysis in determining regional welfare effects.

The question how structurally different regions are affected by the different measures of support is as important as to evaluate the impact of the CAP as whole at the regional level.
Given this background the aim of this work is to contribute to the literature with a welfare economic analysis at the regional level, whereas regional welfare is measured in terms of income and agricultural revenues. The analysis covers the financing and allocation of the different instruments and funds of the CAP. Koester (1977) elaborated a theoretical framework to measure welfare economic effects and to determine winners and losers of the CAP among the EU member countries at the national level. The approach will be extended to the regional level. On the basis of this model the transfers from the CAP for each region and their contribution to the financing of the CAP is calculated.

This allows to determine regions which are favoured and less favoured by the actual mix of instruments. On the one hand, systematic differences between different types of regions are analysed. For example, one would expect rural regions to gain and urban regions which are better off in economic terms to lose. On the other hand, the effects of differential co-financing rules, i.e. second pillar programs are taken into account to control for potential distortions (Oates 1999, Kirschke et al. 2007).

2. Overview and theoretical considerations

Welfare economic effects of the CAP have been analysed in several studies in the last decades. As mentioned above Koester (1977) elaborated a theoretical framework for analysing national welfare effects arising from the EC policy. This extensive study produced a bulk of interesting and relevant findings. One of the most important findings is that the system of common financing provided national incentives for increasing the per unit transfers for those products where a country has a high degree of self-sufficiency. Koester also concluded that in terms of net transfers France was the largest winner while Italy and the UK were the largest losers in the period from 1971 to 1975 (respectively 1973 to 1975 in the case of the UK).

Tarditi and Zanias (2001) find that there are transfers from consumers in a country to producers within that country and to producers in other member states as well for the case of market price support for the period from 1979 to 1996. The authors also find a redistribution of income arising from the CAP between structurally different regions for a panel of 69 (Nuts I) regions where they identify less developed regions to gain while urbanised areas pay these transfers.

Allanson (2007) analyses the redistribution effects of the CAP on income for Scottish farmers. Allanson compared farm revenues with and without transfers and analysed how support influenced the relative outcome, i.e. individual farm income. He concludes that the CAP has substantial redistribute effects but also finds strong differences between structurally different farms.

Kirschke et al. (2007) analyse how regional choices for the design of agri-environmental programs are influenced by the EU multi-level co-financing system. The authors demonstrate that regions will maximise their benefits under the hypothetical situation that all support is given as lump-sum transfers and regions decide on their own how the money is spend. In this model the regions maximise their benefits by shifting money to the measures with the highest external co-financing levels which will result in a distortion of the mix of policy measures.

To transfer Koester’s model at the regional level some adjustments have to be made and several aspects have to be considered. First of all, the trade in goods is no part of the analysis as it is quite complicated to capture trade between small regions within a country in an accurate

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1 The UK entered into the EC in 1974.
Secondly, the examination focuses on the financing system and the program design of the EU’s agricultural policy. This includes the two sides of the CAP. On the one hand the program design and the co-financing rules have to be considered in an appropriate way.

The program design determines which funds pay the program and is closely connected to the underlying co-financing rules. The co-financing rules are much more relevant for measures of the second pillar of the CAP (Hessian Ministry of Agriculture 2000). On the other hand the financing and the financial contribution of a region to the funds have to be recorded. The financial contributions have to be taken into account not only for the EU budget or fund but also for national funds which are paying the national co-financing part (European Commission 2003). The federal structure in Germany makes it even more complex as also the federal states have their own budgets and funds. Hence, a new level – the federal states – have to be implemented into the model. So, each region receives transfers from three different funds: The EU fund, the national fund and the state fund. Also a region’s financial contributions are made to all this three funds as all funds are tax based in there financing. The different policy and financing levels and their relations have to be considered in an appropriate way. Figure I shows this interdependency.

Figure I: Interdependency of the regions and the different policy levels

The regions make financial contributions to the budgets of the different policy levels. So on the one hand the underlying national and regional financing rules are crucial. Undoubtedly, this is closely linked to the relevant tax system. The share of financing to the different levels is the important variable for analysing these payments – this is illustrated by the upward showing arrows in figure I.

On the other hand the design of the different programs determines in which way the money is allocated into the regions. Therefore, the different co-financing rules of the programs have to be considered carefully – this is illustrated by the downward showing arrows in figure I.

1 Under the assumption that the per capita consumption is equal in all regions and that the positive difference between production and consumption is exported to others regions it would be possible to include the trade of agricultural goods. For this first model we focus on the welfare effects of the policy measures and what is the regional cost of financing them.

2 For this study this refers to the EAGGF fund of the EU. The term budget refers to the relevant agricultural part of the total budgets at the different policy levels.

3 Of course the funds are not completely tax based but the largest part of all the three funds is tax based.
Hence, the share of financing for the different funds and the program design determines the interdependency between the regions and the different policy levels.

3. Methodology

The empirical part of the study is an analysis for 424 regions at the community level in the federal state of Hesse, Germany. On the basis of data from the German and the Hessian Ministry of Finance the financial contributions of each region to the agricultural funds of the EU, the country funds and the state funds are calculated. The allocation of support to agriculture is examined with data from the Hessian Ministry of Agriculture and figures taken from the OECD database on Producer Support Estimates (PSE) in the EU. This allows a detailed analysis of regional welfare effects arising from the CAP, as payments from first and second pillar can be compared as well as the effects of single instruments with and without co-financing.

Germany has a federal system which has some important implications for its tax system and financing of the CAP. The federal financial equalisation system transfers money from states which are better off to those which are not. These transfers have to be considered calculating the percentage each state contributes to the national tax revenue. Furthermore, regional disparities in the states have to be captured and considered to obtain exact results. Therefore the relevant variables are regional tax revenues and the transfers to each region. The regional tax revenues determine the proportion the region contributes to the financing of the state, the national tax revenues and EU’s budget. The transfers to the regions (which is the sum of all payments from all measures) and the financing of the measures are determining the benefits.

The underlying model is developed by Koester (1977) as this analysis follows the same idea of calculating the costs for each region with the actual EU policy and comparing it to the hypothetical situation when each region finance its own policy. So the net welfare \( W_{net} \) per region \((j)\) in period \((t)\) is estimated as in equation (1) with \((T_{jt})\) the sum of transfers per region and \((F_{jt})\) the summed financial contributions of a region to the CAP:

\[
W_{net}^{jt} = T_{jt} - F_{jt}.
\]  

In the same manner the net welfare per region can be estimated for single policy measures if transfers and percentages of financing are analysed for a single measure. In general there are two variables with a very strong impact of the regional welfare effects. These are the percentage of financing and the program design. The percentage of financing \((fp_{jt})\) of a region to the CAP depends on its relative contribution to the different funds. This is given in equation (2):

\[
fp_{jt} = f(\frac{\sum F_{jt}^{Bud_{EU}}}{Bud_{EU}}, \frac{\sum F_{jt}^{Bud_{Country}}}{Bud_{Country}}, \frac{\sum F_{jt}^{Bud_{State}}}{Bud_{State}}).
\]  

The percentage of financing is a function relative share a region contributes to the EU fund, the country fund and the state fund. \((\sum F_{jt}^{Bud_{EU}})\) is the sum of transfers a region contributes in a specific period to the EU-budget. The EU-budget is given by \((Bud_{EU})\). Dividing the further by the latter gives the percentage of financing a region has in the EU-budget. Other things

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1 For a detailed overview of the issues and implications arising with a federal financing system see Kirschke et al. (2007) and Oates (1999).
being equal a region has a higher welfare effect the lower is its share of financing to the CAP. In other words comparing two regions with the same sum of transfers the regions which contributes less to the financing has a higher welfare. The program design determines the composition of transfers, i.e. which share of a program is financed by which policy level. Equation (3) gives the policy mix for the Hessian regions for all measures \( i \):

\[
Policy^{mix} = p(EU^i, Country^i, State^i)
\]

with \( (EU^i) \), \( (Country^i) \) and \( (State^i) \) the fractions of co-financing from the different policy levels. These fractions lie between zero and one and also have the sum of one. For a single measure these fractions determine the program design.

Given this equations the summed transfers \( (T_{ji}) \) to a region from all policy measures \( i \) are:

\[
T_{ji} = \sum (T_{ji}^{EU^i} + T_{ji}^{Country^i} + T_{ji}^{State^i})
\]

with the fractions of co-financing for the single measures depending on the program design. The regional transfer for a single program \( (T_{ji}) \) is multiplied by the fractions of co-financing for each level. The sum of all policy measures are the summed transfers a region receives. The percentage of financing per region to the CAP is more complex and depends on the region’s contribution to the different funds of the EU, the county and the state. The financial contributions have the general form as given in equation (5):

\[
F_{ji} = \sum (f_{ji}^{EU} Bud^i_{EU} + f_{ji}^{Country} Bud^i_{Country} + f_{ji}^{State} Bud^i_{State})
\]

with \( (f_{ji}) \) the regional percentage of finance to the different funds. Hence, the summed tax revenues a region contributes to the financing highly depends on its percentage of finance to the different funds and the composition of the programs. Therefore, the tax revenue in a region and the co-financing rules of the single measure are the determining factors. Generally the relationship is as following. The welfare effects depend on the percentages a region contributes to the state tax revenues and to the national tax revenues as well as on the co-financing rules for single programs. The first determines the contribution to the budgets of the different levels while the latter determines the composition of the transfers. So it is expected that the higher the percentages of financing from a region to the budgets of the different levels the more likely the region has negative welfare effects.

This framework allows a detailed welfare analysis of the CAP at the regional level. The federal structure of Germany has some special implications for the examination as a new level – the states – has to be implemented in the model. The framework above allows to determine the driving variable in this analysis. On the side of the financial organisation this is the share of financing a region contributes to the different policy levels. On the side of the policy measures this is the sum of transfers a region receives and the program design which determines from which fund the measure is financed.

**Conclusions**

In this paper a theoretical and empirical framework is developed to analyse regional welfare effects arising from the CAP in a federal state. The model of Koester (1977) is adjusted to the federal state of Hesse to determine welfare effects at the community level.
In the second part a comprehensive overview of studies concerning welfare effects of EU’s CAP is given. Furthermore the adjustments of Koester’s model are discussed in a theoretical way to meet the necessary modifications arising from the application of the model to the federal state of Hesse. A new level is implemented in order to consider the state activities in the analysis. In section three an empirical framework is developed for analysing the welfare effects in a quantitative way. It is shown that the redistributive effects of the CAP at the regional level depend on the regional percentage of financing to the funds and budgets at the different policy levels on the financing side.

On the side of the policy measures the sum of transfers a region receives and the co-financing rules of the policy measures determine the welfare. In general it can be followed that a region is more likely to have a positive net welfare effect from the CAP, the smaller its percentage of financing and the more support a region receives by programs with a high share of co-financing other things being equal. Therefore, urbanised regions are expected to have negative welfare effects from the CAP while rural regions are expected to have positive. This is due to the fact that the more people live in a region the more the region contributes to the financing of the CAP.

References

4. Hessisches Ministerium für Umwelt, ländlichen Raum und Verbraucherschutz (Hessian Ministry of Agriculture), Financial data on agricultural support in Hesse.
5. Hessisches Statistisches Landesamt (HSL), Hessische Gemeindestatistik, various issues.