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Sector- and Economy-wide Effects of Terminating the Use of Anti-microbial Growth Promoters in Denmark

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Abstract

In Denmark the poultry industry and the National Committee for Pig Production, together with the feedstuff industry, decided to voluntarily abolish the use of all Anti-microbial Growth Promoters (AGP). The poultry industry abolished the use of AGP 15 February 1998 and the pig industry followed 1 March 1998 (for pigs over 35 kg) and 1 January 2000 (for pigs under 35 kg).

To evaluate the effects of the removal of AGP, data from both the poultry and pig industries were collected during a transition period for the removal of AGP from feedstuffs. Utilizing these production data, this paper calculates economy-wide effects of the removal of AGP using the Agricultural Applied General Equilibrium (AAGE) model of the Danish economy.

The results show that the long-term effects are a moderate decline in the production and export of pig meat, and a positive indirect effect on other industries including poultry due to lower rental rates for primary factor inputs (land, labour and capital). Production of pig meat is projected to decline by 1.4%, and exports by 1.7%. In the case of poultry, production and exports increase by 0.4 and 0.5%. The overall implication is a small decline in real GDP of 0.03% (363 mill DKK at 1995 prices), and a consumption decline of 0.03% - equivalent to 45 DKK per capita per year.

Although the cost in terms of real GDP and consumption are small, such cost analyses could be compared with expected benefit of the removal of AGP. These benefits have not been a part of this analysis, but only if they are determined or assumed to exceed the costs could AGP removal be said to be beneficial to society as a whole.

1 This paper was prepared for the ‘International Invitational Symposium; Beyond Antimicrobial Growth Promoters in Food Animal Production’ held 6-7 November 2002 in Foulum, Denmark by the World Health Organization (WHO 2003). We would like to thank professor Henrik C. Wegener, Danish Veterinary Institute, Danish Zoonosis Centre for help in preparing this paper.
Introduction

In Denmark the poultry industry and the National Committee for Pig Production, together with the feedstuff industry, decided to voluntarily abolish the use of all Antimicrobial Growth Promoters (AGP). The poultry industry abolished the use of AGP 15 February 1998 and the pig industry followed 1 March 1998 (for pigs over 35 kg) and 1 January 2000 (for pigs under 35 kg).

To evaluate the effects of the removal of AGP, data from both the poultry and pig industries were collected during a transition period for the removal of AGP from feedstuffs. The objective of this paper is to utilize these production data to calculate the economy-wide effects of the removal of AGP, using an applied general equilibrium of the Danish economy.

Production data

The Danish Poultry Council investigated how the removal of AGP influenced broiler productivity in Denmark by analysing data from 6815 flocks during the period November 1995 to July 1999. It was found that broiler weight produced per square meter and percentage deaths were not affected but that the feed conversion ratio increased marginally (by about 1 %) (Emborg et al. 2001a).

The National Committee for Pig Production has recorded, for many years, productivity data in a representative sample of Danish pig herds. Withdrawal of AGPs was found to have had no, or very limited, effect on finishers and growers. In the production of weaned pigs there were increased problems with post-weaning diarrhoea, a reduction in daily weight gain and increased post-weaning mortality (Callesen. 2000).

Finn K Udesen from the National Committee for Pig Production, has estimated that these productivity loses incurred by removing AGP in the production of pigs has cost roughly 7.75 DDK per produced pig c.f. Table 1.

In Table 2 it can be seen that the total cost of pig keeping increases by roughly 1.0 % due to the abolishment of AGP when the increased cost of production (DKK 7.75 per produced pig) is compared to the total cost of pig keeping per sow in Denmark.
Due to the fact that the increased cost of production are best estimates made by Udesk, two sensitivity analyses are also undertaken where the cost of product is increased/decreased by 25%.

In the case of poultry, the feed-conversion ratio increased by 0.016kg feed/kg broiler after the removal of AGP. In economic terms this amounts to 0.025 DKK/kg broiler using an average feed price of 1.55 DKK/kg. It has been estimate that the cost of adding AGP to broiler feeds is roughly 0.027 DKK/kg broiler wherefor the total cost of producing broilers in Denmark is not assumed to be affected by the AGP removal (Emborg et. al. 2001b).

In the following the calculated percentage increases in costs of producing pigs (1.05%) and poultry (0.0%) are used to calculate the economy wide effects of removing AGP from feedstuffs in Denmark.
Model and scenario
Where there are economy-wide interactions between industries, it is important to capture all impacts of changing specific domestic policies, both in the primary industry involved but also in secondary industries of the economy. Therefore in order to evaluate the economic consequences of abolishing AGP, an Agricultural Applied General Equilibrium (AAGE) model of the Danish economy is used.

In the so-called AAGE model of the Danish economy there are five types of agents, namely: industries; capital creators; households; governments and foreigners. The current database of the model identifies 68 industries producing 76 commodities (see appendix A). For each industry there is an associated capital creator. The capital creators each produce units of capital that are specific to the associated industry. There is a single representative household and a single government sector. Finally, there are foreigners, whose behaviour is summarised by export demand functions for Danish products, and by supply functions for imports to Denmark.

The nature of markets and prices
AAGE determines supplies and demands of commodities through the optimising behaviour of agents in competitive markets. Optimising behaviour also determines industries’ demands for labour and capital.

The assumption of competitive markets implies equality between the producer price and the marginal cost in each industry. Demand is assumed to equal supply in all markets other than the labour market (where excess supply conditions can hold). The government intervenes in markets by imposing sales taxes on commodities. This places wedges between the prices paid by purchasers and prices received by the producers. The model recognises margin commodities (e.g. retail trade and freight) that are required for each market transaction (the movement of a commodity from the producer to the purchaser). The costs of the margins are included in purchasers' prices.

Demand for inputs to be used in the production of commodities
AAGE recognises two broad categories of inputs: intermediate inputs and primary factors. Firms in each industry are assumed to choose the mix of inputs, which minimises the costs of production for their level of output. They are constrained in their choice of inputs by nested production technologies (see appendix B). For the land-using industries (see appendix A), AAGE specifies nested substitutions between:
(a) capital, labour, energy and herbicides (CLEH);
(b) land, fertiliser and insecticides (LFI);
(c) CLEH and LFI (CLEHLFI); and
(d) CLEHLFI and an aggregate of remaining intermediate inputs

For non-land using industries substitution is allowed between capital, labour and energy (CLE) and between CLE and aggregate non-energy intermediate inputs.

*Household demand*

The representative household buys bundles of goods to maximise a utility function subject to a household expenditure constraint. Bundles are combinations of imported and domestic goods.

*Demand for inputs to capital creation and the determination of investment*

Capital creators for each industry combine inputs to form units of capital. In choosing these inputs they minimise costs, subject to technologies similar to that used for current production; the only difference being that they do not use primary factors. The use of primary factors in capital creation is recognised through inputs of the construction commodity.

*Government demand for commodities*

The government demands commodities. In AAGE, there are several ways of handling these demands, including: (i) endogenously, by a rule such as moving government expenditures with household consumption expenditure or with domestic absorption; (ii) endogenously, as an instrument which varies to accommodate an exogenously determined target such as a required level of government deficit; and (iii) exogenously. In this paper government demand changes follow household consumption expenditures.

*Foreign demand (international exports)*

Two categories of exports are defined: traditional, which are the main exported commodities; and non-traditional. Traditional export commodities face individual downward-sloping foreign demand curves. The commodity composition of aggregate non-traditional exports is treated as a Leontief aggregate. Total demand is related to the average price via a single downward-sloping foreign demand curve. Contrary to many conventional agricultural products, all organic products are assumed to be traditional export commodities.
Demand for foreign imports
For all industries, AAGE includes the standard Armington specification for imported and domestically produced inputs. This assumes that users of a given commodity regard the domestic and the imported varieties of this commodity as imperfect substitutes. The Armington assumption is also used in input demands for industry investment and in household demands for consumption.

Computing solutions for AAGE
AAGE is a system of non-linear equations. It is solved using GEMPACK, a suite of programs for implementing and solving economic models. A linear, differential version of the AAGE equation system is specified in syntax similar to ordinary algebra. GEMPACK then solves the system of non-linear equations as an Initial Value problem, using a standard method, such as Euler or midpoint. For details of the algorithms available in GEMPACK, see Harrison and Pearson (1996).

Scenarios and expected results
A baseline is constructed to introduce all ongoing policy developments and known shocks to the economy so as to ensure that the policy scenario is undertaken in an economy where all known developments and shocks are accounted for, with the exception of removing AGP. The Baseline takes the economy from the model’s initial year (1995) to 2010, and the effects of removal of AGP are evaluated in the year 2010.

We construct the AGP scenarios as a change in the total factor productivity (TFP). This is because the model has no explicit treatment of AGPs. We use the calculated percentage increases in production costs (from Table 2) to reduce the TFP so that the unit cost of production increases by 1.05 % for pig production.

Two sensitivity analyses are also undertaken where the cost per produced pig is increased/decreased by 25 % cf. table 2.

Expected results from the analysis
The removal of AGP increases the unit cost of pig production. A higher unit cost requires a higher product price if profits are to remain unchanged. Yet a higher product price invites lower demand. A decline in demand/production releases resources from the pig sector, which can then be used in other sectors of the economy. The increased supply of resources to other sectors in the economy lowers the price and required rent
of these resources. A reduction in the required rental rates tends to favour those industries that are not affected by the removal of AGPs. As the production of pigs only accounts for a minor fraction of total national production, the effects on the rest of the economy are expected to be moderate. The expected negative impact on pig production is expected to lower the demand for cereal for feed purposes, exerting downward pressure on cereal prices. In turn, this is expected to benefit the cattle and poultry sectors that use cereals in this way. This should result in increased poultry production and a higher value of dairy quota (as the cattle sector is effectively constrained by the quota).

**Results**

This section presents results for production, exports and the macroeconomic performance of the calculated AGP scenario. The presentation focuses on the results for the primary agricultural and associated processing sectors.

*Production and exports*

The production of live and processed pigs falls by 1.4 %, cf. Table 3. This effect is due to the AGP removal working as an increase in unit cost, which in the longer run requires higher product prices, lowering demand for the product. The increase in unit cost also affects the export possibilities for processed pig meat, which declines by 1.7 %. A large part of cereal production is used for feed purposes, and the reduced production of pigs also causes cereal production to decline by -0.1 %.

Even though the Baseline is not a subject of this paper it worth noting that the production of pigs is expected to grow by 30.5 % from 1995 to 2010 (Jacobsen 2001). The removal of AGP is therefore estimated to reduce this growth to 28.7 %.

The reduction in the production and processing of pigs leads to a lower demand for labour and new capital goods in these industries, resulting in a minor reduction in the wage rate and the price of new capital goods, cf. Table 4. This effect favours other industries not affected by the removal of the AGP’s since lower factor prices reduce unit costs causing production and exports to increase for these industries. Lower factor prices and lower price of cereals benefits poultry production, which is seen to increase by 0.4 % while the processing of poultry meats increases by 0.4 % and export volume increases by 0.5 %.

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2 A more thorough presentation of the Baseline scenario can be found in Jacobsen (2001).
### Table 3. Consequences of abolishing AGP, percentage changes

<table>
<thead>
<tr>
<th></th>
<th>Production</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereal</td>
<td>-0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Oilseed</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Potatoes</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Sugar beet</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Roughage</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Cattle, live animals</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Pig, live animals</td>
<td>-1.4</td>
<td></td>
</tr>
<tr>
<td>Poultry and eggs</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Fur farming</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Horticulture</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Manure</td>
<td>-0.6</td>
<td></td>
</tr>
<tr>
<td><strong>Processing:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle meat</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Pig meat</td>
<td>-1.4</td>
<td>-1.7</td>
</tr>
<tr>
<td>Poultry meat</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Dairy</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Sugar refineries</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Other (selected):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processed fruit and vegetables</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Bread, grain mill and cakes</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Bakery shops</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Beverage and Tobacco</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Agricultural services, forestry and fisheries</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Textile, wood, paper and publishing</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Basic chemicals</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Construction incl. Supply</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Metals products</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Public services and utilities</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Retail and wholesale margins</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Private services</td>
<td>0.0</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Macroeconomic results**

The macroeconomic consequences of AGP removal are moderate. Real GDP falls by 0.03 % or 363 mill DKK at 1995 prices. This is the net result of the reduced production of pigs and cereals on the one hand, and the increased production in most other industries due to lower rental rates for primary factor inputs on the other hand.

Lower rental rates also affect real private and public consumption\(^3\) falling by -0.03 %. This corresponds to a lower real value of private consumption of 45 DKK per capita per year.

---

\(^3\) The two consumption categories are equalised in the so-called model closure.
The resulting reallocation of primary factor inputs results in an economic state where all factor input are a little less productive in the aggregate. All factors of production receive lower rental rates and the aggregate capital stock has somewhat declined, reflecting an economic state where production potential has decreased slightly.

<table>
<thead>
<tr>
<th>Table 4. Macroeconomic consequences of abolishing AGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-Level(^d)</td>
</tr>
<tr>
<td>Billion 1995-DKK</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Real GDP</td>
</tr>
<tr>
<td>Real private consumption</td>
</tr>
<tr>
<td>Real public consumption</td>
</tr>
<tr>
<td>Real investments</td>
</tr>
<tr>
<td>Real stocks</td>
</tr>
<tr>
<td>Real exports</td>
</tr>
<tr>
<td>Real imports</td>
</tr>
<tr>
<td>Real capital stock</td>
</tr>
<tr>
<td>GDP deflator</td>
</tr>
<tr>
<td>Consumer price index</td>
</tr>
<tr>
<td>Price of investment goods</td>
</tr>
<tr>
<td>Terms of Trade</td>
</tr>
<tr>
<td>Nominal wage rate</td>
</tr>
<tr>
<td>Price of agricultural land</td>
</tr>
</tbody>
</table>

Abolishing the use of AGP’s also leads to a slightly lower (-1.37 \%) price of agricultural land. The mechanism for this is the reduced demand for fodder reducing profitability in the cereals sector.

**Sensitivity analysis**

The results of the sensitivity analysis show that changes to pig production, real GDP and land prices vary with plus minus 25 \% in accordance with the higher/lower estimated cost of removing AGP.\(^5\) Therefore the results presented in this paper are sensitive to the initial estimation of increased cost due to the abolishment of AGP. The results of the sensitivity analysis are shown in appendix C.

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\(^d\) 1995-DKK in the year 2010

\(^5\) Even though the model is non-linear the shock to the economy are so small that second round effects and non-linearity only plays a minor role to model results.
Conclusion

This paper has analysed the economy wide implication of the unilateral Danish removal of Antimicrobial Growth Promoters in the production of pigs and poultry. The analysis shows that the long-term effects are a moderate decline in the production and export of pig meat, and positive indirect effects on other industries due to lower rental rates. Interestingly, positive indirect effects mostly impact the poultry sector, which also abolish the use of AGPs from production. The overall implication is a small decrease in real GDP and consumption.

The decrease in the production of pig meat should be seen in the light of the baseline where pig production is expected to increase by 30.5 % over the 15 year period or 1.8 % per year on average. Removing AGPs from pig production reduces this growth in production to 28.7 % which is equivalent to an annul growth rate of 1.7 %, offsetting the ongoing expansion of the pig sector by approximately one year.

The sensitivity analysis undertaken in this paper show, that the results are sensitive to the initial estimation of the increased costs of abolishing AGP.

Even though the cost in terms of real GDP and consumption are small, cost analysis such as the one presented could be compared with expected benefit of the removal of AGP. These benefits have not been a part of this analysis and only if the benefits are determined or assumed to exceed the cost could such a removal be said to be beneficial to society as a whole.

Naturally, the results found should be evaluated in light of the assumptions employed. Compared with other, partial equilibrium, economic analysis the present analysis takes into account the economic linkages between the individual agricultural sectors and between the agricultural sectors and the industrial sectors, and consumer preference or willingness to pay. Furthermore, the analysis has taken into account the derived cost and price effects and the implications of explicitly representing the overall macroeconomic budgetary restrictions. The simulations have also been undertaken with a national AGE model assuming unilateral Danish policy initiatives, as well as it has been assumed that the removal of the AGPs does not affect consumer preferences domestically or on the export markets for Danish pig and poultry meat.
References


### Table A1. Industries and commodities in Organic-AAGE

<table>
<thead>
<tr>
<th>Industries</th>
<th>Commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td>*# 1-2 Cereal</td>
<td>* 1-2 Cereal</td>
</tr>
<tr>
<td>*# 3-4 Oil seeds</td>
<td>* 3-4 Oil seeds</td>
</tr>
<tr>
<td>*# 5-6 Potatoes</td>
<td>* 5-6 Potatoes</td>
</tr>
<tr>
<td>*# 7-8 Sugarbeets</td>
<td>* 7-8 Sugarbeets</td>
</tr>
<tr>
<td>*# 9-10 Roughage</td>
<td>* 9-10 Roughage</td>
</tr>
<tr>
<td>* 11-12 Meat cattle and milk producers</td>
<td>* 11-12 Meat cattle</td>
</tr>
<tr>
<td>* 13-14 Milk</td>
<td>* 13-14 Milk</td>
</tr>
<tr>
<td>* 15-16 Meat cattle and milk producers</td>
<td>* 15-16 Meat cattle</td>
</tr>
<tr>
<td>17 Hunting and fur farming, etc.</td>
<td>17-18 Poultry</td>
</tr>
<tr>
<td>*# 18-19 Horticulture</td>
<td>19 Hunting and fur farming, etc.</td>
</tr>
<tr>
<td>* 20 Agricultural services, etc.</td>
<td>20-21 Horticulture</td>
</tr>
<tr>
<td>21 Forestry</td>
<td>22 Agricultural services, etc.</td>
</tr>
<tr>
<td>22 Fishing</td>
<td>23 Forestry</td>
</tr>
<tr>
<td>23 Extraction of coal, oil and gas</td>
<td>24 Fishing</td>
</tr>
<tr>
<td>* 24-25 Cattle-meat products</td>
<td>25 Extraction of coal, oil and gas</td>
</tr>
<tr>
<td>* 26-27 Pig-meat products</td>
<td>26-27 Cattle-meat products</td>
</tr>
<tr>
<td>* 28-29 Poultry-meat products</td>
<td>28-29 Pig-meat products</td>
</tr>
<tr>
<td>30 Fish products</td>
<td>30-31 Poultry-meat products</td>
</tr>
<tr>
<td>* 31-32 Processed fruit and vegetables</td>
<td>32 Fish products</td>
</tr>
<tr>
<td>33 Processed oils and fats</td>
<td>23-34 Processed fruit and vegetables</td>
</tr>
<tr>
<td>* 34-35 Dairy products</td>
<td>35 Processed oils and fats</td>
</tr>
<tr>
<td>36-37 Starch, chocolate products, etc.</td>
<td>36-37 Dairy products</td>
</tr>
<tr>
<td>* 38-39 Bread, grain mill and cakes</td>
<td>38-39 Starch, chocolate products, etc.</td>
</tr>
<tr>
<td>* 40-41 Bakery shops</td>
<td>40-41 Bread, grain mill and cakes</td>
</tr>
<tr>
<td>* 42-43 Sugar factories and refineries</td>
<td>42-43 Bakery shops</td>
</tr>
<tr>
<td>44 Beverage production</td>
<td>44-45 Sugar factories and refineries</td>
</tr>
<tr>
<td>45 Tobacco manufacture</td>
<td>46-47 Beverage production</td>
</tr>
<tr>
<td>46 Textile, wearing apparel and leather</td>
<td>48 Tobacco manufacture</td>
</tr>
<tr>
<td>47 Manufactured wood and glass products</td>
<td>49 Textile, wearing apparel and leather</td>
</tr>
<tr>
<td>48 Paper products and publishing</td>
<td>50 Manufactured wood and glass products</td>
</tr>
<tr>
<td>49 Oil refinery products</td>
<td>51 Paper products and publishing</td>
</tr>
<tr>
<td>50 Basic chemicals</td>
<td>52 Oil refinery products</td>
</tr>
<tr>
<td>51 Fertiliser</td>
<td>53 Basic chemicals</td>
</tr>
<tr>
<td>52 Agricultural chemicals nec</td>
<td>54 Fertiliser</td>
</tr>
<tr>
<td>53 Non-metallic building material</td>
<td>55 Agricultural chemicals nec</td>
</tr>
<tr>
<td>54 Metal products</td>
<td>56 Non-metallic building material</td>
</tr>
<tr>
<td>55 Machinery and non-transport equipment</td>
<td>57 Metal products</td>
</tr>
<tr>
<td>56 Transport equipment</td>
<td>58 Machinery and non-transport equipment</td>
</tr>
<tr>
<td>57 Electricity</td>
<td>59 Transport equipment</td>
</tr>
<tr>
<td>58 Gas</td>
<td>60 Electricity</td>
</tr>
<tr>
<td>59 Steam and hot water</td>
<td>61 Gas</td>
</tr>
<tr>
<td>60 Construction</td>
<td>62 Steam and hot water</td>
</tr>
<tr>
<td>61 Motor vehicles service</td>
<td>63 Construction</td>
</tr>
<tr>
<td>62 Wholesale trade</td>
<td>64 Motor vehicles service</td>
</tr>
<tr>
<td>63 Retail trade</td>
<td>65 Wholesale trade</td>
</tr>
<tr>
<td>64 Freight transport</td>
<td>66 Retail trade</td>
</tr>
<tr>
<td>65 Financial and property services</td>
<td>67 Freight transport</td>
</tr>
<tr>
<td>66 Transport and communication services</td>
<td>68 Financial and property services</td>
</tr>
<tr>
<td>67 Public services</td>
<td>69 Transport and communication services</td>
</tr>
<tr>
<td>68 Dwelling ownership</td>
<td>70 Public services</td>
</tr>
<tr>
<td>69 Dwelling ownership</td>
<td>71 Dwelling ownership</td>
</tr>
<tr>
<td>70 Coal imports</td>
<td>72 Coal imports</td>
</tr>
<tr>
<td>71 Manure</td>
<td>73 Manure</td>
</tr>
<tr>
<td>72 Fungicide</td>
<td>74 Fungicide</td>
</tr>
<tr>
<td>73 Insecticides</td>
<td>75 Insecticides</td>
</tr>
<tr>
<td>74 Herbicide</td>
<td>76 Herbicide</td>
</tr>
</tbody>
</table>

* Both conventional and organic product/production. # Land using industries.
Appendix B Nesting structure

Figure B1. Nesting structure of Organic - AAGE

Production

Special Imports

Capital, Labour, Energy, Fertiliser, Pesticides, Land and Intermediate Inputs

Taxes

Intermediate Inputs

Capital, Labour, Energy, Fertiliser, Pesticides, Land

Herbicides

Capital, Labour and Energy

Energy

Capital and Labour

Fertiliser and Fungicides

Land

Fertiliser

Insecticides

Fertiliser, Fungicides and Land

Fertiliser, Fungicides, Land and Insecticides

Herbicides

Capital, Labour, Energy and Herbicides

Energy

Capital

Labour

Manure
## Appendix C, Result of sensitivity analysis

### Table C.1. Consequences of abolishing AGP, percentage changes

<table>
<thead>
<tr>
<th></th>
<th>Production</th>
<th>Export</th>
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<td>Sugar refineries</td>
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<td>Processed fruit and vegetables</td>
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<td>Bread, grain mill and cakes</td>
<td>0.028</td>
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<td>Bakery shops</td>
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<td>Beverage and Tobacco</td>
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<td>Agricultural services, forestry and fisheries</td>
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<td>Textile, wood, paper and publishing</td>
<td>0.034</td>
<td><strong>0.045</strong></td>
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<td>Basic chemicals</td>
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<td>Construction incl. Supply</td>
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<td>Metals products</td>
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<td>Public services and utilities</td>
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<td>Retail and wholesale margins</td>
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<td>Private services</td>
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### Table C.2. Macroeconomic consequences of abolishing AGP

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<td>DKK</td>
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<td>Real GDP</td>
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<td>-270</td>
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<td>Real private consumption</td>
<td>694.7</td>
<td>-174</td>
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<td>Real public consumption</td>
<td>353.8</td>
<td>-89</td>
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<td>Real investments</td>
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<td>Real exports</td>
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<td>Real imports</td>
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<td>Real capital stock</td>
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<td>Price of investment goods</td>
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<td>Price of agricultural land</td>
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