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A POLICY IMPACT EVALUATION MODEL FOR SCOTLAND: DECOUPLING SINGLE FARM PAYMENTS

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Abstract

The purpose of this paper is to assess the impacts of decoupling single farm payments in Scotland. It focuses on aggregate impacts on the agricultural products in domestic and external markets and the spill-over effect of this on the non-agricultural sector as well as an aggregate impact on the Scottish GDP. In order to capture system-wide impacts of the policy reform, a CGE model was formulated and implemented using a social accounting matrix constructed for Scotland. The simulation results suggest that the Scottish agricultural sector may encounter declines in output and factor us as a result of the policy reform. However, this critically depends on two factors: (a) the price effect of the policy reform on Scottish agricultural products relative to the EU average as well as the conditions of changes in world agricultural market prices; and (b) the extent to which customers would be sensitive to price effects of the policy reform. As far as the spill-over effect to the non-agricultural sector is concerned, decoupling of direct payments seems to have a positive spill-over effect. Similarly, the aggregate GDP effect is positive under all simulation scenarios. Critically, the simulation experiments indicate that policy shock may have a symmetrical outcome across the two sectors, with contractions in agriculture being accompanied by expansions in the non-agricultural sector, mainly because of factor market interactions between the two sectors.

Introduction

The purpose of the paper is to assess the implications of decoupling direct payments from production for aggregated economic indicators of the agricultural sector and spill-over effects to the non-agricultural sector. It investigates possibilities of induced resource allocations as well as sectoral shifts in demands and outputs of agriculture and non-agricultural sectors. Given the nature of the decoupled single farm payment as an income transfer, the study pays particular attention to the impact of the policy change on rural and urban households.

The Common Agricultural Policy (CAP) of the EU is one of the main drivers of European agricultural systems influencing how, and to what extent, resources are used. Since its establishment in the Treaty of Rome in 1957, the CAP has had to adapt several times in order to meet the challenges it has faced over the years. The MacSharry reform in 1992 introduced coupled direct payments compensating for lower institutional market support prices. The aim of the Agenda 2000 reform agreed in 1999 was to deepen and widen the 1992 reform by further replacing price support with direct payments, and by consolidating and strengthening this process by Rural Development Regulation 1257/1999 (EU-Commission 1999). But EU enlargement, World Trade Organisation (WTO) negotiations, budget concerns, environmental concerns and farming crises such as Bovine Spongiform Encephalopathy (BSE) and Foot-and-Mouth Disease (FMD) clearly indicated the need for further reforms of the CAP (Buller 2003, Binfield et al. 2004). In June 2003 the Council of Agriculture Ministers of the EU agreed on a new reform of the Common Agricultural Policy introducing decoupling of direct payments (EU-Commission 2003).

One of the key elements of the recent CAP reform is the introduction of the Single Farm Payment which replaces most of the direct payments in the beef, sheep, dairy and cereals sectors and decouples direct payment from production. A number of studies have been carried out to assess the potential implications for the agricultural sector in the EU and UK. For example, Conforti (2004) analysed

different CAP scenarios, including different decoupling options, with the Global Trade Analysis Project (GTAP) modelling approach for the agricultural sector in the EU. UK examples are, amongst other, a study commissioned by the Department for Environment, Food and Rural Affairs (DEFRA) (Revell and Oglethorpe 2003) analysing the potential impact of decoupling on the livestock sector in the UK and Moss et al. (2002) assessing the implications of decoupling for the beef, sheep, dairy, cereals and rapeseed sectors in the UK using the Food and Agricultural Policy Research Institute (FAPRI) modelling system. These studies focus on the direct impacts of decoupling on specific sectors within agriculture using farm level models and partial equilibrium models. There seems to be less research on the impact on the agricultural sector at aggregated level. Moreover, most of the available studies do not examine spill-over effects of CAP changes on the wider economy and do not explicitly take into account potential policy implications for rural and urban households.

Thus, in this study a Computable General Equilibrium (CGE) model for Scotland has been developed differentiating between the agricultural sector and a non-agricultural sector and between rural and urban households. The consideration of, and differentiation between, rural and urban households is important to explicit capture the policy change from production-related subsidies to income transfers (decoupled direct payments) paid by the government to mainly rural households. The paper analyses six separate policy simulation runs, implemented in the CGE model, to illustrate a range of conditions surrounding decoupling of direct payments. The database for the model consists of a social account matrix (SAM) for Scotland largely based on the 1999 Scottish IO table but also supplementing this with national income accounts published in various issues of Scottish Economic Statistics.

Scotland provides a particular interesting case study as Scottish agriculture and rural areas are particular vulnerable to policy change (Schwarz et al. 2003). Scottish agriculture is still an important industry in rural Scotland but a large portion of agricultural land is classified as less-favoured area and 98%of that is

severely disadvantaged. Climatic, natural and structural conditions make it difficult for Scottish agriculture to compete on international markets (SEERAD 2002). For many farmers and rural households in Scotland subsidies are an important income source and the nature of these payments, direct payments linked to production or purely income transfers, crucially affects economic behaviour of farmers and rural households.

The paper is divided in five main parts. Following the introduction section 2 describes the policy background and explains the theoretical concept of decoupling. Section 3 summarises the CGE model concentrating on novel model features. This is followed by the presentation and explanation of the policy simulation results (section 4) divided into sectoral impacts and a sensitivity analysis of the trade elasticity parameters explaining the impact on the results of different assumptions with respect to demand substitution. Finally, the paper concludes with a discussion of the results and providing an outlook how the analysis could be extended.

Policy context and conceptual framework

This section consists of two parts. The first part provides an overview about the policy context of the paper. It summarises the main elements of the recent CAP reform and outlines how the reform is applied in Scotland providing the policy background for the model simulations explained in section 4. This is followed by an explanation of the conceptual framework of decoupling. The principal impacts of direct payments, coupled and decoupled, on prices and quantities on EU agricultural markets are outlined explaining the theoretical background for changes in aggregated sectoral indicators.

1.1 CAP reform and its application in Scotland

Support for agriculture from the European Union has been, for many years, centred around the provision of production based subsidies – i.e. subsidies are based on how many hectares are under crop production or how many livestock

units are produced. This emphasis on production subsidies has been the main driver for overproduction and intensification of agriculture that has led to environmental damage – not to mention placing extreme stress on the EU's agricultural budget (Brouwer et al. 1998). To resolve these issues the MacSharry reform in 1992 began the process of reforming the CAP which was continued through the Agenda 2000 reform in 1999 (EU-Commission 1999).

Nevertheless, EU enlargement, WTO negotiations, budget costs, environmental concerns and farming crises such as BSE and FMD indicated the need for further reforms of the CAP. These driving forces are emphasised by considerable socio-economic changes in rural areas and the decreasing importance of agriculture in the rural economy. Recent debates on the future role and nature of the CAP concentrate on aspects of strengthening rural development, environmentally sound methods of production of safe and high-quality agricultural products, and market-oriented food production. In this context, decoupling direct payments from production and transferring funds from the first pillar of the CAP to the second pillar are two of the major issues (SEERAD 2003a, Buller 2003).

Consequently, the Council of Agriculture Ministers of the EU agreed a new reform of the Common Agricultural Policy on 26 June 2003 (EU-Commission 2003) which will move farmers away from most production based subsidies, and replace these with a single farm payment (SFP) based on historic subsidy receipts from 2000 to 2002. While money will be allocated to all farms receiving subsidies during this period, payments to individual producers will depend on the fulfilment of cross-compliance requirements with respect to statutory environmental, food safety and animal welfare standards and on keeping the land in good agricultural and environmental conditions (GAEC) (Schwarz et al. 2003).

In addition to the historically based SFP, in Scotland a national envelope (retaining up to 10% of decoupled payments) will be made available to the beef sector only, with payments around £70 per beef bred calf (for the first ten calves per farm, then £35 per calf) reflecting the importance of the beef industry in

Scotland. In estimation by the Scottish Executive, utilising the full provision of a National Envelope for beef would provide £18 million for beef farmers. While Member States have been given the flexibility to maintain a limited number of coupled (production based) elements in order to avoid land abandonment and possibly to maintain national competitiveness, the Scottish Executive has embraced the reforms wholesale and has decided to apply full decoupling by removing all existing support schemes and allowing producers to decide in response to the market rather than subsidy incentives.

The SFP will be reduced through a system of compulsory modulation of direct payments, as agreed by the Member States, transferring funds to the second Pillar of the CAP. Small farms with a SFP below €5000 will be exempted from the compulsory EU modulation. In addition to the new compulsory EU modulation, the Scottish Executive also intends to continue voluntary national modulation and to increase the total modulation rate (compulsory EU modulation plus voluntary national modulation) to 10% by end 2007 (SEERAD 2004). The Scottish Executive has estimated that this will contribute an additional £30 million per year to rural development by the end of 2007 (compared to £12.4 million in 2004). In addition to this £30 million, the UK treasury has agreed to provide match funding for monies raised through modulation, guaranteeing a pound from the UK treasury for every pound Scotland obtains through national modulation (subject to a review later this year (SEERAD 2004)). It is important to note that additional funding available from national modulation can only be used for accompanying measures while funding available from compulsory EU modulation can be used for both accompanying and non-accompanying measures (SEERAD 2003 a and b).

The Scottish Executive has decided to apply the CAP reform through Land Management Contracts (LMCs) integrating support via Pillar 1 (mainly the SFP) and Pillar 2 (the Scottish Rural Development Plan - SRDP) into a whole farm

approach consisting of three tiers (SEERAD 2003a)[1]. By applying such contracts nation-wide the objectives of the SFP and SRDP could be more integrated. At this time, SEERAD has initiated a consultation process on the LMC Menu Scheme (tier II) discussing what agricultural and non-agricultural measures should be included in the LMC Menu Scheme (SEERAD 2004c). The menu approach consists of a number of different measures farmers can choose from, and thus could allow farmers to incorporate measures that account for the specific characteristics and roles of family farms. The outcome of the consultation process will determine when LMCs are introduced and how pillar I and pillar II support will be integrated in Scotland.

The current SRDP will be replaced with a new plan from 2007. The EU commission published a proposal for a new regulation in July 2004 to replace the existing Rural Development Regulation (RDR) which suggests a new single fund for rural development, the European Agricultural Fund for Rural Development (EAFRD). The proposal defines rules for rural development expenditure from 2007 – 2013. Once the budget and rules are fixed Scotland can prepare a new Rural Development Plan and submit it to the EU commission for approval.

While there are a number of different elements in the CAP reform which potentially have a strong impact on the Scottish agricultural sector, the main policy change is the decoupling of direct payments from production. Initially, direct payments have been introduced in the CAP as production based subsidies through the MacSharry CAP reform in 1992 offering farmers financial compensation for reductions in border protection measures and minimum prices. This process continued in the Agenda 2000 reform in 1999 with further reductions in market price support and increases in direct payments. Direct payments were coupled to production, although with ceilings and production

[1] The concept behind LMC's is of a whole farm system of support where farm businesses undertake to deliver a range of economic, social or environmental benefits in return for support payments. A three tier structure has been suggested with the decoupled SFP as the first tier and the proposed LMC Menu Scheme as the second tier. The third tier will be top-up payments to reward more specific benefits involving both one-off capital or short-life projects, available on a competitive basis along the lines of the existing Rural Stewardship Scheme (SEERAD 2003a).

quota, through number heads (livestock) and number of hectare of arable land (crops). But with the latest reform in June 2003 most production related direct payments have been substituted through the Single Farm Payment and, most importantly, decoupled from production. This is expected to lead to large redistribution effects within agriculture but also between agriculture and the rest of the economy. The following section will explain the conceptual framework of decoupling of direct payments.

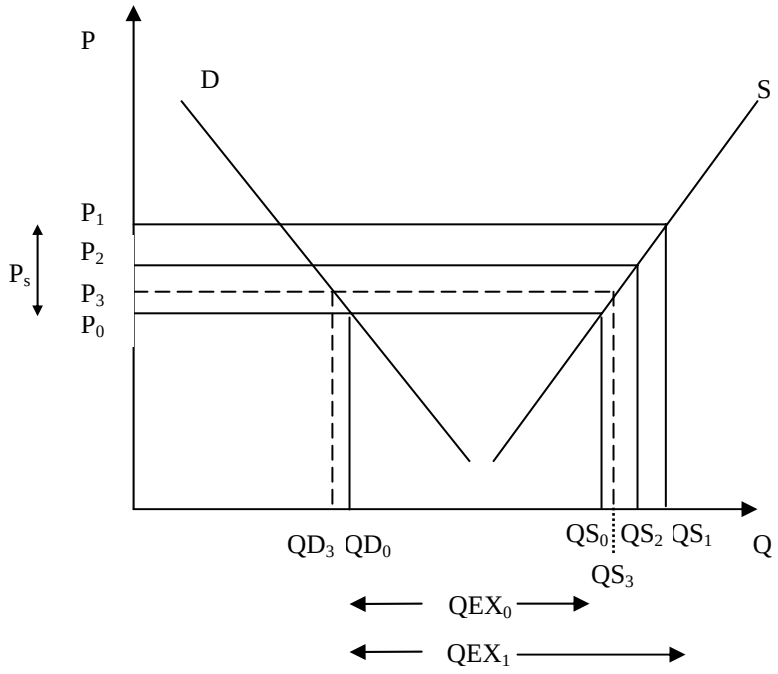
1.2 Conceptual framework of decoupling direct payments in the agricultural sector

The concept of decoupling has become one of the key issues in CAP design. Several definitions have been put forward, all of them relate to the extent of the production effects of farm support. Cahill (1997) differentiates between the concepts of fully decoupled and effectively fully decoupled. A policy scheme is defined as fully decoupled if it does not influence production decisions of farmers receiving payments and that it allows free market determination of prices. This is the more restrictive form of decoupling also requiring, in addition to no changes in equilibrium price and quantities, that demand and supply functions remain unchanged when the policy scheme is introduced and with no difference in the response of the market to any exogenous shock arising on the demand or the supply side. On the other hand, a policy scheme is defined as effectively fully decoupled if it results in production that does not exceed the level that would exist without it. That is, production decisions by farmers could be affected by the policy scheme but in a way that does not result in larger production, although supply responses to external shock would be different with and without the policy regime (Cahill, 1997; OECD, 2001).

However, Moro and Sckokai (1999) refer to decoupling and coupling of direct payments by comparing the impact of direct payments and the impact of producer price increase on production and trade. As figure 1.1 shows, coupled direct payments have the same effect on production and trade. A coupled direct

payment Ps per unit of output raises the producer price from P_0 to P_1 ($P_1 = P_0 + P_s$) and leads to an increase in supply from QS_0 to QS_1 and, consequently, in exports from QEX_0 to QEX_1. On the other hand, a decoupled payment, an income transfer not linked to production, does not directly affect the producer price and production quantity. In the example of figure 1.1, supply would remain constant at QS_0. In between these two versions of direct payments are partial coupled direct payments, e.g. existing EU direct payments (being substituted by the decoupled SFP beginning of 2005). Such payments result in producer price level and production that exceeds the level that would exist without it (P_0, QS_0) but does not exceed which would exist if the scheme was fully coupled to production (P_1, QS_1) (Moro and Sckokai 1999, Cahill, 1997).

Figure 1: Production and price effects of direct payments on agricultural markets



EU direct payments are linked to specific production systems but include payment ceilings and production quotas. Hence, the base situation for looking at the introduction of the decoupled SFP on agricultural markets in Scotland is characterized by producer price and production level between P_0 and P_1 and QS_0 and QS_1, respectively. Changing the partial coupled direct payment to a decoupled income transfer reduces the producer price P_2 ($P_1 > P_2 < P_0$) to market

price level (P_0). The decrease in producer price leads to lower output and supply quantities on agricultural markets will decrease from $QS_2$to QS_0. A lower supply quantity causes an adjustment of the market price leading to a market price increase from P_0 to P_3 which then leads to a reduction of demand from QD_0 to QD_3 and a slight recovery of supply to QS_3. Through these market effects decoupling also affects agricultural trade. In this example of an export market, export quantities will go down as the reduction of supply is bigger than the decrease in demand. The decline of the producer price through the abolishment of rather large partial coupled direct payments causes bigger quantity effects than the market price adjustment. Figure 1.2 explains in more detail mechanism of the upward adjustment of the market price.

These effects described above are only relevant for agricultural markets where direct payments have been applied in the past. On other markets such as pork and poultry markets supply quantities are likely increase due to changes in relative market prices and, consequently, redistribution of resources between the different agricultural markets. But overall, aggregating the different commodity supply quantities to a single agricultural output indicator, it can be expected that abolishing production related subsidies or payments will lead to a reduction in agricultural output, in particular given the large amount of production-related direct payment support for the Scottish agricultural sector.

Description of the Computable General Equilibrium (CGE) model

The conceptual and theoretical discussion in the preceding section provides an interesting insight into conditions of price determination through demand and supply interaction and the role producer subsidy, which is a wage between producer and market prices. Given our interest in inter-sectoral spill-over effects of the policy reform, it becomes essential to employ a modelling framework that accounts for system-wide effects. For this purpose, we require a modelling approach that fully captures interactions between different markets. CGE models are proving increasingly powerful and popular in this context. Such models build

upon the input-output basic data but are capable of accommodating the supply side in a theory-consistent manner. This approach deals with the endogeneity of relative prices (and therefore competitiveness) and quantities as all markets equilibrate simultaneously.

The formulation of our model closely follows the theoretical structure of standard CGE models (Hosoe and Hashimoto 2004; Lofgren et al 2002). Logren et al (2002) provides detailed descriptions of the theoretical structure, algebraic formulations of system of equations for a standard CGE model. Hence, the discussion here is limited to novel aspects of this model. Given that the primary motivation of this paper is to examine aggregate impacts of the policy reform, the model distinguishes between only two producing industries: agricultural activity and non-agricultural activities. Each industry is assumed to produce one commodity: a composite agricultural commodity and a composite non-agricultural commodity. The model distinguishes between rural households and urban households. This is distinction is important because the policy reform essentially relocates funds from production subsidy to farming household income support. The government account is used to transfer subsidies from production to household accounts. The model is essentially static with no variation in the size of factor endowment in the economy during the simulation period. At this stage of model formulation and development, it is important to focus on the “impact interval effect” or the “immediate effect” of the exogenous shock, decoupling of single farm payments, on a range of economy-wide variables. Medium and long-term impacts of the policy shock through induced impacts, for instance, on changes in labour supply via migration or adjustments to capital stock via investment are left for future research (Harigan et al 1991).

Figure 2 provides a graphic display of the production function. Further details of the structural equations for the model, with block by block illustration of institutional accounts, are provided in Appendix A. Sectoral production is modelled as a nested multi-level structure allowing for variations in substitution parameters at different stages and hence bringing greater realism into the model

framework. The top-level structure determines sectoral output (QA_a) as aggregation of intermediate inputs (QI_a) and value-added (QVA_a) using a Leontief functional form, which means that substitution between inputs is not allowed at this level. At the second level of the production nest, the value-added and intermediate composites are split into their components. On the one hand, the composite quantity of intermediate demand by each producing sector is disaggregated into demand for a composite agricultural good and a composite non-agricultural good, which are treated as complementary rather than substitutes in intermediate consumption.

Figure 2 – Structure of production

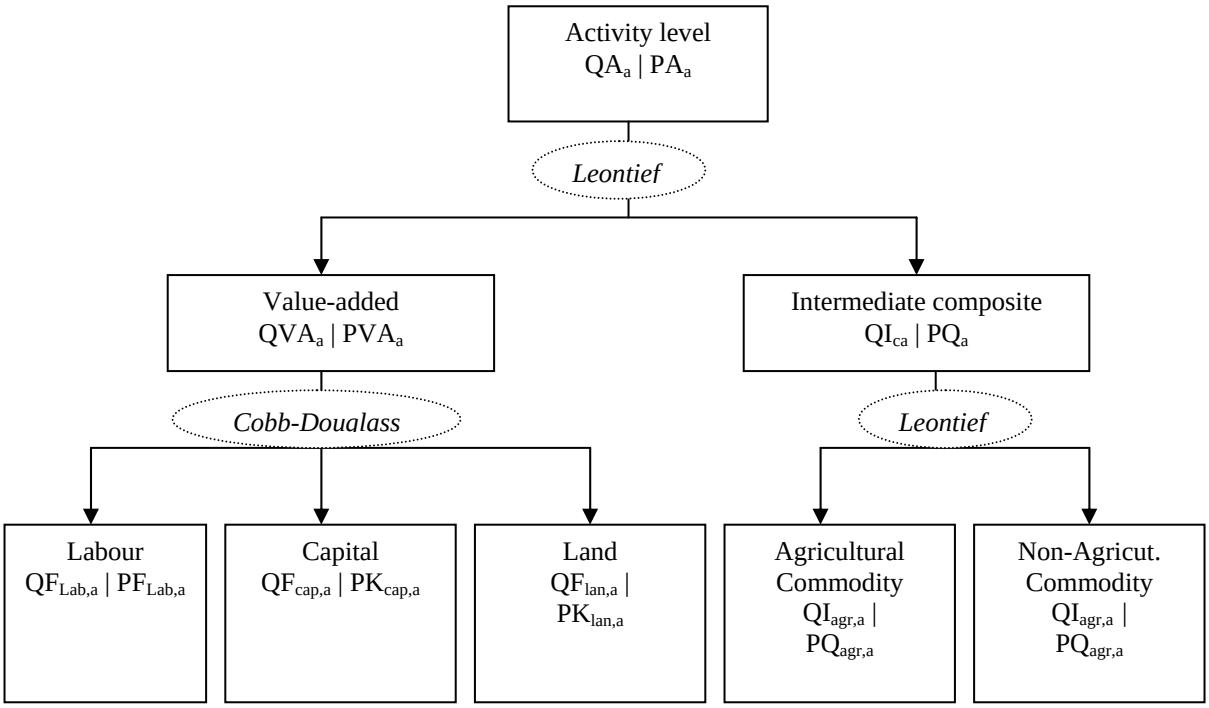
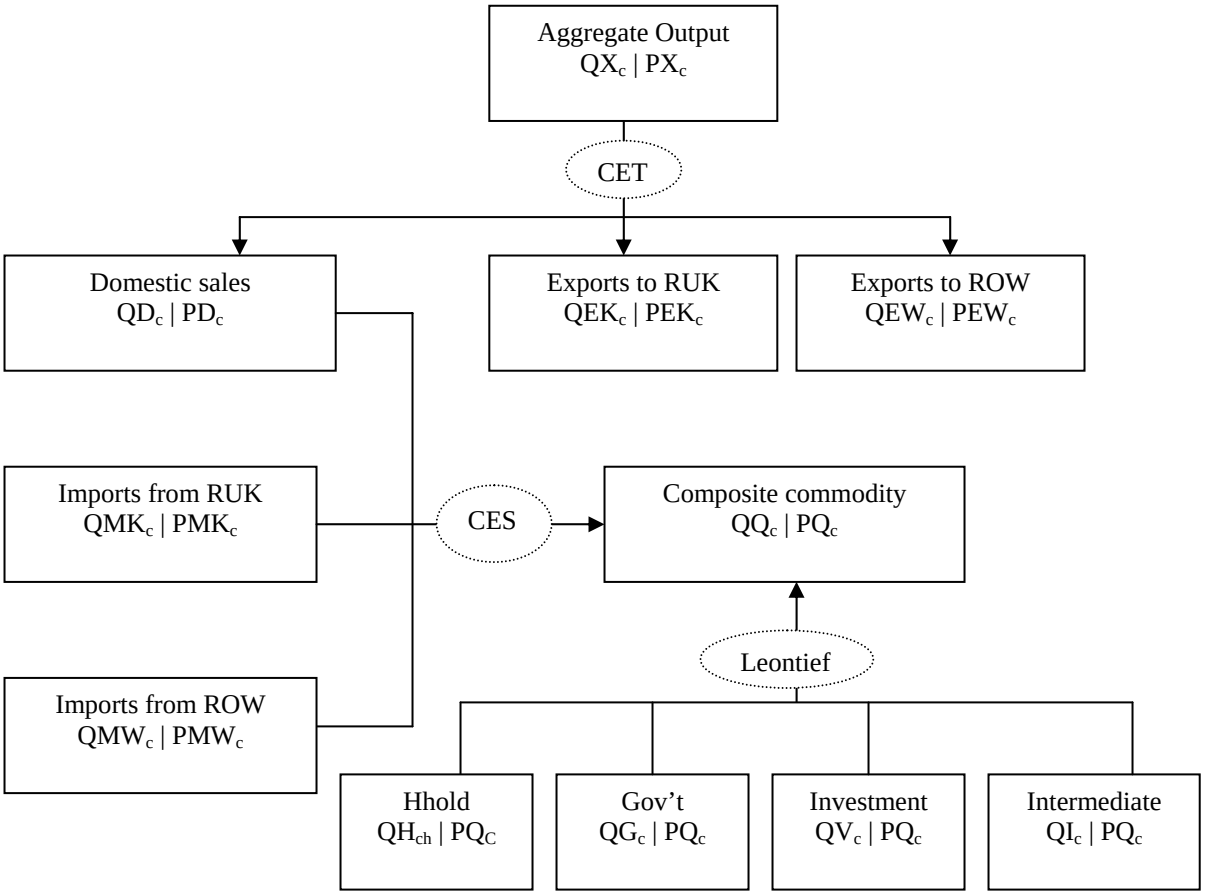


Figure 3 – Flow of marketed commodities



On the other hand, the value-added composite is decomposed into labour, land and capital using a Cobb-Douglass functional form, which allows substation between factors of production. Demand for factors of production is derived from the first order conditions of profit maximisation. This means that quantity demanded of each factor (QF_a) is a decreasing function of the corresponding factor prices (PF_a) and an increasing function of the volume of output (QX_a).

Figure 3 displays flow of marketed commodities. The upper part shows a Constant Elasticity of Transformation (CET) function, allocating domestic commodity output (QX_c) to different geographical destinations: domestic sales

(QD_c), exports to RUK (QEK_c), and exports to rest of the world (QEW_c). The lower part of the diagram shows determination of domestic demand for a commodity composite (QQ_c) from a two-way aggregation. On the one hand, it is determined as a Leontief aggregation of demands by domestic economic agents: intermediate demand by the producing sectors and the final demand sectors. On the other hand, the Armington assumption is employed to disaggregate demand into commodities from different geographical origins using a Constant Elasticity of Substitution (CES) functional form. The Armington assumption implies that commodities from different geographical origins are treated as imperfect substitutes (Armington 1969).

The database for the model consists of a social account matrix (SAM) for Scotland largely based on the 1999 Scottish IO table but also supplementing this with national income accounts published in various issues of Scottish Economic Statistics.

Sectroal value-added constitutes the bulk of household income in each region. They also receive transfer payments from the government and the rest of UK. Given that agriculture is mainly a rural activity and that agricultural income largely goes to rural households, it was essential to have separate accounts for rural households and urban households in formulating the model.

Simulation Results

The model is implemented with six separate simulation runs to illustrate a range of conditions surrounding decoupling of single farm payments. The first simulation run simply replicates the database, the social accounting matrix (SAM) and its satellite accounts. This enables one to check model consistency and accuracy while at the same time providing the base scenario (hence forth S0) against which other alternative scenarios would be compared after applying the policy shock to the model.

The direct payment accounts for just over 50 percent of the total amount of subsidy payments to the agricultural sector during the base year while the remaining proportion of the total subsidy payment will not be subjected to decoupling. Thus, the policy shock was applied to the model in terms of removing 50 percent of the amount of subsidy payments to agriculture. This policy shock was applied to the model under five alternative scenarios. The simulation experiments in this paper are confined to single farm payments, without any consideration of modulations. In S1, the direct payments is removed without any accompanying transfer payments to households and then examine the effect of this policy change on the Scottish economy. The motivation for this comes from the requirement to isolate the effect of subsidy payment to producers from the multiplier effects of household final demand expenditure, which would be induced by transfer payments. The latter is expected to take place with decoupling single farm payments.

In scenario 2, we simulate decoupling proper, i.e., reducing output related subsidy payments to producers by 50 percent and transferring the same amount to households. In scenarios 1 and 2, we have assumed that exogenous price of exports to and imports from the RUK and ROW regions are held constant, scenario 3 relaxes this assumption by allowing these exogenous variables to change with prices of Scottish agricultural goods. Scenarios 4 and 5 investigate sensitivities of key sectoral and aggregate variables to variations in trade elasticity parameters of agricultural products, i.e., agricultural import and export demand elasticity parameter values.

1.3 Sectoral impacts

Table 1 presents proportionate changes in selected sectoral variables as a result of decoupling single farm payments by 50 percent. The proportionate changes under each column for agricultural and non-agricultural sectors are given as percentage changes from the base year scenario. It is useful to begin focusing on the agricultural sector effects under S1, which, as noted above, represents the

removal of direct payments without any accompanying measure to transfer the subsidy as income support to households.

The first few rows report commodity price effects of this policy shock. The overall effect is an increase by about 13 percent of the prices of Scottish agricultural products, which is a composite of the price of Scottish agricultural exports to the RUK and ROW and the average price of Scottish agricultural products sold in Scotland. For the time being, under this scenario, it is assumed that prices of imports of agricultural goods remain unchanged at the base year level. As a result, the overall price effect would be an increase in the composite price of agricultural goods in Scotland by just over 6 percent.

Table 1 Proportionate changes in selected sectoral variables as a result of decoupling payment

	Agricultural sector			Non-agricultural sector		
	S1	S2	S3	S1	S2	S3
Commodity price effects:						
RUK exports prices	12.97	12.97	19.52	0.00	0.00	0.00
ROW exports prices	12.97	12.97	16.24	0.00	0.00	0.00
Domestic-export composite price	12.97	12.97	15.27	0.00	0.00	0.00
Prices of domestic sales	12.97	12.97	12.97	0.00	0.00	0.00
RUK imports prices	0.00	0.00	5.48	0.00	0.00	0.00
ROW imports prices	0.00	0.00	2.59	0.00	0.00	0.00
Domestic-import composite price	6.10	6.10	8.20	0.00	0.00	0.00
Commodity demand effects:						
Domestic sales	-14.89	-14.78	-10.31	0.23	0.23	0.10
RUK exports	-14.89	-14.78	0.29	0.23	0.23	0.10
ROW exports	-14.89	-14.78	-5.08	0.23	0.23	0.10
RUK imports	8.77	8.90	3.02	0.23	0.23	0.10
ROW imports	8.77	8.90	8.93	0.23	0.23	0.10
Aggregate domestic demand	-3.43	-3.31	-2.17	0.23	0.23	0.10
Commodity output	-14.89	-14.78	-6.71	0.23	0.23	0.10
Factor demand:						
Labour	-14.70	-14.60	-6.62	0.34	0.34	0.15
Land	-14.97	-14.87	-6.76	0.02	0.02	0.01
Capital	-15.00	-14.91	-6.78	0.01	0.01	0.01

The commodity demand effects reflect the corresponding changes in the commodity price effects. As one would expect, the overall effect is substitution of imports from the RUK and ROW regions for Scottish agricultural products. The price increases are expected to discourage demand for Scottish agricultural products both in domestic and external markets. Accordingly, the quantity of Scottish agricultural products sold in Scotland, exports to the RUK and ROW regions decrease by about 15 percent. On the other hand, Scottish demand for imported agricultural products increases by about 9 percent. The overall effect on demand for agricultural goods would be a decline by 3.4 percent. Given the price and the demand effects of the policy shock, Scottish agricultural producers are expected to adjust output downwards by about 15 percent. In other words, the effect of removing direct payments would have contractionary effect on the Scottish agriculture. It follows that demand for labour, land and capital in the agricultural sector will fall by about 15 percent, which is the same as the proportionate decline in the level of agricultural output.

Having examined the direct effects of the policy shock on agriculture, we now examine the corresponding spillover effects of this shock on the non-agricultural sector under S1. We observe that the absolute magnitudes of the inter-sectoral spillover effects are relatively small, the proportionate changes being limited mostly to less than a percentage point. There are two explanations for this. The first one is the relative sizes of the agricultural and non-agricultural sectors, which imply that any policy shock applied to agriculture is likely to cause relatively smaller percentage changes on the non-agricultural sectors. The second one is the size of policy shock itself, i.e., the removal of direct payment as applied in this simulation experiment constitutes only about half of the potential changes related to CAP reform. In that respect, the spillover effect reported here would provide some indication of the sign or direction of changes in the effects but also the magnitude of the effect that one might expect when all types of subsidies are eliminated.

With this preliminary remark, we proceed to examining the patterns of spillover effects on the non-agricultural sector under S1. We note that there are no noticeable indirect price effects, with most non-agricultural commodity prices remaining unchanged at the base scenario level. On the other hand, a decline in factor demand in the agricultural sector means that resources, particularly labour, being released for use in the non-agricultural sector. Accordingly, labour force employment, non-agricultural land and capital uses increase by 0.34, 0.02 and 0.01 percentage points respectively.[2] Given the negligible price effects and the possibility of substitution in favour of the non-agricultural good, the latter experiences increase in demand by 0.23 percent in all markets. The rise in demand and the opportunities created by a favourable factor supply leads to a rise in non-agricultural sector output by 0.23 percent.

It is now appropriate to examine differences between scenario 1 and scenario 2, comparing proportionate changes between S1 and S2 of each sector. We note that there is no difference in commodity price effects under these scenarios. However, the quantity demanded of Scottish agricultural goods in all markets as well as Scottish agricultural output declines by smaller percentage points under S2 than S1. Similarly, the decline in agricultural factor employment is smaller under S2 than S1. The main reason for these positive outcomes from transferring output related subsidy payments to income supports is the multiplier effect of household final demand expenditure which is positively influenced because of the income support. When farm subsidy is withdrawn without any compensation, then household income declines which means household final demand declines by this amount. This tends to be more contractionary than when households are allowed to retain as income support the amount of funds they used to get as producers.

[2] These represent the corresponding amounts by which factor demand declined in agriculture, although they differ in percentage terms because of differences in the levels of base scenario factor employment in each sectors.

At this juncture, it is useful to mention that this modeling framework assumes that what is paid to rural households as “income support” would be used to finance final consumption expenditures. However, if decoupling of single farm payments has a built in conditionality that farmers must use the fund to finance farm investment, then the effect of decoupling is likely to differ from our simulation result in that investment and household consumption are separate categories of final demand with different multiplier effects. Moreover, it is also possible that the “income support” is given with some conditionality other than farm investment but this might require a different set of assessments. This could be a non-quantifiable impact, which lies beyond the scope of this analysis. Whilst the discussion so far is limited to a comparison of scenario 1 and scenario 2 for agriculture, it is useful to note that there are no noticeable differential impacts on the non-agricultural sector under these scenarios.

It has to be recalled that CAP reform is not unique to Scotland but an EU wide phenomenon, with all EU member countries implementing the policy reform simultaneously. We expect that the policy reform would have somewhat similar effects on the agricultural sector in each country, although the absolute magnitude of the impact may vary, depending the level of efficiency and flexibility already attained. In that case, it becomes necessary to relax the assumption related to exogenoity of RUK and ROW agricultural prices, which together with the corresponding Scottish prices, determine import and export quantities. Simulation results under scenario 3 present effects of the policy shock when the RUK and ROW prices are allowed to vary exogenously. From the results discussed so far, Scottish agricultural prices are expected to rise by about 13 percent. We might expect RUK prices to rise by less than this proportion on the ground that, on average, Scottish agriculture may be less efficient and flexible to adapt to a policy shock than the agricultural sector in the rest of the UK. Accordingly, S3 assumes a 6 percent increase in the price of agricultural products in the RUK. The corresponding increase in the price of ROW agriculture is expected to be even smaller on the ground that the ROW region incorporates the rest of EU, i.e., EU excluding RUK and Scotland, and non-EU

countries whose agricultural prices may not change significantly. Accordingly, scenario 3 simulates a 3 percent increase in the prices of agricultural products in the ROW region.

If we focus on proportionate changes in key variables related to agriculture, under S3, we observe the effect of the above assumptions. It is useful to compare these results with the corresponding proportionate changes under S2. The domestic price effect remains at the level under S2 but export prices increase by a larger proportion, about 20 percent in the RUK and 16 percent in the ROW region. In contrast to S2, import prices increase by 5.5 percent and 3 percent respectively. Given that the external prices are allowed to rise, the substitution effect becomes weaker than under S2. Hence, the quantity of domestic sales declines by only about 10 percent from the base scenario. In contrast to S2, exports to the RUK region show a marginal increase of 0.3 percent while exports to the ROW region still declines but by a much smaller proportion of 5 percent. On the other hand, imports from the RUK still rise from the base scenario but by a smaller amount compared to S2. However, given the modeling framework and the assumptions employed under S3, imports from the ROW region will even be larger than under S2, simply because the assumed price increase in the ROW region is not large enough to discourage consumers in the domestic markets. Thus, the effect of the policy reform, when we allow for the possibility of similar price increases in the rest of the world, would be less contractionary. Agricultural output and factor demand would fall by about 7 percent, which is less than half of the corresponding declines under S2.

Given that S3 assumes a favourable condition for Scottish agriculture to remain competitive, it follows that there would be less substitution away from it towards agricultural goods particularly in the external markets as well as substitution of non-agriculture for agriculture in the domestic market. These are indicated by a relatively small decline in demand for agricultural goods, by about 2 percent, and a relatively small amount of factors of production being released from agriculture and made available for use by the non-agricultural sector. As a result, there will

be a relatively smaller positive spillover effect on the non-agricultural sector under this scenario.

1.4 Sensitivity of simulation results to agricultural trade elasticity parameters

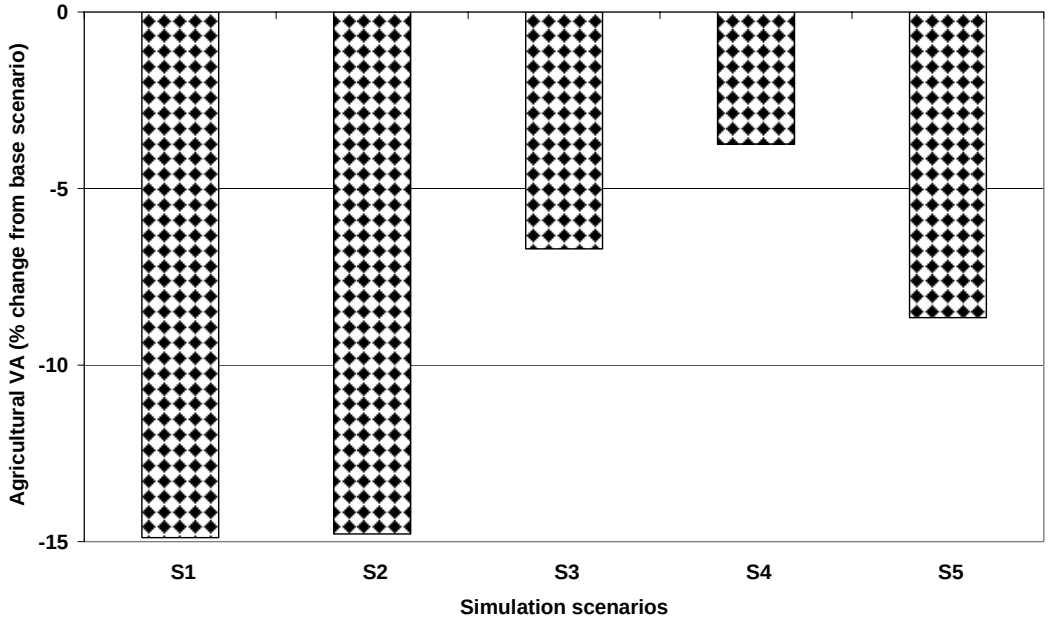
The simulation results discussed in the previous section suggest that the sectoral impacts of the policy reform depend largely on direction of prices changes, demand substitution effects both in the domestic and the external markets; and factor market linkages between the agricultural and the non-agricultural sectors. In this subsection, we concentrate on the role of the demand substitution effects and undertake sensitivities of sectoral value-added and Scottish GDP to changes in trade elasticity parameters. The later encapsulates a range of issues surrounding the flexibility or otherwise of the system to the policy shock. The sensitivity runs were undertaken under S4 and S5, by varying the export and import trade elasticity parameters for the agricultural sector, i.e., ψ and σ, from the default values of 2, which was employed for scenarios S0, S1, S2, and S3. Except for the variations in substitution elasticity parameters, the simulation setup under S4 and S5 are exactly the same as under S3, with decoupled payments still applying and external prices of in the RUK and ROW regions being assumed to rise by 6 percent and 3 percent respectively.

Figure 4 displays proportionate changes of agricultural value-added from the base scenario, S0, for all scenarios of the simulation runs. The largest contraction in the Scottish agriculture happens under S1, i.e., if direct payments were removed but every other variable not being allowed to vary. The policy of decoupling is likely to make some difference but only marginally. Once we allow for a change in the agricultural prices in other countries, the policy effect on the Scottish agriculture becomes less contractionary effect. Depending on the relative impact of CAP reform on the Scottish agriculture and the rest of EU, the impact of the policy change on the Scottish agriculture could range from large contractionary effect to even positive effects. This becomes apparent when we

compare S3 with S2 in Figure 4 and then consider what would have happened if we allowed RUK and ROW agricultural prices to rise by more than the 6 and 3 percentage points respectively.

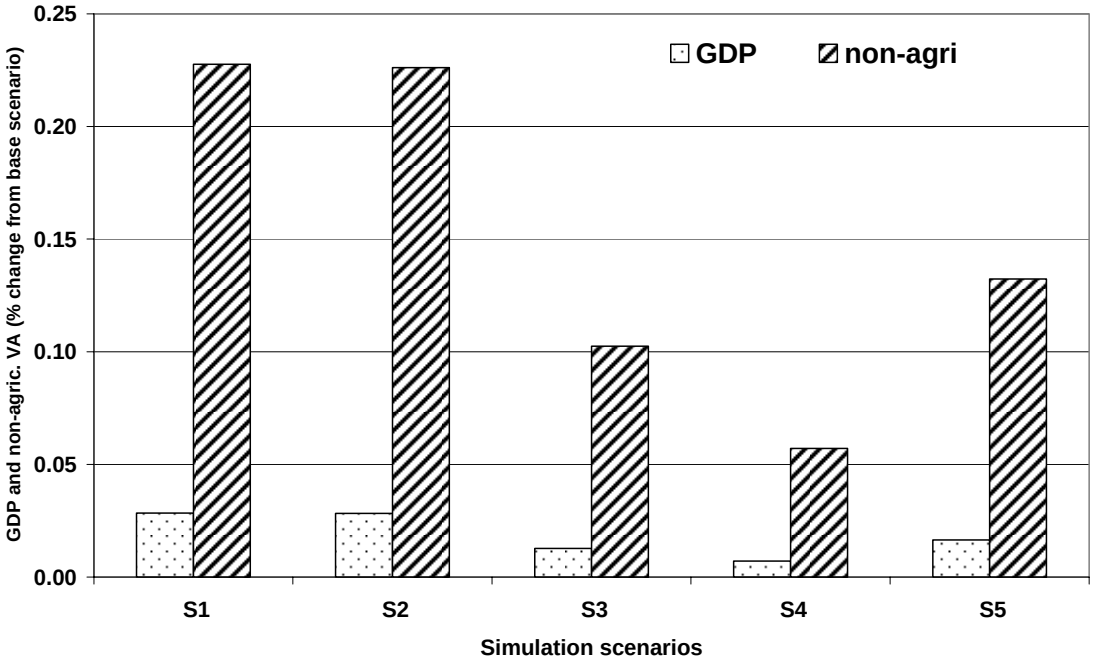
In S4, we reduced the trade elasticity parameter values from the default value of 2 to 1.[3] This implies that buyers of Scottish agricultural products both in domestic and export markets are less sensitive to the price changes. This means that for some reason, for instance because of consumer preference for local products, the existing market structure would continue to exist with out much change to the pattern of imports and exports.

Figure 4 Sensitivity of agricultural value-added to changes in parameter values



[3] In order to avoid division by zero in the exponent of CES and CET functions (see equations 30-37 in Appendix 1), the model is implemented with a value of 1.0001.

Figure 5: Sensitivity of GDP and non-agricultural value-added to changes in parameter values



This would provide another favourable opportunity for Scottish agriculture and hence the policy shock may cause less reduction in agricultural activity. S5 was simulated by assuming a relatively higher sensitivity of buyers of Scottish agricultural products to the price rise that would be induced by the policy reform, the export and import trade elasticity parameters are allowed to rise from 2 to 3. As a result, the reduction in agricultural activity is expected to be larger than the corresponding proportionate changes under S2. In summary, the simulation results indicate that the impact of CAP reform on Scottish agriculture would depend on the extent to which Scottish agricultural prices would change relative to the EU average, and to some extent relative to world prices and the sensitivity of buyer, perhaps most importantly domestic consumers, to price changes.

Figure 5 displays proportionate changes of value-added in the non-agricultural sector together with changes in Scottish GDP under all simulation scenarios. Under all scenarios, given the modelling framework and the simulation set-up, the policy reform is likely to have a positive spillover effect on the non-agricultural

sector and the aggregate GDP. Although the absolute size of the impact on the non-agricultural sector is mostly smaller than a quarter of a percentage point, this has a greater weight in the national economy and would have a larger macroeconomic effect causing the level of GDP to rise from the base scenario. Critically, the policy reform seems to have a symmetrical impact in the two sectors under all scenarios. For instance, a scenario with a large contraction in agriculture has a relatively large but positive spillover effect on the non-agricultural sector, and vice versa. The key to understand this pattern of changes lie in the factor market linkage effects, resources being release from agriculture for use in the non-agricultural sector, and the product market linkage effects, i.e., substitution effects in consumption.

Discussion and Conclusion

The purpose of this study was to quantify impacts of decoupling single farm payments in Scotland on the agricultural sector, non-agricultural sector as well as aggregate GDP. In order to accomplish this task we have formulated a CGE model because it accounts for inter-industry spill-over effects of a policy shock. The model was implemented using Scottish data, which was compiled in a social accounting matrix (SAM) format as well as other satellite accounts related to such variables as factors of production and exogenous elasticity parameters. A simulation experiment was conducted applying a removal of about 50 percent of the total Scottish agricultural subsidy payments, an amount estimated to be subjected to decoupling, and transferring the same amount to households as income support. This policy shock was applied to the model under various assumptions regarding the extents of variation in exogenous agricultural prices in the rest of the UK as well as in the rest of the world and sensitivity of consumers to changes in Scottish agricultural prices.

Focussing on agricultural sector impacts, the policy reform is likely to cause a decline in agricultural activity and hence factor use in this sector under all

scenarios, given the modelling and simulation frameworks employed for this study. The key channel through which the policy shock affects Scottish agricultural activity is by causing the price of Scottish agricultural product to rise in domestic and export markets. This is likely to discourage consumers both in the domestic and external markets from buying Scottish agricultural products. However, the rate of contraction in Scottish agriculture depends on two critical conditions.

First, given that CAP reform is an EU-wide phenomenon, with all member countries implementing the policy reform simultaneously, but expecting different price effects because of peculiar conditions of agriculture in each country. Similarly, EU as a whole being a substantially large contributor to world agricultural markets, upward movements of prices in EU would have repercussions on world market prices. As a result, the extent to which a rise in Scottish agricultural price would cause an adverse substitution effect on Scottish products depends on how the rise in Scottish prices compare with the corresponding average EU price effects of policy reform. The simulation experiments were run assuming 6 percent and 3 percent agricultural price rises in the rest of UK and rest of the world, including the rest of EU, respectively. This generates about 7 percent agricultural output decline in Scotland. Given the impact on the Scottish agricultural prices (an increase by 13 percent), if the price increases in the external regions were higher(lower), then the decline in Scottish agricultural activity would be lower (higher) because of the implications of these for the competitiveness of Scottish products.

Second, the other determining factor for the policy impact on Scottish agricultural activity would be the degree to which consumers in all markets respond to price effects of the policy shock. This is encapsulated in the trade elasticity parameters, demand substitution parameters. These elasticity parameter measures, for instance, the extent to which domestic consumers would be discouraged by Scottish agricultural price increases and hence substitute cheaper imports for Scottish products. The simulation experiments indicate that

the lower the trade elasticity parameters, the lower the expected decline in the Scottish agricultural activity. This suggests that if there is a relatively strong taste for Scottish agricultural products in domestic or foreign markets, then the policy reform is likely to have a relatively small impact on agricultural production and resource use in the Scottish economy. The simulation results from this study would provide a sound analytical basis for promoting the strategy of promoting local and regional food systems, which would provide a viable means of minimising adverse impacts of CAP reform on the agricultural sector (Policy commission on the future of farming and food 2002).

We now turn to impacts of the policy reform on the non-agricultural sector. Given the modelling framework and the simulation set-up, the removal of agricultural subsidy would have a positive spill-over effect on the rest of the economy. Critically, the policy impact seems to have a symmetric effect on the agricultural sector and the non-agricultural sector. This means that simulation scenarios that would cause significant contraction in agricultural output and hence resource use declines in this sector would lead to a significant non-agricultural sector expansion, and vice versa. The key explanation for this comes from factor market linkages between the two sectors, which contain a mechanism by which agricultural sector effects would be channelled to the non-agricultural sector. More specifically, the contraction of agricultural activity would mean release of resources (labour, land and capital), which would be ready for employment in the non-agricultural sector. Given an existing factor demand condition, this would create a favourable condition for the non-agricultural sector to undertake activity expansions. Given the relative sizes of the two sectors in the Scottish economy, the aggregate GDP effect is heavily influenced by the patterns of effects on the non-agricultural sectors, i.e., the aggregate GDP effect is mostly influenced by the spill-over effect of the policy change. Accordingly, the removal of agricultural subsidy is expected to have a positive aggregate outcome on the national GDP.

In spite of notable differences in spatial and sectoral scopes as well as modelling approaches, the simulation results reported here show changes in agricultural

output and prices that are mirrored with results from other models developed to examine impacts of decoupling, albeit with different magnitudes of changes (OECD 2003; Revell and Oglethorpe 2003; Frandsen 2002; Moss, ete al 2002). However, given that most models have concentrated on examining what happens to different sub-sectors of agriculture and model results being reported at this level, it is not straightforward to know the overall impact on agriculture or the rest of the economy. The approach in this study is to quantify sector level and economy-wide impacts, leaving quantifying differential sub-sector impacts within agriculture for future research.

Although the modelling framework we have formulated could capture complex relationships between different markets for the composite agricultural good, on the one hand, and spill-over effects through factor market and product market linkages to the non-agricultural sector, on the other hand, there is still room for improvement. For instance, in this study, we have assumed that farmers would immediately react to market conditions and adjust farm activities accordingly. However, farmers may behave differently, reflecting different attitudes to market conditions. Furthermore, another crucial element which is not addressed in this study is the dynamic features related to factor market effects in terms of induced changes in factor supply via capital investment and labour force migration, which would add greater realism to the dynamic effects of the policy reform. These would be addressed in subsequent improvements to the modelling structure.

Appendix A System of equations for the CGE model

Table A1 – description of the system of equations for the model

Eq No.	Equation description	Equation definition
	Commodity prices	
1	$PEK_c = pekb_c\left(1+\tau x_c\right)+\sum_{c'} PQ_{c'}\psi x_{c'c}$	Price of exports to RUK
2	$PEW_c = pewb_c\left(1+\tau x_c\right)exr+\sum_{c'} PQ_{c'}\psi x_{c'c}$	Price of exports to ROW
1	$PD_c = \left(1+\tau x_c\right)+\sum_{c'} PQ_{c'}\psi x_{c'c}$	Equilibrium domestic price
2	$PMK_c = \left(\tau k_c+\sum_{c'} PQ_{c'}\psi k_{c'c}\right)pmkb_c$	Price of imports from RUK
3	$PMW_c = \left(\tau w_c+\sum_{c'} PQ_{c'}\psi w_{c'c}\right)pmwb_c exr$	Price of imports from ROW
	Domestic production	
6	$QVA_a = \alpha_a\prod_f QF_{f,a}^{\beta_{f,a}}$	Composite factor aggregation Function
7	$QF_{f,a} = \beta_{fa}\left(PVA_a QVA_a\right)/\left(PF_f\, pfd_{fa}\right)$	Factor demand
8	$QI_{ca} = ica_{ca}QA_a$	Intermediate demand
9	$QVA_a = iva_a QA_a$	Composite factor demand
10	$PA_a = PVA_a iva_a+\sum_c ica_{ca}PQ_c$	Unit cost of production
11	$PX_c = \sum_a \delta ac_{ac}PA_a$	Composite output price
12	$QX_c = \sum_a \delta ac_{ac}QA_a$	Composite commodity quantity
	Income generation	

13	$YF_f = \sum_a PF_a \, pfd_{fa} QF_{f,a}$	Factor income
14	$YH_h = \sum_f \delta h_{hf} YF_f + THG_h + TKH_h$	Household income
	Government account	
15	$YG = \sum_c \left(TX_c + TK_c + TW_c \right) + \sum_h TD_h$	Government revenue
16	$TD_h = \tau d_h YH_h$	Direct tax revenue
17	$TA_a = \tau a_a PA_a QA_a$	Production tax
18	$TX_c = \tau x_c PX_c QX_c$	Sales tax
19	$TK_c = \tau k_c PMK_c QMK_c$	Tax sales of RUK imports
20	$TW_c = \tau w_c PMW_c QMW_c$	Tax sales of ROW imports
21	$QG_c = \mu_c \left(YG - \sum_h THG_h - SG \right) / PQ_c$	Government demand
	Saving-investment accounts	
22	$QV_c = \lambda_c \left(\sum_h SP_h + SG + SK + SW * exr \right) / PQ_c$	Investment demand
23	$SP_h = mps_h YH_h$	Household saving
24	$SG = gsr YG$	Government saving
25	$QH_{c,h} = \psi_{c,h} \left(YH_h - SP_h - TD_h - TKH_h \right) / PQ_c$	Household demand
	Trade margins	
26	$TMX_c = PQ_{c'} \psi x_{c'c} QX_c$	Trade margins on local goods
27	$TMK_c = PQ_{c'} \psi k_{c'c} QMK_c$	Trade margins on ruk imports
28	$TMW_c = PQ_{c'} \psi w_{c'c} QMW_c$	Trade margins on row imports

29 $$QT_c = \sum_{c'} \begin{pmatrix} PQ_c \psi x_{cc'} QX_{c'} + PQ_c \psi k_{cc'} QMK_{c'} \\ + PQ_c \psi w_{cc'} QMW_{c'} \end{pmatrix}$$ Aggregate trade services

Armington function

30 $$QQ_c = \gamma_c \left(\delta dk_c QMK_c^{\eta_c} + \delta dw_c QMW_c^{\eta_c} + \delta dd_c QD_c^{\eta_c} \right)^{\frac{1}{\eta_c}}$$ Aggregate commodity demand

31 $$QMK_c = \gamma_c^{\eta_c} \left(\frac{\delta dk_c PQ_c}{(1+\tau k_c) PMK_c} \right)^{\frac{1}{(1-\eta_c)}} QQ_c$$ import demand for RUK goods

32 $$QMW_c = \gamma_c^{\eta_c} \left(\frac{\delta dw_c PQ_c}{(1+\tau w_c) PMW_c} \right)^{\frac{1}{(1-\eta_c)}} QQ_c$$ import demand for ROW goods

33 $$QD_c = \gamma_c^{\eta_c} \left(\frac{\delta dd_c PQ_c}{PD_c} \right)^{\frac{1}{(1-\eta_c)}} QQ_c$$ Domestic good demand

Transformation function

34 $$QX_c = \theta_c \left(\delta sk_c QEK_c^{\phi_c} + \delta sw_c QEW_c^{\phi_c} + \delta sd_c QD_c^{\phi_c} \right)^{\frac{1}{(1-\phi_c)}}$$ Domestic commodity supply

35 $$QEK_c = \theta_c^{\phi_c} \left(\frac{\delta sk_c (1+\tau x_c) PX_c}{PEK_c} \right)^{\frac{1}{(1-\phi_c)}} QX_c$$ RUK export

36 $$QEW_c = \theta_c^{\phi_c} \left(\frac{\delta sw_c (1+\tau x_c) PX_c}{PEW_c} \right)^{\frac{1}{(1-\phi_c)}} QX_c$$ ROW export

37 $$QD_c = \theta_c^{\phi_c} \left(\frac{\delta sd_c (1+\tau x_c) PX_c}{PD_c} \right)^{\frac{1}{(1-\phi_c)}} QX_c$$ Domestic sales

Market clearing conditions

38 $$QQ_c = \sum_a QI_{ca} + \sum_h QH_{ch} + QG_c + QV_c$$ commodity market clearing condition

39 $$\sum_f QF_{f,a} = QFS_f$$ Factor market clearing condition

40 $$UU = \prod_{c,h} QH_{ch}^{\psi_{ch}}$$ Utility function [fictitious]

Subscripts

a	activities	(agricultural sector, non-agricultural sector)
c	commodities	(agricultural products, non-agricultural roducts)
f	factors of production	(labour, land, capital)
h	households	(rural, urban)

Endogenous prices

PA	unit cost of production
PC	sales price of local goods
PD	domestic sales price of local goods
PEK	RUK export price
PEW	ROW export price
PF	factor price
PMK	RUK import price
PMW	ROW import price
PQ	composite commodity price
PVA	price of value-added
PX	producer price

Endogenous quantities

QA	activity output
QD	domestic demand for domestically produced goods
QEK	exports to RUK
QEW	exports to ROW
QF	factor input

QG	government demand
QH	household demand
QI	intermediate input
QMK	import demand for RUK goods
QMW	import demand for ROW goods
QQ	composite commodity supply
QT	composite commodity supply
QV	investment demand
QVA	Value-added
QX	commodity output
SG	government savings
SP	household savings
TA	revenue from production tax
TD	revenue from direct tax on household income
TK	revenue from indirect tax on RUK imports
TMK	trade margin on commodity c imported from ruk
TMX	trade margin on local commodity c
TMW	trade margin on local commodity c
TW	revenue from indirect tax on ROW imports
TX	revenue from indirect tax on local goods
YF	factor income
YG	government revenue
YH	household income
UU	direct utility

Exogenous variables

pekb	exogenous RUK export prices
pewb	exogenous ROW export prices
pmkb	exogenous RUK import prices
pmwb	exogenous ROW import prices

qfs	factor endowment
sk	bop with ruk
sw	bop with row
thg	government transfer payments to households
thk	ruk transfer payments to hholds
tkg	government transfer payments to ruk
tkh	household transfer payments to ruk

Exogenous parameters

α	shift-parameter in production function
β	factor share-parameter in production function
τd	direct income tax rate
τx	rate of indirect tax on local goods
τk	rate of indirect tax on RUK imports
τw	rate of indirect tax on ROWimports
ϕ	elasticity parameter commodity transformation function
θ	shift-parameter in commodity transformation function
μ	share parameter in government demand for goods and services
η	elasticity parameter commodity the Armington function
γ	shift-parameter in commodity the Armington function
ψ	share parameter in hhold demand for goods and services
λ	share parameter in investment demand for goods and services

δac	share of commodity c in output of activity a
δhf	share of factor f in total income of hhold h
δdd	share of domestic goods in total demand for goods
δdk	share of RUK imports in total demand for goods

δdw	share of ROW imports in total demand for goods
δsd	share of domestic goods in total supply of local goods
δsk	share of exports to RUK in total supply of local goods
δsw	share of exports to ROW in total supply of local goods
pfd	sectoral wage distortion parameter
mps	marginal propensity to save
gsr	government savings ratio
iva	share of value-added in activity output
ica	share of intermediate goods in activity output
exr	exchange rate with ROW

Appendix B The Social Accounting Matrix for Scotland

Table A1 – Social Accounting Matrix for Scotland, 1999 (£m)

		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Agricultural activity	A1			2,596							
Non-agricultural activity	A2				138,645						
Agricultural commodity	A3	489	1,761						127	204	
Non-agricultural commodity	A4	1,224	73,717						9,312	35,567	18,063
Labour	A5	273	40,142								
Land	A6	389	12,320								
Capital	A7	164	9,337								
Rural households	A8					8,767	2,711	1,770			1,828
Urban households	A9					31,648	9,998	7,730			8,882
Government revenue	A10								3,410	13,490	
Savings	A11								725	3,054	1,817
Imports from RUK	A12			511	24,547				1,502	5,942	953
Imports from rest of ROW	A13			614	25,311						
Production tax	A14	57	1,369								
Sales taxes on Scottish goods	A15			- 558	4,638						
Sales taxes on RUK imports	A16			8	2,666						
Sales taxes on RUK imports	A17			17	1,873						
Trade margins on Scot. goods	A18			103							
Trade margins on RUK imports	A19			50							
Trade margins on ROW imports	A20			104							
Total	A21	2,596	138,645	3,444	197,679	40,415	12,709	9,500	15,076	58,257	31,542

Table A1 – continued…

		A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21
Agricultural activity	A1											2,596
Non-agricultural activity	A2											138,645
Agricultural commodity	A3	28	601	234								3,444
Non-agricultural commodity	A4	11,400	22,450	25,691					103	50	104	197,679
Labour	A5											40,415
Land	A6											12,709
Capital	A7											9,500
Rural households	A8											15,076
Urban households	A9											58,257
Government revenue	A10		4,572		1,426	4,080	2,674	1,890				31,542
Savings	A11		5,832									11,428
Imports from RUK	A12											33,455
Imports from rest of ROW	A13											25,925
Production tax	A14											1,426
Sales taxes on Scottish goods	A15											4,080
Sales taxes on RUK imports	A16											2,674
Sales taxes on RUK imports	A17											1,890
Trade margins on Scot. goods	A18											103
Trade margins on RUK imports	A19											50
Trade margins on ROW imports	A20											104
Total	A21	11,428	33,455	25,925	1,426	4,080	2,674	1,890	103	50	104	590,998

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