The EC Budget and Agricultural Policy Reforms, with Special Reference to Cereals

by

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'As he lay abed on Sunday, 21st September, Morse was beset by the nagging feeling that there was so much to be done if only he could summon up the mental resolve to begin.'
Ch 5 of 'Last Seen Wearing', by Colin Dexter, Pan, London.

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A final thought:

The storm reached its howling peak overhead. A seagull went past backwards.

'I meant', said Ipslore, bitterly, 'what is there in this world that makes living worth while?'

Death thought about it. CATS, he said eventually, CATS ARE NICE.

from Sourcery by Terry Pratchett, Corgi, P11.

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CONTENTS

ABSTRACT

The aim of this thesis is to explore the links that exist between the Common Agricultural Policy (CAP) of the European Communities (EC) and the EC budget. In particular, the thesis examines the impact on the budget of reforming the CAP. It shows that the nature of support offered under the CAP up to the 1992 MacSharry reforms has a strong historical precedent in French and German history. It then goes on to examine in greater detail the support mechanisms of the cereals and oilseeds sectors. The cereals sector is focused on because of its importance in agricultural output and in total agricultural support expenditure by the EC. Oilseeds is considered for its policy linkages with cereals in both production and consumption. The detailed nature of expenditures on these sectors is examined in detail, with particular emphasis placed on costs and policy problems arising out of intervention storage.

In forecasting future expenditures under different policy scenarios, cereals production and consumption are considered separately. Imports, exports and intervention behaviour are also considered, to permit the examination of all aspects of the cereals market that affect expenditure. The impact of the 1992 MacSharry reforms is compared to a strict continuation of the 1988 stabiliser reforms and a price freeze at 1992 levels for the forecast period to 1999. It is shown that the impact of the 1992 reforms is to reduce the extent of the market imbalances by 1999 as compared with the base scenarios, but unless the level of compensatory payment is cut, then by 1999, the EC faces a support bill that is higher under the new policy than would have been the case had the 1988 reforms been retained.

CHAPTER 1: INTRODUCTION

'I do not know if it will get better when things change, but one thing is certain; if it is to get better, things will have to change.'

Georg Christoph Lichtenberg, 1742-1799.

(Quoted in EC Commission 1988b)

The European Economic Community (EEC), formed in 1958, agreed at the outset that a common policy of agricultural support should be an integral part of the new economic order. This would be established to replace the policies operated by the individual countries before that time. The aims of the new Common Agricultural Policy (CAP) were set out in Article 39 of the Treaty of Rome. The principal policy instrument to be used to achieve these aims, decided subsequently, was that an internal Community price should be maintained above the level that would exist without government intervention. This was to be sustained by levies placed on imports, set at such a level that the high price the EC wished to maintain would not be undercut by cheaper imports. Moreover, if domestic over-supply were to threaten to drive down that high price, supplies would be purchased by government intervention stores, guaranteeing at least a minimum price for farmers. Thus farmers would primarily receive support from consumers, in that they would be buying food at prices that were higher than would otherwise be the case. If further action were needed to maintain that price the cost, net of import levy revenue gains, would be borne by taxpayers via the EC budget. If, for example, excess supplies were to build up over any length of time in the EC, they would be sold out of store rather than be kept indefinitely. Generally, these commodities would have to be exported to third countries, and to ensure their competitiveness on third country markets restitution payments would have to be made to exporters. The cost of these too would be borne by taxpayers.

Even in the early years of the CAP, the EEC Commission expressed concern that such a system could lead in the long term to excessive production resulting in rising expenditures by the EEC to support the policy. At the time however, the EEC was a net importer of most agricultural commodities, including temperate foodstuffs. As the EC imported such large quantities of foodstuffs, the EC budget benefited greatly from the revenues derived from the import levies. In addition, only relatively small quantities were exported or stored, and so the financial burden of operating the policies for the budget (and hence for member state taxpayers) was very small. The high market prices however tended to encourage production to rise over time. By artificially increasing the returns to agriculture relative to other economic activities, more resources were retained in agriculture than would otherwise have been the case. In this way, yields were increased at a greater rate than would have occurred under freer economic conditions. Thus by the late 1970's and early 1980's, the EC had become self-sufficient in most temperate agricultural commodities. By the late 1980's, the EC had become the second largest food exporter in the world, behind the USA.

As the EC increasingly became self-sufficient in a growing number of commodities, it had to budget rising amounts for measures designed to sustain the high internal price. Increasing quantities had to be exported from the EC to relieve pressure on the internal market. The budget still benefited from import levies, but increasingly these sums were being outweighed by export restitution payments. Moreover, more restricted export opportunities meant that farmers were more frequently resorting to intervention as a means of disposing of their production at a guaranteed price. This option gave rise to greater storage costs, in addition to the export refunds required later when the stocks were finally sold from store (actually termed 'other public storage costs' in the EC budget).

This led to growing problems within the EC for a number of reasons. It is a feature of the EC budget that there is no facility for deficit financing. Coupled to this is the limit placed on own resources - sources of income coming into the EC budget each year. Thus the EC can, strictly speaking, spend no more in any one year than it has coming in as revenue. A further feature of the budget is that some expenditure is classified as Compulsory, and some as Non-Compulsory. The former arise from commitments made explicitly in the Treaty of Rome. As the name suggests, these expenditures must be met as a priority for the budget. The main example of compulsory expenditure is the cost of supporting the agricultural policy regimes established under the CAP. Another feature of the budget is that there is a ceiling on the total amount of own resources that can be raised overall, although by introducing a GNP-based own resource, the reforms of 1988 raised that ceiling sufficiently for current expenditure levels still to be well below it.

For these reasons, increased agricultural production posed a serious problem for the EC budget. By the second quarter of the 1980's, expenditures had risen to such a level that they were taking about 70% of all EC own resources, leaving only very limited funds for other policies. By 1984, the situation was reached where total expenditures incurred by the EC exceeded the total value of own resources for that year. In 1984, and again in 1985, the member states had to make additional payments to the EC just to allow it to operate and fund all of its commitments. Reforms were therefore needed, both to the way in which agriculture was supported, and also to the way in which the budget operated. By restricting the growth in agricultural production, it was believed, the growth in agricultural expenditure could also be contained, thus releasing more funds for other EC activities. Moreover, if additional own resources were to be made available for these other policies, with a larger Community and more policies being instigated in new areas of activity for the Community, controls would have to be imposed on agricultural support expenditure in order to ensure the additional revenues didn't simply get swallowed up by the CAP.

Up to 1988, the CAP's support policies generally hadn't really been reformed - merely tinkered with at the edges, with the basic feature of largely open-ended support left unchanged. Policies like coresponsibility, and the backdoor price cuts discussed in detail in the following chapters, also had no major impact on the fundamentals of the

policy. Production had continued to grow unabated, as had expenditures. In 1988 therefore, reforms to both the agricultural support policies (stabilisers) and the budget generally were passed. The new system aimed at restricting budgetary expenditures was called budgetary discipline. Together, these two tools were supposed to achieve the joint aims of controlling the growth in agricultural production and budgetary expenditure, by linking lower support prices to increased production. By keeping the rate of growth of agricultural spending below the rate of growth of total EC spending (by maintaining the 'agricultural guideline'), progressively less and less of the total budget would be taken by agriculture, leaving more for new policies. Initially, the growth of the agricultural budget slowed, but this was principally because of a drought in the US (leading to higher world prices and lower export restitutions) rather than the policy reforms. Within two to three years however, both budget costs and agricultural production were continuing to rise, seemingly unabated.

In 1992 therefore, further changes to the policies were made, to be operative from the 1993/4 crop year. For the first time, a reform package was agreed that broke away from the old support system of high market prices. The new system is to be based on farmers getting much of their income from direct government payments. This means that consumers will pay less for the commodities produced by farmers, with the burden of support shifting still further onto taxpayers, via their contributions to the EC budget. It should be noted that initially, the direct payments are expected to increase the budget cost of agricultural support. Savings however are expected to arise in the medium to long term if, as the EC hopes, production is restrained and unit export refunds are lowered.

By reducing the amount farmers receive from the market, it is hoped that they will reduce output. Implicitly it is assumed that the direct payments to be made from the EC budget to farmers won't encourage production. A key feature of the new system is cross-compliance, whereby for most farmers, the compensatory payments are conditional on land being set aside. By taking large areas of land out of the production of certain key surplus crops, it is hoped that the growth in production, and hence expenditures, can be slowed. With the onset of the single market, and the establishment of more and more common policies, such measures are needed if the EC budget is to have sufficient funds to allow these other policies to grow and develop. For this reason, the growth of agricultural expenditures is seen as unsustainable. Thus it is timely to consider the impact the reforms of the CAP will have on the EC budget. That is the aim of this thesis.

A textbook analysis of the way in which restitutions are funded, import levies are applied, intervention is operated, and expenditure is incurred, all indicate a policy whose *modus operandi* is very straightforward. In reality however, this is not the case. This thesis focuses in particular on the details of how expenditures arise in practice. It discusses in detail how the intervention system operates. In terms of both the EC's agricultural budget and the EC's cereals market, upon which this thesis focuses in particular, this is a very important element. From this, it is shown how the move by the EC from net importer to net exporter has resulted in the financial

difficulties experienced by the EC over the last decade.

Chapter 2 gives the background to the policy regimes that led to such high levels of expenditure. It examines them in their historical context, to see why such policies were adopted by the EEC. It charts the growth in both production and expenditures, as well as outlining some of the early attempts at reforming the CAP. By its very nature, this chapter is largely descriptive.

Chapter 3 leads on from Chapter 2 to examine the two main reform packages of the CAP, the stabilisers of 1988, and the so-called 'MacSharry' reforms of 1992. It discusses the changes in the main tools of support, as well as the changes in the rules of operation of the EC budget. Two appendices then analyse two particular aspects of CAP operations. Appendix 1 carries out an analysis of rising budgetary expenditures in the face of a budgetary ceiling. It then derives an expression to show how long it will be before the budget is exhausted. Appendix 2 focuses on the operation of stock depreciation, and considers the impact of changes in this system to the EC budget. It also shows what the EC Commission expects the future world price of cereals to be.

Chapter 4 goes on to take two commodity sectors in particular, and examine their operation in more detail. The two sectors - cereals and oilseeds, have been chosen because of their significance in the total expenditure on the CAP, and also because of the important way in which the two sectors are inter-linked, both in production and in consumption. It details the methods of support used under the two regimes both prior to the 1992 reforms and also after. It then goes on to take expenditure figures for the regimes for years in the mid 1980's, and tries to replicate them. This has been done in order to assess the way in which such expenditure is incurred, and also to see which variables are important in determining expenditures. This highlights the key variables to be concentrated upon in subsequent chapters. It also examines the joint questions of fraud and financial mismanagement, in order to see if they pose any serious threat to the attempts to impose budgetary discipline on the two sectors.

Chapter 5 moves on from Chapter 4 to analyse the cereals market in a more rigorous manner. It outlines the key variables in the cereals balance sheet, and considers their trends over time. It details storage activity, and analyses intervention stock movements in detail, as well as considering how private stocks relate to the other factors in the market. It then extends this analysis to see how variations in cereals production affect the other variables. Under different scenarios and constraints, it considers the extent to which net trade, net intervention, and consumption vary to absorb variations in production.

Chapter 6 introduces the theoretical concept of stationarity in time series data, which underpins much of the analysis in this and subsequent chapters. It then carries out

detailed modelling of cereals production through the key components of area and yield.

This is repeated for cereals consumption in Chapter 7. Consumption, or 'total internal use', consists of five distinct categories, each of which is considered in turn. The bulk of this chapter focuses on the use of cereals in animal feed, as this is the single main use for cereals in the EC. It also returns to the question of the links between the cereals and oilseeds sector, and how the nature of the two regimes affects the amount of cereals going into animal feed.

Chapter 8 then draws on the earlier work, principally from Chapters 6 and 7, to make forecasts of future budget expenditures in the cereals sector. It takes as comparisons to MacSharry a strict continuation of the stabiliser mechanisms, and an alternative where prices are held constant over the forecast period. Under different policy scenarios, different expenditure scenarios are arrived at. The implications of this and the earlier chapters are then drawn together in Chapter 9.

CHAPTER 2: HISTORICAL BACKGROUND

Honour Yahweh with what goods you have
and with the first-fruits of all your returns;
then your barns will be filled with wheat,
your vats overflowing with new wine.
(Proverbs 3:9-10, Jerusalem Bible)

2.1: THE PERIOD PRE-EEC

2.1.1: Introduction

"Agricultural policy, in its broadest sense, refers to the actions of government in the sphere of agriculture. In that sense, agricultural policy has a very long history going back at least to the ancient Egyptians, Greeks and Romans."[1] Here, therefore, just two centuries of European agricultural history will be briefly considered, in order to show how the policies of certain European countries developed prior to the formation of the European Economic Community (EEC), contrasting this with the development of policies in the countries who joined the Community subsequently.[2] The purpose of this is to see how the Common Agricultural Policy (CAP) was, at least in part, shaped by historical and political factors. Importantly, the financial transfers resulting from these policies are considered in relation to three groups - consumers, taxpayers, and producers - in order to identify past patterns of income transfer. This is important if an understanding is to be gained of why the CAP leads to the transfers it does. Consideration has been limited to two founder-members of the EEC, France and Germany, and two who joined subsequently, Denmark and the UK. This approach is not intended to be exhaustive, but rather to be illustrative of the socio-political factors at work in the EEC.

In general, certain broad groups of policies can be distinguished. Firstly, there are those policies which, like the CAP itself before the 1992 reforms, aim to support farmers by ensuring they receive a 'high' price for their goods from the market. Since these policies ensure consumers have to pay prices higher than those prevailing for that particular commodity on the 'world' market, this type of policy is seen as transferring income from consumers to producers[3]. In addition, if the government applies tariffs

[1] Howarth, R. W. (1985), P6.

[2] For a more detailed account, see Tracy, M. (1989), on which much of the early part of this brief summary is based.

[3] Income will naturally be transferred from consumers to producers when the former buy the product

to imports, say as a means of protecting that high internal price, this acts as a transfer to taxpayers to the extent that it can be assumed the government has some notion of 'target' revenue. Thus any external addition to revenues like tariffs lessens the amount of revenues which must be obtained from taxpayers.

On the other hand, the government could implement a policy whereby consumers only have to pay the world price for commodities, and support is given to farmers by means of direct payments from the government. Such was the general policy operated by the UK until EC accession in 1973. Here, the general pattern of transfers is from taxpayers (as the funders of government operations), to producers. There are many more transfers which can be effected, but these are the principal ones. As will be seen, the distinction which can be made between them, namely that one generally transfers income from consumers to producers, whilst the other transfers income from taxpayers to producers, is very important when considering the agricultural policies operated in Western Europe. This is at least partly because of the fact that when transfers are made from consumers, they will tend to be more regressive, in that poorer consumers will tend to spend a higher proportion of their total income on food than richer consumers, thus bearing a disproportionately high share of total transfers. With transfers from taxpayers however, these will tend to be more closely related to ability to pay, as income tax regimes will generally have proportionality built in. This may however be offset somewhat in some countries if food isn't exempted from VAT, this not being a progressive tax.

2.1.2: The First Three-Quarters of the 19th Century: A Period of Free-Trade

By the middle of the 19th century, most of the larger countries of Western Europe had increased the degree of owner-occupation in agriculture. The main difference between countries concerned the structures of farms, generated by different social histories and inheritance laws. Moreover, in England, the Industrial Revolution was having a uniquely powerful impact on agriculture, and the political environment within which agriculture had to operate.[4] Specifically it represented a shift in political influence away from farmers, but to the urban industrialists rather than the urban consumers generally. The employers wanted cheap food in order to aid them in their desire to keep wage costs low.

In England, the Corn Laws had been in existence since the Middle Ages, and acted

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of the latter. What is of concern here is the extent to which this transfer is increased by the raising of the price faced by consumers above 'free trade' levels.

[4] For more details on this early period, see Abel, W. (1980), and Tracy, M. (1989).

to regulate trade, initially just exports, but subsequently imports as well. The switch from net exporter to net importer meant that they were now acting as a protective device. Under the 1822 Corn Law, a sliding tariff was introduced[5]. The urban working class faced high food prices, especially for bread[6], and in 1838 the Anti-Corn Law League was formed to campaign against a policy which hit the poor urban consumers the hardest. The relaxation in import controls, and good domestic harvests temporarily eased the political pressure for the abolition of the Corn Laws, but with the 1845 Irish potato famine, the pressures returned. In 1846, Parliament abolished the Laws with effect from 1849. Politically, this reflected a significant shift in influence from rural producers to urban consumers or rather, the employers of the urban consumers. This, combined with a whole series of economy-wide duty and tariff-reducing measures, made Britain the centre of a growing Free-Trade movement. A series of good harvests, and fewer imports from America during the American Civil War, helped British agriculture survive the removal of protection from the abolition of the Corn Laws. After a few years of lower prices, the apparent success of that move led to Britain encouraging her Continental neighbours to do the same. The main catalyst for the success of this mission was the signing in 1860 of the Anglo-French Treaty of Commerce from which arose, directly or indirectly, a whole series of agreements freeing up agricultural trade throughout most of Europe. The motivation for France was partly political, with Emperor Napoleon III wishing to end France's political isolation. In Germany too, political considerations played their part, as they wanted France's support for Prussia against Austria and Denmark; though as a net agricultural exporter, the agricultural sector saw no need for protection, and opposed it for manufactures lest their input costs be increased.

This 'free trade interlude' was however soon brought to an end by technological developments in transportation, permitting wheat to be exported to Europe at competitive prices from the USA and to a lesser extent Russia.

2.1.3: The Late 19th Century - A Time of Increasing Protectionism[7]

Before the 1870's, price rises followed bad harvests, but the poor harvests of the late 1870's coincided with four excellent harvests in America. This, coupled to the much lower transport costs, resulted in large increases in imports from the US, depressing prices. The decline in prices in Europe continued almost through to the end

[5] see Abel, W. (1980), pp227-8.

[6] see Appendix 2 for wheat prices in the 1820's.

[7] see the data in Appendix 2.

of the century; initially this was confined to grains, but the development of refrigerated container ships meant European livestock producers faced falling prices too, through increased competition from the USA, Canada, and Australia, with falling grain prices only partially offsetting this.

In France, the 'edifice' of free trade, to use Tracy's term, started rocking in 1870 when France was defeated in the Franco-Prussian war. This put the country heavily in debt, and increased nationalist sentiments, causing successive governments to gradually increase import duties and also the burden facing consumers. The early campaigners for protection were from industry, principally iron and textiles, but the disastrous harvest of 1879 brought agriculture into the protectionists' fold. Given the technologically undeveloped state of French agriculture, French farmers were quite unable to compete with the cheap imports from the US and elsewhere, especially as the majority of farmers were poor owner-occupiers. In 1892, the 'Méline Tariff' imposed or raised duties on agricultural goods in the region of 10% - 25%. The main exception was with agricultural raw materials, such as wool and cotton. Moreover, given the relative price changes following the growth of cheap imports of grain, there was a switch towards livestock production.

The period 1850-70 was a good one for German agriculture, which was doing well as a net exporter of grains. Industrialists tried to retain duties on iron, but their failure through the opposition of farmers caused them to concentrate efforts into getting the farming community to support the protectionist cause. The increased competition from America during the 1870's worked in their favour, with US grains displacing German grains on the British and French markets. In addition, population growth turned Germany into a net importer of some grains. A tariff was introduced on grains in 1879 at a relatively low level, which was raised steadily throughout the 1880's. By 1890, bad harvests had raised prices somewhat, and significant election gains by left-wing parties concerned about the effect of duties on the cost of living saw these duties reduced. The new century however saw a political climate more favourably inclined towards agricultural protection, though the government didn't increase duties by as much as the Farmers' League wanted. In the livestock sector, the favoured method of protecting domestic production was to have very tight regulations on imported meat and meat products.

Denmark had traditionally been a net exporter of grains. The events of the 1870's however had been foreseen by some, and there was a widespread adaptation from the traditional crops like wheat to livestock, feed grains and root crops. This transformation was crucially aided by widespread co-operation, providing the necessary processing

and marketing channels. The lower prices didn't pass Denmark completely by, but by the turn of the century Denmark had an agriculture which was efficient and well-organised right down the marketing chain. Exports of livestock products found a ready market in the UK, having been squeezed out of the German market by the latter's highly protective 'hygiene regulations'.

For British agriculture, the period after the repeal of the Corn Laws was very much the 'Golden Age'. The late 1870's however saw a general economic depression, coupled to poor harvests (especially 1879), the impact of US exports, as well as a series of foot-and-mouth, sheep liver-rot, and rinderpest epidemics. Many farmers went out of business, but some relief came for tenant farmers with many landlords reducing or suspending rents. Thus here, farmers' costs were lowered, rather than their revenues raised by transfers. The transfer of income was implicitly from landowners to producers. Harvests recovered slightly during the 1880's, but through the early 1890's, a series of poor harvests coincided with prices at their lowest levels ever as imports flooded the market (although these problems were less for livestock producers than arable farmers). From the late 1890's on however, prices slowly rose and gradually British farming recovered. Unlike most of Continental Europe, the depression passed with still virtually no protection. This strongly reflected the different political balance in Britain, with the 'cheap bread' war-cry still as important as it had been in the 1840's. Furthermore, the food-security argument for increasing food production (which has frequently been taken as being synonymous with becoming self-sufficient in food) failed to take hold in Britain, since she was one of the great sea-faring nations, with an Empire which supplied her with as much cheap food as she needed. The lack of pressure from agriculture to get protective barriers erected was due to a number of factors: As noted above, the swing in political power meant many farmers recognised that they would be unsuccessful had they tried to campaign for protection, besides which the widespread existence of the landlord-tenant system meant the burden of depression was partly shared with landlords, who generally had alternative sources of income in addition to rents from their land.

2.1.4: The Great War And Subsequent Recession

The events of the inter-war period were heavily influenced by both the economic situation following the First World War and the general economic depression from 1929. The First World War saw farmers temporarily benefit from high prices. In France, duties were removed during the war, and only slowly re-introduced, partly

because of the government's concern with the rising cost of living. Through the 1920's, farming faced a cost-price squeeze, and more labour moved from the rural areas to the towns. The late 1920's saw world grain supplies rise and prices fall. France's response was to raise tariffs, initially simply to prevent a collapse of the market[8]. A looming election and a world price which continued to fall however meant that tariffs alone couldn't be used to help protect domestic agriculture. Over the next few years import quotas were introduced in a number of markets, with a milling ratio imposed for wheat.[9] These policies worked well until higher domestic production started depressing the home market. Intervention buying was initiated, but domestic political instability resulted in French agriculture entering 1939 highly regulated but without settled policies.

German agriculture suffered badly during the First World War. Blockades worked well for the enemy, accentuating the problems caused by lack of preparation due *inter alia* to the expectation that the conflict would soon be over, and thus a lack of stocks, and too much food being sent to the front. Production fell sharply and rationing was imposed. The early 1920's saw a sharp rise in grain prices but by 1925, farm prices were rising slower than the prices of purchased inputs. Tariffs on food imports, suspended at the beginning of the war, were reimposed in 1925. Although prices rose a little, agriculture was in no way made prosperous. In 1929 a wheat milling-ratio was adopted, encouraged by falling prices, and import duties were raised, increasing the transfers from consumers., to both taxpayers and producers. This encouraged a rising level of self-sufficiency, helping to insulate Germany from declining world prices in some markets. In others, especially livestock products, falling prices and the consequent fall in incomes proved too much for many farmers. The weakened rural economy helped the Nazi Party gain support in these areas as well as in the urban areas. The National Socialists were very pro-protection for German agriculture, not just because their nationalistic thinking made self-sufficiency a very important target, but also because of the Germanic tradition linking values to the soil[10]. Agriculture did recover, but this occurred elsewhere too, so it's hard to isolate the impact of the Nazi's autarchic policies alone. Imports were cut, and incomes recovered to pre-crisis levels

[8] Appendix 2 details the rising protection given by France and Germany to foodstuffs over this period.

[9] Quotas transfer income from consumers to producers by reducing supplies reaching the market, thereby raising market prices. In as much as the government has administrative costs to cover, they also represent a transfer from taxpayers to producers. If quotas are auctioned, taxpayers receive a transfer. The right to produce granted by a quota may also generate rents for the producer.

[10] Their slogan *Blut und Boden* translates as "Blood and Soil".

but no further, as price stabilisation was a key policy target. Lower imports cut total supplies on the domestic market, raising prices, but there were elements of price control to offset this. Overall, the protectionist philosophy of the National Socialists was in general shared by other countries; what made Germany stand out was the incorporation of measures into a coherent package.

Denmark, being neutral, came through the war relatively unscathed, both physically and economically, since she managed to export to both Britain and Germany. Trade kept up after the war, and the slump in grain prices around 1929 didn't have too adverse an impact given the general predominance of livestock production. The health of Danish agriculture helped sustain the whole economy through the early years of the depression, but 1931 saw exports hampered by the increased protectionism in other countries, especially Germany, and the tariffs Britain was starting to apply on imports from non-Empire countries. The position weakened through 1931 and 1932, worsened by having farmers who'd borrowed heavily during good years being caught under a heavy debt burden. Import controls in an export-oriented sector would have been ineffective, so the government tried to negotiate openings for exports, and with great reluctance imposed some internal measures. The negotiations with Britain resulted in limited concessions. Whilst exports to the UK recovered slightly, a degree of Empire preference remained, and Denmark continued to lose out to New Zealand. Denmark restricted grain imports further in 1938 because of a further price fall. Wheat and rye imports were completely banned, and a milling-ratio was imposed. Lower imports led to higher market prices. Danish farmers had traditionally been supporters of laissez-faire principles, so these protectionist developments represented a major shift in their position.

During the First World War, British farmers were guided to grow certain crops, but without financial inducement or an overall plan for raising output. Although it was suggested that price guarantees would be needed to increase wheat output, the 1915 harvest was good. Moreover, the American harvest was large, and the German U-boat attacks on shipping seemed to be dwindling, so reducing fears about import supplies being interrupted. Little extra effort was therefore made to increase output; but 1916 saw much smaller harvests and more attacks on shipping. In late 1916 and early 1917 therefore, guaranteed prices for wheat, oats and potatoes were introduced, but as market prices actually rose above the minimum level, these payments weren't actually made (output rose by nearly a quarter by 1918). Rationing was introduced, price controls enforced, and County Agricultural Committees were set up, with the power to compulsorily plough grassland, and take over poorly run farms. By the end of the war

most food, both domestic and imported, was under government control, and much debate then followed as to whether or not prices guaranteed by deficiency payments should continue. It was debated as to whether or not agriculture could survive without support, but this appeared to be settled with the 1920 Agriculture Act, which extended the support indefinitely. Within a year however the price of grain plummeted, sending the cost of the guarantees shooting upwards, and in August 1921 payments ceased. This return to free trade was then maintained through the twenties, with agriculture tending to specialise in those products that received 'natural protection' from Britain's island location, eg milk, eggs and fresh vegetables.

The depression from 1929 had a serious effect on British agriculture since its open-market stance made it an easy target for dumping. Its problems were further worsened by the general economic depression. The main government response was to raise tariffs, but following negotiations in 1932, imports from the Empire were exempted, thus although transfers were directed from consumers to producers, these were only limited to purchasers of non-Empire produce. Even so, these measures didn't really give British farmers any relief. Furthermore the government's policy of cheap food was still very important, especially given the general state of economic depression the country was in. The 1931 and 1933 Agricultural Marketing Acts introduced some measures, but these were commodity-specific, and didn't represent an overall package of help for agriculture. These Acts enabled the formation of Marketing Boards for milk, potatoes, bacon-pigs and hops. For wheat, deficiency payments were introduced, again transferring income from taxpayers to producers; for beef, import restrictions were imposed, but as this alone wasn't enough, the government made a flat-rate payment to producers.

2.1.5: The Second World War And Post-War Recovery

With the onset of World War Two, the main target in all countries became maximum production, subject to such constraints as lack of labour, fertilisers and fuel. By the end of the war, food was in very short supply throughout Continental Europe, with only Britain not facing critically short supplies. In Britain, preparations were made before fighting started, and memories of the the First World War resulted in the Ministry of Agriculture concluding that farmers needed greater market security. It was thus agreed in 1940 that prices would be fixed, and markets guaranteed, until the end of the War. In 1944 it was further agreed that in February of each year the government and the National Farmers Union would meet, and at this 'Annual Review' decide on the level of guaranteed farm prices.

Post-war, the aim of all governments was to restore output to peacetime levels. In France, mechanisation was promoted to raise output and to release labour for industry. By 1950, the expansion in output had caused some markets, eg wheat and sugar, to move into surplus. By the late 1950's, the policy changed to a sector-by-sector approach, but the problems continued with French agriculture readily adopting new technologies. Given continued low agricultural incomes, price reductions would have been politically totally unacceptable, so in 1957 prices were indexed to farm wages, non-food retail prices and input costs. When de Gaulle's government abolished this the following year however, the farmers responded with violent demonstrations, after which indexation was partly restored. Here, unlike the UK, prices were guaranteed 'directly' by means of higher market prices. Limited import levies were also operated.

Denmark had been the only country to remove its wartime provisions after the end of the hostilities, but export opportunities continued to deteriorate. The only major export market left after the further raising of protective barriers post-war was Britain but even here, with self-sufficiency in butter and eggs, rapidly rising pigmeat production, and increased competition from newcomers onto the export scene like France, Denmark's farm sector came under great financial pressure. They tried to diversify exports, but a lack of success here resulted in the reintroduction of intervention/protective measures such as the milling-ratio.

In many respects, Britain moved in a similar direction to France, with price guarantees used to raise output resulting in domestic supplies exceeding domestic demand in certain markets (principally eggs, pigmeat and barley), switching the policy emphasis to 'selective expansion'. As with France, production of these products proved hard to contain; and depressed markets resulted in large increases in support costs to the government/taxpayer under the deficiency payments system, still employed in preference to a system burdening consumers.

In post war Western Germany, there was a dire shortage of food, with the country cut off from East Germany, the traditional source of much of its food. Domestic production was providing dreadfully inadequate supplies of food. Although imports were raised under the Marshall Plan, by the time the Federal Republic was established in 1949, domestic food supplies were still very low. In 1950 and 1951 therefore, Import and Storage boards were set up to cover the markets for most of the main products. They had the power to intervene in the market in order to maintain (high) prices that were compatible with the aims of agricultural policy, principally that of guaranteeing returns to producers and expanding output. The 1955 Agricultural Act

was very pro-agricultural protection. A key reason for this, and for its widespread support, was the part the rural depression of the 1930's played in the rise to power of Adolf Hitler. This Act continued to set domestic prices well above import prices, at sufficiently high levels to cover most farms' costs, regardless of their efficiency. Consumers bore the burden of this, but appeared to accept it as being politically expedient, bearing in mind the events of the 1930's.

The overall pattern was one of growing protectionism, and production rising faster than demand, reducing imports of temperate foodstuffs. The justification for sustaining this support on a more permanent basis was questioned in most countries but particularly in Britain, where the debate, at first anyway, was between those who felt protection was needed to help the poor balance of payments situation and lack of foreign exchange; and those who felt it was bad economics to produce something domestically when it could be imported at a lower economic cost. An alternative was noted in 1962 by Gavin McCrone, who saw that a laissez-faire policy wouldn't succeed in removing inefficient producers because "they often stay until they have ruined the other factors of production and until the job of repair and reclamation is too expensive to be worth undertaking."[11] He favoured credit policy and consolidation of uneconomic farms to improve agriculture's competitiveness and raise incomes.

The cost of support too was much criticised in England, with a perception that the largest share of the expenditure went to the largest farmers who arguably needed support least. In contrast with this, in France there was hardly any debate at all, with it generally being accepted that support for agriculture was absolutely necessary. Further, there was barely any recognition of a need for labour to move out of agriculture. In the backward areas especially, the effect would more likely be adverse, with insufficient initiative among those remaining to take advantage of this outflow.[12] A longer-term analysis in France led to the growing realisation that given the potential for greater output, a necessary consequence would be increased exports, with preferential access to neighbouring European countries as the best way of achieving this.

With regard to the foregoing discussion, it bears re-emphasising that it is not intended to be definitive in terms of policy-coverage, but just aims to look at a few of the main policies implemented and their income-transfer implications. Of those referred to, French and German policies were dominated by transfers from consumers to

[11] McCrone, G. (1962), P45.

[12] Latil, quoted in Tracy, M. (1989), P231.

producers; Denmark's similarly, once protectionist measures were introduced. Just the UK's main policies were dominated by transfers from taxpayers to producers, reflecting the political influence of the early industrialists, who wished to keep down food costs to allow them to keep down the wages they paid to their employees. Here, farmers had to accept other, overt forms of support.

This isn't to say, however, that these other countries didn't operate policies which effected transfers from taxpayers to producers, just that the dominant transfers were from consumers. In 1956, for example, an OEEC study[13] reported, *inter alia*, that Denmark, France and Germany were using government (ie taxpayer) funds for a wide range of projects, such as land consolidation and research & development. Here though, these are much more structural policies than 'direct' income-support policies.

2.1.6: The 1950's - Closer Policy Cooperation In Europe

As noted above, France saw for herself a strong interest in developing Europe as an export market. In 1950 under the auspices of the Council of Europe, a Special Committee was set up to look at how European countries could jointly organise their agricultural markets. Two distinct lines emerged; one promoted by France, who for the above reasons was at the forefront of the talks, put forward a plan (known as the Charpentier Plan after the French delegate René Charpentier) calling for a supranational 'High Authority' to oversee a pan-European policy. The other line was promoted by the British (the Eccles Plan) which called for the 'Authority' to be just an intergovernmental forum with no more power than the ability to "suggest how [national policies for agricultural production and trade] could be reconciled"[14]. The Charpentier Plan was finally adopted (only Britain and Denmark opposed this) but the French, being impatient for a common policy, proposed a European Agricultural Community. Negotiations then took place between 15 European countries to see how such a supranational body could be formed. Ultimately this 'Green Pool' failed. It did however show more clearly the positions of the different countries, and the problems likely to be involved in reconciling these differences.

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[13] see OEEC, (1956).

[14] Tracy, M. (1989), P246.

2.2: THE FORMATION AND DEVELOPMENT OF THE EEC

2.2.1: Towards a European Economic Community and a Common Agricultural Policy

By 1955 and the Messina Conference[15] (the preparatory conference prior to the 25th March 1957 signing of the Treaty establishing the European Economic Community; more commonly called the 'Treaty of Rome'[16]) the participating countries, France, West Germany, Italy, and the countries of the Benelux customs-union (Belgium, the Netherlands and Luxembourg), decided after much debate and argument that "[t]he Common Market shall extend to agriculture and trade in agricultural products"[17]. The committee set up after Messina to lay down guidelines for the Treaty, under the chairmanship of Paul-Henri Spaak, reported that it was "inconceivable that any common market should be established in Europe which did not include agriculture."[18] This view reflected the economic significance of agriculture in Europe during the mid-50's, with total agricultural employment around 17.5m, (representing over 30% of the working population in some countries), many farms being less than 5ha; a share of total merchandise production over 10%, and up to 36% (in Italy); and a contribution to GNP of up to 23% (again, Italy).[19]

In addition, there would have been the very real practical problems of distinguishing between agricultural and industrial products should agriculture have been excluded from the Common Market; and also the distortion to competition arising from a differential treatment of goods. Moreover, it was very unlikely that the major agricultural exporters such as France would open their markets to German industrial exports without a corresponding increase in market access for their agricultural exports. It can be seen therefore that despite the sort of problems that ended the 'Green Pool' negotiations, there was a sort of inevitability that agriculture would somehow **have** to become part of the Common Market.

The way this was achieved was, under Art 38(2) of the Treaty, to make agriculture subject to the rules of the Common Market, except where Articles 39 to 46 of the Treaty provide for the contrary, with the agricultural Common Market being accompanied by the "establishment of a common agricultural policy among the member states",[20]

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[15] where the British were present, but only as observers, by their own decision.

[16] Note this title strictly also applies to the Treaty establishing the European Atomic Energy Community - Euratom - signed in Rome on the same day by the same countries.

[17] Treaty of Rome Art 38(1).

[18] quoted in Neville-Rolfe, E. (1984), P185.

[19] see European Communities, (1987), P11.

echoing Art. 3(d)'s call for "the adoption of a common policy in the sphere of agriculture". Art 40(2) lays down the forms this may take, according to the products involved: "[C]ommon rules concerning competition; compulsory co-ordination of the various national market organisations; or a European market organisation." Whichever form was chosen, it was to include whatever measures were deemed necessary to fulfill the objectives of the common policy, as laid down in Art 39(1):

> "a) to increase agricultural productivity by developing technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, particularly labour;
> b) to ensure thereby a fair standard of living for the agricultural population, particularly by the increasing of the individual earnings of persons engaged in agriculture;
> c) to stabilise markets;
> d) to guarantee regular supplies; and
> e) to ensure reasonable prices in supplies to customers."

Given the potential conflicts between these aims, there inevitably had to be compromises, based on the priorities set. These started to be debated in July 1958, after the Treaty of Rome had come into effect (on 1st January 1958) when at Stresa, the governments and farming organisations met. The starting-point for the talks was the set-up of the national policies, and likely future requirements. To this was added the objectives contained within the Treaty, but in practice very little needed to be changed, so for example the structure of farming was to be adjusted, but still within the context of the family farm unit. With the benefit of hindsight, it is very interesting to return to see what the Commission wrote in its First General Report on the Activities of the Community back in 1958:

> "In the past, attempts to increase agricultural incomes have been based on the too one-sided principle of increasing production. True, this has led to a marked increase of productivity per worker, especially as there was a simultaneous decrease in the number of persons occupied in agriculture. However, the increase in production has led to new difficulties on the markets. In view of the fact that production of the major products is increasing more vigorously than consumption, surpluses are appearing

[20] Art 38(4).

on the various markets and their disposal is causing serious difficulties and worries."[21]

As Hans von der Groeben wrote: "Although the participants in the conference were not unaware that many government schemes for increasing agricultural incomes had tended to boost production to an excessive degree, neither the resulting threat to market equilibrium and finance nor consumer interests were high on the agenda at the Stresa Conference."[22]

The final decision taken amended the original Commission proposal by giving the Council the power to set prices, with the Commission's role reduced (from what they wanted) to initiating the discussions by making the price proposals. Thus the supranational input was restricted, with the major decision-making power in the hands of the Councils of Ministers. Whereas the Ministers were elected, there were no similar democratic controls over the Commission, and at that time there was no directly elected European Parliament.

By the early 1960's, three principles for the future CAP had been established, not expressed explicitly as such at the time, but underpinning all the negotiations. They were that there should be a Single Market, allowing the free circulation of goods between countries, implying common prices, competition rules and stable exchange rates; Community Preference, meaning protection against lower priced imports; and Financial Solidarity, meaning joint financing of the policy, and the implementation of a common system of collecting revenues and disbursing funds. The first two derived directly from the Treaty of Rome, whereas the third derived from Regulation 25 on the financing of the CAP (see below).

It had also been decided that there would be a 12-year transition period leading to the completion of the EEC Customs Union, to end no later than 1st January 1970.

2.2.2: The Creation of the CAP and Its Method of Funding

At the start of 1961, the first concrete moves were made towards establishing the Common External Tariff for industrial products. With agriculture however, by the end of 1961 draft regulations had only just been submitted on cereals, poultrymeat & eggs, pigmeat, wine, and fruit & vegetables. The principal difficulty came in trying to reconcile the differing stances of Germany and France. Within Germany the industrial lobby, looking to gain from liberalised trade, felt the proposals were too protectionist.

[21] P70, quoted in Harris, S. et al (1983), P37.

[22] Groeben, H von der. (1987), P73.

The German farm lobby however saw the Commission's proposals as representing a lower level of support than pre-EC. Moreover, the pivotal price - that for cereals (central as an arable crop and as an input for livestock production) - was higher in Germany than in France (the main producers) and the lower common price was seen by the Germans as untenable[23]. The French however were united in their determination to get the agricultural common market agreed, and would delay the progress towards a common market in manufactures in order to achieve this.[24]

By December 1961, no decisions had been taken on the proposals for common agricultural market organisations, even though the basic method of support, that of 'high' market prices, was in line with what these countries had operated in the past. Given the French position, a decision had to be forthcoming. Apart from breaks for Christmas and the New Year, the first "marathon" session of the Agricultural Ministers lasted from 19th December 1961 to 14th January 1962. From 31st December 1961, for the first time, the procedure of "stopping the clock" was undertaken so that, on paper at least, the negotiations finished in time for the second phase to start as scheduled.

Two main issues caused the talks to be so protracted: The first concerned safeguard clauses, giving the Community and/or individual member states the right to block imports should they be causing a 'serious disturbance' on the home market. The second was concerned with the financing of the CAP during the transitional period. It had already been decided (on 20th December 1960) that a levy system was to be used for intra-Community trade, with the levy-revenues accruing to the importer, already the dominant system among the member states. With imports from third countries, initially the revenues were to go to the importer, but with an increasing proportion going into the Community budget, with all revenues going there by the end of the preparatory period (this being different to the transition period. It had no set time-limit, but would end with the establishment of the common agricultural market and common prices).

The legislation following this marathon became Regulation 25, which enabled the establishment of a 'fund' to handle agriculture's expenditures and revenues. This is the European Agricultural Guidance and Guarantee Fund - EAGGF - though it is more commonly known by its French acronym FEOGA[25].

The funding of FEOGA was to be based on the Community's general budgetary 'key' laid down in Article 200 of the Treaty[26]. This decision, although only covering

[23] Eventually, agreement was reached on 15th December 1964 regarding common cereals prices, to be operative from 1st July 1967. See Appendix 2 for more details.

[24] see eg Groeben, H von der. (1987), P102.

[25] Fonds Européen d'Orientation et de Garantie Agricole.

three years[27], is nonetheless a very significant achievement in that it represents the convergence of six countries' methods of financing agricultural policy into a single set of rules.

FEOGA, as the name implied, was to have two parts: the Guarantee Section which was to fund export restitution payments and intervention measures (the costs of buying-in and storing surplus products, and also production aids, processing aids etc.) - all measures known as Compulsory Expenditure, ie that arising directly out of obligations under the Treaty and associated legislation; and the Guidance Section, which was to cover structural measures (eg support for co-operatives, farm consolidation, infrastructure work etc) ie Non-Compulsory Expenditure, where no direct obligation for the expenditure arises out of the Treaty. As will be seen later, the term 'Compulsory' has over the years been taken quite literally, with important consequences for the evolution of the EEC's financial situation.

Regulation 25 also specified that, at the single market stage, the revenues raised from levies on imports from third countries shall pass to the Community, to be used for 'Community' expenditure, along with other monies to be decided upon; with the expenditure arising out of operations under the CAP being met from Community funds "for at the single market stage price systems will be unified and agricultural policy will be on a community basis."[28]

Before moving on, it is worth pausing to consider the transfer implications of the CAP mechanisms as agreed. The cornerstone of the income-support arrangements was to be price-support, coming from consumers via commodities trading in the EC at a price above global free-trade levels[29]. The internal EEC market price however had to be protected from (a) cheaper imports undermining the higher-priced EEC produce, and from (b) internal over-supply driving down market prices. The former was to be achieved by a variable import levy (VIL) on imports, raising their price from world market levels to the EEC level, thus transferring income from consumers to producers and taxpayers. The latter was to be achieved by intervention buying and, if necessary, exports, subsidised to make them competitive on the lower-priced world market. These also transfer income from consumers to producers in as much as they help maintain the higher market price. They also transfer income from taxpayers to producers by means

[26] see Appendix Table 1 for details.

[27] see below for more on the negotiations for the period from 1965 on.

[28] see EEC Commission, (1962), P147.

[29] for more details on this, especially with respect to the cereals sector, see Chapter 4.

of the direct government expenditure incurred in their operation.

As was noted above, France and Germany did have a history of policies which transferred income from taxpayers as well as consumers. In particular France as an exporter had funded export subsidies. Thus, implementing policies under the CAP that effected transfers from taxpayers to producers wasn't without historical precedent[30], but more significantly put into its time-setting, the CAP as originally formulated by the EEC as a net importer for many products meant that, *ceteris paribus*, the above system resulted in taxpayers being net gainers in certain markets: The costs of export restitutions and intervention measures were kept down by the fact that the EEC was, at the time, a net importer of many products. This obviated the need for the above protective devices to be used in any permanent or extensive way. On the other hand, imports meant taxpayers gained by the value of the VIL's collected and, for so long as in any particular market the EEC remained a net importer, taxpayers would face an overall net gain in that market.[31]

It must also be added that the above method of support wasn't to be used universally. Some sectors were to be supported by direct payments similar to the UK's deficiency payments, where total production and self-sufficiency levels were generally low[32].

It can therefore be seen that overall, although the principal form of support was to be via the institutional setting of 'high' market prices, there was also to be an extensive transfer of income from taxpayers to producers. Only this latter figure is shown in the EEC Budget as FEOGA expenditure. This transfer was initially restrained by the EEC being a net importer, but as will be seen below, subsequent over-supply in many markets has more recently caused the magnitude of taxpayer transfers to producers to rise.

2.2.3: The Empty-Chair Crisis and the Luxembourg Compromise

Before the single market stage, it had to be decided how the CAP and other Community operations were to be financed from 1965. On 31st March 1965 therefore, the Commission submitted to the Council a number of proposals concerning, *inter alia*, the future financing and associated matters:

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[30] see section 2.1.6 above.

[31] With the EC being a very large player on the world market, there will also be terms of trade effects to consider. Most notably, as a net exporter of cereals, the EC's exports act to depress the world market price. Thus as the volume of exports rises, so does the unit refund cost. As a net importer in the early years of the EC however, the reverse situation would have prevailed.

[32] see Chapter 4 for details of the system operated with respect to oilseeds.

The target date for the establishment of the single market had already been set at 1st July 1967, and for the period 1st July 1965 to 30th June 1967, it was proposed that the transitional financing system already in operation should be continued. It was also proposed that from the single market stage, agricultural levies should form part of the Community's independent revenue. With the completion of the Customs Union, it was seen that there would be less and less coincidence between the country where third-country imports entered the Community and the country of final consumption. This notion has since been labelled the "Rotterdam Effect" since many imports enter the Community at Rotterdam, but then pass on to other member states. The result therefore is that there is much less justification for the 'country of first import' to retain the levy revenues, whilst the high EEC prices are paid by the consumers in the 'country of final consumption'. Consequently, "the proposals concerning the financing of the common agricultural policy [have been linked] with the whole question of achieving a financial and institutional balance as the integration of the Community progresses."[33] It was however proposed that these revenues should only go in full to the Community from 1972, and between 1967 and 1971 the Member States would pay over a (rising) proportion thereof. A third, connected issue was also proposed, regarding giving the European Parliament a greater role in the budgetary procedure.[34] The package was discussed on 28th-30th June. France was alone in not wanting to take the package as a whole, wishing instead to concentrate on the single issue of agricultural finance in the remainder of the transitional period. At 2am on 1st July, the meeting was closed with no decisions made, so plunging the Community into the 'empty-chair' crisis, following France's refusal to participate in Council and Permanent Representatives' meetings over the following few months.

It wasn't until December 1965 that France agreed to resume talks. An extraordinary session of the Council was held in Luxembourg on 17th-18th January 1966. Here, M Couve de Murville, the French foreign minister, set out the issues of importance to France. These were given as the 'style' of the Commission, for which a 'decalogue' of desired changes was given (see Lambert, pp 221-3), and the issue of majority voting, where France was adamant that on matters of 'vital national interest' no country should be in a position where it could be outvoted. The other countries and the Parliament however were equally adamant that the Treaty-based principle of majority voting should not be lost. This meeting ended deadlocked, but resumed on January 28th. Prior to this, the Permanent Representatives met and produced a 'heptalogue' of points

[33] see EEC Commission, (1965), P335.

[34] see below for more detail on the granting of greater powers to the European Parliament over time.

concerning the Commission (ibid pp 224-5), which toned down the language of the 'decalogue' without really reducing the proposed role of the Commission. With majority voting however, the sides remained diametrically opposed. In the end, they had to settle for a 'gentlemans disagreement' known as the Luxembourg Compromise, which wasn't so much a compromise as an agreement to disagree:

> "1 When issues very important to one or more member countries are at stake, the members of the Council will try, within a reasonable time, to reach solutions which can be adopted by all the members of the Council, while respecting their mutual interests, and those of the Community, in accordance with Article 2 of the Treaty.
> 2 The French delegation considers that, when very important issues are at stake, discussion must be continued until unanimous agreement is reached.
> 3 The six delegations note that there is a divergence of views on what should be done in the event of a failure to reach complete agreement.
> 4 However, they consider that this divergence does not prevent the Community's work being resumed in accordance with the normal procedure."

What this did was to let the six get on again with developing the Community, without stating what was to be done when that process hit the difficulties foreseen in Point 3. It also showed up major differences between the member states regarding how that development should progress.

One of the main areas of Community activity where the Compromise had an impact straight away was the CAP, where the Council felt decisions should be made on the basis of unanimity, at that time referring to establishing market regimes for sugar, and oils & fats, the fixing of certain common prices, and the setting-up of a financial regulation for agriculture.

The arrangements for financing the rest of the transitional period (extended to 1970 at France's insistence) were then agreed upon. For the remainder of the transitional period, payments were to be made in accordance with the figures shown in Appendix Table 1. On the expenditure side, it was decided that all expenditure on market support arrangements (ie the Guarantee Section of FEOGA) would be borne by the Community from 1st July 1967, but for structural expenditure (FEOGA's Guidance Section) the Community would only bear part of the cost, with this expenditure subject to a ceiling

each year.

1967 also saw the institutions of the three Communities - economic, atomic energy, and coal & steel - merge to form the European Communities (EC).[35]

2.2.4: The Financial Arrangements for 1970 Onwards

Having decided how the transitional stage was to be funded, a definitive system of financing had to be agreed. The Commission didn't make its proposal until 16th July 1969, three months after de Gaulle had resigned as French president, replaced by M Georges Pompidou.

These proposals split the introduction of the full own-resources system into two:

PHASE 1: From 1st January 1971, agricultural levies and common external tariff revenues (known as the CCT or Common Customs Tariff in Euro-jargon) should accrue to the Community.

PHASE 2: From 1st January 1974, all Community activities were to be financed from own-resources. It was from this time that Parliament should be given wider powers of control.

A meeting of Heads of State and Government was proposed for the end of 1969. In a subsequent memorandum, the Commission proposed a movement towards the long-term goal of economic and monetary union (EMU), and set the short-term targets as deciding the procedures for financing agriculture, creating own-resources, and increasing Parliament's budgetary powers. The summit took place in The Hague on 1st-2nd December 1969, and resulted in a statement saying that the member state governments agreed with the above aims, and would work within the Council to achieve them. Given that the conference was initially proposed by the French, who then signed such a positive statement of intent, this "Spirit of The Hague" represented a renewed political will amongst the six (as opposed to just the five, in the face of French opposition) to further integration.

The Council then got to grips with the proposals on 19th-21st December. On the proposed system of financing, it put the start of Phase 2 back a year; and whilst agricultural levies would accrue in full from 1st January 1971, CCT revenues were to accrue on a rising scale, accruing in full from 1975. 10% of revenues however would then be returned to the Member States to cover collection costs. The shortfall in revenue would be made up by a GNP-based key and the old Treaty keys up to 1975, beyond which time a '3rd Resource' - 1% of a theoretical harmonised VAT base - was to cover the excess of expenditure over CCT revenues and agricultural levies, these two

[35] the EC being distinct from the EEC in that the latter subsists within the former.

constituting "traditional" own-resources. If the harmonised VAT base wasn't in place by then, the keys would continue in operation until it was.

These 'agreements' then had to be ratified by all the member states' parliaments, in accordance with Article 201 of the Treaty. This was completed on 21 April, hence the common name for this legislation; the "Decision of 21 April 1970"(!) This still left the financing arrangements for 1970 unresolved, so it was agreed to combine the previous and following methods for that year ie expected levy receipts and the capacity to contribute, based on GNP. The final agreement[36] was as agreed by the Council, with an additional clause that until 1975, each member state's aggregate payment couldn't rise by more than 1% or fall by more than 1.5%. This being so, the introduction of the FULL own-resources system couldn't start until 1st January 1978 (with changes in payments for 1975-7 limited to 2% up or down).

The 'Decision' also changed the practical nature of financing Guarantee expenditure. Previously, a clearing-house system had been in operation, but now a system of direct financing was put in place, whereby the necessary funds were made available to disbursing agencies such as the national intervention boards.

At this point, it is worth summarising the moves made up to this point concerning granting greater powers to the Parliament (EP):

On 31st March 1965, a number of proposals were made concerning the progress of the Community, one of which aimed at giving the EP a greater role in the budgetary procedure, in line with the EC's operations being funded from own resources. This would also mean the EP being elected by direct universal suffrage. It was these proposals that led to the 'empty-chair' crisis.

On 16th July 1969, a new proposal was made that from 1st January 1974, all the EC's activities would be funded from own resources. From this time, the EP's powers would be increased.

21st April 1970 - the Treaty of Luxembourg was signed. This increased the EP's powers to make changes to the budget. It also made for these powers to be increased further from 1975. From this time also, it was to be the President of the EP who would have the power to declare the budget adopted. By 1975 moreover, non-compulsory expenditure (over which, the EP had greatest power) would have risen to 22.6% of the total EC budget.

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[36] in Official Journal of the EC, OJ L94, 28.04.1970.

2.2.5: Common Prices...For a Year; then the Advent of MCA's

1968 saw for the first time truly common prices in the key cereals sector, in national currency terms and in the common currency, the ua[37]. The following year however saw considerable pressures on both the German Mark (DM) and the French Franc (FF). Low inflation and currency stability through most of the 1960's now gave way to (relatively) high inflation and greater pressure on the Bretton Woods system of fixed exchange rates. As a consequence, during 1969 the FF was devalued, and the DM revalued. This made imports from all EC countries into Germany cheaper than German products, but this was especially so with French exports. What both governments did however was to continue converting AGRICULTURAL prices from the ua to their national currencies at the old IMF par values. This prevented French consumers from suffering price rises in FF-terms; and protected German farmers from a price-cut in DM-terms. With free intra-Community trade, the consequence of all this would have been that imports into Germany from the rest of the Community would have been cheaper than German products (in DM terms), and French exports to the rest of the Community would have been cheaper than domestic products. France's response to this was to impose border taxes and subsidies on trade. Imports had a subsidy applied to lower their price to the French market price, and exports had a tax levied to prevent them undercutting the other member states' products. The German response to the falling prices to farmers following the DM's rise after being allowed to float was to impose an import tax of 11% on all CAP products. The Commission however were opposed to this, since "if the German government were allowed its MCA-type import tax [see below], there would be a strong temptation to leave it in force indefinitely."[38] With the French already applying border taxes and subsidies, this would have divided the Community into three separate monetary zones which was unacceptable to the Commission.

Initially, a plan was drawn up to realign French and German prices over a two-year period, but by 1971 international economic pressures were breaking-up the Bretton Woods exchange-rate system. At this, all attempts at returning to a single common price were abandoned, and Regulation 974/71[39] formally institutionalised uncommon prices, giving the taxes and subsidies the name Monetary Compensatory Amounts (MCA's). Countries like Germany with prices in national currency terms above the common price at the market exchange rate had 'positive' MCA's, and countries like

[37] see Appendix 1 for more details about the common currencies of the Community.

[38] Neville-Rolfe, E. (1984), P255.

[39] in OJ L106, 12.05.1971.

France in the opposite situation had 'negative' MCA's. These MCA's are the difference, in national currency terms, between the agricultural prices as they would have been had they been converted from the common currency at the 'market' exchange rates, and the prices as they were when converted at the 'green' or 'representative' rates, (Germany's green rate being 'undervalued' and France's being 'overvalued'). This was done because unless exchange rates are fixed, there will be a natural trade-off between 'common' and 'stable' prices. If common prices were to prevail, they would be converted at the market exchange rates, but as these changed fairly frequently, so would the prices received by farmers in national currency terms. As stable prices for farmers were considered more important, institutionally-determined exchange rates were used for agriculture which, being more stable, resulted in more stable prices being paid to farmers in national currency terms. In terms of claims on the Budget, MCA's only appeared as elements of intervention expenditure from 1 January 1973, before which time they were made as direct inter-country transfers.

By this time, Community-funded structural measures were being pushed further and further into the background. 1968 saw them re-emerge when the Commissioner for agriculture, Sicco Mansholt, issued his "Memorandum on the Reform of Agriculture in the European Economic Community"[40], subtitled "Agriculture 1980" but more commonly known as the Mansholt Plan. Mansholt, concerned about the rising cost of agricultural support, proposed to expand the CAP beyond price support. It should also include socio-structural measures involving, *inter alia*, fewer farmers, and land consolidation and amalgamation, creating fewer and larger farms. He estimated that under his plan, Guarantee expenditure in 1980 would be 750m EUA - it turned out to be 11b EUA (current prices). Even at 1970 prices, 1980 expenditure was 6 times that envisaged by Mansholt, albeit in an enlarged Community.[41] The Plan itself was never formally discussed, and when three socio-structural Directives were eventually adopted on 24 March 1972, they bore little resemblance to the measures Mansholt felt were necessary. Claims on FEOGA's Guidance Section were in the form of a partial reimbursement on member states' expenditure; normally 25% but up to 65% for the poorest regions.

[40] Commission Document COM (68) 1000.

[41] Neville-Rolfe, E. (1984), P299.

2.2.6: The First Enlargement and the Commodity Price Boom

Later in 1972, Treaties of Accession were signed with the United Kingdom, Ireland, and Denmark, to start on 1st January 1973. During the negotiations, the '*acquis communautaire*' principle was tested for the first time. This principle was based on the notion that new member states couldn't demand wholesale changes to the Treaty when joining, but would have to accept the Treaty and subsequent institutional arrangements as they stood. This was going to cause difficulties in as much as two of the new members, the UK and Ireland, were poorer than the average of the six, heightening the regional disparity within the Community. Moreover, the UK was a net agricultural importer. Given the dominance of FEOGA Guarantee expenditure in total EEC expenditure, it was recognised that the UK would become a major net contributor to the Budget, once the 5-year transitional period was over. Thus it was that when on 25th July 1973 the Commission proposed the establishment of a European Regional Development Fund (ERDF), this was seen as a concession to the UK in order to partly offset their large net Budget contribution as well as trying to reduce regional disparities.

Up to 1973, the progress towards EMU in 1980 had been moving fairly well, but 1973-4 was to see two events that caused the member states to become rather less Community minded. Firstly, OPEC - the Organisation of Petroleum Exporting Countries - tripled the price of crude oil. Agriculture was affected initially by the rising cost of fuel inputs, but subsequently by the general rise in the cost of living too. The second problem was a natural one; a simultaneous series of bad growing conditions in the major agricultural areas worldwide causing poor harvests and rising prices for a number of products. This period is now known as the 'Commodity Price Boom Era'. The impact of the oil price-hike on the Budget will become clear below, its effect being indirect. The effect of rising agricultural commodity prices was in general a saving for the Budget, with rising world prices reducing the levels of export subsidy needed. The extreme case was sugar, where prices rose so much import subsidies were needed to ensure supplies to the Community at 'normal' prices.

In February 1974 in the UK, a Labour Government was returned to power at the General Election. When the implications for the UK of the full own-resources system became clear, they immediately started renegotiating the terms of membership, in the context of an imbalance in net contributions (rather than on gross contributions as previously). The talks continued until late 1974 at the Paris Summit. To avoid compromising the *acquis communautaire*, the outcome was stated in general terms, applicable to any member state. Point 35 of the final communiqué read: "The Heads of Government recall the statement made during the accession negotiations by the

Community to the effect that 'if unacceptable situations were to arise, the very life of the Community would make it imperative for the institutions to find equitable solutions.'"[42]

Also at this Summit the details of the ERDF were finalised. For a trial period of three years, it was to get a budget of 1300m ua. This was allocated between member states by means of fixed quotas, the UK being given 28%, the second largest share.

A note to the Council and Commission followed the Summit, calling for a correcting mechanism to be found within the own-resources framework. Measures were agreed at the European Council[43] meeting of 11th March 1975 in Dublin, and a Regulation was adopted on 17th May 1976, initially for seven years. This 'Financial Mechanism' was to operate when an 'unacceptable situation' arose, defined in terms of:

1 a measure of national wealth (GNP per capita must be below 85% of the Community mean),
2 a measure of economic progress (the real GNP growth rate must be below 120% of the Community mean, and
3 a contribution of over 110% of the theoretical contribution had payment been based on national GNP as a percentage of Community GNP; all to occur simultaneously.

Payments were to be restricted to 250m EUA[44] or 3% of the expenditure chargeable to the current financial year. If however a country's average balance of payments for the preceding three years[45] was positive, only VAT and GNP-based payments are included in the calculations. These payments had to exceed 10% of the amount the member state would have had to pay if the payment was based on its GNP as a proportion of EC GNP.

In the end however, this mechanism was only available for four years, and was actually never used. To see why, the situations of the three poorest member states, the UK, Ireland and Italy, may be considered for 1976-8. All three countries in all three years satisfied the first criterion. Ireland and the UK both satisfied the second criterion also. Both of these criteria were based on the ex post calculation of a three year rolling

[42] see EC Commission, (1974), P303.

[43] the new title for the "Heads of State and Government".

[44] European Unit of Account, the new common currency, a basket currency as compared with the ua which was based on gold.

[45] at current market exchange rates.

average. The third criterion was an ex ante estimate, but the Act of Accession restricted the contributions of the UK and Ireland. In 1979 the UK did apply for a 68m EUA rebate, but by the time the 1980 draft Budget had been adopted, sterling had risen sufficiently for the UK to no longer be eligible on the balance of payments criterion.

In May 1975, as a direct result of the UK's accession negotiations, the CAP's structural measures were extended. The UK had an established policy on hill-farming, and the EEC version aimed at "the continued conservation of the countryside in mountains" where "farming performs a fundamental function", as the preamble put it. This was to cover principally mountain areas, and less favoured areas (LFA's) in danger of depopulation.

At this time, a common basis for VAT assessment hadn't been agreed, so the introduction of the 'full' own-resources system was delayed beyond 1975, and GNP-based contributions continued as before.

2.2.7: "The Years That the Locusts Consumed"

As noted earlier, the oil price hike resulted in rising input costs for farmers, and in certain sectors, farmers were receiving prices lower than those prevailing on world markets. The price-decisions of the time reflected this, and indeed in 1974, an additional price-rise of 5% across-the-board was agreed in October[46]. Commission statements at the time showed this was based on the prevailing world market situations for each commodity, even though some internal markets were already in structural surplus. These events followed a year after a group of writers published the neo-Malthusian "The Limits To Growth". Subsequent publications such as "Mankind at the Turning Point" by the Club of Rome supported this view that the Commodity Price Boom represented a major switch in world food production to much tighter markets, food shortages and higher world prices. The four price-reviews of 1974-6 increased nominal prices by an average of over 9.5% per annum in common currency terms. In national currency terms, the increases were over 13% per annum. This was possible because the setting of prices in the common currency, and the determining of 'green' exchange-rates (effectively the setting of prices in the national currencies) are two separate operations, and the manipulation of green rates can either negate or accentuate any changes in common prices. The flip-side of this coin however was rising support expenditure: FEOGA Guarantee expenditure rose by 46% in 1975 and 23% in 1976, reflecting increased productivity and the stepped accession of the new members, but also rising export refunds as internal EEC market prices rose and world prices fell

[46] The 'normal' price decisions being made in February-March each year.

back, as global food production picked up after 1973-4. The years 1973-6 under the agriculture Commissioner Petrus Lardinois, have been described as "the years that the locusts consumed"[47].

Another factor within the EC that acted to take the pressure off the agricultural policy directly was the accession of the UK. In the cereals sector in particular, the EC of six was approaching 100% self-sufficiency, whereas the UK was a major net importer. For the crop year 1972/3, the self sufficiency ratio for all cereals for the EC6 was 97%, whereas it was 90% for the EC9. This benefit was however only a temporary phenomenon, with the figures rising rapidly as the high support prices fed through to greater production. Total wheat self sufficiency rose above 100% the following year, 1973/4, for the EC9, and hasn't fallen below that figure since. With total cereals, the 100% figure wasn't exceeded until 1979/80, but again has never returned below that level. This trend hasn't been restricted to cereals either. For example, total meat self sufficiency reached 100% in 1981, and again hasn't fallen below that since.[48]

Lardinois' successor was Finn Gundelach who, unlike Lardinois, had no past connections with, nor particular loyalties towards, agriculture. Moreover, Community inflation rates were falling, so he was both more willing and more able to restrain price increases (his annual average for 1977-80 came to 3% in common currency terms; 6.5% in national currency terms). Over that period however, Guarantee expenditure still rose by around 80%. The largest single sector in terms of expenditure at this time was milk and milk products, which was taking 40% of Guarantee expenditure, representing 35% of total EEC expenditure. In 1977, a co-responsibility levy (CRL) was introduced on milk production, and was supposed to act as a 'tax' on producers, so that they might share some of the costs of disposing of the surpluses. In the Budget nomenclature, the CRL is shown as 'negative expenditure' so total disbursements are net of this CRL. As has been shown subsequently however[49] the price-decisions incorporated this CRL, making it in effect a tax on consumers rather than producers. Over the period 1977-9, the costs of milk intervention measures rose by 61% (current prices), representing around 43-46% of total Guarantee expenditure.

The full own-resources system finally came into operation in 1979, with a VAT rate of 0.78% applied. It had been expected that the 1% ceiling for VAT would be reached in 1981, but during late 1980, and especially during 1981, commodity prices rose

[47] Neville-Rolfe, E. (1984), P264.

[48] All the above data is taken from the various editions of the Agricultural Situation in the Community.

[49] see Hubbard, L. J. (1986).

sharply, with world wheat prices once again approaching EEC levels, and world sugar prices rising above them. Moreover, international demand for butter was strong, EEC milk product stocks were low following a period of aggressive stock-reduction; and MCA movements in the main were favourable, (most notably the UK MCA, with a strong rise in sterling causing it to go from a large negative position to positive). Between 1979 and 1980, CCT revenues rose slightly, and agricultural levy receipts fell, but the VAT percentage required still fell, to 0.73%. By 1981, it was still only 0.79%.

Another strong feature of the late 1970's in terms of budgetary discussions concerns the tone of the Commission's writings on the subject of the budget and budgetary problems. During the late 1970's, a number of Commission documents[50] considered this particular problem. In general however, the emphasis was not on agricultural expenditure to anything like the degree it became during the 1980's. In COM(78)531, for example, they say that if "the increase in agriculture spending [sic] is extrapolated from 1973 it would rise very substantially and leave little room for the development of other policies by 1981 within the existing own resources."[51] Other than that, agriculture gets no major mention. Even though much of the paper looks at the question of increasing the availability of own resources, it doesn't look at the question of increased control of the agricultural markets in order to ensure that the extra funds don't go into CAP support. In COM(79)85, there are vague mentions of CAP reform, and about getting the markets back more into balance, but nothing concrete is proposed or even hinted at. In COM(79)462, the argument, very common at that time, was of the dominance of guarantee expenditure because of "the relatively low degree of development of other policies,"[52] regardless of the absolute level of expenditure.

2.2.8: Towards the 1980's and Budgetary Indiscipline

1979 saw a change of government in the UK. The new Conservative administration under Mrs Thatcher renewed the attacks on the Financial Mechanism and on 30th May 1980, the Council produced the 'Brussels Compromise' package, which provided for fixed amounts to be refunded to the UK equal to two-thirds of her expected net contribution, a provision to cover just 1980-1, unless a long-term solution was reached. This provision was however conceived before the market events referred to

[50] See, *inter alia*, EC Commission, (1978), (1979a), and (1979b).

[51] Page 2.

[52] Page 5.

above occurred and in the end, the rebates turned out to be equal to 78% of the UK's 1980 net contribution and 99% of the 1981 figure. Given the failure to agree on a long-term solution to the problem however, this rebate mechanism was extended for two years, the rebates being equal to 57% of the 1982 contribution and 40% in 1983, thus giving a four-year average roughly equal to the 67% target figure.

The events of 1981-2 can also heavily influence the outcome of any analysis of FEOGA's operations over the period of the 1970's and early 1980's. It makes the period under discussion an important factor to bear in mind, as can be seen in the following example: In its 1981 paper on FEOGA[53], the Commission stated that between 1975 and 1981, Guarantee expenditure grew at 16% per annum, "slightly above the Community inflation rate" (page 10). On the other hand[54] between 1974 and 1980, the growth-rate of agricultural expenditure was 24.6% per annum.

The price-rises at this time were historically very large indeed. Even so, expenditure actually fell in nominal terms between 1980 and 1981, because of high world prices, despite also the accession of Greece and the first full year's operation of the new sheepmeat regime. In 1982 however, expenditure rose sharply, and the VAT percentage required rose from 0.79% to 0.92%, despite rising levy and tariff revenues. Notwithstanding this, the 1982-3 price decision was an average increase of 10.4% in ECU[55] terms, and 12.2% in national currency terms. This was the largest single rise EVER, and other than in Italy and Ireland was an increase in real, as well as nominal terms.[56]

To this can be added the impact of continually rising self sufficiency. As noted above, self sufficiency was achieved for cereals and meat around 1980. Looking at total import and export data for cereals, although large quantities of parallel imports and exports had been traded for the whole period under consideration, 1980 was the first year that total cereals exports exceeded total cereals imports. Although imports then rose above exports slightly for 1981 and 1982, since 1983 exports have been consistently above imports. Thus total expenditure on the cereals sector rose sharply from 1977 to 1978 to 1979, and then again from 1982 to 1983.[57]

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[53] see EC Commission, (1981).

[54] see Ørstrøm-Møller, J. (1983).

[55] European Currency Units - see Appendix 1.

[56] Poul Dalsager, the former Danish Minister for Agriculture took over from Gundelach after the latter's sudden death. Although the Commission had acknowledged the need for price restraint, and had proposed 'just' a 9% price rise, the Council felt this was too harsh. The UK Minister failed to block this package (see below), and the more pro-agriculture Dalsager accepted the views of the majority regarding a more lenient price package. See Tracy, M. (1989), p306 for more details on this, and Fearne, A. (1988) for more details on non-economic pressures involved in price setting decisions.

By the time of the 1982 price-negotiations also, a solution to the problem of the UK's large net contribution should have been found, but wasn't. The price-package had all-but been agreed, giving an average price-rise of 10.4%. The one dissenting voice was that of Peter Walker, the British minister. He was caught in an awkward position since he unofficially agreed with the price-package, but wanted to force the Council to finally settle the UK's contribution problems. A proposal was put to the Foreign Ministers but it was Francis Pym, the British representative, who rejected it.[58] This was taken rather badly by the other ministers, who saw it as a snub for their support for the UK over the Falklands War at that time. Back in the Council of Agricultural Ministers, Peter Walker, rather than linking the price-package to its impact on the British contribution (an estimated £112m), claiming this as a 'vital national interest' and invoking the Luxembourg Compromise until a deal on the British contribution had been settled, tried to invoke the Luxembourg Compromise 'directly' by reference to the solution of the British contribution problem. Having already 'unofficially' agreed to the price-package however, his bid to force a unanimity vote failed, and although the Greek and Danish members voted with him (as a matter of principle), together they failed to make up a blocking minority, the price-package was agreed, and the UK failed to get a long-term solution to its contribution problem.

2.2.9: The Council's Response to the Problems, 1982-83

With the developments referred to earlier, not even a strong dollar restricting per-unit export refunds could prevent the expenditure situation in 1982 from getting worse, as own-resources neared the 1% VAT ceiling. In an attempt to try to contain expenditure, the Council introduced a set of 'Guarantee Thresholds' for tomato concentrate, oilseed rape, milk, and cereals. For these products, if production exceeded the specified 'guarantee threshold', support prices the following year would be cut in proportion to the excess production, up to a maximum of 5%. Some of these sectors were already in structural surplus by this stage, with the guarantee threshold merely building this into the system. Moreover, the actual application of the penalties the following year was not as it at first appeared it should be. Rather than applying the penalty to the 1982 prices *ex post facto*, the Council predicted a 'normal' price-rise for 1983 over 1982, then applied the penalty to this higher price. In some cases, the net

[57] For more detail on this, see Chapter 4.

[58] According to the Times editorial of 20th May, Pym had been advised that France would not abandon the Luxembourg Compromise, which was why he held out for a better deal than the £450m offered.

effect was still a price-rise, and in those cases where there would have been a net reduction in support prices, this proved too much for some ministers to accept, especially the German minister over the cereals price.

In the milk sector, this mechanism had a negligible effect. For a price cut to get the market more into balance, it was felt that the cut would have to be of the order of 12-20%[59], an option seen as politically unacceptable. Following the European Council meeting in Stuttgart in June 1983 therefore, proposals were submitted for a quota/super-levy system for controlling milk production. This was passed by Council on 31 March 1984.

1983 saw the 1% VAT own-resource ceiling reached. Initial discussions on alternatives for 1984 and beyond noted the attractiveness of simply increasing the VAT ceiling. They did however note the regressive nature of VAT, and felt some progressivity could be achieved by for example introducing (or rather re-introducing) a GDP-based payment. By the end of the year, no firm decisions had been made. At the Brussels European Council meeting in March 1984, it was finally agreed that VAT should be raised to 1.4% from 1st January 1986 (and the accession of Spain and Portugal), with the option of raising it again two years later to 1.6%.

The March meeting of the Council of Agricultural Ministers, in addition to agreeing to dairy quotas, for the first time ever agreed to an average ECU price change smaller than the Commission proposals (-0.5% as opposed to +0.8%), although after MCA adjustments the change in national currency terms came out to +3.3%. Even so, appropriations were insufficient, so the Commission proposed that member states should make loans to the Community, to be repaid over four years starting in 1986 after the increase in own-resources.

On the question of the UK's rebates, agreement was finally reached in June 1984 at the Fontainebleau Summit. As with the 1975 agreement, the mechanism was designed for any member state facing a budgetary imbalance. This was defined in terms of the gap between the share of VAT own-resource payments and the share of expenditure allocated. For the UK, a lump-sum payment of 1b ECU was made for 1984, with for 1985 onwards the rebate being 66% of the 'basis for correction'. Although the money value of the rebate was lower than before, there was now no need to renegotiate rebates yearly. The rebates were to be controlled via the VAT payments, with the UK's payment reduced by an appropriate amount and the other member states paying more, both to cover this and the one-third reduction in the extra contribution made by Germany; a concession made in recognition that Germany was the largest net

[59] see "Brussels Briefing" in Dairy Farmer, June 1983, Page 49.

contributor.

The early 1980's also saw a change in the tone of the Commission's deliberations on matters financial and agricultural.[60] In COM(83)270, the Commission refer to the need for the Council and themselves to jointly take action to control growing agricultural expenditure. In addition, they imply that there will be a need to ensure that any increase in own-resources isn't immediately swallowed up by the CAP. In COM(83)500, the issues of changes to agricultural support policies and budgetary issues are actually linked and discussed in the same sentence. What this indicates, compared to the Commission's position as referred to above in Section 2.2.7, is that the issue of agricultural reform, and the need to generate additional own-resources, were now being seen as two consequences of the same fundamental problem - that of structural imbalance in the agricultural sector, given the nature of support under the CAP.[61]

2.2.10: Budgetary Discipline...A Change of Mood?

1984 saw the introduction of a new piece of Euro-jargon - "Budgetary Discipline". This label describes the terms of the agreement made at the December European Council meeting, which was aimed at restraining expenditure:

a) a reference framework for total expenditure was to be set by the Council of Finance Ministers, with other Councils asked to ensure their decisions respected this;

b) growth of non-compulsory expenditure was to be strictly subject to Article 203 of the Treaty[62]; and

c) financial guidelines were to be set for agricultural spending : From 1984/5, the growth in agricultural spending was to be no greater than the growth of own-resources. "Barring aberrant developments", if this was exceeded, expenditure was to be "brought back within the limits imposed by this guideline" (Article 5) within two years.

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[60] See, *inter alia*, EC Commission (1983a), (1983b), and (1983c).

[61] Another issue of importance to the development to the budget - that of the ECU:$ exchange rate - was also not explicitly recognised by the Commission until the later 1980's. This topic will be dealt with in detail in Chapter 3.

[62] This was to be set by the Commission, based on the growth of Community GNP (volume terms), the average variation of national budgets, and the trend of the cost of living.

In 1985, there was another shortfall in the Budget. As with 1984, the member states were asked to make 'advances' to the Community, but this time, they were non-repayable.

1986 too saw a budgetary shortfall, despite the increased VAT ceiling. It must be noted that whilst the 'theoretical' VAT limit was raised to 1.4%, this wasn't the case in practice. Most member states paid a VAT rate of 1.39996%, but given the UK rebate was paid by means of an abatement in the UK's VAT contribution, the UK itself only paid a rate of 0.67663%. Germany, as the largest net contributor, had its contribution to the UK rebate reduced by a third (again, via its VAT payment), so it therefore only paid a rate of 1.33697%. This gave an overall uniform rate of only about 1.25%. Moreover, with the unit value of traditional own-resources being reduced by industrial tariff reductions under GATT[63] and lower agricultural imports reducing VIL revenues, a greater burden was being placed on the VAT own-resource, reducing still further the effect of the VAT ceiling being raised. Despite this, the Council refused to adopt a supplementary Budget to cover the 820m ECU deficit, raising the debts carried over from previous years to roughly 5b ECU by 1987. The falling dollar contributed to the above problems by raising unit refund costs and reducing expected CCT revenues by a total of around 1.3b ECU.

In the cereals sector, rising costs and surpluses resulted in the introduction of a co-responsibility levy though unlike the milk co-responsibility levy, this was designed to be more transparent in order to prevent it just being passed onto consumers.

2.2.11: The Situation By 1986-7

Several commentators through the early to mid 1980's were predicting the financial collapse of the Community[64] given total accumulated debts of around 17b ECU. Article 199 of the Treaty of Rome requires that revenue and expenditure be in balance. Given that this had last occurred in 1982, it can therefore be seen that technically the Community had been bankrupt since 1983. It is however a measure of the value the member states place on the Community and its operations that they have been prepared to bail it out so regularly since then, not that this could have been allowed to go on forever, (see below). In 1987, Parliament commented that "it has long been apparent that the Council of Ministers is incapable of taking the agricultural policy decisions

[63] see Hine, R. C. (1985), especially P223. There, he makes the point that not only were there large percentage tariff cuts (especially in the Tokyo Round), but moreover that these were cuts on already low tariff levels.

[64] see, eg, Ørstrøm-Møller, J. (1983), P30, and Australian Bureau of Agricultural Economics. (1985), P53.

necessary to ensure compliance with their own views on budgetary discipline."[65] Brian Gardner went further than this, implicating the Commission as well (Gardner, B. (1987)). He quotes a senior Commission official who apparently confessed to him that "the Commission only proposes and the Agriculture Council will only agree what it knows COPA will accept" (P171).[66] He continues (P173), "the most important conclusion to be drawn from the events of the last six years is that even under the severest budgetary pressure, neither the Commission nor the Council will do anything sufficiently radical to cut spending on the CAP. They will be reluctant even to take measures that will stabilise spending at present levels."

To see what he means by this, the case of dairy quotas as introduced in 1984 may be considered: Member states could choose one of two formulae when implementing quotas: Formula A, where each producer was allocated an individual quota, and faced a super-levy of 75% of the target price on over-quota deliveries to dairies; and Formula B, where quotas were allocated to purchasers (ie dairies), who faced a 100% super-levy on over-quota production, which should then be passed on to all producers contributing to the over-quota production. Great Britain (excluding Northern Ireland) chose Formula B, and given the nature of British milk marketing, ie the existence of a single purchaser, the Milk Marketing Board for England and Wales (with three regional boards in Scotland), over all deliveries to the MMB, the over-quota deliveries from some producers could be offset by under-quota deliveries from other producers. This reduced the effective levy that the over-quota producers faced, as rather than facing the super-levy on their gross excess deliveries, they faced it on just their net over-quota deliveries (net of the shortfall of under-quota deliverers). In Great Britain in 1985-6, over-quota producers faced a super-levy of 2.25% rather than 100%. As the rules stood initially, this could only be done in Great Britain, but rather than change the rules to prevent it happening there, they were changed so that in all member states the quota was effectively "nationalised". Overall, it was estimated that this decision cost over 500m ECU in extra support expenditure in 1985 alone.[67] Production did fall by 5% in 1985, partly through the reduced use of concentrate feed inputs, partly through panic culling, and partly through culling occurring because of the position of 1984-5 in the dairy production cycle. Milk deliveries rose by 1.5% in 1986, and butter and skimmed milk powder stocks rose rapidly. By the end of 1986, production was barely below 1983 levels, and expenditure had risen 33%; not surprising given that the initial 1984

[65] see European Parliament, (1987), P13.

[66] COPA - Comité des Organisations Professionnelles Agricoles - the European Farmers' Union.

[67] see "Brussels Briefing" in Dairy Farmer, January 1986, Page 39.

global quota built in 15% over-supply, representing expenditure of £3b per annum.[68] These measures so weakened the effect of quotas that in December 1986, tighter measures had to be introduced, including cutting the global quota level, raising the penalties on over-producing farmers, and tightening the rules governing sales into intervention.

Another problem (discussed in more detail in Appendix 2 of Chapter 3) is that of the over-valuation of stocks, caused by their valuation at buying-in prices rather than selling-out prices. Thus for 1986, the stocks as valued at the intervention price totalled 11.2b ECU, but when valued at their resale value came to just 3.7b ECU.[69] The Budget had always allowed for appropriations to be made to cover depreciation (ie the writing-down of the book-value of stocks), but this facility had only been used occasionally on an *ad hoc* basis if sufficient resources had been left available at the end of any particular year. By 1987, the Commission had admitted that stocks needed to be depreciated by 8b ECU, or 67% (ibid). By 1987 therefore, a lack of control within the agricultural sector, coupled to financial mismanagement, had left the EC in a very precarious financial position.

It can be seen from this chapter that the EC's market position for many commodities was fundamentally different in 1958 when the EC was established, and the discussions for the CAP begun in earnest, from the 1980's and 1990's. For many products, the EC has moved from being a net importer to net exporter. Despite this, the basic method of support had remained unchanged, not just since 1958 but, for the founder members of the Community, since the early part of this century. The great significance of this for the EC budget has been that the growth in agricultural production under the CAP regimes has generated large increases in expenditure, especially during the 1980's, when the EC became a net exporter of a number of major products. The next chapter describes the reforms implemented in 1988, which aimed at controlling both the development of imbalances on the agricultural product markets, and the financial crisis arising out of that imbalance. It also gives a lead into the consideration of whether or not the 1988 reforms of both the agricultural policies (stabilisers) and the operation of the budget (budgetary discipline) represented a sufficiently significant break with previous policies to be effective in their aims.

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[68] see "Brussels Briefing" in Dairy Farmer, October 1985, Page 38.

[69] COM (87) 101, P7 - for full details see Table 3 in Chapter 3.

APPENDIX TABLE 1 - SCALED NATIONAL CONTRIBUTIONS TO THE EC BUDGET (%)

	1958-1964/5[1]	1965/6-1966/7 AV[2]	1967/8-1970/1 AV[2]	1971/2-1972/3[3]	1973/4-1978/9 range[3,4]
D	28.00	31.25	31.50	32.90	25.53-32.13
F	28.00	30.92	30.00	32.60	22.99-25.30
UK	-	-	-	-	16.90-20.04
I	28.00	20.00	20.90	20.20	13.20-15.60
NL	7.90	9.66	9.30	7.30	5.26-6.00
B	7.90	7.87	8.20	6.80	4.11-5.28
DK	-	-	-	-	2.40-2.58
IRE	-	-	-	-	0.60-0.71
L	0.20	0.22	0.20	0.20	0.15-0.17

NOTES:

1) 80-90% on a fixed scale, 20-10% according to each country's share of net EC imports

2) 90% of receipts from agricultural levies and customs duties on agricultural produce, the balance according to the schedule of contributions.

3) All receipts from agricultural levies and all CCT (50% in 1971, rising to 100% in 1975), the balance according to the scale of contributions.

4) From 1979, the balance made up by VAT contributions.

SOURCE: Bowler 1985, Page 66.

APPENDIX 1

THE UNIT OF ACCOUNT[70]

Article 207 of the Treaty of Rome called for the Budget to be "drawn up in the unit of account", that is, a form of common currency, rather than having all sums denoted in terms of all national currencies. The first common unit of account which was used from 1958 through to 1977 was known as the 'unit of account' or ua. This was a 'parity' unit, with its value set at 0.88867088 grams of fine gold (the same as the US$ from 1934 to 1972), and with fixed exchange rates between it and the member states' currencies. This fitted in with the global fixed exchange rate system still operating in the 1950's. By 1971, of all EEC currencies, only the German Mark revaluation and the French Franc devaluation, both in 1969, had diverged from this, but in the period through the mid 1970's, discrepancies between the official exchange rates declared to the IMF and the actual market exchange rates became much more widespread, and started to damage the operation of the Community's economy.

The decision to change the nature of the common currency followed the negotiations for the Lomé Convention in 1975, as the Community desired greater stability in aid financing. The new currency was called the European Unit of Account (EUA) and was fundamentally different from the parity in that it was a 'basket' currency based on the member states' currencies, weighted according to the member states' shares of Community GNP, and their shares in the short term monetary arrangements of the Community. It was initially adopted for use in the European Development Fund with aid managed under the Lomé Convention, but in 1977 was incorporated into the Financial Regulation for use in all the Community institutions' financial operations. A year later however, the Community had passed a resolution establishing the European Monetary System (EMS). This was to have two elements; a basket currency which, like the EUA, was to contain all the member states' currencies, and an exchange rate mechanism (ERM) which set narrow bands of fluctuation between member states' currencies, both bilaterally between each other, and between each one and the central common currency. From this came a new common currency, the European Currency Unit (ECU). The EUA had been designed as a fixed package to remain unchanged until the Community reached twelve members, but the ECU was to be more flexible, allowing changes in its composition if it was felt necessary. The ECU finally took over as the common currency in 1981.

In addition, to the foregoing, and specifically in connection with agriculture, the question of MCA's (see above, Section 2.2.5) has further complicated monetary

[70] see also Strasser, D. (1980), PP25-30.

issues. Whilst common prices are expressed for the EC in ECU, when expressed in member states' currencies, conversion takes place not at the market exchange rate but at a more stable 'representative rate', set each year as part of the annual price fixing. It was the divergence between this rate and the market rate which set up a gap which needed to be bridged by an MCA. Since 1984 however, a 'switchover' mechanism has operated in order to try to overcome the problem of reducing positive MCA's with restraint in ECU price setting. That is, at a time when, *ceteris paribus*, the dismantling of positive MCA's would result in the farmers in the strong currency countries facing nominal own currency price cuts. This introduces the concept of the green ECU central rate (green ECU) in addition to the green rate, applied monetary gaps, and real and natural real monetary gaps.[71] With this system, the agricultural ECU is tied to the DM, as the strongest EMS currency in order to remove future negative MCA's created. Existing MCA's cannot be removed this way however, nor can new positive MCA's, which will still require changes in the green rate. Initially, the aim was to dismantle MCA's by 1992. The 1992 reform package appeared to accept this wouldn't happen. Apart from the political problems surrounding the changes in farm support prices in national currency terms that would be required, there is also the issue that although most currencies are in the ERM, they can still fluctuate to a limited extent. This means that there would still be a trade-off between 'common' prices and stable prices, as measured in national currency terms.

It has however subsequently been proposed that from 1993, the artificial green ECU would be abolished. Fluctuations in the ECU would still create monetary gaps, but rather than apply MCA's, the EC will instead restrict the total spread of monetary gaps across all member states to five percentage points. If the spread exceeds this, the negative gap currency would be devalued, acting to increase the national currency value of ECU prices.[72]

With green exchange rates being abolished, and market rates used instead, in those situations where this would lead to a fall in prices in national currency terms, the ECU prices are being increased to offset this.[73]

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[71] For an excellent guide through this maze, see EC Court of Auditors. (1989).

[72] see, for example, Agra Europe No.1500, 17th July 1992, page E/5.

[73] Strictly speaking, the green rates are being retained. It is just that now, they are equal to the market rates, so any distinction is superfluous.

APPENDIX 2:
PROTECTIONISM AND INTERNATIONAL PRICE COMPARISONS FOR GRAINS FROM 1800

Getting an accurate indication of the extent and effects of protectionism further back than the most recent of years can often prove difficult. Presented here are data collected from a number of sources[74] which aim to give a general feel for what was happening with grain policies during the nineteenth and twentieth centuries.

Data in Abel[75] for the price of wheat in 1825, give the following picture (with all prices quoted in RM[76] per 100kg):

French Ports	18.20	North German Ports	8.55
Copenhagen	7.50	North American Ports	13.85
Dutch Ports	11.45	England	30.50
o/w Amsterdam	10.75		

Thus, owing to the Corn Laws in England, the price of wheat there was about four times that in Germany or Denmark. Abel further[77] points out that after 1828, the price of wheat in England was around 51-52 shillings a quarter, with a customs duty of 35 shillings and 8 pence a quarter.

For 1830, Abel presents the following prices, again in RM per 100 kg:

Rye:		Wheat:	
France	23.45	Danzig	13.75
Denmark	12.09	England	28.61
Danzig	7.78		

Again, it can be seen that whilst there was a markedly higher price in France than in Germany or Denmark, it was still below the price being charged in England. By the 1890's, and what was for English agriculture, a time of depression, wheat was selling at 22 shillings and 10 pence a quarter, or about a third of the price realised in the mid-1860's.

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[74] For the period until WW2, the references are Abel, W. (1980) and Tracy, M. (1989).

[75] Page 227.

[76] Reichmarks. 1RM equalled 5.56 grams of silver.

[77] Page 241.

Data presented in Tracy[78] indicate that in contrast to England, both France and Germany increased tariff protection during the 1880's and 1890's. In France, the tariff on wheat was 0.60FF per 100kg in 1881, but this had risen to 5 FF by 1892 (the time of the Méline Tariff), and to 7FF by 1894. This pattern was seen on a number of other products, with the Méline Tariff in most cases reinforcing existing protection.[79] In Germany, the pattern was generally the same. In 1879, the tariff on wheat and rye was 1 mark per 100kg, in 1887 it was up to 5, in 1891 it slipped back to 3.5, but in 1906, it was back to 5 for rye and up to 5.5 for wheat.

For all foodstuffs too, this pattern was evident. Tracy refers to a study by Liepmann who looked at 'potential' tariffs[80] for foodstuffs. For a number of European countries, he estimated tariff levels as the percentage of export prices. Selecting some of his results[81]:

	1913	1927	1931
France	29	19	53
Germany	22	27	83
Finland	49	58	102

This shows how the levels of protection rose during this period. Finland is included to give something of a comparison, and to show that the central countries studied were by no means the worst (best?) at protecting their farmers.

Moving forward to the period of the 1960's (that is, the period around the time of the formation of the CAP), the following data are presented by the FAO[82] for wheat producer prices:

year	France	W. Germany	UK
	FF/100kg	DM/100kg	£ per 112lb
1960	37.8	40.6	1.346
1961	40.0	41.7	1.338
1962	40.9	42.2	1.367

[78] Page 66 for France, page 88 for Germany.

[79] See Tracy, M. (1989) for details.

[80] The study looked at 38 foodstuffs. The author didn't weight each foodstuff by its importance in the imports of each country, thus he referred to the figures estimated as the 'potential' tariffs.

[81] See Tracy, M. (1989), pages 22 and 123 for fuller details.

[82] Agricultural Production Yearbook, various years.

1963	39.2	42.2	1.342
1964	38.7	42.8	1.304
1965	37.5	42.2	1.237
1966	41.6	43.0	1.267
1967	43.4	38.2	1.294
1968	43.2	37.2	1.371
1969	43.1	37.5	1.450
1970	46.9	35.8	1.562
1971	49.0	36.0	1.630
1972	49.8	36.9	1.753
1973	55.5	37.8	2.974

From this, it is clear that for France and Germany 1967, the year when common prices were introduced, marks something of a watershed. As the data show, from that year prices in France make an upwards shift, whilst those in Germany shift to a lower level. For the UK on the other hand, the ebb and flow of prices received doesn't do anything dramatic until 1973. This can only be partly attributed to the UK's accession to the EC however as this was also the time of the commodity price boom.

APPENDIX 3
SUMMARY OF CAP REFORM MEASURES PRIOR TO 1988

- Council Directives 72/159/EEC, 72/160/EEC AND 72/161/EEC are passed which introduce structural measures on farm modernisation, cessation of farming, and the acquisition of skills by those engaged in farming. These were all that came out of the Mansholt Plan.
- Council Directive 75/268/EEC on mountain and hill farming, and farming in less favoured areas is passed. This is seen as a development on Mansholt in terms of structural measures.
- 1977 - a co-responsibility levy is introduced in the dairy sector on 16 September.
- 1982 - Guarantee Thresholds were introduced for tomato concentrate, oilseed rape, milk and cereals.
- 1984 - Quotas introduced in the dairy sector.
- 1986 - a co-responsibility levy is introduced in the cereals sector.

CHAPTER 3: CAP REFORM: FROM STABILISERS TO MACSHARRY

"'Stabilizers' are the latest effort by the Community to come to terms with the financial pressures brought about by excessive support of the agricultural sector. It is a cheap but fatally indicative remark that stabilizers are 'E' numbers, artificial European additives designed to preserve the policy beyond its natural life and likely to produce unwanted and harmful side-effects."

David Harvey, 'Coping with the agricultural financial crisis', P 836, in 'Agriculture and Governments in an Interdependent World', the proceedings of the 20th international conference of agricultural economists, Dartmouth, Aldershot.

3.1: THE BACKGROUND TO THE STABILISER PACKAGE

3.1.1: Introduction

As was described in Chapter 2.2.10, the term 'budgetary discipline' was first coined by the EC in 1984, at the December meeting of the European Council. As an agreement, it was aimed at restraining the growth in agricultural expenditure. As can be seen from the terms of the agreement however, there was nothing in the text to make the target of lower growth in expenditure binding on the institutions of the EC. What the EC had therefore was a polite request to the EC's Councils of Ministers (in particular the Council of Agricultural Ministers) to take policy decisions (eg the setting of farm support prices) in accordance with the aims of the budgetary discipline declaration, rather than a strict requirement so to do.

As was subsequently shown, the Council of Ministers were "incapable", in the words of the European Parliament, of abiding by the requirements of the declaration, and by 1987, stronger action was needed.

3.1.2: Towards an Agreement on Stabilisers And Expenditure Control

"The Community is at present faced with a budgetary situation which can only be characterised as being on the brink of bankruptcy."[1] 1987 not only saw the Commission assessing the financial situation with unusual frankness, but also respond with a series of proposals aimed at correcting the imbalances. The proposals in essence fell into two inter-related categories: The provision of greater revenues via a new type of own resource for the Community, along with greater financial restraint (a

[1] see EC Commission, (1987a), P1.

reinforcement of the rules of budgetary discipline); and the restraint of growth in agricultural guarantee expenditure by the introduction of policies aimed at controlling the growth in agricultural production (the so-called 'stabilisers' measures, discussed below). These must themselves be seen as part of a larger whole, including the completion of the internal market by 31st December 1992[2], reducing agricultural guarantee expenditure to just 55% of the total EC budget, and raising structural spending to 25% of the total; with the restraint in agricultural guarantee expenditure permitting the development of new policies in areas such as research, communications, and the environment.

At the European Council meeting of 29th and 30th June 1987, it was agreed that budgetary discipline "must be binding on all the bodies which will be associated with its implementation."

The various sets of proposals[3] received a mixed reaction. Parliament felt their across-the-board application would impact more severely on small farmers.[4] Sir Geoffrey Howe, the British Foreign Secretary welcomed the proposals, saying they wouldn't operate arbitrarily or unpredictably, but would act positively to reduce production and costs.[5]

By the end of the year however, there had been neither agreement on these proposals, nor on the Budget for 1988. Given this situation, the Commission decided to manage the agricultural policy as if the stabilisers package had been passed, in order to remain within the financial constraints of the "provisional 12th's", the procedure whereby if in any year a Budget has yet to be agreed, the monthly spending limit is set at 1/12th of the previous Budget's appropriations.

When Parliament came to discuss the stabilisers in January 1988[6], a number of concerns about the methods of operation were voiced. The essential feature of the operation of the stabilisers in most sectors was to be the MGQ or maximum guaranteed quantity. Should production rise above this, price-penalties would be incurred. This proposal however wasn't seen by all as being sensible, let alone likely to be effective. One MEP pointed out that with regard to the proposals in the pea/field-bean/lupin sector for example, if production reached 10mt, support would be cut to zero, and there

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[2] In February 1987, Jacques Delors spoke to the European Parliament about budgetary discipline, stating that sectors other than agriculture get the "optimum allocation of resources" as these "are essential to the success of the Single Act." See Bull EC Supp 1/87 "The Single Act a New Frontier".

[3] see, *inter alia*, EC Commission, (1987a) to (1987f).

[4] see European Parliament, (1987b).

[5] see Agra Europe No.1261, 13.11.1987.

[6] see OJ Annexe 2-360, pp275-98.

would still be an import requirement (ibid P279).

When Parliament questioned the then Commissioner for agriculture, Frans Andriessen, he first of all commented on the failure of farm incomes to rise with the increase in Guarantee expenditure, saying that "there is something fundamentally amiss with the agricultural policy and that therefore something fundamental must now be done about it, even if it is not popular and not pleasant" (ibid P282). "Finally, it has also been repeatedly stated in the debate that this is a budgetary policy. That is not true. Adjustments to the agricultural policy are necessary on account of the market and market conditions. The Budget too, calls for adjustments to be made, but it is not true that it was budgetary considerations alone which now prompt us to make the proposals which we have made. There are three factors involved: the market, the international situation, and hence the world situation, and the fact that soaring agricultural costs are gradually making it impossible to pursue other policies in the Community" (ibid).

Not for the first time in the history of the CAP, cereals were a major sticking-point in the negotiations. The Commission had proposed an MGQ of 155mt, with a penalty in the form of price-cuts, a line supported only by the UK and the Netherlands. Germany however, supported by the majority of member states, was proposing an MGQ of 158-160mt, with the penalty to be in the form of an additional co-responsibility levy. At one point, the German minister Herr Kiechle was even claiming that if the Commission's proposed land set-aside scheme were to come into operation, stabilisers would become unnecessary.

The arguments over the proposals were fast-reducing confidence in the likelihood of a decision being reached. By halfway through the summit, Britain was no closer to Germany and France, and still opposing any moves aimed at watering-down the proposals. To try and break the deadlock, Chancellor Kohl held bilateral "confessionals" with each leader. It transpired that Mrs Thatcher had become a minority of one, and in the end had to compromise in order for a deal to be concluded. The relief with which this was greeted in the rest of Europe didn't just reflect agreement finally being reached on the stabilisers package, but also the perceived change in the political climate: It was felt that Mrs Thatcher had finally accepted that neither she (nor anyone else) could single-handedly bludgeon the Community into submitting to their position. It was felt moreover that it would now be much harder for any member state to justifiably or successfully invoke the Luxembourg Compromise, and thus hold up the development of the Community.

3.1.3: Details of the Agreement Concerning Budgetary Discipline

Article 199 of the Treaty of Rome requires that "the revenue and expenditure shown in the budget shall be in balance". Expenditure may be classified as Compulsory or Non-Compulsory, where the former refers to commitments arising directly out of obligations under the Treaty and associated legislation, the main example being agricultural guarantee expenditure (ie expenditure incurred by FEOGA's Guarantee Section); and the latter referring to all other expenditure. The tightening of the rules on budgetary discipline were aimed at once again restoring this situation.

The first major change to note was that which gave the EC a new own-resource. As determined in a Council Decision of 24th June 1988[7], the first two 'traditional' own resources were to be amended in that the levy payments and tariff revenues collected by the member states were to be handed over net of the 10% collection cost reimbursement. This is a major change, the significance of which will be seen below. Secondly, the VAT own resource had a ceiling placed on it of 1.4%. Moreover, the VAT assessment base was now to be restricted to 55% of a member state's GNP. One criticism of VAT as a tax is that it is inherently regressive in nature. This measure was therefore aimed at aiding those poorer member states for whom consumption represents a very large percentage of total GNP. The most important development however concerns the provision of a new own resource, based on member states GNP, the basis of which, like VAT, is estimated on a theoretical common base. Once the monies from the other three own resources have been called upon to cover expenditure, this 4th resource can be called upon, subject to a ceiling being placed on TOTAL own resources. Article 3 of the aforementioned Council Decision puts this total ceiling on payment appropriations at 1.15% of EC GNP for 1988, rising to 1.20% by 1992 (equivalent to around 1.9% - 2.0% of the harmonised VAT base), or 1.3% for commitment appropriations. This too is a significant development in terms of total resources available to the EC for the funding of actual policies. Before, both the 10% reimbursement to the member states to cover the collection costs of the two traditional own resources, and the reimbursements made to the UK for its disproportionately large net contribution, and the abatement of the German contribution to the funding of this latter reimbursement, were taken out of own resources in such a way as to deprive the EC of those funds for its other activities by reducing the effective own resources base. What the new system allows is for those payments still to be made, and the EC not lose out on the total own resources available for the funding of its activities, given the 'topping-up' nature of the new resource. The new resource moreover, being based on

[7] 88/376/EEC, Euratom, in OJL185, *op cit*, P24.

GNP, ie a measure reflecting ability to pay, also reduces the relative burden falling on the poorer members of the Community.

The Interinstitutional Agreement on Budgetary Discipline and Improvement of the Budgetary Procedure[8] established a financial perspective which outlined what in effect was a medium term financial plan for the EC.[9] This specified commitment appropriations for the years 1988-1992 (in 1988 prices) for all forms of expenditure, including 'EAGGF Guarantee', expenditure on which was expected to rise from 27.5b ECU in 1988, to 29b ECU in 1992 (see Table 1).

TABLE 1 - THE FINANCIAL PERSPECTIVE 1988-1992

All figures in 1988 prices.

(a) year	(b) total expenditure	(c) FEOGA Guarantee	(d) (c) as % of (b)
1988	45303	27500	60.70
1989	46885	27700	59.08
1990	48900	28400	58.08
1991	50950	29000	56.92
1992	52800	29000	54.92

SOURCE: the Interinstitutional Agreement on Budgetary Discipline and Improvement of the Budgetary Procedure, in OJL185, 15.7.88, P36.

The intended growth of this expenditure was to be limited to 74% of the growth rate of the EEC's GNP (the 'Financial Guideline'). This had behind it the intention of reducing FEOGA Guarantee expenditure as a percentage of total EC expenditure over this period, thus releasing own resources for other sectors within the EC's operations. This became doubly important given the increased own resources now available to the EC. Tighter control was necessary to ensure that the increase didn't simply go into funding an ever-expanding CAP. The target set out in COM(87)101 was that by 1992, Guarantee expenditure should have fallen to just 55% of the total EC budget's outlay (in 1988 for example, it turned out at 64%). See also Appendix Table 5 to see the financial perspective updated to 1992 in current prices.

Another reform, to be considered in more detail below in Appendix 2, is that which

[8] see OJL185, 15.7.88, P33.

[9] Stahl, G. (1989).

deals with the depreciation in value of agricultural stocks held in public storage.[10] The EC has long had a facility to allow for the financial depreciation of agricultural stocks held, necessary because of the discrepancy between the 'value' at which they are bought in (as determined by the intervention price, buying-in price, etc) and the (usually lower) price that the stocks realise on resale. This lower price is due to two factors: Firstly, stocks will deteriorate in quality whilst held in store to some degree. More importantly however, most stocks will eventually be exported onto third country markets, and will require a payment to cover the gap between the (usually higher) EC market price, and the world price. Although this is in effect EXACTLY the same as the 'normal' export refund, the EC treat it differently in the budget, terming it 'other public storage costs'. Despite this facility for depreciating the value of stocks during their time held in store (which for some commodities has been up to five years), it has only rarely been taken up. The new rules require that all newly created stocks must be fully depreciated by the end of the calendar year in which they are purchased. That is, by the end of that year, the value at which the stocks are entered into the accounts of the EC must reflect the price at which they could realise on sale onto the world market. This is a most significant development in terms of improving the financial discipline under which the CAP operates.

To illustrate this point, consider a hypothetical year pre-1988, when the EC is, by August say, starting to run out of own resources for that financial year. A large harvest of wheat has been brought in, and a considerable surplus must be disposed of. The cereals management committee can either agree to export it, or let it be put into intervention stores. If it is exported, FEOGA must reimburse the exporter the value of the total export refund within a few months. If the surplus is put into store however, the short term call on FEOGA's funds is limited to the monthly payments to the member states which only partially cover the technical and financial costs of holding surplus stocks[11], with the main expense, that of 'other public storage costs', not being faced until the product is actually removed from store, which could be up to 5 or so years away. This system has also had significant distributional consequences. The initial expenditures are incurred by the member states, who then make monthly claims for reimbursement on the technical and financing costs incurred. These reimbursements have however been made by FEOGA at a rate less than the full cost of these operations

[10] Council Decision 88/377/EEC concerning budgetary discipline.

[11] technical costs cover the physical costs of moving the product into and out of store, as well as the actual costs of keeping it there. Financial costs represent an interest payment on the member states' 'investments' in the stocks, ie it represents the opportunity cost of having capital tied up in the form of stocks.

as incurred by the member states. Thus in this way there has been a 'hidden' transfer of resources from the member states to FEOGA. In addition, the payment of the remainder of the cost of holding intervention stocks, that of 'other public storage costs' hadn't, up to the 1988 reforms, been met by FEOGA until the stocks were sold out of intervention, with the burden being fully borne by the member states in the meantime. Thus farmers (producers) received their payment relatively promptly[12], whereas member states (thus taxpayers) received a less than full payment for the costs incurred by operating the intervention system for the EC, and also faced delays in the amounts they were reimbursed. Moreover, this would have hit the northern member states more heavily as the main intervention products have traditionally been the 'northern' products of cereals, dairy products and beef.

Thus the system as it operated before 1988 allowed for the real cost of operating the CAP to be hidden and deferred by this form of 'creative accounting'[13], as well as partly being passed onto the member states over and above the contributions via the own-resources system. Whilst this was fine for perhaps one or even two years, given the extent to which intervention stocks rose during the 1980's, eventually the consequences of this action would be felt. In the long-term, this was a more expensive action, given the 'refund' still had to be paid for, but there were also the technical and financial costs to be covered in the meantime as well. This point concerning the non-depreciation of stocks, and the adverse consequences that will result for the budget of the EC is discussed in greater detail and illustrated by means of a simple model in Appendix 1. As was noted above, the rules now require the value of stocks to be written down each year to fully reflect the declining price they will realise on sale from intervention. This point is discussed, with numerical examples, in much greater detail in Appendix 2.

Two further points need to be made concerning the issue of the "burden of the past". Firstly, this reform only referred to how newly constituted stocks were to be dealt with financially, namely that the depreciation was to be dealt with within the constraints of the financial guideline. Regarding stocks already held by 1988 however, funding for the depreciation of these was to occur outside the guideline. This is seen by Shackleton as a concealment of the true cost of getting the agricultural markets back on a sound financial footing. He notes[14] that this will contribute to the real cost of

[12] although over time, the gap between sale into intervention and payments to farmers from the intervention agencies has been increased slightly, as a way of saving money.

[13] Swinbank, A. (1988).

[14] Shackleton, M. (1990), P28.

FEOGA's operations only falling to around 63% of the total budget in 1992, rather than the targeted 55%.

A second point is that over the years, this failure to depreciate the value of agricultural stocks has contributed greatly to the so-called 'burden of the past'. The other contributor to this has been open-ended structural policies, commitments for which have extended over a great number of years. This too has been reformed[15], with in most cases projects now only having funds made available for a maximum of five years, thus correcting the other major form of creative accounting within the CAP. The extent of this burden can be seen in Tables 2 and 3.

TABLE 2 - THE EXTENT OF FINANCIAL MISMANAGEMENT IN THE MID-1980'S

% OF VAT RATE CONTRIBUTION (unless otherwise stated)

	1983	1984	1985	1986	1987
Actual VAT rate	1.00	1.14	1.23	1.40	1.39
non-budgeted expenditure:					
-deficit (at 1987)[1]	-----	-----	-----	0.10	0.23
-non depreciation of agricultural stocks	0.13	0.08	0.08	0.10	0.03
-"cost of the past"	0.09	0.06	0.09	-----	-----
VAT rate required for proper financing	1.22	1.28	1.40	1.60	1.65
Accumulated liabilities (in b ECU)	3.0	6.0	8.6	12.2	17.0

NOTE: 1) Guarantee deficit plus traditional own resources shortfall, 1986-87.
SOURCE: EC Commission (1987a), Page 4

[15] by Council Reg (ECSC, EEC EURATOM) No 2049/88, in OJL185, 15.7.88, P3.

TABLE 3 - AGRICULTURAL STOCK OVERVALUATION

end of year (billion ECU)

Value at	1982	1983	1984	1985	1986	1987
Intervention Price	4.0	7.0	8.8	10.6	11.2	12.3
Market Price	2.2	3.6	4.3	4.9	3.7	4.2
Depreciation Required	45%	49%	51%	54%	67%	66%

SOURCE: As for Table 2, (Page 7).

3.1.4: Details of the Agreement Concerning Agricultural Policy Reforms

As for the 'stabilisers'[16], that is the measures aimed at controlling agricultural production, the sectors where quotas were already in operation, namely sugar and milk, had the operation of those quotas confirmed and generally strengthened. For the other sectors, the main weapon is the setting of a maximum guaranteed quantity, or MGQ, with some form of price penalty if this is exceeded:

SECTOR	STABILISER
cereals	MGQ + additional 1.5% CRL, repaid in full if production less than MGQ, and repaid in part if the overrun is less than 1.5%. For a greater overrun, up to a further 1.5% could be charged. For any overrun, the intervention price is cut by 3% the following year. This cut is cumulative.
oilseeds and protein plants	MGQ, with production aid and support-price cuts the following year for MGQ overrun. This cut is not cumulative.
olive oil	MGQ (+ any shortfall from previous years), with cut in production aid payable at end of year if net MGQ exceeded in that year.
wine	MGQ, with price cuts which can be offset by grubbing-up vines.
cotton	MGQ, with cut in production aid if MGQ exceeded.
fresh fruit and vegetables	MGQ, BUT applicable on quantities withdrawn from

[16] see OJ L110, 22.4.1988 for the legislative details and eg EC Commission (1988a) for a broader description.

	market rather than quantity produced. Overruns result in cuts in 'basic' and 'buying-in' prices the following year.
processed fruit and vegetables	EITHER: MGQ, with cuts in the production aid the following year if the MGQ is exceeded; OR: aid limited to a pre-determined quantity (equivalent to a production quota system).

With regard to price cuts, it is unclear from the legislation whether the cut should be an absolute one off the current year's price, or as happened in the early 1980's, a cut in the intended price rise for next year. With cereals, for example, if the MGQ is exceeded, "the intervention prices for the following marketing year shall be reduced by 3%."[17] Given this wording, either interpretation could be applied. In practice however, the former of the two possible methods of implementation has been the one used. Thus for example, with the 1989/90 price decisions for cereals other than durum wheat, the intervention price was cut by 3% (in ECU terms), ie there was an 'intended' zero change in support prices, plus the 3% cut under the stabiliser system. The same thing occurred with the 1990/91 price-setting.

As referred to earlier, these 1988 budgetary discipline/agricultural stabiliser measures differ from the 1984 package in that they are now legally binding on the institutions of the EC. This is ensured through the Council Decision concerning budgetary discipline.[18] Article 5 demanded that the Commission's proposals and the Council's decisions must be consistent with the Guideline. If the Commission feels the Council's decisions will result in the Guideline being breached, it will refer the decisions back to a special meeting of the Council. Moreover, unlike the 1984 package, which had a 2-year leeway should the expenditure ceiling be exceeded, the "agricultural Guideline must" now "be respected each year." Article 6 acts to ensure this, by establishing an "early warning system". Each year, for each chapter in the budget, the Commission sets out monthly spending profiles based on the monthly expenditure incurred over the previous three years. If spending rises above profile, or threatens to do so, the Commission shall examine the operation of the stabiliser and, if they deem it necessary, will submit proposals to the Council, who must act "within a period of two months in order to remedy the situation".

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[17] Reg (EEC) No 1097/88, in OJL110 of 29.4.1988, P7; Art2(3).

[18] 88/377/EEC in OJL185 15.7.88, P29.

3.1.5: The Summer of 1988 and its Consequences

A few months after the February Brussels meeting, Jacques Delors addressed the G7 meeting in Toronto. There, he declared the CAP to be reformed, agricultural spending had been "cut", and he added that no further concessions should be made - farmers had had as much as they could take. Looking back on the events of the period since the 1988 reforms, it can be seen that through 1988 and 1989, large budget savings were indeed realised (even if saying that spending had been cut was a little excessive). There is however much conjecture over the possible cause or causes of this. The 'event' which puts doubt on the Commission's interpretation of things came from the United States of America, in the form of a drought in the Mid-West. The effect of this was felt primarily on the world cereals market. World cereals prices rose sharply, reducing dramatically the levels of EC export restitution payments necessary. Through 1988, these payments fell from about $120/t to $60-70/t. In addition, the firming of demand for EC grains helped in the reduction of stock levels, so leading to reduced expenditures there by both reducing existing stocks and lessening the demand for storage for the 1988 harvest. As predicted by Ackrill[19] however, the benefits from this only lasted for two years. More recent data on the world grains situation[20] indicated that whilst production rose year by year from 1988/9, during 1990/1 the rebuilding of stocks eased right off, and the rise in consumption slowed.

This having been said however, there were a number of sectors causing immediate concern, in addition to the cereals sector. An article in Agra Europe[21] indicated that the main overspending sectors were beef, sheepmeat, dairy, fruit and vegetable, and wine. With beef for example, the problems hung over from 1990, when there was a BSE (bovine spongiform encephalopathy, or mad-cow disease) scare in the UK and Ireland. In Ireland also, there was the problem of the collapse of Goodman International, the company that controlled 40% of the Irish beef industry. In addition to this, the EC industry faced very tough competition on the internal market from cheap imports of beef from the former East Germany. With the cereals sector, appropriations for 1990 were 4390m ECU, but were 5242m ECU for 1991.[22] The main areas of expenditure for which greater appropriations were allowed for were export refunds (up from 2846m ECU in 1990 to 3236m ECU in 1991), and the coresponsibility levy[23], (where

[19] see Ackrill, R. (1988).

[20] Agra Europe No.1426, 8.2.91, page M/13.

[21] Agra Europe No.1426, 8.2.91, page P/1.

[22] though as these are only appropriations, the actual outturn figures may well differ - up or down.

[23] counted in the budget as negative expenditure, therefore appearing as a negative number in the

'revenues' are 'down' from -1177m ECU to -899m ECU).[24]

In total, the Commission as at February 1991 was forecasting a budget overrun of 1875m ECU in 1991, despite the Guideline set for 1991 at 31516b ECU (in 1991 prices).

The debate on the future course of the CAP then had to focus on the price proposals for 1991/92. In the cereals sector, the coresponsibility levy was set to rise from 3% to 6%, BUT farmers were to be exempt from the levy if they set aside 15% of their land. The intervention price for hard wheat was scheduled to be cut by 7% (if the Council agreed with the Commission proposals). Perhaps more significantly however in terms of keeping the overall expenditure within the Guideline was that on the same day that the Commission announced the price proposals, they also announced that the 1990 harvest came in at 159.7mt, or slightly less than the MGQ. Thus the budget lost Additional CRL revenues (or 'negative expenditures'). In the beef sector, the proposal was that the emergency intervention safety net be abolished, and the level to which the market price must fall before normal intervention will occur was, it was proposed, to be cut by 8%. In practice, this meant that if these proposals were accepted, and the beef market returned to 'normal', then there should have been virtually no intervention purchases the next year. With the dairy sector, a 2% cut in quota was proposed, but there was to be no price cut. Other sectors facing the possibility of price cuts, included oilseeds, rice and peas (all 3%), sugar (5%), and tobacco (10%). These proposals, if accepted by the Council, would still have resulted in spending on agricultural price support rising by 30% that year, from 25.1b ECU to 32.5b ECU, and there would still have been the need for a supplementary budget. These measures however still fell well short of those proposed in a paper written by the Agricultural Directorate and discussed in January 1991.[25] There, it was proposed that cereals prices should be cut to levels around 30 ECU/t above the current world price level[26] (to give a 90 ECU/t intervention price and 100 ECU/t target price), with direct payments made to fully compensate small farmers, and partially compensate larger farmers so long as they set

expenditure section of the budget rather than in the revenue section.

[24] figures from the 1991 budget of the EC, in OJL30, 4.2.91, pp456-462.

[25] The "MacSharry Plan". See, for example, Agra Europe No.1423, 18.1.91, page E/1ff.

[26] This is never defined. It isn't clear if it is the third country selling price of EC exports, or cif border price of EC imports. At the end of June 1992, data from HGCA and Agra Europe suggest that both are higher than the 90/100 ECU per tonne figures imply. It could be therefore that the EC are taking as the world price the lower long-term trend value for the third country selling price of EC exports (considered in the context of intervention stock depreciation in Appendix 2). Some illustrative calculations there suggest the appropriate order of magnitude for this price.

aside land. The CRL, MGQ and stabiliser mechanisms would then be abolished. For oilseeds, the proposal had been for price cuts of a similar size to cereals, with aid paid again on condition of land being set aside. For milk, the global quota was to be cut by 4.5%, with an intervention price cut of 10%. For beef, the intervention price was to have been cut by 15%, with the beef premium raised, but available on fewer head.

3.1.6: The Decisions of 1991

General negotiations for a major reform of the CAP, with the MacSharry proposals as the starting point, were scheduled for later in 1991. In the meantime however, the 1991 price decisions had to act to try to restrain expenditure within the Guideline. Prior to the negotiations, it became clear that action was going to have to be taken to ensure that the guideline wasn't breached, with rising expenditures in a number of sectors. During the negotiations, all member states bar the UK and the Netherlands argued that because of German unification, there was a need for the Guideline to be increased. The Commission and the two member states opposed this however on the grounds that extra appropriations had already been made available for this - the principal reason for the continuing rise in expenditures under the CAP was worsening imbalances internally in a number of sectors, coupled with deteriorating world market conditions. Eventually an agreement was reached, but it required a softer position by the Commission to get the other member states, especially France to agree[27].

Certain features of the 1991/2 price agreement, and the concessions that the Commission had to make, are set out below:

With cereals, the Commission wanted a 6% basic CRL, but the agreement just raised the CRL to 5%. If however farmers agreed to set aside 15% of their land for one year, they would be exempt from this levy. Producers already in the 5-year scheme would get the extra 2% levy refunded. In the oilseeds sector, the Commission wanted a 3% price cut, but the final agreement cut prices by 1.5%.

Turning briefly to some other sectors, in the dairy sector, the 2% quota cut proposed by the Commission was passed, but there was now the facility for member states to add to their national reserves, and reallocate this quota to, for example, producers in less favoured areas. In the beef sector, the plan to abandon the 'safety net' intervention purchases wasn't passed. The only change is that the trigger price has been lowered - to 78% on an EC-weighted basis, and 72% in any individual member state. Regarding 'ordinary' intervention, the buying-in price was also lowered, by 4% (the

[27] The Commission had partly to twist the other member states' arms by threatening to take the final decision on the price proposals away from the agriculture ministers, passing it to the finance ministers.

Commission wanted an 8% cut).

Whilst the compromises forced on the Commission were expected to cost an extra 800m ECU[28], they were able to ensure that those arguing for an increase in the Guideline weren't successful in that wish. Also, as far as the cereals sector was concerned, there was now an element of cross-compliance, with the lowering or removal of the CRL conditional on land being set aside. Moreover, as the package was expected to push spending up to the Guideline ceiling, the Commission's hand hadn't been weakened for the negotiations later on in 1991 when a more extensive reform of the CAP would be discussed.

3.1.7: Summary up to 1991

As can be seen from the foregoing discussion and from Tables 2 and 3, by 1987 the extent of financial mismanagement had grown to such a magnitude that the future development of the whole EC was being threatened. In February 1988 therefore, the European Council agreed reforms to both the way in which agriculture was supported under the CAP, and more broadly, reforms to the financing of the EC, in particular creating a new own resource based on the relative GNP's of the member states. In the immediate wake of this, as can be seen from Appendix Table 1, spending on farm support continued to fall as a percentage of total EC expenditure in 1988, and in 1989 actually fell in absolute terms. The Commission took this to be a vindication of the 1988 reforms, but with hindsight, it appears that the dominant feature influencing this favourable, though short-lived, fall in expenditure, was the drought in the US. Indeed, in the latter part of 1990, it appeared that expenditure was once again starting to rise. Certain features of the budgetary reforms actually, paradoxically, made this more likely, the main one being the way in which stocks were now to be valued. For the reasons discussed above, there were rising stocks of a number of major commodities through 1990 but unlike previously, the financial consequences of this couldn't be put off, as happened in the early 1980's. Now, the financial effects are felt by FEOGA immediately, and thus any rise in stocks are accompanied by a more immediate rise in FEOGA expenditure than occurred in the past.

Moreover, there was one fundamental aspect of the stabiliser reforms, missed by many, that made them less effective in restraining production than was at first predicted. That is the point that support to agriculture was still 'open-ended', that is, regardless of how much farmers produced, there was still, to a large extent, support for all of that produce given that it can be sold at a price domestically that is greater than

[28] Financial Times, 29 May 1991, Page 30.

prices on the world market. The only major exception to this was where rules for intervention were tightened up, so that sale into intervention was restricted to certain months of the year or, as with some commodities, the quality requirements for purchase increased. All that happened under the stabiliser mechanism was that the support to farmers would occur in future years at a reduced price level; a policy that, over the years, appears not to have been successful in containing production, given the strong rising trends in yields for so many of the commodities supported under the CAP. The only exception to this point was in such sectors as oilseeds, where the stabiliser rules permitted such large price cuts that farmers' marginal returns were significantly affected (athough the long term impact of this was undermined by making the price cuts non-cumulative).

3.1.8: A Look to the Future

The reform proposals put forward by the Commission in December 1990 received a hostile reception. Foremost among the causes of this was the way in which the payments to cereals producers compensating them for lower support prices, discriminated against the larger, more efficient producers. In late June 1991 therefore, revised reforms appeared which aimed at correcting this, as well as appearing to have one eye on the GATT negotiations which, at that time, were making no headway.

Agreement was finally reached on 22th May 1992. For the first time, a reform package was agreed that moved away from the original support system, based on high market prices. The new system supports farmers by means of direct payments. The new policy covers the arable, tobacco, milk, beef, and sheepmeat sectors from the 1993/4 crop year. In addition to the changes to the support regimes, the set aside arrangements have been extended, as have environmental measures, early retirement and forestry.

The new arrangements for cereals and oilseeds are considered in more detail in Chapter 4. One key point with the new system is that initially, the direct income payments were to be degressive over time. As they currently stand however, there is no degression in the scheme as it appears up to 1997. The delaying of the question of reducing the payments after that date permitted agreement to be reached, but on past experience this may make agreement in the future harder to make. Moreover, it may well undermine any chances the new system has of returning the agricultural markets (and the EC budget) back towards balance. This will be considered in greater detail in the later chapters of the thesis.

APPENDIX TABLE 1 - TRENDS IN EC EXPENDITURE FROM 1973

NB 1973-77 in mio ua, 1978-80 in mio EUA and 1981 on in mio ECU

(a)	(b)	(c)	(d)
Year	Total Expenditure	FEOGA Guarantee	(c) as % of (b)
1973	4004.6	3174.2	79.26
1974	4516.4	3277.9	72.58
1975	6411.2	4821.5	75.20
1976	7287.6	5365.0	73.62
1977	8704.9	6166.8	70.84
1978	11973.1	9264.6	77.38
1979	14367.1	10417.5	72.51
1980	16290.4	11283.2	69.26
1981	17792.8	10960.2	61.60
1982	20422.7	12369.5	60.57
1983	24313.0	15788.2	64.94
1984	27523.6	18328.3	66.59
1985	28098.7	19725.9	70.20
1986	34192.8	22120.0	64.69
1987	35324.2	22951.8	64.97
1988	41278.9	26389.6	63.93
1989	41131.0	24460.4	59.47
1990	43324.8	24979.5	57.66
1991*	56085.4	32419	57.80
1992*	62827.6	36022	57.33

SOURCES

1973-1990: EC Court of Auditors Annual Reports (in OJC Series) - various years

1991-1992: Budget of the EC for 1992, OJL26, 3.2.92.

* - These figures are payment appropriations.

Note Mio is Eurojargon for 'million'. Thus for example, 4004.6 Mio ua is 4.0046 billion ua.

APPENDIX TABLE 2 - ACTUAL FEOGA GUARANTEE EXPENDITURE 1973 - 1990 AS A PERCENTAGE OF INTENDED EXPENDITURE

(units of account as for Appendix Table 1)

Year	Percentage	Year	Percentage
1973	134.39	1982	90.49
1974	97.89	1983	112.35
1975	108.94	1984	111.10
1976	94.11	1985	98.86
1977	106.78	1986	105.27
1978	124.39	1987	99.95
1979	108.72	1988	92.63
1980	98.31	1989	84.26
1981	86.41	1990	91.16

SOURCE: Budget of the European Communities (OJL series), various years.

APPENDIX TABLE 3 - TRENDS IN EC OWN RESOURCES FROM 1973

NB 1973-77 in mio ua, 1978-80 in mio EUA and 1981 on in mio ECU

(a)	(b)	(c)	(d)			
Year	Total	'Traditional' o.r.	financial contributions			
1973	4583.9	2496.6	2087.3			
1974	4971.5	3067.7	1903.8			
1975	5893.1	3741.1	2152.0			
1976	7710.3	5228.2	2482.1			
1977	8200.2	5705.7	2494.5			
		customs duties	agricultural levies	sugar levies	GNP	VAT
1978	12003.9	4390.9	1872.7	410.6	5329.7	
1979	14372.4	5189.1	1678.6	464.9	2302.1	4737.7
1980	15427.6	5905.8	1535.4	466.9		7519.5
1981	18024.0	6392.4	1264.9	482.6		9884.1
1982	21164.2	6815.3	1522.0	705.8		12121.1

1983	23013.6	6988.7	1347.1	948.0		13729.8	
1984	24880.0	7960.8	1260.0	1176.4		14482.8	
1985	26080.8	8310.1	1121.7	1057.4		15591.6	
1986	33270.7	8172.9	1175.5	1111.5		22810.8	
1987	35349.1	8936.5	1626.1	1471.7		23314.8	
					balancing item		collection costs
1988	40883.3	10344.7	1504.6	1390.7	4445.8	24522.6	-1325.0
1989	44329.3	11458.8	1282.7	1381.6	1641.8	29976.7	-1412.3
1990	41413.1	11427.9	1173.4	910.7	284.5	28967.8	-1351.2
1991	52907.8	13277.6	1262.3	1288.2	8408.0	30255.9	-1584.2
1992	62441.7	12888.8	1353.1	1236.0	14280.8	34232.4	-1549.4

SOURCES

1973-1990: EC Court of Auditors Annual Reports (in OJC Series) - various years

1991-1992: Budget of the EC for 1992. NB These are expected revenues required to cover the appropriations set out in Appendix Table 1.

NOTE

During the accession of Greece and Portugal, their VAT based contribution is being replaced by an additional GNP based contribution.

APPENDIX TABLE 4 - THE COST OF UK REBATES IN VAT % TERMS

1981	1982	1983	1984	1985	1986	1987	1988
0.117	0.125	0.120	0.082	0.098	0.149	0.127	0.187

NB 1986 is an estimate

1987 excludes 0.018 additional payment for 1988

1988 includes 0.018 for 1986

SOURCE: Commission 21st General Report, page 64.

APPENDIX TABLE 5 - THE FINANCIAL PERSPECTIVE 1988-1992

(APPROPRIATIONS FOR COMMITMENT - CURRENT PRICES)

(million ECU)

(a) year	(b) total expenditure	(c) FEOGA Guarantee	(d) (c) as % of (b)
1988	45303	27500	60.70
1989	48464	28613	59.04
1990	53485	30700	57.40
1991	61477	33000	53.68
1992	66592	35039	52.62

SOURCE: Commission 25th General Report, page 293.

APPENDIX 1
FINANCIAL MISMANAGEMENT AND BUDGETARY DISCIPLINE

The people's curse is on the man who hoards the wheat,
A blessing on him who sells it.
(Proverbs 11:26, Jerusalem Bible)

As was discussed above, the EC's failure to deal in a 'correct' financial manner with incorporated stocks led to a large financial burden known as the 'burden of the past'. The Commission estimated this over-valuation of stocks to be around 8b ECU by 1987.[29] As was also discussed, this gave the cereals management committee a loophole they could potentially exploit should financial pressures grow too great in any particular year. To consider how this could come about, consider the following theoretical models of management committee behaviour.

The starting point is the assumption that there is an optimal cost-minimising balance of sales of surplus products between export and intervention depending, *inter alia*, on current and future world price levels, and the effect EC exports have on those levels, and also on the discount rate. Budgetary constraints, occurring either on the income side with the exhaustion of own-resources, or on the expenditure side with a limit placed on possible expenditure, will distort this allocation in the short run, and will

[29] EC Commission, (1987a), page 7.

create a financially unsustainable policy in the long-run.

Assume initially there is no financial restriction on the operations of the committee. Assume also (initially at least) that there are no carryover stocks into the first time period under consideration, there are constant unit storage costs, there is a constant unit export subsidy rate, there are just two outlets for surplus production - export now or storage now and export later. Both the future export price and discount rate are known, budgetary resources can't be carried over from year to year, there is a constant level of surplus each year, and the aim of the management committee is to minimise surplus disposal costs (subject to any budget constraints that may be present).

Regarding the assumption of constant per unit storage costs, whilst economies of size in storage may be available to the national intervention authorities, payments made by FEOGA to reimburse those authorities for storage costs are made on a flat-rate basis. Thus looking at this cost from FEOGA's viewpoint, it can be seen that per unit storage costs are indeed constant.

Consider model 1 (developed from Diagram 1):

MODEL1: DIAGRAM 1 - THE COST IMPLICATIONS OF EITHER STORING OR EXPORTING

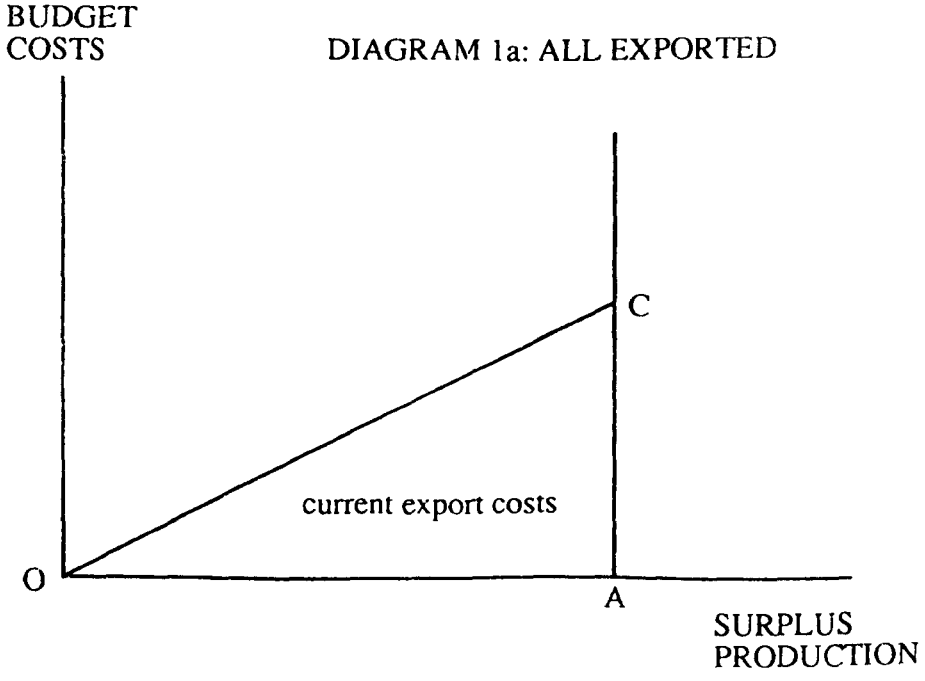
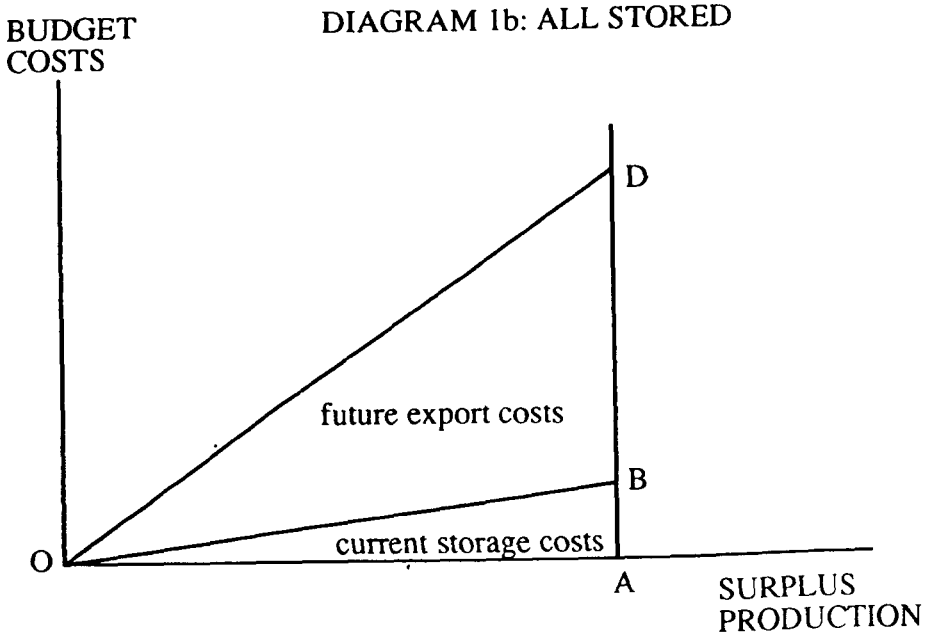


DIAGRAM 1b: ALL STORED

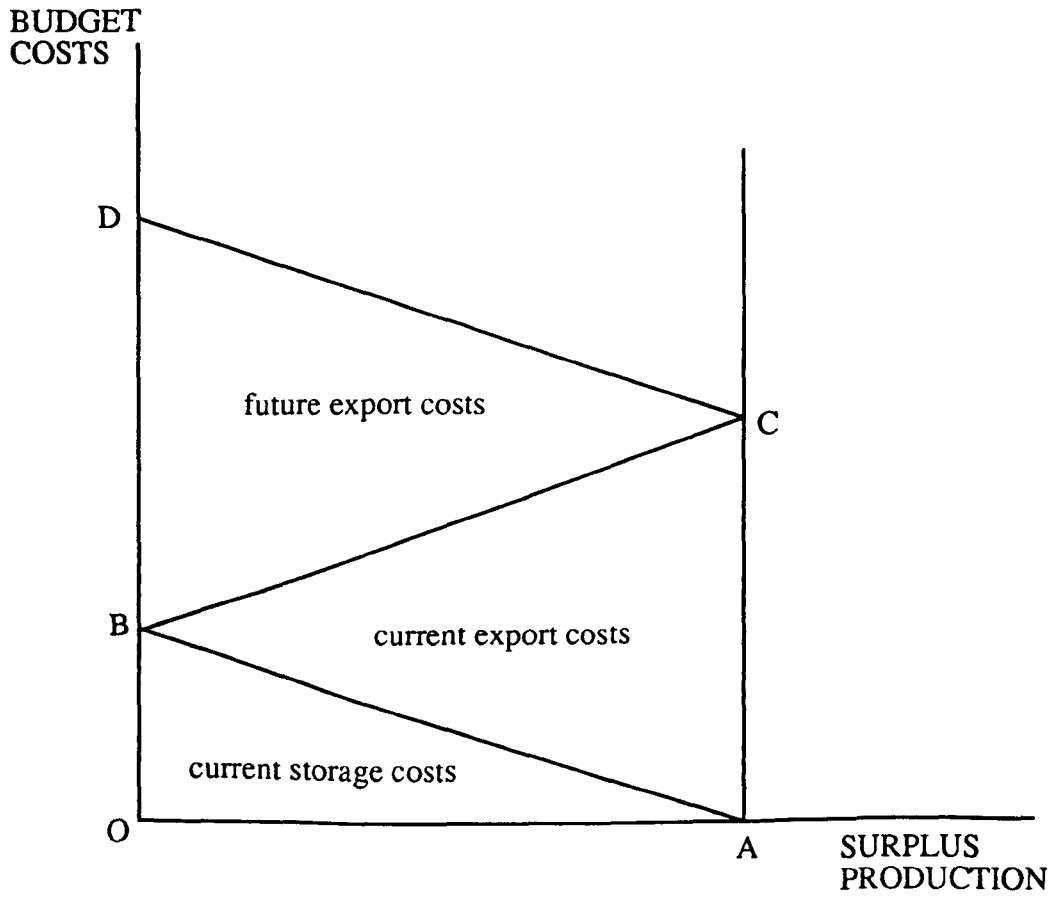


In Diagram 1a, all the surplus quantity OA is exported. Assuming a constant rate of export refund, OC is a straight line, with a slope equal to the unit refund level. Diagram 1b shows the outcome of OA being stored now, and exported later. Given the assumptions regarding constant unit storage costs and export refunds, OB and OD are also straight lines. Assuming OA is constant each year, and constant unit export refunds, BD, the cost of exporting the surplus in a future year, equals AC, the cost of exporting all the surplus in the current year, discounted at the appropriate rate.

Reversing Diagram 1b and amalgamating Diagrams 1a and 1b yields Diagram 2, overpage. The quantity exported in the current time period reads from O to A, and the quantity stored currently and exported later reads from A to O. So, for example at A, the whole quantity is exported in the current time period, and at O, the whole quantity is stored currently, and exported later. Given these assumptions, the committee will either export all of OA in the current time period, or store it all currently and export it later, depending on which is the lower cost option (ie is AC or OD the lower budget cost ?) The key variables determining this are the per unit levels of export refund and storage cost, and the discount rate. As Diagram 2 is drawn, the committee will choose to export all now. If in this simplified scenario however the discount rate and the unit storage cost changed sufficiently relative to the unit export refund level, this situation could be reversed. Except for the unlikely situation where OD=AC, where the committee would be indifferent between outlets, the committee will therefore face a corner solution, either exporting all now, or storing all now and exporting all later. Note that in Diagram 2, the unit export cost is NOT given simply by the slope of the line BC, because the total

export cost for a given level of exports is given by the vertical distance between AB and BC at that particular export level, not by the height of BC above the x-axis.

DIAGRAM 2: TOTAL STORAGE AND EXPORT COSTS

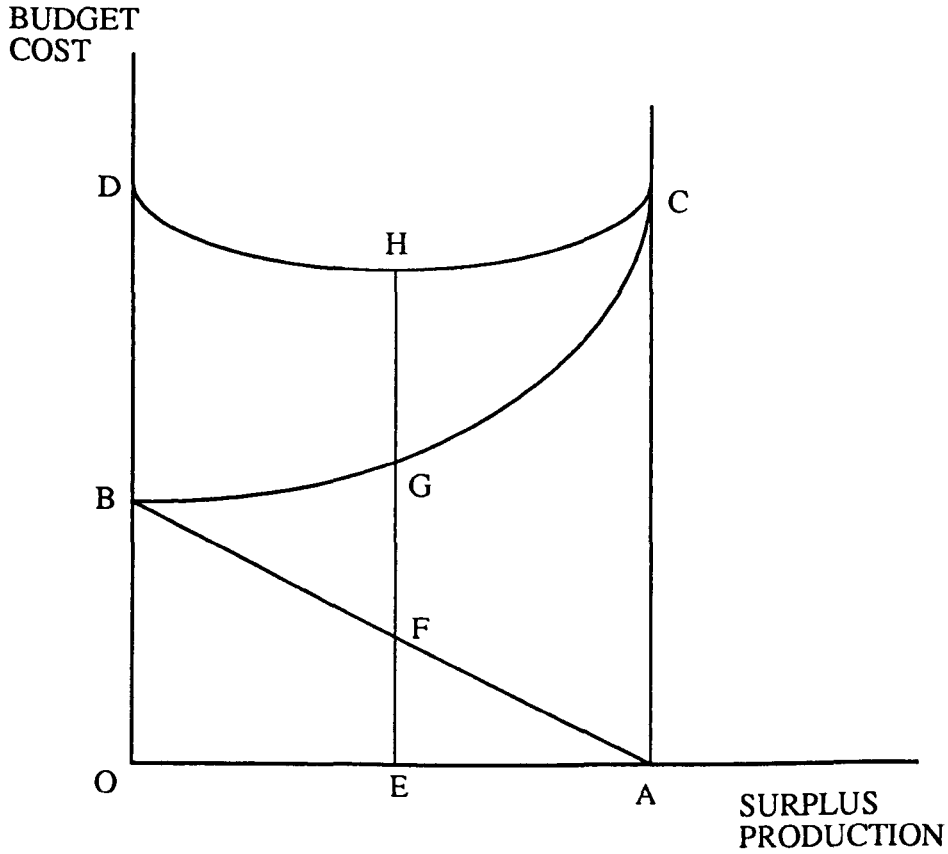


Note that the model presented assumes that if there is no net exportable surplus, there are no budget costs. This can be justified by assuming that with the 'surplus production' so defined, there is no short term public storage of any production, and any modest exports that are made with refunds are exactly offset with imports with the same unit VIL applied. Thus the impact on the budget is neutral.

From this position, the model can now be made more realistic by relaxing the assumption regarding unit export refund rates. It can now be assumed that as exports rise, so the world price falls and the unit export refund rises. That is, it is now being assumed that the EC is a 'large exporter', and the volume of exports is sufficiently great so as to alter the level of prices on the world market. Graphically, both BC and CD

become curvilinear. The impact of this is to make the cost-minimising solution one where only part of the surplus OA is exported in the current time period, with some being held in store until a later time period. This can be seen on Diagram 3. Here, OE is exported, with EA being sold into intervention and exported subsequently. FG is the cost of exporting OE, EF is the cost of storing EA, and GH is the discounted cost of exporting EA in the future. This diagram therefore shows the cost minimising balance of disposing of the surplus quantity OA between intervention and export, with no external constraint on this activity.

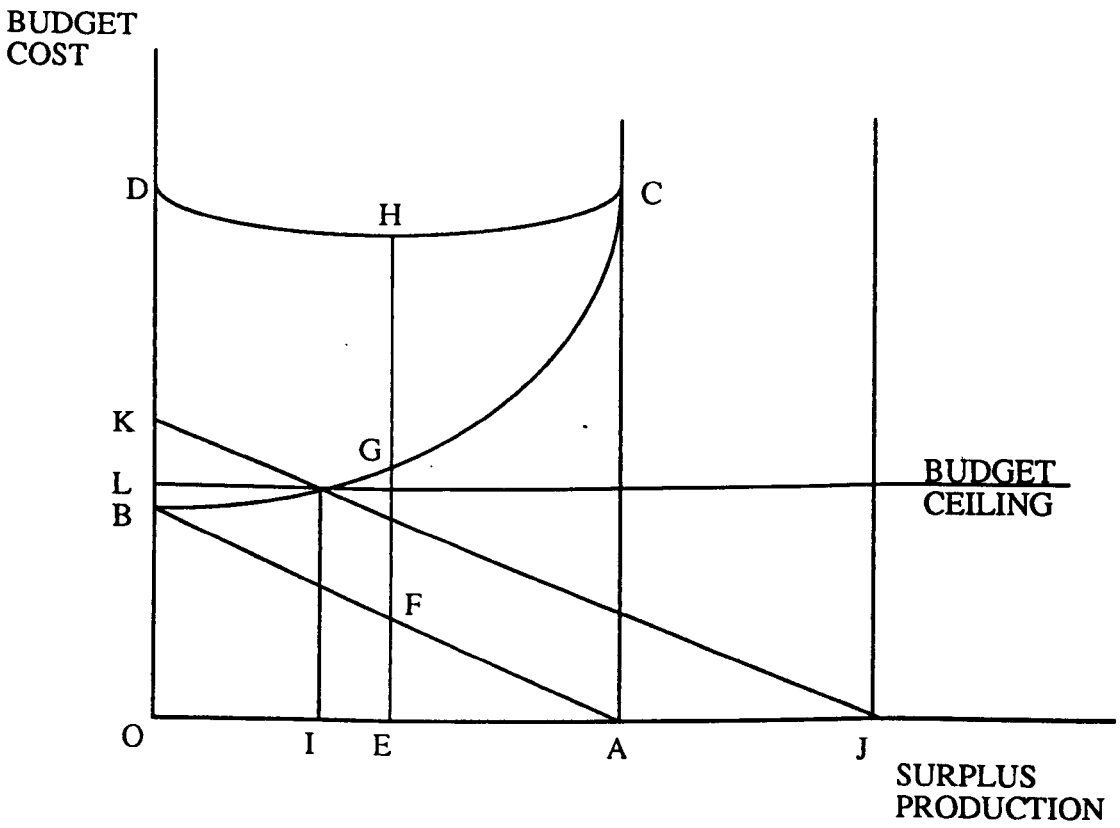
DIAGRAM 3: TOTAL STORAGE AND EXPORT COSTS FOR A LARGE EXPORTER



With the Common Agricultural Policy however, there will necessarily be a constraint on the EC's spending activities. This will occur because, as mentioned before, expenditure shouldn't exceed revenues in any one year. Consider therefore Diagram 4 overpage, with a budget ceiling of OL imposed. Without this constraint, the cost minimising point would have been at H, with OE exported and EA stored. For this

particular year however, the capped budget of OL is insufficient to fund that level of exports, so EI exports must be diverted from export to intervention. Given the assumption of constant levels of surplus production needing to be disposed of each year, in the following year there is a disposable surplus of OA, plus IA carried over from the previous year (IA=AJ). Thus in this second time period, there is a total surplus of OJ requiring disposal. Assuming there is no change in the unit storage costs, AB and JK will be parallel.

DIAGRAM 4: BUDGET CONSTRAINT IMPOSED ON A LARGE EXPORTER



As Diagram 4 is drawn, with OK>OL, this policy would be financially unsustainable by the second year, even if all the surplus production of OJ were put into store. Thus, even if the policy is such that the budget ceiling isn't breached until a number of years have passed, it can be seen from Diagram 4 that ultimately, this policy is unsustainable. This 'crisis point' will occur when the total of annual production plus carryover of intervention stocks generates costs beyond own resources. In the experience of the EC, this happened despite the increase in own resources in 1986 resulting from the

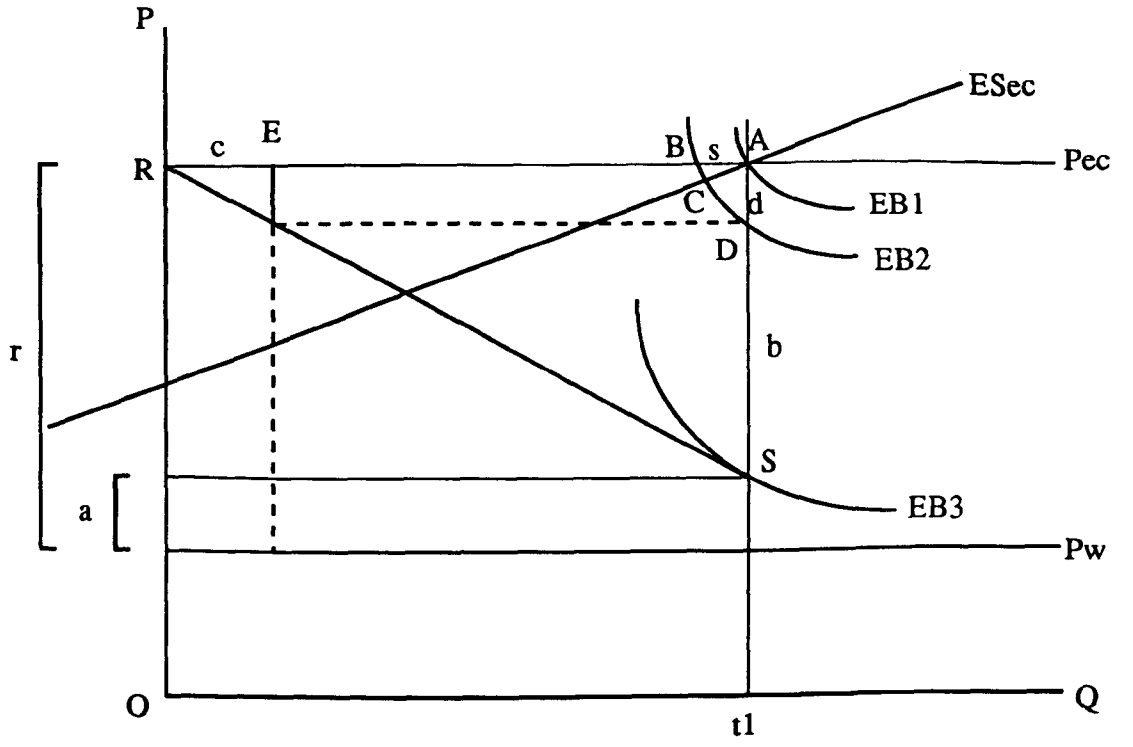
European Council meetings of 1984.

Moreover, the model illustrates a point which is crucial to the success of any policy reforms enacted by the EC. Given that the EC rule that the budget must be in balance, and the additional constraint effective since 1988 that total expenditure on agricultural market support can only increase in line with the Guideline, then the problems arising out of the way the CAP operated during the early and mid 1980's will only be prevented by ensuring both that there is no more financial mismanagement of the sort that generated the 'burden of the past', and that the growth in agricultural production is successfully curtailed. The former reform, by itself, will not be sufficient to alleviate the ills of the CAP.

An alternative representation of this particular problem can be seen in Diagram 5 overpage. EB1, EB2 and EB3 are rectangular hyperbolic 'equi-budget' lines. The total surplus is Ot1. Given this quantity, and an available budget of EB1 or above, the committee has a free hand in deciding whether to dispose of the total surplus quantity to intervention or export, or whether some should go for export and the rest be put into intervention.

If the budget was set lower, at EB2 say, then an effective constraint would be put on the committee's operations. The quantity RB could be exported at the full export refund level 'r', but there would be the quantity BA (=s) for which there would be no funds left to do anything with - not even storage costs could be covered. Alternatively, all of Ot1 could be exported at a refund level PwD, but this would leave these exports uncompetitive on third country markets. What is needed therefore is a way of allocating all of Ot1 between export and intervention, whilst not breaching the budget ceiling EB2. Let 'a' be the per unit storage cost. The line RS is a 'blend-price' line of combinations of sales to export and intervention. If all of the surplus is stored in any year, the unit cost to the budget in that year is 'a'. If it is entirely exported, the unit cost is 'r'. For combinations of export and storage, the unit cost is given as the height of RS above Pw. A budget constraint of EB2 would permit maximum exports of EA, with the remainder RE going to intervention. This yields a unit cost of PwD. The limit case is represented by a budget constraint of EB3. Here, the budget could just cover the storage costs of all of Ot1 being put into intervention in that particular year, but would, *ceteris paribus*, result in too great a demand on the following year's budget for the policy to be sustained.

MODEL 2: DIAGRAM 5 - STORAGE AND EXPORT UNDER A BUDGET CONSTRAINT



Let Ot1 = t. The proportion of underfunding of the total surplus is s/t. It first needs to be re-stated that it is currently being assumed that s, t, r, d, and a are all constant over time.

Current expenditure is equal to the quantity stored (ie carried over) times the per-unit storage cost (ie c*a), plus the quantity exported times the unit export refund (ie r[t-c]). With EB2 the budget constraint may be defined as r(t-s), ie the full refund rate times the reduced quantity which can be exported at this rate, ie:

$$ca + r(t-c) = t(r-d) = r(t-s)$$
$$ca + r(t-c) = r(t-s)$$
$$ca + rt - cr = rt - sr$$
$$c(r-a) = sr$$
$$c = \frac{sr}{r-a}$$

Thus, an expression is derived for the quantity carried over from year 0 to year 1 (the subscripts refer to years relative to year 0, the base year). What is needed however is a general expression for the carryover in ANY year. Considering the carryover from the second year, given the above assumptions, in year 1, s_1 (the current season's surplus) and c_0 (the quantity carried over from the previous year) need to be both carried over to the next year, if $EB2_1$ is only sufficient to finance t_1-s_1 at r_1. Therefore:

$$C_1 = \frac{r(s+c_0)}{r-a}$$

$$= \frac{r\left[s+\left(\frac{sr}{r-a}\right)\right]}{r-a}$$

$$= \frac{sr}{r-a} + \frac{sr^2}{(r-a)^2}$$

From this, a general expression for C_n can be established:

$$C_n = \frac{sr}{r-a} + \frac{sr^2}{(r-a)^2} + \ldots\ldots + \frac{sr^n}{(r-a)^n}$$

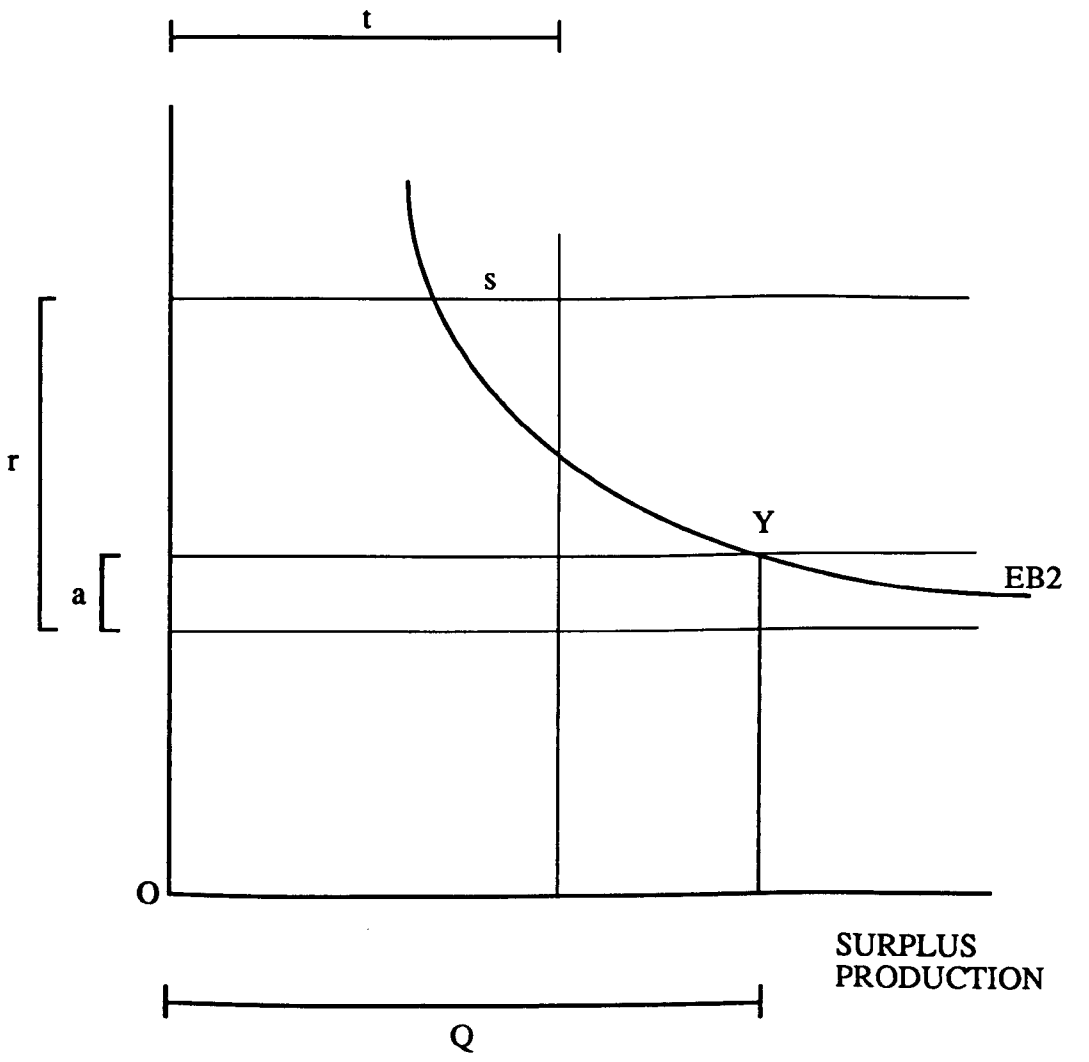
$$C_n = s\left(\frac{r}{r-a}\right) + s\left(\frac{r}{r-a}\right)^2 + \ldots\ldots + s\left(\frac{r}{r-a}\right)^n$$

Thus it can be seen that the build-up of carryover stocks follows a geometric progression, the general formula for which is:

$$C_n = \frac{s(1-g^n)}{1-g} \qquad \text{where} \qquad g = \left(\frac{r}{r-a}\right)$$

Turning now to diagram 6, it can be seen that eventually EB2 will reach (Pw + a) at point Y. What this shows is the "limit point" where output has reached the point where the constrained budget is only sufficient to cover the minimum possible expenditure on total production plus carryover Q ie if all output Q is put into store.

DIAGRAM 6: THE EXTREME POSITION - THE 'CRISIS POINT'



This can be written:

$$Qa = r(t-s)$$

$$Q = (t-s)\frac{r}{a}$$

Given that in this situation the carryover is the full quantity of production plus carryover from previous years, it can be written:

$$\frac{s(1-g^n)}{1-g} = (t-s)\frac{r}{a}$$

$$1-g^n = (t-s)\frac{r}{as}(1-g)$$

$$g^n = 1-(t-s)\frac{r}{as}(1-g)$$

$$n \log g = \log\left[1-(t-s)\frac{r}{as}(1-g)\right]$$

$$n = \frac{\log\left[1-(t-s)\frac{r}{as}(1-g)\right]}{\log g}$$

Thus an expression has been derived which shows how many years it will take before the budget is exhausted, ceteris paribus.

APPENDIX 2
THE OPERATION OF STOCK DEPRECIATION

In order to prevent the internal price for agricultural commodities from falling below a certain specified level on the internal EEC market, the Commission has at its disposal the possibility of buying goods into intervention stores so as to restrict supply on the market and sustain market prices. There are certain financial consequences arising from this, including payments to cover the cost of the physical operations involved, and the financial costs incurred by the member states in having capital tied up in the stocks. In addition to these, there is the problem that stocks usually realise a lower price on sale out of intervention than was paid when they were bought in. This, in the case of products like cereals (and indeed butter, if stored correctly), is NOT due to a physical deterioration in quality, but to the fact that when they are sold out of store, they are usually sold onto the lower-priced world market (since to sell them back onto the internal EEC market would undermine the reason for buying them in off that market in the first place. Those products that are sold back onto the internal market are sold at the prevailing internal market price unless going for non-food uses).

At some point, this difference must be paid for. Up until the 1988 Brussels Summit, the full difference between the two prices would not be paid by FEOGA until

the products were sold out of store, with the member states having to wait until then to get reimbursed fully for the expenditure they incurred in buying in these products. Following this Summit however, this situation changed, with the requirement now being that the stocks are written down in value from the level at which they are bought in, to the level at which they are expected to be sold out at, by the end of the financial year during which they are bought in.

Regarding the expected future selling-price, this is taken as the estimate of the future world price for that particular commodity, which is calculated as an extrapolation of the average of the last few years' world prices (usually 5-10 years), since to try to be any more "accurate" with the estimation would still leave problems due to the vagaries of the world market and its susceptibility to external shocks such as the US drought.

Thus, having established the selling-out price for the particular commodity, and knowing the buying-in price, the degree to which the commodity's value must be depreciated is now known. In general, most depreciations use the facility allowed for in the legislation whereby most, but not all, of the depreciating is done at buying-in, with the balance being completed at the end of the financial year. For cereals, 75% of the depreciating is done at buying-in, and the remaining 25% at the end of the year. This does however vary between products, with for example milk products being depreciated 70%/30%.

With intervention expenditure, the expenditure initially falls on the member states' intervention authorities, who then get reimbursed month by month by means of the monthly claims submitted to FEOGA. When a particular consignment of a product enters store therefore, they will claim back the cost of the initial depreciation (75% for cereals) in that month's claim. The way this is calculated is by means of the depreciation coefficient ('k'), which appears in the Official Journal. The value for k for cereals is 0.55[30], ie by reducing the value of the cereals to 55% of the buying-in price, the value has been reduced TO 25% of the <u>difference</u> between the buying-in and the selling-out prices (given that products sell for at least something on leaving store).

	$Pk = 0.55Pbi$	1
and	$Pbi - Pk = 0.75 (Pbi - Pso)$	2

substituting equation 1 into equation 2 yields:

	$Pbi - 0.55Pbi = 0.75Pbi - 0.75Pso$	
or	$0.3Pbi = 0.75Pso$	
Thus:	$Pso = 0.4Pbi$	3

[30] OJL281, 30.09.89; Reg(EEC) No 2964/89.

So, it can be seen from equation 3 that in depreciating newly constituted stocks, the Commission is working on the basis that the world cereals price (ie that which the stocks will realise when sold out onto the world market) is 40% of the buying in price.

As regards the actual financial transfers involved, there is a payment made relating to the initial depreciation, and a subsequent one made relating to the final part of the total depreciation at the end of the financial year. It ought to be noted that although the regulation requires that the depreciation be done in full by the end of the year, if the budget situation is too tight to allow the second part of the depreciation to be carried out, then this requirement will not be fulfilled.

Consider this principle in action for October 1989:

The buying-in price for common wheat was 163.62 ECU/t.[31] This figure gives an implied selling-out price (ie world price) of 65.45 ECU/t. The IWC quoted the price on 20th October to be $155/t, or 140 ECU/t converted at Eurostat $/ECU exchange rates.

Repeating for December 1990, the common wheat buying-in price was 161.44 ECU/t[32], implying a world price of 64.58 ECU/t. The IWC was quoting, for 14th December, prices of $83/t fob for French wheat, and $81fob for UK wheat. Taking the French price, and converting it to ECU at the Eurostat-quoted exchange rate gives a price of 60.72 ECU/t.

What is therefore happening is that the EC has taken the decision to consider the long term trends in world prices, and depreciate down to that level (demonstrated to be a level of 40% of the buying in price), rather than try to follow all the fluctuations in current prices. What was therefore happening during 1988 and 1989 was that with the high world prices following the US drought, the EC was over-depreciating its stocks. For those years where that occurred, it was then the case that the member states refunded FEOGA the amount of the over-reimbursement. Currently however, it can be seen that the long term world price the EC is working to is approximately the actual level. Whilst any divergence is going to result in administrative costs correcting the imbalance, it will still probably be less than that required to have 'k' continually being changed in order to get Pso to track the variable world price exactly all the time.

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[31] Home Grown Cereals Authority Bulletin 24/14.

[32] HGCA Bulletin 25/26.

APPENDIX 3
BUDGETARY EXPENDITURE AND THE US $

For many sectors within the EC budget, including the cereals sector, the ECU:$ exchange rate will play an important role in determining the overall level of support expenditure, regardless of internal policy decisions. Considering the cereals sector in detail, there are two main lines in the cereals chapter of the budget that will be heavily influenced by exchange rate movements. They are the lines representing refund expenditure on exports from the open market; and the line representing other public storage costs, effectively refunds on exports from intervention. These lines will be affected because they relate the internal cereals support price to the world price, the latter normally being quoted in terms of US$ per tonne. In terms of the per unit level of refund payment made, or reimbursement given on export from intervention however, the payment, made in ECU in the first instance, must cover the difference between the internal and world prices when both are quoted in ECU terms. Thus *ceteris paribus*, a change in the $:ECU exchange rate will affect the world price when quoted in ECU. This will in turn affect the level of unit refund required on exports. In general terms, when the $ strengthens, so the ECU world price rises, and a lower unit refund is required. The converse holds as well.

Despite this very important link between the EC budget and the value of the US$, it wasn't until the 1988 policy reforms of 1988 that explicit account was taken of the role of the ECU:$ exchange rate on budgetary expenditure.

During 1985 and 1986, two factors led to a heightened awareness of the problem. Firstly there was the US Farm Bill that proposed cutting domestic support levels. This, it was estimated[33], would result in lower world prices of around 25% and greater EC support expenditure of 400m ECU in 1986 alone. Soon after[34], it was realised that the financial limit, agreed at Fontainebleau in 1984, was going to be breached. Part of the blame for this was levelled at the exchange rate movements that had occurred - the $ had fallen by 35% in the previous year, and by 22% since the budget had been agreed at the end of 1985.[35] The EC Commission had estimated that a fall in the value of the $ by 10% would raise support expenditure by 800m ECU. Independent estimates put

[33] Agra Europe No.1167, 17-1-86.

[34] Agra Europe No.1174, 7-3-86.

[35] It must be noted that when estimating the appropriations each year in the budget, a particular ECU:$ exchange rate is assumed. It was from this level that the $ had fallen by 22% in this particular case.

the figure at over 1 billion ECU. It had become all too apparent to the policy-makers that the ECU:$ exchange rate played a very important, and potentially very disturbing role in the finances of the EC, but until 1988, no policy was forthcoming that attempted to offset this disturbance.

It was decided in 1988[36] that a monetary reserve should be established. It was to consist of 1000m ECU of provisional appropriations, "to cover development [sic] caused by significant and unforeseen movements in the dollar/ECU market rate compared to the rate used in the budget".[37] Certain features of this arrangement need to be highlighted. Firstly, the appropriations are only provisional because the reserve is 'held' by the member states, only to be drawn upon should the need arise. This need is defined in terms of the actual expenditures incurred as compared with the forecast expenditures. A 'significant' movement in the market rate is one which raises or lowers actual expenditures by more than 400m ECU, when compared with the rate used in drawing up the budget[38]. Moreover, these appropriations operate outside the agricultural guideline. Thus if exchange rate movements affect expenditures by up to 400m ECU, but not more, then the burden is borne by the budget within the guideline. If however costs rise by more than 400m ECU, the extra costs are borne by the member states, with no extra pressure being placed on the guideline. Also, the reserve operates in a symmetrical fashion. Thus savings over 400m ECU can be added to the reserve, up to a maximum of 1000m ECU. Note that this reserve is to be called up under the fourth, GNP-based own-resource, so the member states' contributions reflect their wealth as measured by the harmonised GNP base. Moreover, "any savings...which have been transferred to the monetary reserve...and which remain in the monetary reserve shall be cancelled and ...be counted as a revenue item in succeeding budgets",[39] ie any sum remaining at the end of the year is cancelled, and counted as a budgetary surplus. Thus, sums over the 1000m ECU are not carried forward to future years.

In 1988, "it was not necessary ...to have recourse to the reserve"[40]. In 1989 however, considerable savings for the EC budget could be attributed to favourable

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[36] see the Council Decision of 24th June 1988 concerning budgetary discipline (88/377/EEC) in OJL185, 15.7.1988, Page 29, and Article 10 in particular.

[37] *op cit* P29.

[38] For the 1991 budget, the rate was $1=0.83ECU. For 1990 and 1989, the rate used was $1=0.81ECU.

[39] *op cit* P31, Article 12, second paragraph.

[40] see EC Commission. (1989), P4.

changes in the ECU:$ exchange rate.[41] Total savings were put at 1219m ECU, 819m ECU of which were transferred to the reserve. The other 400m ECU went to become "unutilised appropriations". That is to say, the first 400m ECU of the total savings was received by FEOGA. The converse would also have been true - that just the first 400m ECU of any additional expenditure would be borne by FEOGA. "In 1990, recourse to the monetary reserve was not necessary."[42]

Although figures are not yet available for 1991, savings are once again possible. At the beginning of the year, support costs were rising rapidly, partly due to a dollar weakened by the Gulf War. After the end of hostilities however, the dollar rose sharply - between mid-February and mid-April, it rose 12.2% against the ECU.[43] Given the assumptions made by Agra Europe, this will yield a saving of around 1.5b ECU. This will be accentuated given also that the dollar had been falling since the start of the War, and was therefore relatively weak when the 1991 budget was drawn up.

[41] see EC Commission. (1990a), P17.

[42] see EC Commission. (1991), P2.

[43] Agra Europe No.1435, 12.4.91, page P/4.

CHAPTER 4: DETAILS OF THE CEREALS AND OILSEEDS SECTORS

'If necessity is the mother of invention, crisis seems the mother of redirection in farm policy.' Luther G Tweeten, 'Agricultural Policy: A Review', IN Food And Agricultural Policy. American Enterprise Institute. Washington (P40).

4.1: INTRODUCTION

As has been pointed out during the first two chapters, the sectors upon which this thesis focuses most closely are cereals and oilseeds. These have been chosen because of their central importance when looking at total CAP support expenditure (see below), and also because the two sectors are very close in terms of policy linkages. The purpose of this chapter is to look at the two sectors in detail, considering first the methods of support employed. This offers a chance to compare and contrast the two very different methods of support that were employed from the policies' instigation until the reforms agreed in 1991 and 1992. This work will then be moved on to look at how expenditures actually arise under the different regimes. To this end, consideration will be given to work carried out that attempted to reproduce the expenditure figures for cereals for 1986 and 1987, and 1986 for oilseeds. This was carried out in order to gain particular insights into those expenditures, and also to act as an introduction to the later work of actually modelling and forecasting expenditures in those sectors. In addition, the questions of financial fraud and mismanagement will be examined, in order to see whether or not these problems could seriously undermine the EC's attempts at enforcing budgetary discipline.

4.2: METHODS OF SUPPORT IN THE TWO SECTORS

The main focus of this section is the policy format that applied to each sector from their instigations, as it has been these policies that have shaped the patterns of expenditure over the lifetime of the CAP. The oilseeds regime however was reformed in 1991, with adjustments made in 1992 when the cereals regime was reformed, though only with effect from the 1993/4 crop year. Thus as the new regimes principally influence the forecasting sections of the thesis, discussion of their nature will occur after the old systems have been examined in detail. With the cereals regime, the 'old' system will still therefore be described in the present tense.

4.2.1: The Cereals Sector

The original support policy for cereals was determined in the 1960's at a time when the EC was a major net importer of cereals. Indeed, the EC only became a net exporter of cereals in the crop year 1980/81[1]. The method of support employed offers an illustration of the 'classic' method of price support in the EC. In this sector, support is given to farmers by means of an internal price within the EC that is maintained at a level generally above that prevailing on the world market. In Western Europe, most agricultural markets can be typified as exhibiting relatively static, inelastic demand, coupled to inelastic but increasing supply. Technological advance is an ongoing process, and as will be seen in later chapters, this is usually modelled in a very simple way by the use of a time trend. Thus new production methods are continually being introduced which act to increase supply. The significance of the method of support employed in the cereals sector is that by setting a price greater than the opportunity cost of resources used in agriculture[2], excess resources are encouraged to remain in agriculture. This doesn't induce technological change *per se*, it simply encourages a more rapid development of new, output-increasing technologies by artificially raising demand. The short run supply curve is therefore pushed to the right, against a relatively static commercial demand curve. For cereals specifically, the main demand is for animal feed. Here, demand is actually falling slightly, accentuating the downward pressure on prices.

The implication is that with a relatively stable and high institutionally-determined support price insulated from the world market, and a 'free-market' internal price being driven down over time, then at the high support price the net self sufficiency ratio will rise over time. This has happened in the cereals sector, as with all sectors receiving support under the CAP.

Moreover, because this price represents a disequilibrium position, in that EC supply and demand are not equal, and because the EC's internal market is a place where lower-cost third country suppliers can earn super-normal profits, then certain protective devices must be permanently maintained in order to protect this high price for EC cereals producers.

First, in order to prevent domestic over-supply from driving down the internal price on the Community market, a system of intervention is operated. At the annual price-fixing, the Council of Agricultural Ministers determine the 'Intervention Price', from

[1] Data from the cereals balance sheets in the Agricultural Situation in the Community, Eurostat, various years.

[2] as measured at free trade prices.

which is derived the 'Buying-In Price'. This is intended to put a floor in the market, so that if producers can't realise at least this price by selling their crop on the open-market (net of transport costs to the intervention store), then they can sell their crop to the Community, via the intervention agencies in the member states, and thus receive at least this minimum level of return.[3]

Second, protection must be given against cheap imports entering the Community and selling on the internal market at a lower price than the comparable EC product. In order to achieve this, the Council of Ministers first set the Target Price. This is set as the market price at Duisburg in the Ruhr. This is deemed to be the place of greatest cereals deficit within the EC, therefore having the highest market price. From this is deducted the costs of transporting cereals from Rotterdam (the main point of import into the Community) to Duisburg. This then yields the Threshold Price, that is, the minimum import price for cereals coming into the Community. This having been estimated, the Variable Import Levy (VIL) can be calculated. The Community considers all the offer prices (cif) from exporters to the Community, takes the lowest, and sets the VIL as the difference between that and the Threshold Price.

At first glance, it might be assumed that when exporting to third countries, the EC carries out the reverse operation in estimating the level of the export refund, ie the payment required to producers to enable them to sell their produce on third country markets at a price low enough to be competitive, yet still get a reasonable return. In practice however, the unit refund is normally lower than the unit VIL. There are several reasons for this:

When calculating the level of the refund, the aim is to take the price of the cereals being exported down from the internal market price to the price at which the cereals sell for on third country markets. This needs certain features to be highlighted. First, the internal market price received by producers in the cereals sector tends to be around the level of the intervention price, which is up to 35% lower than the target price. Thus the EC internal 'reference' price[4] is lower when calculating the export refund. Moreover, whilst the third country selling price of EC exports is lower than that for the types of cereals imported by the EC[5], the difference between these two prices is typically less

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[3] In recent years, the degree of support offered to producers by the intervention system has been undermined by various policy manipulations. These will be discussed in detail below.

[4] With the cereals sector, the term 'reference' price has no specific meaning, unlike target, threshold, intervention and buying in prices. It is used here to cover all these terms and their use when reference is made to them in calculating the VIL, export refund, and payment to producers when selling to intervention.

[5] Principally accounted for by quality differences - the high quality cereals imports, eg hard milling

than that between the internal threshold and market prices.

Putting some numbers on this to illustrate[6], on Monday 17th August 1992, the import levy for wheat was 147.99 ECU/t, whereas the maximum export refund for exports by tender the previous Thursday was 76.95 ECU/t. The standing refund for specified destinations was 60 ECU/t.[7] Thus it can be seen that the unit VIL is indeed rather larger than the unit export refund.

Turning to international grain prices, at Thursday 13th August 1992 French wheat from the open market was selling at $120.40/t ($117 for wheat from intervention), with US Soft Red Winter also selling at $120.40/t, Canadian Western Red Spring was selling at $147.90/t, and Australian Prime Hard was selling at $181/t. Even Argentinian wheat, which often historically has traded at a lower price than EC wheats, was trading at a higher price - $129/t.[8]

Internally, the August Threshold Price for common wheat was 223.18 ECU/t, and the Buying-in Price was 153.68 ECU/t. With an exchange rate of 0.693$ to the ECU[9], this gives a third country selling price of French wheat of 83.44 ECU/t. With an export refund of 76.95 ECU/t, this gives an implied internal price of 160.39 ECU/t, above the buying-in price but only about 72% of the threshold price.

Turning now to see how these policies have resulted in particular budgetary transfers, it should first be re-emphasised that when talking about cereals, or even about 'wheat', the product is highly differentiated in consumption, and as was noted above, whilst the EC exports large quantities of its own lower quality non-milling wheats, it at the same time imports smaller, yet not insignificant, quantities of - for example - hard milling wheats. Thus in terms of Diagram 2 (below), the transfers

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wheats, trade internationally at higher prices than EC standard non-milling wheats, barley, etc.

6 From the Home Grown Cereals Authority's Weekly Bulletin Volume 27, No 7, 17th August 1992.

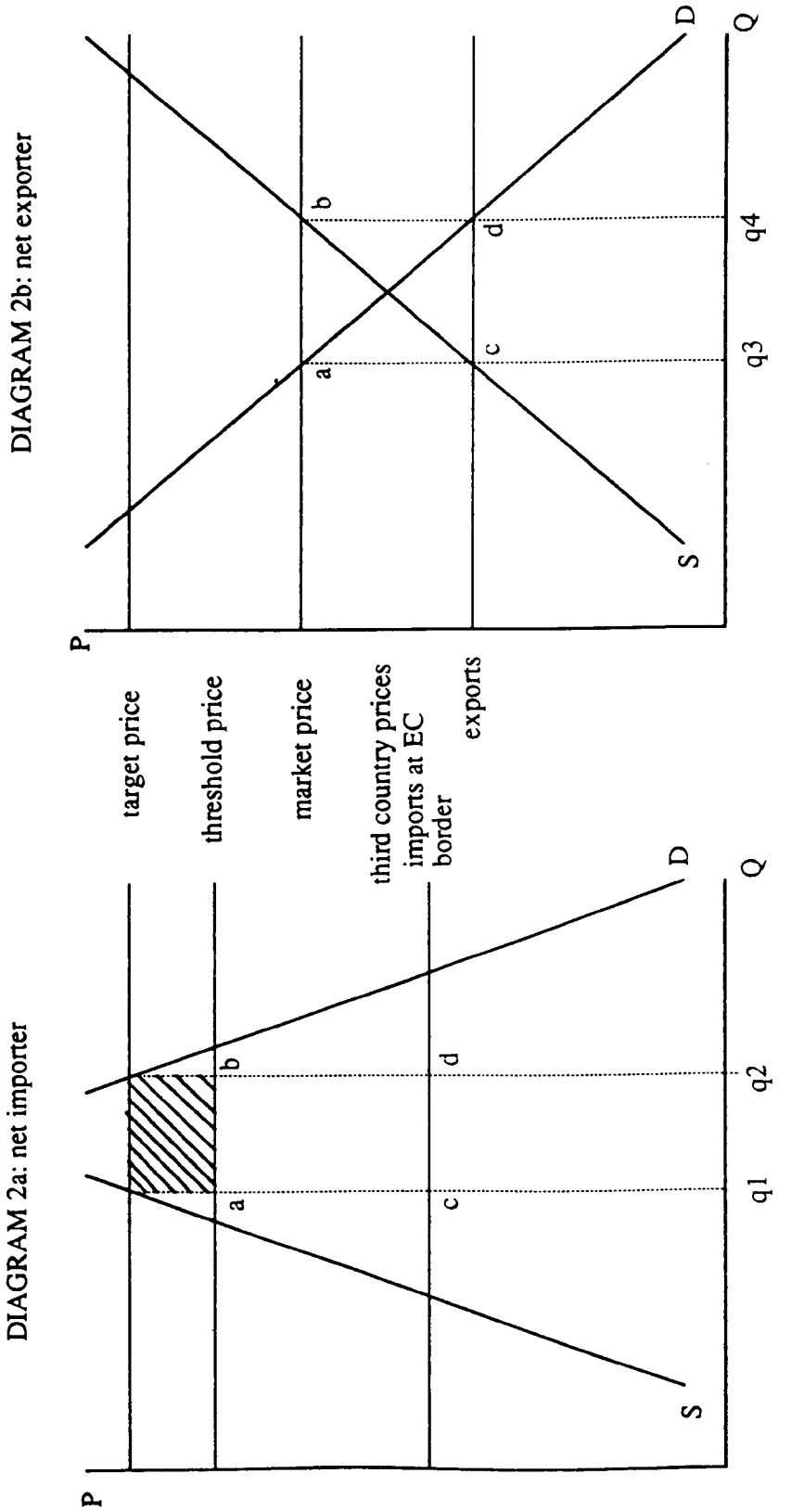
7 There are two ways of exporting from the open market - by tender or by standing refund. The latter has the refund given, and normally is used by traders exporting small quantities on a regular basis to the Alpine or Scandinavian countries. The former is how the bulk of open market exports are funded. There is a process of competitive tendering (traders bid for the unit level of refund they require on a stated quantity), and the Commission decide which bids to accept. The refund offered is a maximum, and often individual tenders require a lower refund than the maximum, depending on the trader, market conditions etc.

8 These prices are quoted as, respectively, fob Rouen, fob intervention, fob US Gulf, in store St Lawrence, fob Eastern States, and fob Bahia Blanca.

9 Financial Times 25th August 1992. The market rate was used as the 'Green' rate was not available. This calculation is given for illustrative purposes.

illustrated can be represented by the import of hard wheats in Diagram a, and the export of soft wheats in Diagram b:

DIAGRAM 2: FINANCIAL TRANSFERS WITH RESPECT TO TRADE UNDER THE CAP



In Diagram 2a,the area abcd represents the total import levy revenue earned for the budget, with the unit levy ac on import quantity q1q2. The hashed area represents transport costs from Rotterdam to Duisburg. In Diagram 2b, the unit export refund ac is paid on quantity q3q4, giving a total export refund cost to the budget of abcd.

This far, only the transfers arising out of the trade protection part of the cereals regime have been considered. As discussed earlier however, this is only one part of the regime's protective devices. The other major element concerns intervention storage operations (the expenditure category 'intervention other than storage' will be discussed later).

Within this element of expenditure, certain key lines can be identified. First there is the expenditure officially called 'other public storage costs' (OPSC). This is the budget line covering the difference between the book value of the stocks when sold from intervention, and the price realised in that sale. As described in Chapter 3, stocks are depreciated in value when bought in, and again at the end of each financial year, but still may not be fully depreciated in value at the time of sale. Moreover, the bulk of cereals stocks (around 80% or so) go for export to third countries. The main difference is in terms of how traders bid for the right to export. With export refunds, traders bid for the level of export refund they would require, whereas with exports from intervention, they bid in terms of the price they expect to be able to sell at on third country markets. Given the intended purpose of intervention, this price should be no lower than the price that exports from the open market can be purchased at. As described in Chapter 3, there is also the expenditure covering the depreciation of stocks held. These two expenditure lines together represent the difference between the buying-in price and the selling out price. Since selling out most frequently occurs to third country markets, it is this that is seen as analogous to the export refund. Note also that if world prices are relatively 'high', OPSC can actually be negative, with the member states having to reimburse the EC for over-devaluation of the stocks when held in intervention.

In addition to these payments however, there are the 'storage' costs themselves. These can be broken down between 'technical' and 'financial' costs, both of which are paid to the member states as standard amounts. Taking the technical costs first, these represent "the amounts of the standard rate reimbursements paid by the EAGGF to the member states to cover the cost of the physical operations involved in storage. [They are] therefore directly related to the quantities in stock and to their movements."[10]

[10] Court of Auditors Report for the financial year 1985, in OJC321, 15.12.86, Page 45, para 4.18.

Specifically they include "taking into store, packaging, transport, processing, storage, and withdrawal from store."[11] Financial costs on the other hand represent the opportunity cost of the interest foregone by the member states having funds tied up in intervention stock purchases. Put another way, it is the "charge on borrowing the money for storage, ie the borrowing cost of the actual purchase of the stock."[12] "Variations in this expenditure are therefore directly related to changes in the book value of the stocks."[13]

The member states make monthly claims to FEOGA against these expenditure categories, with the 12th claim at the end of each financial year settling any outstanding sums that might exist. With technical costs, no details are published as to how much they are. With financial costs however, the rates of interest at which these payments are made are published in the Official Journal. In the Court of Auditors report already quoted however, it is estimated that across both types of expenditure, the Community under-reimburses the member states. For 1985, the estimate was a total of 160.2 Mio ECU[14] - a burden that has been effectively transferred from the Community budget to member state budgets.

These transfers can be considered with reference to Diagram 3 overleaf. The gap marked (OPSC + depreciation) illustrates the difference between the buying-in price and the selling out price. As alluded to above, this is to all intents and purposes the equivalent of export refunds on sales which go for export to third countries. The upper reference price in the refund calculation is the internal market price of the EC. Here, it is the Buying-in Price. Data from Eurostat[15] suggest that, excluding exceptional market conditions, the market price and the intervention price are not very far apart. In most cases, the market price lies from about 90%-110% of the intervention price. Thus in the two situations where exports take place from the open market or from intervention, the upper of the two reference prices is approximately the same. Moreover, work reported in greater detail in a later chapter suggests that whilst in the early 1980's cereals sales from intervention sold at a markedly higher price on third country markets than sales from the open market, since around 1983/4 sales from the two outlets to third countries

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[11] Reg (EEC) 3247/81, OJL327 14.11.81, Page 1.

[12] see House of Commons. (1987).

[13] Court of Auditors, *op cit*, Para 4.19.

[14] *ibid* Page 45.

[15] In the 'Agricultural Situation in the Community' each year , a table is published showing "Market prices for cereals as a percentage of the intervention price".

have been at approximately the same price. Thus the lower reference price is also approximately the same in the two situations (although from the trader's point of view, with exports from intervention the costs of transport to the port must also be accounted for).

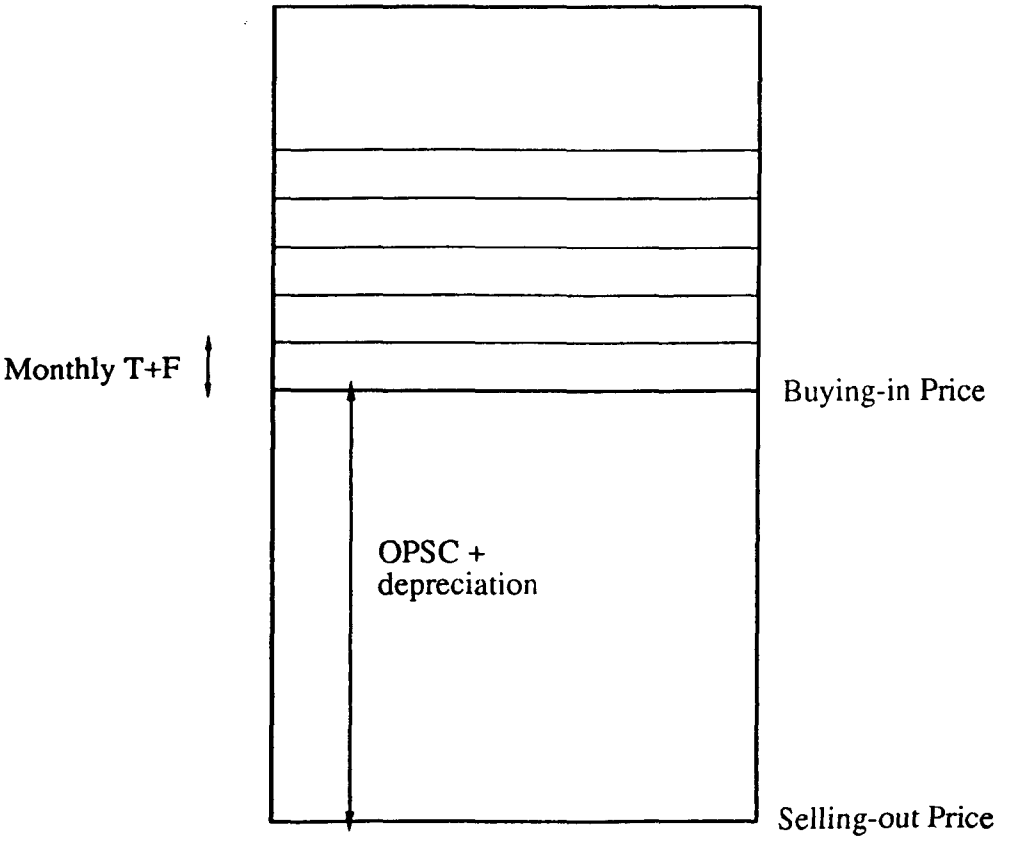


DIAGRAM 3: FINANCIAL TRANSFERS WITH RESPECT TO INTERVENTION STORAGE UNDER THE CAP

When comparing the unit cost of disposing of a tonne of cereals 'directly' onto third country markets or via intervention therefore, this part of the operation costs approximately the same in each case. What Diagram 3 illustrates also is that with disposal via intervention, the technical and financial costs (labelled as T+F) add to the total unit disposal costs. With each monthly claim from the member states, the unit cost rises. Personal attempts to put a figure on unit values of T+F have met with a wall of silence in the European Commission, but it can be seen that if stocks are held for any length of time, then unit costs can rise significantly. Although exact lengths of stay are hard to pin down, it is not uncommon for cereals to be held in store for 2-3 years, if not

longer. Thus in terms of Diagram 3, the additional monthly payments required on top of the (OPSC + depreciation) can add quite significantly to the unit cost of disposing of surpluses via intervention. This can be seen in that the vertical height of the box (total expenditure when cereals are sold into intervention) gets added to by the distance marked 'Monthly T+F' for each month a consignment of cereals is held in store.

A final point to note on this aspect relates back to the question of stock depreciation. With most of the writing down of the book value of stocks occurring as soon as the products are bought into store, this means that the unit payments by FEOGA on financial costs have fallen since the 1988 reforms because of the lower book value of the stocks on which those payments have to be made. The points to note here therefore are that savings have been realised by FEOGA because of the policy of depreciating stocks values, but this has meant that the burden of expenditure falling on FEOGA has become more immediate, as was discussed in Chapter 3.

In addition to these two principal forms of support, there is a category known as intervention, other than storage. The main element within this for the cereals sector is the production aid available for durum wheat. When the price in the area of greatest surplus falls below a minimum guaranteed level, aid is paid on the basis of area grown and harvested. In practical terms, this payment is a regional support payment, as the producers who are eligible are, in the main, amongst the poorest in the Community. The other major element of expenditure in this section of the budget is a production aid paid to producers of crops that go to make starch. The products involved are potatoes, wheat and maize. With potatoes, it is felt that starch potatoes have just the one possible outlet, and the producers are in a region that provides very limited alternative production opportunities. This payment is therefore justified as a sort of regional payment. The payments for the cereal crops are therefore needed to allow their producers to compete fairly with the producers of starch potatoes.

The fourth element of 'expenditure' in Chapter 10 of the budget, the cereals chapter, is that dealing with coresponsibility levies (CRL's)[16]. Whilst this is principally a revenue for the budget, it appears in the expenditure section of the budget. The EC justify this by classifying CRL monies as 'negative expenditure'. The effect of this is to reduce the final total expenditure figure on the cereals sector by a considerable sum. In 1990, for example, the 'positive' expenditures in the first three sections of the cereals chapter come to around 4389.35m ECU. The 'negative' expenditure under this

[16] The basic CRL charged, the reimbursement of this for small producers, the additional CRL payable under the stabiliser mechanism, and the repayment of this, if required, in accordance with the 1988 agreement.

fourth section totals nearly 590m ECU, or about 13.5% of the positive expenditures. Thus the final 'expenditure' figure on cereals comes out at approximately 3799.35m ECU, a lot of money still, but rather less than 4389.35m ECU.[17]

4.2.2: The Oilseeds Sector

This sector was reformed in 1991. The 'old' regime will be discussed first, before the pressures for change are discussed, and the new regime examined, in particular in the policy linkages established between it and the cereals regime.

In terms of the budget, the oilseeds sector is actually only half a sector. In full, it is the oils and fats sector, which includes olive oil. Moreover, this sector as a whole is actually the highest spending sector supported by the CAP (appropriations for 1991 total 6.041b ECU, and 5.551b ECU for 1992). For this thesis however, the focus will be just on the oilseeds sector for the reasons outlined above.

The oilseeds sector covers a wide range of products, principally rape, sunflower and soya, but also linseed, castor, flax and hemp. Expenditures on this sector comprised production refunds, intervention storage measures, and export refunds. The most dominant single category of expenditure has been production refunds for rape sunflower and soya. Since 1973, it has fallen to 90% of total oilseeds support expenditure once (in 1976), but in recent years has represented around 96-99% of the total.

Before these payments are discussed in detail however, certain key features of the oilseeds regime need to be discussed. Firstly, and perhaps most significantly, is the fact that imports enter the Community at low or zero rates of tariff. This has been bound in the GATT since the 1960's when the EC agreed to this in exchange for being allowed to operate the VIL system on cereals. Moreover, with a processing industry very heavily dependent on imported seeds, there was much internal pressure to allow seeds in at global trading prices in order to continue providing the processing industry with a cheap input. This laid the foundation for a regime that was in the main very different from the cereals regime.

Unlike the cereals regime, where support to farmers comes from the high maintained prices, with the oilseeds regime, support has come 'directly' from payments that were essentially the same as the deficiency payments as operated by the UK before entry into the EC.

[17] Chapter 10 of the budget also includes expenditure on the rice sector. This is very small in the EC and has no major policy linkages with the cereals sector. It is therefore ignored in this thesis (expenditure on the rice sector in 1990 totalled 85 million ECU).

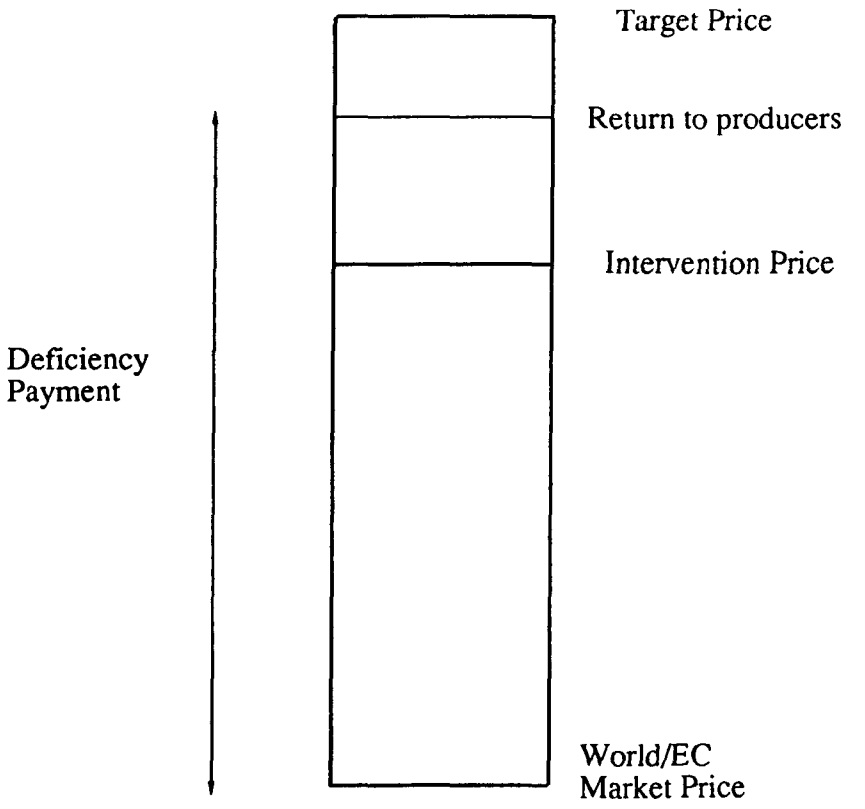
As with the cereals regime, a target price was decided upon that producers should ideally receive. It was set at a level "which is fair to producers, account being taken of the need to keep Community production at the required level." When the world price (and therefore the internal EC market price) was below this level, as it usually was, the difference was bridged by a variable crushing subsidy, paid to Community oilseed crushers. If the world price rose above the target price, rather than reverse this payment, it was simply suspended. The payment of the subsidy allowed support to be given to EC oilseed producers whilst ensuring that Community oilseed crushers could buy EC-produced seed, and then sell their products, at a price competitive on the EC and world markets. Under normal circumstances, this system ensured that a market could be found for all EC-produced seeds, but should this ever not have been the case, then an intervention price was fixed, at a level just fractionally below the target price, so as to put a floor in the market price for producers. As with cereals, buying-in took place at the "buying-in price", set at 94% of the intervention price. Sales into intervention could only take place in the country of harvesting, seeds had to be in batches of at least 100t, had to be of the LEAR (low erucic acid rape) varieties, and supplies offered would only be bought in between November and May of each respective marketing year. Sales from intervention normally took place only by tender. Thus intervention was a rather more restricted outlet for produce than was (and still is) the case with cereals.

In practice, producers tended to receive a price slightly lower than the target price. The difference was partly accounted for by the administrative costs of the crushers in handling the subsidy, and partly reflected the bias in the system towards the buyers of oilseeds. These crushing subsidies were not payable on imports, but only on seeds "harvested and processed within the Community". As no import levies were imposed, a security was lodged against imports. This was returned either once the imported batch had been checked through the crushing mill, and it been ensured that no crushing subsidy had been paid; or when the seed had been "rendered ineligible".

The basic operation of this system can be seen in Diagram 4 overleaf. In terms of the detailed system of operation, although the mechanism for supporting soya was slightly different, the basic principles were exactly the same.

As noted above, intervention was available for oilseeds, though rarely taken up at all, and certainly not on anything approaching the scale of cereals. When it was however, the categories of expenditure were exactly the same as with cereals. At the end of June 1992, cereals stocks totalled nearly 23 million tonnes. Oilseeds stocks were zero. The 14000 tonnes of rape held at the end of May had all been removed.

DIAGRAM 4: FINANCIAL TRANSFERS - PRODUCTION AIDS UNDER THE OLD OILSEEDS REGIME



It should be noted that with rape, two types are distinguished - normal and double zero. It is the latter which the Commission has been trying to encourage farmers in the EC to grow. Indeed, from 1991 support was intended only to be available for these varieties. The double zero refers to the nature of the chemical make-up of the seeds, and what this implies for potential end-uses. Firstly, there is a low or zero erucic acid content, which allows the oil to be used for human consumption, either directly or in processed food products. Secondly, there is a low or zero glucosinolate content, which makes the meal better for incorporation into animal feed. One problem with '00' varieties is that they have lower yields than traditional varieties, and thus the Commission has applied premia to the support prices of '00' varieties over the traditional varieties.

A final point that is worth noting concerns the operation of the stabiliser applied to the oilseeds sector. As described in Chapter 3, when production exceeded the MGQ in

any particular year, the support prices were cut the following year, as with the cereals sector. Unlike cereals however, those price cuts had no limit to them, but the price reductions were calculated using a coefficient. With rape for example this is 0.5, so as an example, if production exceeded the MGQ by 30%, then producers would face a 15% cut in support prices the following year. Coupled to this is the fact that these price cuts were non cumulative, so if a price is cut in year t+1, in t+2 that price cut is restored before considering t+2's price decisions in the face of the size of the harvest. The consequence of this was to generate very large price fluctuations from year to year. This in turn generated an oilseed cobweb. If in year t, production exceeded the MGQ, t+1's prices were cut proportionately. In t+1, it may well have been found that this lower price resulted in output falling below the MGQ, thus the price in t was restored in t+2. This encouraged higher production, above the MGQ.....and so it (generally) went on. Indeed this established something approaching a 'true' cobweb in as much as the oilseeds cycle had a periodicity of two time periods. So the EC found itself in the position of having a policy called a stabiliser that actually actively destabilised the market, because of the two points that the price cuts were non cumulative and unlimited. Whilst it can be seen that the 'cobweb' doesn't apply absolutely perfectly, in general a fall in the intervention price (net of stabiliser adjustment) one year, leads to a fall in area the following year. With price cuts being non-cumulative, a rise in price that following year leads to an increase in area the year after that, etc:

year	rape	NET	sfl		soya		ALL oilseeds	
	area	price*	area	price*	area	price*	Σ area	price*
1987/88	1860	407.6	2291	534.7	567	489.4	4718	477.2
1988/89	1843	373.2	2165	419.2	534	431.6	4542	408.0
1989/90	1660	393.6	2133	498.7	632	381.6	4425	424.6
1990/91	1986	406.9	2646	533.8	664	488.6	5296	476.4
1991/92	2099	400.8	2376	525.8	481	481.3	4956	469.3
1992/93	1847		na		na			

NOTE: The price given is the intervention price for rape and sunflower, the minimum price for soya, and the average of these prices for total oilseeds.

4.3: POLICY LINKAGES BETWEEN THE TWO SECTORS.

As stated in the introduction to this chapter, one reason for focusing on these two sectors in particular is that the products involved have particularly strong linkages, both directly and via a third group of products, known commonly as Annex D Products, as the list of these products appears in Annex D to the EC regulation governing the cereals sector[18]. They include manioc (cassava)[19], corn gluten feed, and beet pulp. Like oilseeds, they have low or zero import duties bound in the GATT. Together, oilseeds and their products - oil and meal - plus Annex D products, make up a group known collectively, but somewhat inaccurately, as cereals substitutes. They can indeed be substituted for cereals in animal feed but of all possible combinations, only a mixture of manioc and soya bean meal comes very close to substituting for the energy/protein balance of cereals. Other than this, individual cereals substitutes aren't really substitutes for cereals or for each other. Despite this, the name has stuck, and the problem they pose is still the same. That is, since they trade within the Community at a price below cereals, they are replacing cereals in animal feed. For the EC12, the quantity of cereals going to animal feed, as expressed as a percentage of total internal cereals use, has remained very stable. In 1973, it was 65%, by 1980 had gently fallen to 62%, and by 1989, had fallen even more slowly, to become 60% of total EC12 cereals consumption. In absolute terms however, the figures suggest a rather different story. Between 1973 and 1989, the quantity of cereals going into animal feed fell from 93mt to 79mt. At the same time, imports of these cereals substitutes has risen significantly. Taking a few substitutes to illustrate this point - the imports of cassava into the EC in 1977 were 3.8m tonnes. By 1982, this figure had risen to 8.1m tonnes. With maize gluten feed, imports rose from 1.5m tonnes in 1977 to 3.7m tonnes in 1986. The imports of soya beans into the EC in 1973/4 were 7.7m tonnes. In 1986 they were 12.9m tonnes. Similarly, soyabean meal imports rose from 3.4m tonnes to 10.9m tonnes in that same period.[20] Data for the make-up of compound feeds show that between 1975 and 1986, the cereals content fell from 61% to 51%, with oilmeals rising from 13% to 18% and substitutes rising from 5% to 10%.[21]

This leads on to why the EC has been trying to encourage the production of double

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[18] Reg (EEC) 2727/75, OJL281, 1.11.75, Page 1.

[19] During the late 1970's, imports of cassava rose sharply. In 1982 therefore, VER's were agreed with the main suppliers, most notably Thailand. The EC 'traded' lower exports to the Community for aid to help develop and diversify those areas where cassava was the dominant crop.

[20] All the above data is taken from Tracy (1988).

[21] Agra Europe. (1989), Page 5.

zero varieties of rape since the mid 1980's. Although the EC is only around 50% self sufficient in oils, it is just 20% self-sufficient in meal. Most of the imports of meals are in the shape of soya from the US, Brazil and Argentina. By switching production to a variety of rape which produced a better form of meal, it was hoped the EC could reduce its import reliance in the feed and protein sector. (NB - although the EC had been trying to increase production of soya as well as rape, it was generally much less successful). These efforts were however curtailed rather with the introduction of stabilisers and the MGQ.

Another feature, highlighted in a paper by Ian Sturgess[22] is that the EC's production of oilseeds is biased towards high oil-bearing varieties. This creates a problem for the EC in as much as the world price of oil is rather more unstable than the world price for meal. Thus the EC has been encouraging production of those crops for which prices are rather more stable. From the viewpoint of the EC's budget, this makes the aid levels more stable, and rather more predictable.

In addition to all these factors, by the mid 1980's, the crisis in the cereals sector was starting to take shape, with high and rising levels of expenditure and self sufficiency. The principal response from the EC was to cut support for cereals, firstly under the guaranteed threshold policy, and more latterly under stabilisers. On the production side this has led to farmers switching from cereals to oilseeds, subject to constraints such as crop rotation[23]. So far, this hasn't been offset at all by falling cereals prices halting the decline in cereals' incorporation into animal feed, although more will be said on this in subsequent chapters.

4.4: AN EXAMINATION OF PAST EXPENDITURES

Whilst the basic principles underlying the way in which expenditures have been effected under the CAP are very straightforward, in practice the complexities of market management mean that a detailed understanding of exactly how these expenditures arise can be quite difficult to come by. As a prelude to the main forecasting work later on therefore, expenditure outturn figures for past years (1986 for cereals, 1986 and 1987 for oilseeds) have been taken and then replicated. This exercise was needed in order to discover the main areas of cereals expenditure, and the problems that would likely be faced in the subsequent simulation work. Below is a table summarising actual and 'estimated' expenditures. Following that is a brief explanation of the work carried out, which highlights those areas where expenditure is significant, and where difficulties

[22] Sturgess, I. M. (1987), P24.

[23] For disease control reasons, rape for example can't return to a field for at least 6 or so years.

were encountered, with comments on implications for the simulation work. Note that with cereals, CRL revenues were not replicated.

4.4.1: The Cereals Sector

As can be seen from the table below, each line of the cereals chapter in the budget was considered individually. A number of lines haven't been estimated as they represent relatively very small sums of money. Each element will be considered separately below, and problems discussed. This will then lead into the problems of fraud and mismanagement.

1986 EXPENDITURE ESTIMATES

(MILLION ECU)

Category	A: Actual	B: Estimate	B as % of A
100 REFUNDS ON CEREALS			
1000 refunds on common wheat grain & flour	691.9	926.16	133.9
1001 refunds on barley grain and malt	587.4	644.17	109.7
1002/1003 refunds on other cereals	372.7	167.8	45.0
100 TOTAL	1,652.0	1,738.9	105.26
101 INTERVENTION STORAGE OF CEREALS			
1010 carryover payments	~~~	not estimated	
1011 technical costs	342.6	362.8	105.9
1012 financing costs	216.6	169.4	78.2
1013 other public storage costs	783.1	779.1	99.5
1019 other intervention storage	~~~	not estimated	
101 TOTAL	1,347.4	1,264.5	93.8

102 INTERVENTION, OTHER THAN STORAGE, OF CEREALS			
1020 production aid for durum wheat	210.8	300.5	142.6
1021 production refunds for potato starch	53.0	52.2	98.5
1022 other production refunds	124.7	132.4	106.2
1029 other intervention	~~~	not estimated	
102 TOTAL	388.5	485.1	124.9
CHAPTER 10 TOTAL	3387.9	3488.5	102.97

NB ~~~ = negligible sum

1000: REFUNDS ON COMMON WHEAT GRAIN AND FLOUR

This expenditure has three separate elements - grain refunds set by tender, grain refunds set by standing refund, and standing refunds on flour.

Calendar year exports from the open market (Xom) were required for this calculation, as exports from intervention are dealt with separately in the budget (see 1013). Thus, exports from intervention (Xi) were deducted from total exports (ΣX) to derive this figure:

$\Sigma X - Xi = Xom$

ΣX=9.2m tonnes (from SITC/NIMEXE trade tables)
Xi=3.3m tonnes (from Agra Europe)
Xom=5.9m tonnes[24].

Exports from the open market can receive one of two types of refund - a standing refund, or one granted on acceptance of a tender bid. The former is generally lower, and is mostly used on exports to geographically close countries such as Sweden and Switzerland. Data on the quantities permitted for export on export licences granted by tender (Xomt) are available[25], and so a figure for exports by standing refund (Xoms)

[24] This figure does carry with it the proviso that once the trader is granted an export licence, he can hold it for up to 4 months before having to use it, and he can trade a quantity between 93% and 105% of the quantity stated on the licence. Thus this figure can only be an approximation of the ACTUAL quantity traded.

was derived:

Xom-Xomt=Xoms
Xomt=1.8m tonnes
Xoms=4.1m tonnes

For exports by tender, details are available for each individual tender, and so for each, the quantity and maximum refund quoted were multiplied and the sum found.[26] For exports by standing refund, no such data are available so an approximation of 94.95 ECU/tonne was taken.[27]

For wheat flour, a different approach was taken. a split was made in the data so that separate estimates were made for January to June and July to December. From the same sources as for wheat grain, total exports were 2.3 million tonnes. Another data source[28] showed total licences issued as 1.6 million tonnes (that figure subject to the caveats noted earlier) with 30% exported in the first six months of the year, and 70% in the second half of the year. The latter proportions were applied to the former quantity. The average refunds for each half were obtained as before[29] and thus:

Period	quantity	refund ECU/t	q*r
January-June	0.7mt	109.2	76.44
July -December	1.6mt	150.2	240.32
			Σ=316.76

For grain, tender exports were valued at 220.1 mECU, and for standing refund exports, 94.95*4.1mt totals 389.3 mECU.

Thus total expenditure on item 1000 comes to 220.1+389.3+316.76=926.16 mECU, about 134% of the actual figure, but subject to the caveats noted earlier, such as the assumption that the maximum refund is paid on all exports.

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[25] From the H-GCA.

[26] From H-GCA's 'Cereals Statistics'. Note that this calculation assumes the maximum refund is paid on all exports - this is unrealistic, but no accurate alternative is available other than by going back to details of each export from Customs or the EC.

[27] In H-GCA *op cit*, the highest and lowest standing refunds available each month are shown. This figure is simply the average of all the 'highest ' figures available through the year.

[28] H-GCA *op cit*.

[29] *ibid.*

1001: REFUNDS ON BARLEY GRAIN AND MALT

For barley grain, exactly the same approach was taken as with wheat. This gave:

Xoms=0.8mt

Xomt=3.1mt

An estimate of standing refunds was obtained in the same way, coming to 107.25 ECU/t. This, multiplied by 0.8mt comes to 85.8 mECU. For exports by tender, the total value of tenders comes to 380.9 mECU. The sum of these is 466.7 mECU.

For malt, the same approach was taken as with wheat flour. A total export quantity of 1.2mt was split 28%/72%. Thus:

Period	quantity	refund ECU/t	q*r
January-June	0.3mt	156.1	46.83
July- December	0.8mt	163.3	130.64
		$\Sigma=$	177.47

Thus total expenditure on item 1001 comes to 644.17 mECU, 109.7% of the actual figure, but subject to the caveat that the product 'malt' is differentiated, including malt made from wheat, roasted, unroasted, etc. The data however make no allowance for potential differences to be accounted for with regard to different refunds available.

1002/1003: REFUNDS ON OTHER CEREALS

This category covers other cereal grains, and also flours, groats and meal therefrom, plus worked grains (eg rolled, flaked, kibbled, pearled, germs and pellets). Considering first the unworked grains, estimates were made as before of exports from the open market. This gave:

durum	59997t	rye	-2445t
oats	6129t	maize	-56840t
other	4009t		

It can clearly be seen that for rye and maize, meaningless results were obtained. Approximate account was therefore taken of the fact that some licences issued at the end of 1986 wouldn't be taken advantage of until early 1987. The licences issued for these two grains in the last 6 weeks of 1986 were assumed not to be taken up until 1987, leaving 46830t of rye and 14660t of maize exported from the open market in 1986.

For standing refunds, figures for rye (16 ECU/t), oats (95 ECU/t) and maize (20 ECU/t) were obtained as before, but no data were available for durum. For this therefore, an implicit refund level had to be derived. According to Eurostat data, in the Southern member states, the market price for durum came to 96.7% of the intervention price over the year as a whole, or 307.0 ECU/t (including monthly increments). As a world price, the IWC's monthly quotations of Canada No 1 CW Amber Durum were taken, converted to ECU, and the average taken. This came to 128.4 ECU/t, giving an implicit unit refund of 178.6 ECU/t. Thus:

cereal	quantity	refund	q*r
durum	59997	178.6	10.72 mECU
rye	46380	16	0.74 mECU
oats	6129	95	0.58 mECU
maize	14660	20	0.29 mECU
			Σ=12.33 mECU

Turning to that other than unworked grains NIMEXE tables detail the breakdown of each type of working between cereal types. Export refunds apply as a proportion of the corresponding unworked cereal's refund, and these are detailed in, for example, the H-GCA's 'EEC Marketing Arrangements for Grains and Processed Products' (Annex 10). These coefficients are typically 1 or above. Also, maize is differentiated between make-up and end-use, with different coefficients applying to each.

Flour		
oats	(95*1.8)*6	= 1,026
maize	(20*1.4)*13844	= 887,632
	20*713	= 14,260
	Σ	= 0.9 mECU

Groats and Meal		
durum	178.6*772979	= 138,054,049.4
rye	16*867	= 13,872
maize	20*44497	= 889,940
	(20*1.8)*72348	= 2,604,528

	(20*1.4)*557	= 15,596
	Σ	= 141.6 mECU
Flaked		
barley	(107*1.5)*29922	= 4,802,481
	(95*2)*19099	= 3,628,810
	Σ	= 8.4 mECU

The sum of these expenditures is 150.9 mECU. There is in addition 24018t of small quantities of the above types not accounted for. Even if a high refund was chosen, say the 95 ECU/t of oats, and a coefficient of 2, this expenditure would still only come to 4.56 mECU, giving a total expenditure for items 1002 and 1003 of 167.8 mECU. This figure is just 45% of the actual figure. There is clearly a problem here, but some light was shed when the problem was repeated for 1987. This was the first year in which the expenditure items were split between durum and all the other cereal types in the budget. Here, the estimate of expenditure on durum came to 71.8% of the actual figure, but for the other cereal types, the figure was just 29.5% of the total. That having been said, this overall represents only a relatively small element in total expenditure, and this therefore doesn't represent a major problem for the later estimation work.

1011: TECHNICAL COSTS OF PUBLIC STORAGE

The component parts of this expenditure item are varied and, as admitted by the Court of Auditors[30], inherently difficult to forecast. Even ex post, it is hard to see clearly where the money has gone. A rough estimate has been made however on the basis of an assessment of 'average' stocks held over the year, and the use of the value of the monthly increments paid on the intervention price as a representative figure for the monthly per-unit costs of holding stocks.

The Court of Auditors annual report for the year 1987[31] shows that at 30.11.1985, total cereals stocks came to 19.3mt, of which nearly 1mt was durum wheat. At 30.11.1986, the total had fallen to 14.7mt, of which just over 1mt was durum (note that for the purposes of intervention, the 'year' goes from 1st December to 30th November, but data limitations necessitate this being taken as a proxy for the calendar-year). The source also shows total quantities moving into and out of intervention during the year, so an assumption had to be made as to the pattern of these movements; it was

[30] See EC Court of Auditors. (1988), P26.

[31] OJC316, 12.12.1988, P65.

assumed that the quantity moving into store did so entirely during the first 5 months of the harvest year (ie from harvest, taken as July, through to November inclusive), and did so evenly through this period; and that movements out of store took place (evenly) through the remaining 7 months of the year (December to June). The ensuing calculations were as follows:

For the seven month period December to June, the average monthly sale figure was calculated as one seventh the total sales figure (11.9mt). This figure of 1.7mt was then used to estimate the stock figures for each month December to June, by assuming that 1.7mt was sold from intervention each month, given the starting stock level at the end of November as 19.3mt. Next, the figure for monthly sales into intervention was estimated as one fifth of total sales (7.4mt). This figure of 1.48mt was then added successively to the June stock estimate from the above manipulation to give stock figures for July to November. The average was then taken of the 12 monthly stock figures so estimated, which came to 0.9mt for durum and 11.3mt for all other cereal types. The figure for durum was calculated separately as it has a different monthly increment from the other cereals, 2.83 ECU/t as opposed to 2.45 ECU/t (figures apply for the harvest year 1986/7). These figures were first multiplied by 12 to give an estimate of the annual per-unit cost of storage, and then multiplied by the relevant quantities to give an estimate of the overall expenditure for item 1011:

(2.83 * 12) * 880700 = 30.6m ECU for durum

(2.45 * 12) * 11313000 = 332.2m ECU for the rest

This gives a grand total expenditure figure of 362.8m ECU, 105.9% of the actual figure.

1012: FINANCIAL COSTS OF PUBLIC STORAGE

For this, the quantities referred to were taken from the above source, and the price of buying-in was taken as the average of the 12 monthly intervention prices including monthly increments for each cereal type. This gives us:

	DURUM	RYE	BARLEY	REST
P_{int} 12-month average	316.4525	187.305	188.261	189.998
Quantity bought in ('000t)	880.7	966.75	2,925.25	7,421
P*Q (mECU)	278.7	181.1	550.7	1,410.0

where the quantity bought in is the monthly average figure as calculated using the same method as for the previous item of expenditure. This gives a total expenditure

incurred by the Member States of 2420.5 mECU. This is then reimbursed by the Community at the rate of 7% (that was the figure used during 1986), giving an expenditure burden falling on the Community of 169.4 mECU. This equals 78.2% of the actual figure.

1013: OTHER PUBLIC STORAGE COSTS

These are, in effect, the same as item 100 in the budget, only for exports from intervention rather than from the open-market. Quantities of exports from intervention are shown in Agra Europe. An implicit subsidy payment was calculated on the basis of this author's estimates for third country trading prices of EC cereals sold from intervention and average annual intervention prices, net of monthly increments. The estimate was made on the basis of two half-yearly estimates. The cereal types were split into wheat and the others because of data restrictions, with barley data taken as representative of them all.

			quantity * refund
Jan-Jun	wheat = 2,323,218t	refund = 78.1316 ECU/t	181,516,739.5 ECU
	rest = 1,804,999t	refund = 101.9316 ECU/t	183,986,436.1 ECU
Jul-Dec	wheat = 1,009,186t	refund = 104.398 ECU/t	105,357,000.0 ECU
	rest = 2,885,303t	refund = 106.84 ECU/t	308,265,772.5 ECU

giving a total expenditure of 779.1 mECU, 99.5% of the actual figure.

1020: PRODUCTION AID FOR DURUM WHEAT

This is paid per hectare sown and harvested of durum wheat. According to the Yearbook of Agricultural Statistics, the area sown to durum in 1986 was 2.1mha in the EC_9, 0.5mha in Greece, 0.1mha in Spain, and 24,000ha in Portugal, a total of 2.7mha. Given that payments are made with reference to area sown AND harvested, it seems reasonable to assume the rate of aid applicable is the 1986/87 rate of 113.79 ECU/ha (with 16.26 ECU/ha in Spain), rather than the 1985/86 rate of 101.31 ECU/ha. This gives an estimated expenditure of 300.5 mECU, 42.6% too high. There are however certain factors causing inherent problems in this calculation: Only areas where durum represents a traditional and important part of agricultural production are eligible, and so some of the total area may be excluded and the durum must satisfy certain other conditions, principally it must be suitable for pasta production and fit for human consumption(!) Also, the aid will only be granted when, in the area of greatest surplus, the intervention price is lower than the guaranteed minimum price.

NB: for durum, the marketing year has always been 1st July of one year to 31st

June of the following year (ie harvest time to immediately before the next harvest). All other cereals have only had this marketing year since 1986/7, before it was 1st August to 31st July, the change being needed to accommodate the earlier harvest period in the Southern States.

1021: PRODUCTION REFUNDS FOR POTATO STARCH

Not for the first time, there was a data problem here. For quantity of potatoes going for starch, the H-GCA's Weekly Digest of 24-10-1988 (Volume 15 No 17) showed the quantity for 1986/7 = 1.0mt.[32]

As regards refunds, there are two types: Article 2 of Regulation 2742/75 (OJ L281 page 57) states that "Member States shall grant a production refund of [x ECU]/metric tonne of potato starch", x being 31.25 for 1986/87. Article 2 of Regulation 1008/86 (OJ L94) states that "for the marketing years 1986/87, 1987/88, and 1988/89, Member States shall pay to producers of potato starch a premium of 18.70 ECU/t of potato starch produced". Adding these two refunds together gives a total refund available of 49.95 ECU/t. Then: 49.95*1.0mt = 52.2 mECU, 1.5% less than the stated figure. Given that to qualify for a refund, 'starch in the dry matter' must be at least 97% pure, it might be expected that this estimate is above the actual figure, but this might be offset by the effects of taking figures for the crop year 1986/87 rather than the calendar year 1986.

NB - this payment is being phased out, along with the following category (1022), as protection (for wheat and maize at least) is available through the mechanisms of the CAP, (this being coupled to an increase in refunds TO THE PROCESSOR when products not protected by the CAP - like potatoes - are used).

1022: OTHER PRODUCTION REFUNDS

The same Weekly Digest article as above gives, for 1986/87, 4.6mt of maize going to the manufacture of starch, and 1.6mt of wheat. Regulation 1569/83 (OJ L163) gives, for 1986/87, refunds of 19.41 ECU/t for maize and 27.79 ECU/t for wheat. Then:

4.6m*19.41 = 89.3 mECU, and 1.6m*27.79 = 43.1 mECU, giving a total expenditure of 132.4 mECU, 6% higher than the actual figure, though the same caveats apply as for 1021.

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[32] This was however the first time they'd shown this data, the source of which was stated (in a phone conversation) as a MAFF letter marked confidential, and is also the only figure found anywhere and for any year showing the quantity of potatoes going for starch production.

From this, it can be seen that the overall estimate is very close to the actual figure. Within that, item 102 is put out by the errors inherent in the estimate of the production aid for durum wheat. Item 101 comes very close to the actual figure, owing to a close estimate of the dominant expenditure, that of other public storage costs. It must be remembered however that, as acknowledged by the Court of Auditors, the technical and financial cost elements are very hard to estimate. With Item 100, overall the estimate is fairly close, but certain elements are rather inaccurate. Concerning the relevance for later work however, the first stage, that of estimating total expenditure for future years, should be reasonably straightforward, on the basis of the fact that in this initial exercise, the total Chapter 10 estimate is quite close to the actual figure. Where this work suggests problems might arise however is in trying to allocate that expenditure between different lines in the budget.[33]

4.4.2: The Oilseeds Sector

In this section, the focus is on the sums paid out as production aids[34] for rape/colza[35] seeds, sunflower seeds and soya beans in 1986 and 1987. Dominant within total expenditure are the aids for colza/rape and sunflower seeds, with expenditure on these representing anything from 80 to 98% of total oilseeds support over the period 1981-90. In contrast to cereals, as has been noted before, storage plays a much smaller part in the management of the oilseeds market, and the expenditure incurred is negligible. Moreover, export refunds also constitute only a minor part of

[33] The above work was sent to MAFF in the hope that a civil servant could find the time to consider the calculations, and make comments accordingly. Remarkably, Allan Buchan in Cereals and Set-aside Division A was able to do this. Some of his points are that for 1986, the lowest figure for cereals exports he could find was 9.4 million tonnes; the refund received by traders will "be anything from 0.5 to 2 ECU below the maximum level granted." With standing refunds, he notes that the higher levels relate to small quantities to specific destinations "involving some of the Alpine states", with the lower figures relating to most exports. He also comments that generally, for exports from intervention, licence validity is 1 month plus 2 months, not 1+4. With exports of 'other' grains, he notes that NIMEXE data suggests rather more was exported than the figure used in the above calculation.

None of the calculations has been re-worked in the light of these comments, but the points are to be borne in mind with future work. The author thanks Mr Buchan for the time he obviously took in making these points.

[34] Aid is paid to farmers on the quantities of seed they produce and send for crushing. Since the production aid is given in the form of a crushing subsidy for rape, these terms are used interchangeably.

[35] In Eurojargon, rape and colza are, for our purposes, the same product, that is the seed. These uses of the terms need to be distinguished from their traditional uses in England, where 'rape' was used to describe the seed and 'colza' the oil produced from the rape seed.

total expenditure. Since 1981, it has risen above 1% of total oilseeds expenditure on one occasion only - 1987 - and then it only reached 2.4%.

Thus to restate, the emphasis of the current work is in re-creating the past expenditure for production aids payable on the three seeds referred to earlier, the expenditure for which represents nearly all support expenditure for oilseeds.

The procedure was the same for all three seeds. First, details of quantities of seeds going for processing, imports of seeds, and changes in stockholdings of seeds were obtained from Eurostat's quarterly publication "Crop Production". The first edition of each year has detailed balance sheets for each seed type separately (and end-uses as well). Initially ignoring stock movements, the quantity of imports was subtracted from the quantity of seeds going for processing, in order to get a figure for EC-produced seeds going for processing. This is necessary as it is only these seeds which are eligible for aid payments. This procedure makes the assumption that all seeds imported go for processing. Although this assumption is forced into the process as details simply aren't available here as to the end use of imported seeds, given the relatively very small quantities of seeds going for alternative end-uses, the potential adverse effects on the final calculation of this assumption not being completely accurate are only minor.

The quantities thus obtained from Eurostat relate to crop years (1-7 to 30-6 for rape), whereas the budget works on a calendar-year basis. Thus the crop data had to be converted to a calendar year basis. Initially, the *ad hoc* assumption was made that 75% of the total crush went for crushing between July and December, and the remaining 25% between January and June of each harvest year. After further consideration however, and with reference to data published in the H-GCA's "Annual Statistics" on quarterly quantities of seeds going for crushing in the UK, the calculations were re-run assuming a 50/50 split, ie a steady supply of seeds all year round. It is these latter results that are reported below. Although oilseeds storage is technically quite difficult, it seems reasonable to assume that a number of producers will still have adequate facilities. Thus those who haven't will supply their seeds for crushing straight after harvest, and those with storage facilities will supply their seeds later. Also, it seems more reasonable to assume that the mills themselves would prefer a steady supply of seeds for crushing throughout the year, rather than have some very busy periods and other very slack periods.

This procedure of splitting the total supplies also proved necessary for another reason. For 1987, (though not for 1986), the levels of aid were very different between the two periods January-June and July-December. In this year, the average level of aid

available during July-December was one third lower than for January-June. Two estimates were made therefore. One simply took the annual figures of seeds processed, and one looked at separate estimates for each of the two 6-month periods.

The figures for crushing subsidies are published in the Official Journal throughout the year. The published data show a number of different figures. At the top are three separate numbers (for the EC10, Spain and Portugal) of gross refunds in ECU, for seeds going for crushing in the current month and for future months, up to 6-months hence. The figures rise slightly through time. Then, the aids are shown in national currencies for each member state, net of MDA's.[36]

For simplicity, the gross ECU aids were used in the calculations. As no detail exists here as to the flow of seeds for crushing throughout the year, all that was done was to take the arithmetic average of the aids. Again, there is little information available to allow an improvement on the rather *ad hoc* method used concerning these last points, and the fact that their potential inaccuracy may affect the final outcome to a limited degree needs to be borne in mind.

This having been said however, a look at estimates for 1986 and 1987 shows that for rape and sunflower seed production aids, this method doesn't give too inaccurate a result. For the estimates of total aid given for soyabean production however, the problems are obvious. The main one is that the method of estimating domestic production eligible for aid, and then allocating this between years, clearly gives absurd results. Unfortunately, there seem to be no data available here to help correct this situation. One further point ought also to be added regarding the estimates for rape. As mentioned elsewhere, there is a higher aid payment available for 'oo' varieties of rape. The EC however seems not to publish data breaking down production by quantities of ordinary and 'oo' rape produced. This estimate therefore uses the total production figure published, and the aid available for normal varieties of rape. The fact that this gives an estimate higher than the actual figure is therefore disappointing, as a more detailed approach, taking into account the premium for 'oo' varieties, will push this estimate up rather than down. One possible explanation of why the expenditure is being over-estimated is that it is wrong to assume an even spread of production going for crushing through the year. This may be resulting in more assumed to be going for crushing in periods of relatively high aids than was actually the case in practice (though of course, the converse to this would be easier to explain away!)

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[36] Monetary Differential Amounts - the term used in the oilseeds sector for what are elsewhere called MCA's.

THE PROCEDURE USED IN ESTIMATING THE EXPENDITURE:

"12 month" calculation:

$$E^j = (Cr_{10}{}^j * Sr_{10}{}^j) + (Cr_{Sp}{}^j * Sr_{Sp}{}^j)$$

where:

E^j = estimate of the total cost of the rapeseed crushing subsidy in year j

$Cr_{10}{}^j$ = the estimated quantity of domestically-produced rapeseed going for crushing in the EC10 in year j

$Sr_{10}{}^j$ = the 12-month average of the crushing subsidy available for rape produced and crushed in the EC10 in year j

$Cr_{Sp}{}^j$ = as for $Cr_{10}{}^j$ but data for Spain

$Sr_{Sp}{}^j$ = as for $Sr_{10}{}^j$ but data for Spain

NB: j always refers to calendar years.

The 6-month calculation is essentially the same as for the 12-month calculation except that for both the EC10 and Spain there are two parts to the calculation, the first taking the estimated quantity of seed going for crushing in each country in the period January-June and the average subsidy available in that same period; and the second taking the same data as it applies to the period July-December of year j:

processing minus imports ('000t)

year	rape EC10	rape Spain	s/fl EC10	s/fl Spain
1985/86	3624	12	1685	885
1986/87	3448	8	2050	842
1987/88	5207	11	2659	836
year	soya EC10	soya Spain	soya Port'l	
1985/86	-316	5	2	
1986/87	103	-119	-43	
1987/88	594	-305	-22	

taking these as 50% to Jan-Jun, 50% to Jul-Dec:

1986:	rape EC10	rape Spain	s/fl EC10	s/fl Spain	soya EC10
Jan-Jun	1812	6	843	443	
Jul-Dec	1724	4	1025	421	52
annual	3536	10	1868	864	

1987:	rape EC10	rape Spain	s/fl EC10	s/fl Spain	
Jan-Jun	1724	4	1025	421	52
Jul-Dec	2604	6	1330	418	297
annual	4328	10	2355	839	349

oil crushing subsidies (ECU/t)

1986:	rape EC10	rape Spain	s/fl EC10	s/fl Spain
Jan-Jun	290.57	6.1	386.73	17.2
Jul-Dec	323.14	6.1	384.82	17.2
annual	306.85	6.1	385.86	17.2

1986:	soya EC10	soya Spain	soya Port'l
Jan-Jun	367	:	:
Jul-Dec	400.15	250.89	403.29
annual	383.57	250.89	403.29

1987:	rape EC10	rape Spain	s/fl EC10	s/fl Spain
Jan-Jun	360.45	6.1	416.71	17.2
Jul-Dec	242.98	0	354.23	31.9
annual	303.74	3.16	387.1	24.2

1987:	soya EC10	soya Spain	soya Port'l
Jan-Jun	261.36	16.9	261.36
Jul-Dec	226.66	4.225	226.66
annual	243.26	10.3	243.26

estimated and actual expenditures EC12 (mECU)

	rape	s/fl	soya
1986:			
actual	1042.65	759.1	200.25
"12 month"	1085.08	735.65	
"6 month"	1083.67	735.31	
1987:			
actual	1238.99	949.72	405.31
"12 month"	1314.62	931.92	
"6 month"	1254.16	918.83	

4.5: FRAUD AND FINANCIAL MISMANAGEMENT

As noted previously, the practical day-to-day operation of the markets is very complex indeed, and so it is quite reasonable to expect farmers, and others involved in the operation of the markets, eg first-processors, to make mistakes in the operations required to receive financial support, for example in filling in forms declaring area under a particular crop, quantity produced etc. This complexity however, coupled to the potentially large sums of money involved, is also likely to induce certain parties involved to attempt to obtain money they're not due. Regarding intervention, the rules often result in bureaucratization, making it difficult to control, and increasing the likelihood of financial mismanagement.

Before moving on, the problem in hand should be defined. Following the approach of the House of Lords[37], fraud exists when transactions or events have dishonestly been intended to mislead, as concluded by admission of such or by a court's decision. Irregularities cover "mistakes, errors, and incorrect behaviour in carrying out financial transactions in the course of Community operations" (HoL ibid, para 8). If investigated further, they may be shown to be fraudulent if intent to deceive can be demonstrated. For many purposes however no distinction need be made as the effect on the Budget is the same. As the House of Lords points out, the distinction between intentional and innocent misappropriation of funds "affects only the remedies available" (ibid para 9)

One of the great problems with fraud, as with any illegal activity, is being able to get an idea of the extent of the problem. First, where fraud is concerned, given that it's illegal, the perpetrators will naturally try their utmost to avoid detection, but unless fraud is detected it can't be quantified with any sort of accuracy. Second, as regards problems concerned with mismanagement, with the problems of intervention detailed later, again the problem cannot be quantified accurately.

The Commission's approach is one of just reporting the sums involved with the cases brought, with usually just a passing reference to the likelihood of there being other cases that aren't reported. For example, in a report from 1982[38], they note that "over the eleven years for which cases have been recorded, there have been some 1400 instances of irregularities, involving 80 million ECU...Although this seems a huge amount at first sight, it represents only about 0.1% of all EAGGF expenditure and, in view of the millions of honest transactions financed during this period, it cannot be considered excessive" (P5). It goes on to note that "over a third of the sums wrongly paid have been recovered" (ibid). In a more recent report[39], it puts this line even more

[37] see House Of Lords. (1989), P8.

[38] see EC Commission (1982).

strongly, for while it acknowledges a few cases involving large sums of money do exist "it should be firmly pointed out that the figures given for the financial losses resulting from frauds are not based on any really reliable study. Frauds do occur; but there is no verifiable source to justify claims that they amount to 10% or even more [of EAGGF expenditure]" (ibid P3). It is however rather extreme to discount all but reported cases of fraud.[40]

4.5.1: Intervention and Associated Problems

Intervention storage, as mentioned above, is one of the key elements in the operation of the CAP. In order to see the main problems which exist with this system, a detailed examination of the way in which the system is operated and administered is needed. The sheer complexity of the system will be highlighted in this section.

Over all commodities, about 60% of all guarantee expenditures have been on intervention measures. There are analytically two distinct types of intervention:

First Category Intervention refers to withdrawal from the market, ie intervention storage, production and processing aids, guidance premiums and private storage (ie paying farmers to hold products on-farm rather than selling them to public intervention stores).

Second Category Intervention covers the losses incurred when products are sold from intervention, and also the reimbursements covering technical costs and financing costs.

Within First Category Intervention, for some products a distinction may be made between Intervention A ie purchases by intervention stores[41], and Intervention B which refers to private storage.

Considering these in more detail, taking 2nd category intervention first as it is this which relates most to the cereals and oilseeds sectors:

2nd Category Intervention

Introduction

Whilst certain management functions rest with the Commission, the day-to-day operations occur at the local level, and control therefore rests with the member states through their appointed bodies (eg the Intervention Board for Agricultural Produce, IBAP, in the UK). It is these bodies therefore that deal directly with the players

[39] see EC Commission (1987g).

[40] see House Of Lords. (1989), P89 of the minutes of evidence for more on the 10% figure.

[41] "normal intervention" - see Harris, S. et al. (1983), P72.

involved- those selling into intervention, those buying from intervention, and those running the stores. As regards buying-in, there may be in addition some (national) central control to try and ensure the best use is made of the existing storage capacity. There is often a time-delay between quantities arriving at stores and their being officially accepted, due either to physical capacity limitations, or to allow quality checks to take place. These may be carried out at a State laboratory, an independent lab, an intervention agency lab, or just in the storekeepers lab. With cereals, for example, tests must be made for maximum moisture content, maximum % content of imperfect grains (eg broken, shrivelled, pest-damaged, and sprouted grains and grains of other cereals), minimum specific weight, etc, all of which have a bearing on the actual price paid to the bearer on official reception of the product into store. National agencies may also set minimum quantities that can be offered, (eg 100t in the UK). It must be noted from this that intervention isn't in practice the bottomless pit it might be thought to be, since products must reach at least a minimum quality, as set by a number of criteria, and even if this is met, suppliers may not get the full intervention price if an intermediate quality level is attained (though premiums may be available if better quality produce is supplied). Also, the period when sale can be made to intervention is restricted.

As regards payment for sale into intervention, this is made in the first instance by the intervention agency; not immediately, but after a prescribed time-delay (around 90-120 days), which reduces the effective price paid to the seller; and the reimbursements to member states to cover the costs incurred (see below). Whilst the commodities are in store, the technical and financial costs are paid in the first instance by the member states, and when the commodities are sold out of intervention, usually at a loss, ie at a lower price than they were bought in at, then that cost too is initially borne by the member states.

Reimbursements from the Community to the Member States

Annex 1 to Council Regulation 3247/81 (reproduced below) shows the "Standard account with revenue and expenditure items for determining the amount to be financed by [FEOGA] in respect of intervention measures entailing the buying-in, storage and disposal of agricultural products", ie just what is being reimbursed (net) to the member states.

DEBIT (EXPENDITURE)	CREDIT (REVENUE)
1 Costs, material operations	
1 standard amounts for costs incurred	1 Revenue from transport
a) by entry into stock	

b) in storage
c) by withdrawal from stock
d) by processing or market preparation
e) by drying and special cooling and homogenization processes
f) by transport
2 Transport costs not covered by a standard amount
3 Other costs deriving from operations provided for in Community regulations

2 Financing Costs(Article 5 of Reg 1883/78)

3 Price difference and other items

1 Value of quantities in stock at the beginning of the year
2 Value of quantities bought in at the end of the year
3 Other

1 Revenue from sales
2 Value of quantities in stock
3 Value of quantity losses exceeding the tolerance
4 Amounts collected or recovered from sellers, purchasers, and storers
5 Other

4 Credit Balance **Debit Balance**

This leads onto one issue that has repeatedly been commented on and criticised, and that concerns the **method** of reimbursement from the Community to the member states. As with other FEOGA Guarantee expenditure, these reimbursements are made on the basis of monthly declarations. With these declarations however, it's not a question of stating how much expenditure has taken place during the particular month in question, but rather the amount of expenditure that's occurred from the beginning of the financial and calendar year to the end of the month in question. The difference is then taken between the declaration at the end of month t and that at the end of month t-1 to get a figure of expenditure to be reimbursed just for month t. (Put another way, these declarations show a cumulative total, and the figures for individual months'

expenditures are the differences between successive cumulative totals). This system results in certain problems:

In effect, each declaration is just a provisional estimate, elements of which can be changed in subsequent months without the need to show these changes - they are "simply absorbed by the system"[42]. This feature was desired initially **because** of the ease with which preceding calculations could be corrected "and only a single figure by column and by product is required for noting second category expenditure in the monthly declaration (ibid P29). Moreover, as the Court of Auditors note (ibid P26) this second category expenditure is, by its very nature, very hard to predict, as its quantity and unit-cost components depend on:

"a) climatic and technological conditions;

b) supply and demand conditions on the world market;

c) the level of the internal intervention prices which are fixed in the course of the financial year ie after the budget for that year has been adopted." (ibid).

Given this therefore, it can clearly be seen that with the problems inherent in predicting the above variables, any forecast of expenditure based on these variables is going to be subject to frequent revisions. Looking at what constitutes second category expenditure, the 'material operations' are at least partly determined by movements into and out of store, which is in turn partly determined by current Management Committee policy, itself partly determined by the state of the Budget, but also partly determined by the international situation (should, for example, the EC target exports to a particular third-country to counter US exports?) Moreover, Commission Regulation (EEC) No 2775/88[43] restricts the reimbursement of financial costs provided for in Article 4(2) of Reg (EEC) No 729/70 to Greece, Spain, Ireland and Portugal, given "the current situation in the Community" (Reg (EEC) No 2775/88 - 3rd recital of the preamble) ie because the financial situation in the Community has got so tight, this category of expenditure has been transferred in full to the national exchequers of eight member states, and in part to the remaining four (given a reimbursement rate of interest of 6.8% in 1988, compared to national 1988 short term interest rates of 15.2%, 11.5%, 8.1%, and 13.0% respectively, and long term interest rates of 16.6%, 11.8%, 9.5%, and 14.1% respectively).

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[42] see EC Court of Auditors. (1988), P29.

[43] OJL249, 8.9.1988, P8.

The Loss on Sales

The third element in the equation, 'Price Difference and Other Items' (as well as part of 'Costs, Material Operations') relates to the value of stocks, and the value of movements of products into and out of store for each reference period ie from the beginning of the year to the end of the particular month in question).

First, the book-value of the stock at the beginning of the year, and the purchase-value of all stocks bought in between the beginning of the year and the end of the month in question are added together. This figure is then divided by the total quantity involved (ie the size of the opening stocks, plus quantities bought in) to give the **global average purchase-price**. Next, by dividing the revenue received for total sales out of store during the reference period by the quantity released, we derive the **global average sales price**. The difference between these two global figures gives the **average loss on sales**. This is then multiplied by the total quantity released to give the **total cumulative loss on sales** for the reference period. The difference between this figure in successive months gives expenditure during the last month included.

Problems With This Calculation

a) Assessing the Quantity in Stock

Looking first at the quantity in stock, an aide-mémoire from the Commission to the member states asks for a physical stocktaking of all stocks on the last day of the year. In practice, the degree of detail given to the stocktaking depends not only on the member state involved, but also the product. In 1988, the Court of Auditors carried out a study of intervention in six member states - West Germany, France, Ireland, Italy, Holland, and the UK, and with reference to three products, cereals, milk products and beefmeat, which gives a combination representing 95% of total expenditure on public storage[44]. The Court found that in many cases, it was very hard to tally the stock figures declared to FEOGA with the figures on central records. In a number of cases, the only way they could obtain up-to-date stock data was to contact the stores directly. With products kept in cold store, a great problem was found in gaining access to individual lots to audit, caused primarily by lack of space. Other problems they note include lots being mixed together and their separate identities being lost; and lots unable to be located within a reasonable time. With specific reference to cereals, only Germany stored cereals in such a way as to get a reasonable estimate of the quantity stored from the dimensions of the pile of cereals, kept in a regular shape. Elsewhere, cereals are

[44] see EC Court of Auditors. (1988), op cit.

stored in irregular piles. In Italy, movements of cereals into and out of store are sometimes reported in such round figures that they "can only represent global and approximative estimations"(ibid P9).

In conclusion, consider the following, taken from the Court of Auditors Annual Report for the year 1987[45].

"In practice, the Court found that for these and other reasons to do with the member states' administrative arrangements, the monthly declarations submitted by member states bear only a tenuous relationship to the actual level of the underlying expenditure. Its analyses showed, for example, that the average rate of error for quantities declared as having entered public storage was of the order of 25% and that the average error rate of quantities declared as having left public storage, which determine the losses on sales from intervention to be made good by the Community, was as high as 45%" (para 4.15).

"In the absence, taken overall, of adequate independent physical stocktaking and quality control arrangements in the member states, in the Court's opinion no reliance can be placed on published figures for the quantities and values of products held in intervention storage at the end of the financial year nor on the related expenditure in the year" (para 4.17) - despite the central importance of these variables in the cost calculations.

Although it must be noted that the errors referred to above can conceivably work in either direction, it is of great concern that the data used for the calculation of billions of ECU's-worth of expenditure can be so inaccurate.

b) Putting A Value on the Stock

Whilst stocks are now depreciated fully within one financial year (see Chapter 3), in the years before 1988 this didn't occur, therefore this would potentially have introduced significant biases into the calculations.

The provisional nature of these declarations can and does engender a casual attitude towards the accuracy of the filling-in of the monthly declarations. Even if the data on which the forms were based were accurate, this casual attitude by the people involved may well go unnoticed, since a detailed audit only occurs after the twelfth and annual declaration has been submitted and since, as noted above, monthly readjustments to previous estimates don't have to be spelled out in detail, changes which have occurred may well be impossible to pick up. These changes are, as the Court put it "widely considered to be excused from internal and external control".[46]

[45]OJC316, 12.12.1988, P67.

Another problem, in some ways closely related to the foregoing discussion is that the profit or loss on individual lots coming into and going out from store cannot be calculated. As noted above, data are often inaccurate as regards quantities going into store and coming out of store, BUT even if the data were totally accurate, given the method of booking the expenditure in terms of global averages, individual consignments are lost. Specifically, the price at which consignments are taken in is either taken as the intervention/buying-in price, or the global average purchase price only as calculated at the end of the year. This sort of averaging calculation smoothes over possible benefits from providing the best storage facilities to ensure minimum quality deterioration in stock so as to minimise the loss on sales; and it lessens the "penalty" on badly kept stocks which deteriorate to a significant degree.

A third problem as noted by the Court, again related to the above issues, is that since the calculations relating to the value of stocks, and the losses made on sale from intervention (even assuming accurate data) are based on ad hoc averaging procedures not audited until the end of the year, the ongoing monthly figures can't form part of the intervention agencies' accounts, so are not subject to normal double-entry accounting procedures and safeguards.

1st Category Intervention

Storage

Turning now to first category expenditure, the problems faced with public intervention storage have been covered above, and with private storage, similar problems can be expected to exist, especially in respect of keeping a check on the quantities in store and the value of those stocks. These may well lead to genuine mistakes in any declarations made by farmers, but they could also conceivably permit unscrupulous people to make fraudulent returns.

Production Aids

A second element, production aids, are paid for a number of products. For durum wheat it is paid per hectare sown, which raises questions of how the areas are checked, especially as durum is mainly grown in the Southern states where the administrative infrastructure is weaker. This problem is manifold as it involves checking areas and also ensuring the area recorded is sown to durum wheat. Furthermore the durum must fulfill a number of criteria in order to be eligible for the payment.

With olive oil, a production aid is payable set at the difference between the target

[46] see EC Court of Auditors. (1988), op cit, P12.

price and the price producers should get from the market. The aid is paid on the basis of regional standard yields, as established by government sampling. Many claims operate through producer-groups, who have responsibility for checking the claims, and who receive a percentage of the production aid to cover the costs involved in all this. In the member states involved, agencies are being set up to police these producer groups and their work. In their first year of operation, the Commission noted that "some member states found aid claims dropping by up to 30%"[47], a notable achievement given that areas eligible for aid are set in terms of areas planted at 31.10.1978 (France and Italy), 1.1.1981 (Greece), and 1.1.1984 (Spain and Portugal), rather than current areas. Given that producer-groups receive a PERCENTAGE of the aid, they have an incentive to ensure the producers get as much as possible, thus checks are very necessary.

In the fruit and vegetables (f&v) sector, support for market prices is provided by compensation paid by the intervention agencies for products withdrawn from the market ("normal" intervention is impractical given the perishable nature of f&v), and withdrawal is normally carried out via producers' organisations. This withdrawn produce is, as provided for in the basic regulation[48] to be disposed of in a number of specified ways; for example free distribution to charitable institutions (subject to these supplies being additional to normal demand), as animal feed, for processing into alcohol, and 'use for non-food purposes'. In practice, most withdrawn produce (around 80% in recent years) is destroyed, and the claim for compensation made under the category 'use for non-food purposes'. Certain issues arise from this system:

Firstly, in disposing of withdrawn produce, if any revenue is received, this is to be declared, and offset against the figure claimed for compensation for withdrawal from the market.

Secondly, and following on from this, since destruction isn't an officially-recognised outlet for withdrawn produce, it lacks an adequate, full control system. There is therefore, no conclusive check to ensure such produce isn't subsequently sold back onto the market, and the full amount of compensation still claimed for, though Italy and Greece do have teams monitoring destruction. They involve, in each country, 2 local officials with the third coming from the Guardia di Finanza in Italy and, interestingly in Greece, a member of the very producer organisation which could gain if products declared as bring destroyed are then surreptitiously sold again! Moreover, there also appears to be little or no detailed checking of the declarations of revenue from

[47]COM(87)694 13.1.1988, P4. This is actually a proposal for a regulation to set up controls in the wine sector.

[48]Council Regulation (EEC) No 1035/72 OJL118 20.5.1972.

the sale of withdrawn produce.

4.5.2: Export Refunds

In the House of Lords Report, one of the witnesses[49] said he felt the main area where fraudulent activity could be perpetrated was with export refunds. Whilst much of the Lords report focuses on refunds for meat products, certain general features could be applicable to cereals in particular. Firstly, refunds will depend on the quality and quantity of the goods exported, yet given the volume of exports each year, it would be all but impossible to closely monitor all lots traded. Secondly, as the Lords found to be the case with certain other products, the fact that refunds vary between different destinations can lead to an incentive to claim a particular export is going to a destination with a high refund level, then actually export it to a low refund destination. Thirdly, with the facility available, it is possible to fix an export refund well before export occurs. Again it is administratively virtually impossible to monitor all export consignments to ensure they all match the conditions on the export licence regarding quantity, destination etc, or even that they are exported at all.

On the basis of the details given in the House of Lords Report, it appears on the whole that with the product sectors under consideration here, the question of financial mismanagement has generally been more applicable than that of export refund fraud. Thus in terms of the EC's overall attempts at combating fraud, there appears to have been relatively little significance for the cereals and oilseeds sectors. The main problems it would appear lie with the way in which the intervention expenditures are estimated. Here however, the main causes appear to be member state inefficiencies and the sheer complexity of the regulations, although the latter does offer some scope for fraudulent activity to take place. As with all the foregoing discussions however, it is impossible to estimate at all precisely the extent of the inaccuracies. Moreover, it could be inferred that whilst the problems as they most affect cereals and oilseeds could be reduced by a simplification of the rules concerning the way in which the expenditures are calculated, this issue appears to be very low on the list of reform priorities with the CAP, and therefore is likely to remain as it is, despite the possible adverse effects it could be having on the budget.

[49] Mr John Tomlinson, MEP.

4.6: THE 1991/92 REFORMS OF THE CEREALS AND OILSEEDS SECTORS

4.6.1: Introduction

The general discussion of policy reforms within the EC has so far focussed on the 1988 stabiliser package, and the 1992 MacSharry reforms. Whilst the latter package included measures relating to the oilseeds sector, the major reorientation of this regime occurred in 1991, under other pressures, in addition to the usual internal budgetary ones.

4.6.2: The New Oilseeds Regime

In December 1987, the American Soybean Association, through the US trade representative, lodged a complaint with the GATT that the old regime, as described earlier, violated the EC's zero tariff binding agreed in GATT. In December 1989, the GATT panel upheld the US's complaints, and required the EC to change the way in which it supported oilseeds producers. Whilst the new regime retained the principle of direct deficiency payments, certain important changes were made.

Firstly, under the new regime producers receive the payments directly, rather than via the processors. In this way, the EC hoped to overcome US complaints regarding the nature of the old system that processors only received payment for EC-grown oilseeds, and they could retain part of the payment. Secondly, the nature of the deficiency payment was changed from a production-based payment to an area-based payment. Thirdly, the payments recognise explicitly a link between the cereals and the oilseeds sectors, and how the inter-relationships can lead to excess production efforts in one or other of the sectors if the returns to each crop are out of line. The system, to apply from the 1992 harvest, is illustrated below:

First, a balance must be struck between the cereals and oilseeds regimes, in order to ensure that there is no significant switch in production between them with the introduction of the new policy. For this purpose, the EC aims to achieve a price relationship of 2.1:1 between oilseeds and cereals prices. Multiplying the current average cereals buying-in price by 2.1 gives the average oilseeds support price. Next, in order to get the level of aid payable (ie the subsidy or deficiency payment), the projected reference price - PRP - (ie the world/EC market price that is forecast for the year ahead, and therefore the price expected to be paid to EC producers by EC oilseeds crushers) is calculated. The deficiency payment (DP) is the difference between the two. This is the return per tonne of oilseeds produced. In order to convert this to an area payment, the level of the DP is multiplied by the average EC oilseeds yield to give the Community Reference Amount - CRA -, that is the payment per hectare. This is then

adjusted to account for regional variations in yields of both cereals and oilseeds, thus giving a Regional Reference Amount - RRA. Moreover, if the actual market price (Observed Reference Price - ORP) turns out to be more than 8% away from the PRP, then a further adjustment to the payment calculation is made.

Price ratio for oilseeds to cereals
2.1:1

Current average buying-in price for cereals = 155 ECU/t.
Thus average current EC oilseeds support price = 155*2.1 = 325.5 ECU/t

PRP initially given in the regulation as 163 ECU/t
Thus oilseeds deficiency payment = 325.5-163 = 162.5 ECU/t

Average oilseeds yield per hectare = 2.36 t/hectare.

Thus CRA set at 162.5*2.36 = 384 ECU/hectare.

Regarding regionalisation, take for illustrative purposes the oilseeds yield in England of 3.08 tonnes per hectare, as against the EC average of 2.36 t/ha. The regional aid level would be calculated as follows:

$$\text{Regional Aid} = \frac{384*3.08}{2.36} = 501.2 \text{ ECU/ha}$$

- allowing for rounding. Note that this is identical to simply multiplying the DP by the regional yield. With the proposals regarding limiting payments to larger farmers not being adopted, it appears that there is now no ceiling on individual payment levels.

4.6.3: The 1992 Cereals Reforms and Changes to the Oilseeds Regime

The arable sector arrangements cover cereals, oilseeds, protein crops and dried fodder (but not, eg, linseed, sugar beet and potatoes). The main motive for this, in theory at least, is to try to balance the different sectors against each other, and reduce or remove the incentive to move from any one crop in surplus into another.

The basic support system for cereals is for a target price to be set such that, when the basic compensatory payment is added, the farmer receives the same return as the current average cereals buying-in price of 155 ECU per tonne (the same level as that used last year in the establishment of the new oilseeds regime). Note that the term 'target price' now has a new meaning. It is no longer some notional price that the policy is attempting to give farmers. It is instead now a 'reference price for aid'.[50] Over the

period 1993/4 to 1995/6, the target price will be cut, but the compensatory payment increased, to leave the same level of total payment to farmers. The intervention price, as before, is set at a level below that of the target price, and falls over this same time period. The threshold price is set at a level of 45 ECU/t above the target price, and is also to be lowered over the three years of the initial scheme. By 1995/6, it will be equal to the target price plus compensatory payment. The following table sets out all these arrangements:

	1993/4	1994/5	1995/6
Target Price	130	120	110
Compensatory Payment	25	35	45
Target Price plus payment	155	155	155
Threshold price	175	165	155
Intervention Price	117	108	100

It is important to note that the compensatory amounts above are 'basic amounts', specified in terms of ECU per tonne. In practice, the payments are made on a per hectare basis. Thus the cereals compensatory payment is given as the product of the basic amount per tonne and the average regional cereals yield over the individual producer's total production. Moreover, these payments have a number of conditions attached. The first relates to the distinction made between 'small' producers and others. Small producers are defined in terms of an area of land that represents production of not more than 92 tonnes (using the regional yield figures used in all the other calculations). In the UK, this translates to about 16 hectares.

Two schemes for compensation exist - the 'general scheme' for all producers, and the 'simplified scheme', for which only small producers are eligible. For the general scheme, farmers must set aside 15% of their land.[51] Small farmers however are exempt from this set aside requirement, and can receive compensation on all areas farmed 'irrespective of the crops actually sown'.[52]

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[50] See Agra Europe No 1492, 22.5.1992, page P/14.

[51] According to the preamble of Council Regulation (EEC) 1765/92 of 30th June 1992, establishing a support system for producers of certain arable crops, in OJL181, 1.7.1992, page 12, on page 13 it notes that this set aside percentage should be re-examined to see if changes need to be made in the light of production or market developments. Presumably, this suggests that the figure will need to rise as cereals yields rise, so as to offset the effect of the latter on the cereals market.

[52] ibid, page 13.

The land set aside is to be part of the rotational scheme of the farm. Payments at a higher rate will be available for non-rotational set aside. Land not cultivated in earlier years will not be eligible for compensation, except where the land has been set aside as part of the ongoing voluntary set aside scheme. The total area of land in any region eligible for aid payments[53] is however limited to the average arable area, plus land fallowed under publicly funded schemes, for the period 1989-1991.[54] As before, compensatory payments will be made under the cereals regime to producers of potatoes going for the manufacture of starch. A further point to note is that from 1993, there will be no intervention quality standard set for feed wheat. Whilst this sounds significant however, only about 2% of wheat currently taken into intervention is feed wheat.

The oilseeds regime has already been reformed, as set out above. The regulation as set out in 3766/91[55] will be replaced by those sections of Regulation 1765/92 that relate to oilseeds from 1993/4. Whilst the projected reference price will be unchanged, the Community reference amount (that is, deficiency payment multiplied by average yield per hectare) will be cut from 384 ECU per hectare to 359 ECU per hectare. With the average yield still given as 2.36 tonnes per hectare, this means a lower per unit deficiency payment under the updated arrangements from 1993/4. Note that with the GATT dispute with the US continuing, further changes to this regime may yet appear.[56]

With the set aside payments for cereals on large farms not being limited, as the initial proposals had wanted, 'the Council of Ministers has effectively increased the profitability of grains in relation to oilseeds.'[57] It appears that the effect of this will be to encourage farmers to minimise the area of cereals land set aside, and maximise the set aside burden on other crops (the area to be set aside relates to 'arable' area as a whole). A further point that will contribute to this is that when the new oilseeds regime was established in 1991, a price ratio of 2.1:1 was used in the calculations, supposedly

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[53] where region can be a complete member state, or an area within, at the discretion of each member state.

[54] Further details specifically of the new cereals regime are in Council Regulation (EEC) No 1766/92 of 30th June 1992 on the common organization of the market in cereals.

[55] in OJL356, 24.12.91.

[56] They are still unhappy about the nature of the regime, despite the changes made. In 1992, they got the GATT panel reconvened, who upheld the US's continuing criticisms. The EC have not yet agreed to further changes, despite the threat of trade sanctions being imposed, and the parties will be meeting again in September 1992 to try and reach a compromise solution to the problems.

[57] Agra Europe No 1495, 12.6.1992, page P/1.

in order to ensure a balance between the two sectors. With a cereals price of 155 ECU per tonne being retained, but the oilseeds price being cut, the calculation now works out to give a new ratio of approximately 2.03:1:

The lower reference amount of 359 ECU per tonne (it was 384) gives a deficiency payment of 152.1 ECU per tonne (it was 162.5). With the world price still given as 163 ECU per tonne, this implies an EC price of 315.1 ECU per tonne. Taking the cereals price as still being 155 ECU per tonne, so a price ratio of 2.03 to 1 is obtained.

The set-aside part of the agreement really introduces cross-compliance into the CAP for the first time in a key commodity sector[58]. All farmers other than those defined as 'small' must set aside 15% of their arable land in order to qualify for the compensatory deficiency payments. In addition however, all farmers will receive payment for setting aside their land. This is set at a level equal to that compensatory (ie deficiency) payment which farmers would have received in 1995/6 had they sown the area in question to cereals. It appears at the time of writing that if a farmer sets aside more than 15% of his arable land, he will not receive additional payments. Note that land receiving these payments must be part of the farm's rotation, in order to ensure the farmer doesn't simply set aside his least productive land. If a farmer chooses not to rotate his set aside land he will, from 1993/4, have to set aside a higher proportion of his arable land than 15% in order to offset any effects setting aside the least productive land could have on total production.

Regarding the five year set aside scheme already in operation, no new participants are permitted. Existing participants can choose whether or not to remain in the scheme. If they choose to remain in the scheme, the land set aside is NOT included in the total base area subject to the 15% set-aside requirement of the new scheme. There will moreover be no temporary one-year scheme this year.

4.7: THE NEW REGIMES AND THE FRAUD/MISMANAGEMENT ISSUE

The 1991 Commission report on fraud states that during 1992, the EC should help to cut fraud by simplifying agricultural regulations, and changing the methods of control within the CAP.[59] The work above suggested that the old cereals and oilseeds regimes tended to be such that fraud wasn't a major problem, certainly not in the way it

[58] Cross-compliance is where farmers receive payment under one part of the policy (the area compensatory payment) only when they fulfil obligations set out in another part (that land be set aside). Note that the compensation for setting aside land is not cross compliant.

[59] Reported in Agra Europe No 1495 of 12th June 1992, page E/10.

is with the dairy and meat regimes. The greater problem is that of mismanagement, caused at least in part by complexity of the regimes and nature of the expenditure calculations. Consideration therefore needs to be given to whether or not these new policies fit in with the Commission's ideas of simplification.

At least in the short term, it would appear that no changes are on the way in terms of the calculations used in estimating intervention expenditure. Thus the main problem with the old system seems to have been retained by the new.

The new regimes however do introduce one new problem in particular into the system - the monitoring of areas to be planted to particular crops.[60] It would appear that aerial surveillance photography from satellites is increasingly offering the opportunity to monitor areas planted to different crops. Rape in particular is very easy to identify, but other crop too can quite readily be examined from photographs. It is also becoming much cheaper to carry out such exercises as the technology advances. One problem in the Northern member states in particular is the question of cloud cover. It could be pointed out though that these countries have better administrative infrastructures to cope with ground level surveys, whereas the Southern states, with better weather and less well developed administrative structures could particularly benefit from the photography approach. Thus whilst it is still unclear how the member states are going to police this particular issue, the technology is, or at least should be, available to allow the governments to offer a viable threat to farmers considering cheating. This technique could also be used to ensure that farmers do indeed rotate their crops as required by the regulation.

A related problem however is that the system also relates to an historical 'base area', covering the years 1989 to 1991. Here, it would appear that the best the EC can do is to rely on the accuracy of past records.

4.8: CONCLUSION

This chapter has explained both the old and the new systems of support to the cereals and oilseeds sectors. It has shown that the change in policy is from one that burdened both consumers and taxpayers, to one where the burden is principally on taxpayers. It also illustrated, for each commodity, the derivation of expenditures. In so doing, it highlighted those variables which are most important in determining expenditures. Subsequent chapters therefore focus on these variables, notably the elements making up production and consumption. The chapter also highlighted the

[60] This section has benefitted from discussions with members of the Geography Dept at Nottingham University.

problems of fraud and mismanagement, in order to see how these might adversely affect attempts at maintaining budgetary discipline.

The next chapter begins the detailed analysis of the cereals sector. Then, both old and new regimes are examined to consider future budgetary expenditures under both systems. This chapter has outlined those systems and paved the way for this analysis.

CHAPTER 5: EC CEREALS MARKET ANALYSIS

'As the machine gun was on the Somme, the CAP is to sound rural management.'

Mr Philip Eliason, deputy director, National Farmers Federation, Canberra, Australia, in a letter to the Financial Times, 16/7/91.

5.1: INTRODUCTION

For the last ten to fifteen years, the EC has been experiencing a rising structural surplus in its cereals sector (specifically a net surplus - that is production plus imports, less consumption less exports). A consequence of this has been the rising levels of expenditure discussed in earlier chapters. This has been due to the need either to export this surplus directly, or to store it in intervention stores first, and then export it.[1] This chapter starts by examining the trends in production, imports, consumption and exports, in order to quantify the rise in surplus production. It then moves on to consider in greater detail the processes at work in the intervention operation, as well as looking at the factors influencing the levels of stocks held, and the movements in those stocks. Thus consideration will be given to the possible alternative functions for intervention storage, in particular the short run stabilising role in the face of year by year fluctuations in production, and the possible longer run role as a counter to the rising trend in surplus production. The final section of this chapter considers how the cereals market absorbs variations in production - to what extent do such variations lead to variations in consumption, net trade, and intervention activity.

5.2: DATA SOURCES AND PROBLEMS

The work reported below was carried out on a crop year basis. The main sources of the cereals balance sheet data were Eurostat publications (the 'Agricultural Situation in the Community' and 'Crop Production'), updated by data from Agra Europe and the Home-Grown Cereals Authority, as well as balance sheets from DG VI itself. The intervention balance data set is from the HGCA's annual 'Cereals Statistics' publication, as is the data for US production. The cereals balance sheet gives data on production, consumption, trade and changes in stocks, and the intervention balance sheet gives data on intervention stock purchases, sales from intervention to the home and export (ie third country) markets, and also opening and closing stock totals.

[1] There are other outlets, for example food aid or resale back onto the domestic market, but quantitatively these are much less significant.

These terms require careful definition. Regarding production, the figure presented in the cereals balance sheet is usable production. This is distinct from harvested production, which is calculated as area times yield.[2] Overall since 1973, usable production has come to about 99.5% of total production, or currently about 1 million tonnes less than harvested production. That loss occurs prior to the grain reaching the market - losses sustained after then ie within the marketing chain - are counted as a separate category of consumption. Consumption appears on the cereals balance sheet as *Total Internal Use*, and equals the sum of five different end uses for cereals: animal feed, seed, losses, industrial use, and human consumption (in grain terms). As has been noted above, the dominant use quantitatively is animal feed. Overall therefore, total cereals consumption is dominated by cereals use in animal feed (discussed in greater detail elsewhere in this thesis).

With trade, the focus is on extra Community trade, as it is here that the EC incurs major budgetary expenditures[3], and here too where the quantity of imports and exports affects the TOTAL EC cereals balance that is the focus of this work. Further, as regards exports, there are two distinct sources of supplies that the EC can draw upon - intervention stores and the open market. In practical terms, there is no difference between these two sources, but the distinction is nonetheless important as they are treated differently in the EC budget, (see Chapter 3 above for more details). Thus when cereals are exported from the open market, the expenditure incurred is classified as export refund expenditure, but when cereals are exported from intervention, the expenditure is classified as 'other public storage costs', although the two expenditures are effectively used in the same way to achieve the same economic end. In terms of the data used, the figure given in the cereals balance sheet for exports will include that quantity of cereals which has been exported from intervention, as well as that quantity exported from the open market.

In addition, a further distinction needs to be explicitly highlighted - that between public (ie intervention) stocks, and private stocks. The intervention balance sheet from the HGCA, as its name indicates, deals solely with public stocks, whereas the 'change in stocks' data from the cereals balance sheet also appear to include figures for private stockholdings, although the HGCA never explicitly makes this distinction, nor does it (or any other source) present separate figures for private stocks. More will be said

[2] Note that here too, there can be two estimates, one using planted area and one using harvested area. The usual estimate is the one using harvested area, as is noted in earlier chapters.

[3] although there will also be a minor net impact on the budget due to the continued application of MCA's to intra-Community trade.

about private stocks later.

When collecting data, it needs to be borne in mind that the data are subject to measurement errors. Not only are the figures updated as more information is known (see below), but the figures may simply be wrong or totally unreliable. This point can be illustrated by quoting from the Court of Auditors reports on intervention storage[4]. They comment on the irregular way in which most countries store their intervention grain. With particular reference to Italy, they note that quantities and their movements are reported in such round figures that they "can only represent global and approximative estimations" (P9).

In their annual report, in referring to this and other problems, they draw the following conclusions:

> "In practice, the Court found that for these and other reasons to do with the member states' administrative arrangements, the monthly declarations [for the reimbursement of expenditure incurred in operating the intervention system] submitted by member states bear only a tenuous relationship to the actual level of the underlying expenditure. Its analyses showed, for example, that the average rate of error for quantities declared as having entered public storage was of the order of 25% and that the average error rate of quantities declared as having left public storage, which determine the losses on sales from intervention to be made good by the Community, was as high as 45%" (P67, para 4.15)

"In the absence, taken overall, of adequate independent physical stocktaking and quality control arrangements in the member states, in the Court's opinion no reliance can be placed on published figures for the quantities and values of products held in intervention storage at the end of the financial year nor on the related expenditure in the year." (para 4.17). Unfortunately, the official data are all that is available, so it must always be borne in mind that statistical calculations are being performed using data that can be up to 45% away from the actual figure.[5] Another issue, highlighted in recent years by the Court of Auditors amongst others has been fraud against the EC budget (see Chapter 4 for more details). Thus, to take an example, it appears that a common

[4] see EC Court of Auditors. (1988) and the Court of Auditors Annual Report for the financial year 1987, OJC 316, 12.12.1988.

[5] It is a methodological point that because the answer is given to two or three decimal places, it might be perceived that this answer is necessarily accurate. It can only be accurate however to the extent that the data used in the calculation are accurate.

fraud is to declare a particular export consignment to be for a destination that can get a high unit export refund, and then export it to a destination which is only eligible for a low refund. It can therefore be difficult to tie up export quantities and expenditures incurred. This can be compounded by the type of fraud described in paragraph 4.37 of the Court of Auditors report for the financial year 1987[6]. Here, exporters claim and receive export refunds on goods that are not exported at all, but are diverted back to use in the home market. Thus this 'trade' will appear in the expenditure data but not in the trade data. Alternatively, the cereals could be exported, but then secretly re-imported and sold on the internal market for the higher price.

During the period under consideration, the EC has expanded from 9 member states to 10 and then to 12. As will be seen below, most analysis was carried out using two sets of data. One had the figures for all years corrected to an EC membership of 10, and the other had the data set using figures for EC10 up to 1984/5, and EC12 from 1985/6. For some variables such as production, the quantity pertaining to the EC2 was stated directly, whereas with other variables such as imports and exports, a 'conversion coefficient' had to be used. This utilised the fact that for some years, data were available for both EC9 and EC10, or EC10 and EC12. The ratio between the two items could, for example, be used to infer the EC10 position from the EC9 data, where EC10 data were not available. It will be seen below from the data on the cereals balance sheet that for the years 1975/6 and 1976/7, the balance sheet doesn't actually balance. This is because the trade figures had to approximated in the aforementioned way. There is of course no *a priori* reason to assume that the proportionate difference between EC9 and EC10 trade in any one year will be the same as in any other year - imports and exports are determined by too many outside variables for that to be the case. Unfortunately, there is no better alternative given the data available.

One caveat to note regarding any comparison between the cereals and intervention balance sheets is that whilst the former was put onto an EC10 basis right back to 1975/6, the intervention balance sheet was only available for the EC9 in the early years. That is however generally a minor problem since Greek stocks represent a small percentage of the EC total.

As was noted above, the data presented by Eurostat get updated in subsequent years. This is standard practice, but does mean that the most updated data set needs to be obtained. With, for example, the cereals balance sheet in the Agricultural Situation in the Community, this occurs as a matter of course[7], but with the intervention balance

[6] OJC 316, 12.12.1988.

[7] though as will be seen later with the stock change figure for 1980/1, some care is still needed.

sheet from the HGCA, this has not been the case. Each year, the table appears in the 'Cereals Statistics' publication, but each edition only carries that year's data, and no amending of the full table for the previous year. The only figure that is updated is the closing stock figure from the previous year's table which reappears the following year as opening stocks, but updated as it is printed a year later. For some years however, slightly updated tables did appear in the HGCA's Weekly Digest, and where this happened, use was made of those updated figures (as will also be noted, where relevant, in the tables below), but this updating hasn't been reported by the HGCA on a consistent basis for all years. Thus whilst for all data the most updated figures were always used, consistency across all data was not possible. This leads onto another problem faced - that of inconsistency between sources. Given a lack of consistency between sources, the difference in the extent to which data are updated could be a major explanation. Indeed, given that, for example, Eurostat publishes the cereals balance sheet in the Agricultural Situation in the Community, Crop Production, and the Agricultural Statistical Yearbook, and a completely consistent set of data couldn't even be obtained from these, one must assume that, if Eurostat only get their figures from one source[8], then data revision must be perhaps THE explanation for the discrepancies. With this problem between data from the one source - Eurostat - lack of consistency between data from different sources should be expected. The problem is that no single source offers all the data required, therefore different sources HAVE to be used. An identification of some of the main inconsistencies between the cereals and intervention balance sheets is presented later, but the following table gives an indication of the extent to which this process occurs (ASIC is the Agricultural Situation in the Community, and CP is 'Crop Production', all data are in '000 tonnes, and the figures are for usable production, total internal use, and use of cereals in animal feed respectively, all from the cereals balance sheet):

Source	84/5	85/6	86/7	87/8	88/9
	173090	(usable production)			
ASIC 1986	145380	(total internal use)			
	91804	(use in animal feed)			
	173258	160148			
ASIC 1987	144854	140831			

[8] and even if they don't, why would they publish data from one source in one place, and from another source in another place?

	90677	87272		
		160431	153785	
ASIC 1988		143202	138012	
		88670	85404	
			154501	153553
ASIC 1989			139571	134730
			84862	81722
		160433		154729
ASIC 1990		142416		136084
		87797		81142
				163977
CP 4/1991				136654
				80970

The main point illustrated by this table is the extent to which data can be updated from year to year, but for 1988/9, it can also be seen that the difference between the figures from the latest Agricultural Situation and the latest Crop Production vary too. The variation can be up towards 1% each year, or up to about 1 million tonnes, but with the figures for 1985/6, between the 1987 and 1988 ASIC's, the variations on the consumption and animal feed figures is over 1.5%.

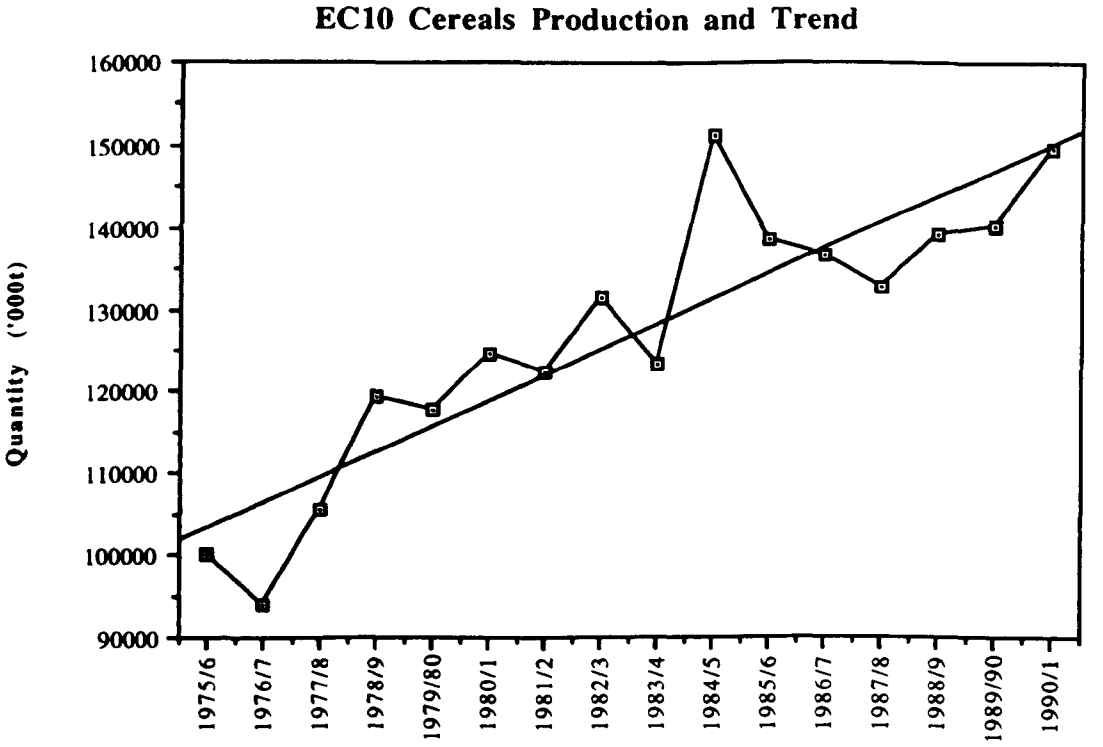
5.3: ANALYSIS OF PRODUCTION, CONSUMPTION AND TRADE

5.3.1: Aims and Methodology

The aim of this section of work is to examine the trends in EC cereals production, consumption, imports and exports since the mid-1970's, as mentioned at the beginning of this chapter. This has been done using OLS regressions, examining the data for time trends in the first instance. Two sets of data were used, as has been noted before - one using figures corrected to an EC10 basis, and another using a combination of EC10 and EC12 data. Initially, the EC10 data will be considered, followed by a consideration of the enlargement of the EC to twelve member states, and the impact of that on these key

variables. For most of the following analysis, the data period begins in 1975/6 with the most recent observation being 1990/1 (16 observations). Although cereals balance sheet data are available before this year, the intervention balance sheet - only available in HGCA publications - hasn't been found before this time.

5.3.2: Production



Initially, a linear time trend was fitted to the production data. A strong time trend was found, but with large variations around that trend in certain years:

$$Q = 100223.9 + 3116.615t \qquad \text{Rsq=0.79 Rbsq=0.775 DW=1.743}$$
$$(24.107) \quad (7.249)^{9}$$

1984/5 appeared as an outlier using the standard rule of thumb.[10] The observation for

[9] Note that with all regressions reported, the figures in brackets are the t-statistics.

[10] That is, if the value of the residual of an observation is more than twice the regression standard error, that observation is considered an outlier. These observations were so treated in acknowledgement that their inclusion would incorporate the effect of very unusual years into the estimation of the regression coefficients. In many cases, the incorporation of dummies has been accompanied by an *a priori* explanation of why that particular observation should be excluded. Thus these observations

1976/7 also had a large residual, but could not actually be classified as an outlier.

This regression was then re-run with a dummy added for 1984/5 that takes the value 1 for that observation, and 0 for the rest:

$$Q = 99688.119 + 3022.065t + 21431.229D84/5.$$
$$(32.185) \quad (9.413) \quad (3.505)$$
$$Rsq=0.892 \quad Rbsq=0.875 \quad DW=1.548$$

Here, with the effect of the 84/5 outlier removed, the 1976/7 observation was also now classified as an outlier using that same rule of thumb:

$$Q = 102970.79 + 2746.5966t + 20903.247D84/5 - 14530.982D76/7$$
$$(36.576) \quad (9.728) \quad (4.165) \quad (-2.706)$$
$$Rsq=0.933 \quad Rbsq=0.916 \quad DW=2.409$$

The use of dummy variables for 1976/7 and 1984/5 has the effect of weakening the estimated time trend. The lower figure is supported by the results achieved from an analysis of a longer data set. The starting period of the data set used was the mid 1970's - a time when world commodity markets were highly volatile. The data period was therefore extended back to 1972/3. When this data set was regressed just against time, with the longer data set, 1976/7 and 1984/5 again appeared as outliers. Re-running the regression therefore with dummies on these two observations gave the following result:

$$Q = 99797.63 + 2384.629t - 17787.781D76/7 + 20542.187D84/5$$
$$(40.344) \quad (11.154) \quad (-3.415) \quad (4.005)$$
$$Rsq=0.927 \quad Rbsq=0.913 \quad DW=2.473$$

Production (as distinct from usable production) can be split into two elements - area and yield. The rise in cereals production in recent years has been essentially a yield-driven phenomenon. The upward trend in production is generated by a very dominant trend in cereals yields, rather than an upward trend in cereals area. Taking the cereals yield data for the (calendar) years 1973-1989, and testing for a time trend, the following result emerges:

ARE outliers to that extent.

$Y = 29.993 + 0.99t$ Rsq=0.828 Rbsq=0.816 DW=1.971
(25.104) (8.488)

Moreover, the 1984 yield observation is an outlier (though no other year in this data period is found to be so). Re-running this regression with a dummy on that observation gave:

$Y = 30.039 + 0.943t + 6.344D84$
(32.591) (10.362) (3.348) Rsq=0.904 Rbsq=0.891 DW=1.933

When a regression was run for area, the following result was obtained:

$A = 37075.301 - 109.654t$ Rsq=0.548 Rbsq=0.518 DW=1.309
(140.69) (-4.264)

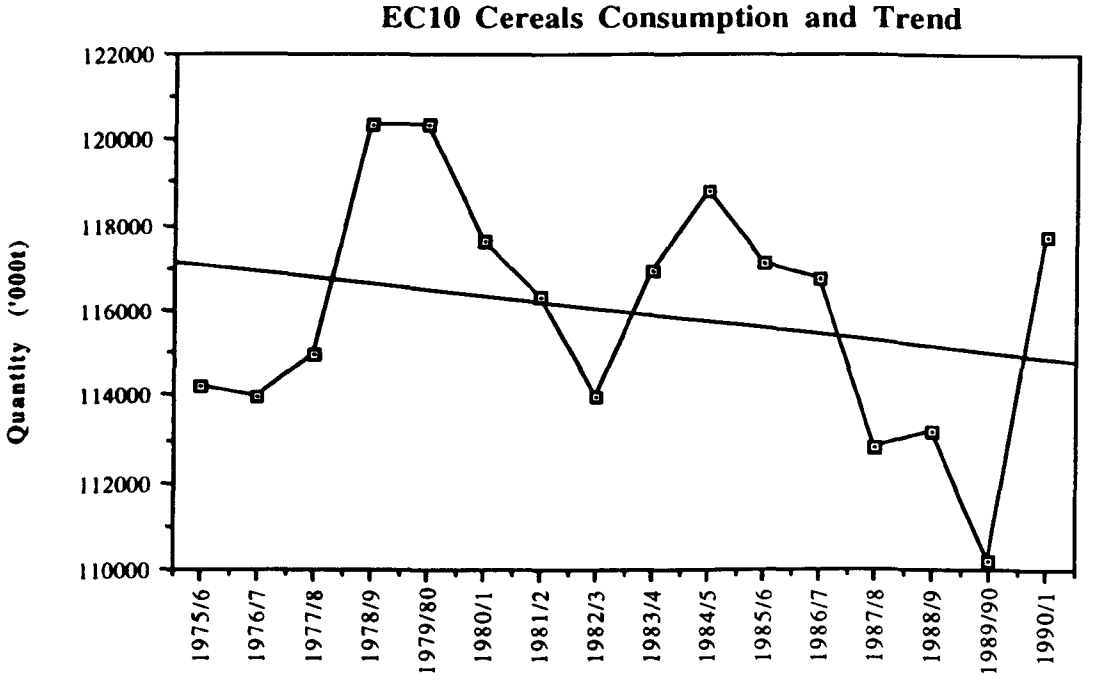
A detailed examination of the factors influencing cereals area and yield occur in Chapters 6 and 8. These regressions illustrate that the strong upward time trend present in the production data derives from the trend in cereals yield. For the data period, the average yield is 3.89 tonnes per hectare, and the average area 36.1 million hectares. From these averages, the regression coefficients indicate that yields are rising by 2.54% per annum, with area falling by 0.30% per annum. Even though the data set for usable production is over a different period, is for EC12, and is for crop year rather than calendar year, the growth per annum, calculated on the same basis, of 2.17% per year, is still very close to the net effects of rising yields and falling area (2.54 - 0.3 = 2.24).

5.3.3: Consumption

Although consumption, or total internal use, consists of a number of different elements, considered separately in greater detail in Chapters 7 and 8 of this thesis, here just the aggregate data are considered. Over the full data period, no significant time trend is to be found:

$C = 117192.675 - 147.903t$ Rsq=0.063 Rbsq=-0.004 DW=1.386
(79.288) (-0.968)

The regression statistics confirm that a linear time trend is not the correct specification for the consumption data.



Given the greater analysis on total internal use elsewhere, this is to be expected, as consumption is the sum of five different end-uses, each with their own characteristics. Thus whilst this merely confirms the absence of a time trend for current purposes, the correct specification for each individual end use is considered elsewhere. No outliers are present with this regression, indicating that consumption in total is much more stable than production, not being subject to the same random influences that production is vulnerable to (eg the climate).

As with production however, the regression was re-run with data for the longer period from 1972/3.

$C = 118284.491 - 194.77t$ Rsq=0.155 Rbsq=0.106 DW=1.429

(94.222) (-1.769)

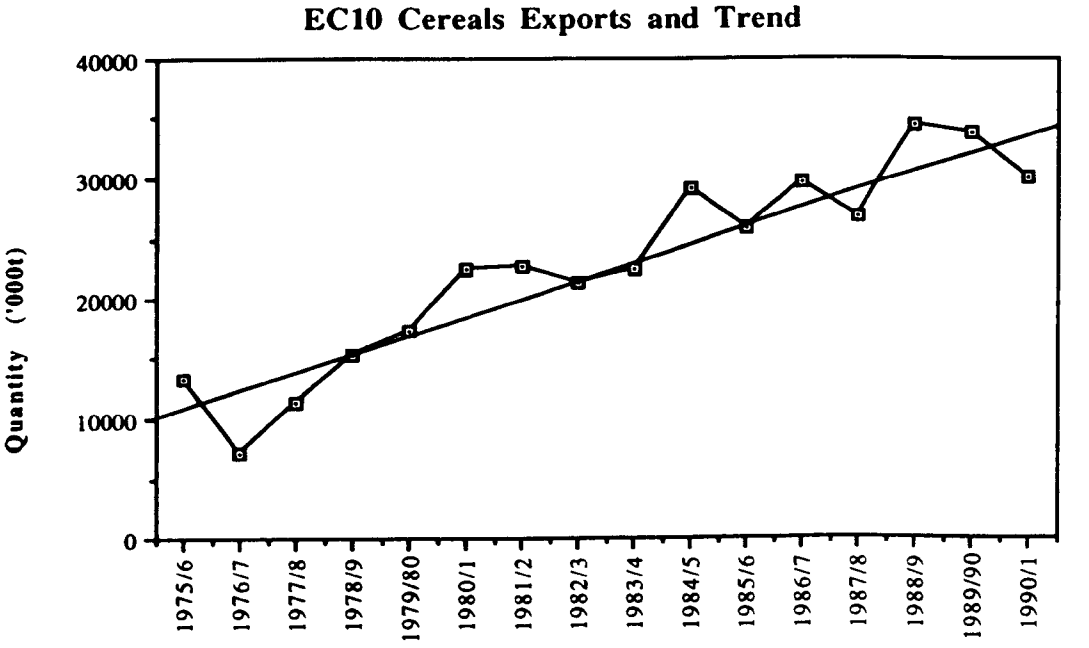
This confirms the findings from the regression over the shorter data period. Again, no observations were found to be outliers.[11]

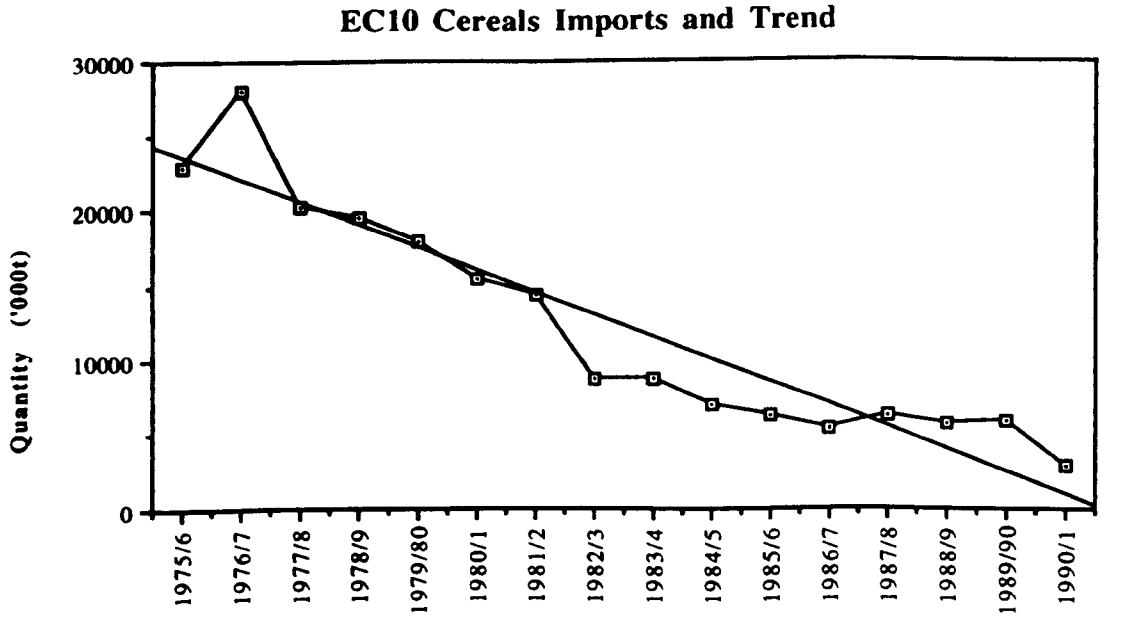
5.3.4: Trade

Over the data period, given the production and consumption trends, the significant

[11] Note that comparable data wasn't available for exports and imports, so a full analysis over this longer data period couldn't be carried out.

feature of EC trade patterns has been the move from a major net importer of temperate agricultural products to a major net exporter. Imports (M) and exports (X) have shown strong opposite trends during this time:





$M = 24994.35 - 1508.151t$ Rsq=0.888 Rbsq=0.88 DW=1.196
(18.024) (-10.516)
with 1976/7 identified as an outlier.

$X = 9184.25 + 1584.904t$ Rsq=0.873 Rbsq=0.864 DW=2.112
(5.89) (9.828)

Re-running imports with a dummy for 1976/7 yielded:

$M = 23322.153 - 1366.069t + 7431.986D76/7$
(19.893) (-11.621) (3.32) Rsq=0.939 Rbsq=0.93 DW=0.647

Whilst this improved the explanatory power of the regression, the Durbin-Watson statistic still indicates autocorrelation, although for current purposes, only the general direction of import data is important. The graph showing actual and estimated imports indicates that the pattern around trend is cyclical, but does follow trend. Also of concern is the data just taken from 1982/3. In these most recent nine years, the general movement has been much flatter. A regression examining the trend in the most recent nine years data yielded the following result:

$M = 9206.389 - 585.567t$
(14.276) (-5.11) Rsq=0.789 Rbsq=0.758 DW=1.818

Indicating that although there is still a significant downward trend in imports, it is now down to almost a third of the trend figure from the full data period.

A log transformation was then applied to the import data to allow for the falling trend. Moreover, with a continued import requirement by the EC, it is improbable that any downward trend in imports will be sustained to the extent of imports falling to zero. This transformation allows for that:

$\ln M = 10.355 - 0.135t$
(109.596) (-13.769) Rsq=0.931 Rbsq=0.926 DW=1.854

With this transformation, no observations are outliers. Moreover, the coefficients on the trend variables from the various regressions above approximately balance. Rising production of 2.75 million tonnes a year, with approximately static

consumption, is translated into exports rising at 1.58 million tonnes a year, and imports falling at 1.37 million tonnes a year (full data period, with dummy variable included). Excluding the consumption figure as insignificant, the balance on production, imports and exports is just 200,000 tonnes per year. Taking the coefficient on the regression with logged import data, the figure translates to imports falling at an average of 1.14 million tonnes a year, a net balance which leaves just 30,000 tonnes unaccounted for by this (albeit) very simple analysis.

5.3.5: EC Enlargement

Following on from the previous analysis, it needs to be considered how the enlargement of the EC to include Spain and Portugal from 1986 has affected the EC cereals market. A brief consideration of cereals production in the EC2 will be made, before the analysis moves on to look at the impact of the enlargement of the Community from 10 to 12 on the trends identified in the EC10 data above.

Qsp = 11127.956 + 564.221t
(8.36) (4.344) Rsq=0.557 Rbsq=0.528 DW=2.044

Qpt = 1283.221 + 14.034t
(10.963) (1.229) Rsq=0.091 Rbsq=0.091 DW=1.21

Qs+p = 12411.176 + 578.255t
(9.09) (4.34) Rsq=0.557 Rbsq=0.527 DW=1.99

where Qsp is Spanish production, Qpt is Portuguese production, and Qs+p is the sum of Spanish and Portuguese production, and the data set is for the period 1973 to 1989.[12] Those last regressions include the first four years of EC membership.[13]

An analysis of EC enlargement and its impact on EC production, consumption, imports and exports was then carried out using dummy variables. Using data for the EC10 up to 1984/5 and the EC12 from 1985/6, a dummy variable was placed on the EC12 data in order to attempt to pick up the impact of enlargement. The data period is from 1975/6, and the dummy takes the value 1 for the years 1985/6 to 1990/1 (and 0 for all preceding years):

[12] Data is for calendar year and is from FAO Production Yearbook.

[13] Regressions run for the period 1973-1985 indicated the trend identified for the period up to 1989 was much weaker with the data up to 1985. The regression statistics were poorer also.

Production

Q = 94741.865 + 4410.77t + 6153.24D Rsq=0.93 Rbsq=0.919 DW=2.01
(21.419) (6.326) (0.927)

Consumption

C = 116481.155 + 44.79t + 20494.013D Rsq=0.932 Rbsq=0.921 DW=1.167
(60.497) (0.148) (7.092)

Imports

M = 26959.845 - 1943.99t + 6265.187D Rsq=0.922 Rbsq=0.91 DW=2.154
(19.923) (-9.114) (3.085)

Exports

X = 8203.465 + 1821.37t - 3906.293D Rsq=0.882 Rbsq=0.864 DW=2.098
(4.634) (6.528) (-1.47)

The coefficients on the time variables all confirm in ordinal terms what was found earlier, although here the net balance of production, import and export coefficients is 646000 tonnes, or 15% of the production coefficient of 4.411mt (if, as before, the consumption figure is ignored). With the dummy variables; on production, the coefficient is insignificant. A major problem is that the last year of the EC10 period, 1984/5, is one with an exceptionally high level of total EC production. Moreover, for 1986/7 and 1987/8, the levels of production are below what is a very strong rising trend. Thus because of these variations around that trend, the difference between the later EC10 observations and some of the EC12 observations is less than a long term trend would suggest.

With consumption on the other hand, there is much less susceptibility to such short term variations from these 'outside' influences and so the enlargement, as one would expect, does cause an increase in overall EC cereals consumption with the addition of the Iberian human and animal populations to the EC's total.

With trade, at the time of accession Spain was a slight net importer of grains, and Portugal was far from being self-sufficient[14]. With exports, one would expect these to fall as the exports from the EC10 to the EC2 are now counted as intra EC trade rather

[14] According to ASIC 1990, for the three-year period around 1985/6, Spain was 83% self sufficient in grains other than rice, and Portugal was 33%. By 1988/9, Spain was 113% self sufficient and Portugal was 46% self sufficient.

than extra trade. Given also the fact that the exports from the EC10 to the EC2 are relatively small, one could perhaps accept the negative but insignificant coefficient on the EC10/12 dummy.

This analysis was then extended to see if enlargement affected either or both the intercept and the slope of the regression function.[15]

Production

$Q = 91948.667 + 4918.624t + 41267.733D12 - 2902.024t12$

(20.64) (6.851) (1.904) (-1.691)

Rsq=0.943 Rbsq=0.929 DW=2.492

Imports

$M = 28069.2 - 2145.691t - 7680.99D12 - 1152.577t12$

(22.515) (-10.679) (-1.266) (2.4)

Rsq=0.947 Rbsq=0.934 DW=3.814

Consumption

$C = 115312.667 + 257.242t + 35183.581D12 - 1214.14t12$

(58.93) (0.816) (3.695) (-1.61)

Rsq=0.944 Rbsq=0.93 DW=1.287

Exports

$X = 7339.867 + 1978.388t + 6950.371D12 - 897.245t12$

(3.933) (6.577) (0.715) (-1.248)

Rsq=0.896 Rbsq=0.87 DW=2.515

To test for any difference between the EC10 and the EC12, an F-test can be used. It was found that for production and exports, for the data period under consideration, there was no difference between the data periods, ie the enlargement of the EC had no significant impact on either cereals production or exports. With both imports and consumption however, the enlargement of the EC had an impact. With consumption, the intercept coefficient is different, but the slope coefficient is the same, ie the enlargement affects the quantity of cereals consumed, but not the rate of change of that quantity. The regression output for imports suggests there, it is the slope coefficient that is different between EC sizes, with the intercept being the same.

[15] See Appendix 1 for the theory behind the results presented here.

Given that only extra EC trade is being considered, exports from the EC10 to the EC2, formerly included in the trade figures, are now excluded. Imports from the EC2 to the EC10 have undergone that same change. Trade between the EC2 and the rest of the world, formerly irrelevant to EC trade statistics, is now included in EC external trade figures. *Ceteris paribus*, the impact of EC enlargement would be straightforward to quantify from this. That *ceteris paribus* assumption however doesn't hold. Consider for example the case of maize. Prior to accession to the EC, Spain imported large quantities from the US, a low cost producer. On joining the Community however, US exports to Spain were subject to the EC's Common External Tariff, as well as variable import levies. The levy-inclusive price of US maize, likely to be higher than the price of EC maize on the Spanish market, would induce consumers to buy less US maize and more EC maize. With the higher price however, it is likely that the reduction in consumption of US grain would be greater than the increase in consumption of EC grain. This *trade suppression* may well result in lower demand for the commodity, both via higher prices and lower consumer welfare. In the face of this, the US has attempted to force the EC to agree to permit supplies of maize to continue to reach the Spanish market.

The accuracy of the regression coefficients can be tested by quantifying the impact of the EC enlargement by other means, and comparing the results with those obtained from the regressions. For the period 1980/1 to 1990/1, data were available on production, consumption, imports and exports for the EC10. EC12 data were not available for all years directly, but where only the EC10 figures were available, the conversion factors referred to earlier (page 3) were used to derive them.

The impact of the EC2 was initially estimated by subtracting the EC10 figure from the EC12. Taking production first, the average EC2 figure estimated for the whole period was 19.8m tonnes, and for the period 1980/1 to 1985/6 was 19m tonnes. The coefficient on the dummy variable in the production regression above was only 6.2 million tonnes. With that regression however, 1984/5 was an outlier. The re-run regression (with a dummy inserted), yielded:

$$Q = 97383.211 + 3604.935t + 14390.659D12 + 17907.434D84/5$$
$$\quad (25.353) \qquad (5.441) \qquad (2.243) \qquad (2.564)$$
$$\text{Rsq}=0.955 \quad \text{Rbsq}=0.943 \quad \text{DW}=1.96$$

The dummy coefficient of 14.4 million tonnes is still below the 19 million tonne figure, but is now closer to it. A further comparison for the production data set was

performed using data from the FAO.[16] Here, the average of the data for the years 1973 to 1989 is 17.6 million tonnes.[17]

Extending the two-dummy analysis to the longer data period starting in 1972/3, the following result was obtained:

$$Q = 94449.231 + 3150.747t + 32717.369D12 - 1134.147t12$$
$$(19.82) \quad (5.248) \quad (1.008) \quad (-0.559)$$
$$Rsq = 0.909 \quad Rbsq=0.891 \quad DW=1.729$$

(The F-test statistic was 2.604).

The regressions suggest that the EC's enlargement has had no significant impact on total cereals production. The main problem is that a clear picture cannot be obtained of the events surrounding enlargement. This may possibly be explained by the fact that the year immediately before the EC12 data, 1984/5, saw an exceptionally large harvest in the EC10. This would lessen the impact of the data on the enlargement effect being picked up by dummies. The following regression and its correlation matrix may indicate certain statistical problems:

$$Q = 95066.884 + 4068.2t + 38149.511D12 - 2051.6t12 + 15591.111D84/5$$
$$(23.158) \quad (5.577) \quad (2.026) \quad (-1.336) \quad (2.232)$$
$$Rsq=0.961 \quad Rbsq=0.947 \quad DW=2.166$$

Q10/12				
t	0.962			
D12	0.845	0.84		
t12	0.489	0.865	0.987	
D84/5	0.183	0.084	-0.2	-0.197

Turning to consumption, the average figure implied from the EC10/EC12 data is 23.6m tonnes as the average of the period 1980/1 to 1990/1, and 24.6m tonnes for the period 1980/1 to 1985/6. The coefficient on the dummy variable from the regression puts the figure at 20.5m tonnes. A further comparison was made here using data for Spanish and Portuguese cereals consumption from Eurostat[18] for the years 1981/2 to

[16] Various years of the FAO Production Yearbook - note that this refers to calendar year.

[17] For the years 1985 to 1989, the average is 21.9 million tonnes.

[18] The data for 1981/2 was from the Agricultural Statistical Yearbook, and for the other years, from

1988/9. The average figure for this period is 24.2 million tonnes.[19]

With imports, the regression coefficient came to 6.3m tonnes, whereas the averages (as before) came to 5m tonnes and 8.4m tonnes respectively. Similar to production however, the earlier regression suggested that the year 1976/7 was an outlier, and so the regression was re-run with an extra dummy inserted for that year. The result was as follows:

$$M = 25097.576 - 1721.154t + 5119.175D12 + 6366.733D76/7$$
$$(23.104) \quad (-10.543) \quad (3.464) \quad (3.7)$$
$$Rsq=0.964 \quad Rbsq=0.955 \quad DW=1.133$$

Thus, the regression coefficient of 5.1 million tonnes is within a hundred thousand tonnes of the average figure for the period 1980/1 to 1990/1.

Finally with exports, the regression coefficient suggests an 'enlargement effect' of -3.9m tonnes, whereas the estimates based on the EC10/EC12 data put the figure at -99000 tonnes for full period average. Although the technique used to estimate export (and import) figures for different EC memberships is *ad hoc*, and possibly inaccurate, the figures for the two years where this was done come out very close to the overall average. Therefore if the actual EC12 figures for those years vary greatly from those estimated, it is possible that the overall average will vary as well.

Data from Eurostat[20] indicate that in the period 1986 to 1989, intra community trade between the EC10 and the EC2 has been declining in both directions, suggesting the presence of trade suppression. Extra community trade by the EC2 in the same period has not provided much support for any trade diversion argument.[21] With imports, there was a slight fall from 1986 to 1987, a sharp rise in 1988, and a modest fall in 1989. With exports, the trend has been upwards, but with the 1987 figure lying well below that trend (EC2, quantity in tonnes):

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the balance sheet in Crop Production.

[19] This data also highlight the problem of data being amended and updated. For Portugal some sources give the 1985/6 consumption figure as 3.358 million tonnes, and others give 4.162, and for 1984/5, the figures quoted are 3.681 and 4.158. In both cases the lower figure has been used as that should be the most updated.

[20] the monthly External Trade publication.

[21] although the trade agreements discussed earlier may have influenced this.

Year	intra imports	intra exports	extra imports	extra exports
1986	2077731	234598	4130128	1058136
1987	1289505	1163846	3930417	366665
1988	934250	1090799	5853510	1449243
1989	565679	1032145	5027142	1506503

The data therefore can be seen not to tally with the regression coefficients on the variables.

5.4: PRIVATE AND PUBLIC STOCKS IN THE COMMUNITY

For the EC, any examination of the cereals market and its operation needs to go beyond just looking at production, consumption, imports and exports - as noted before, intervention plays a major role in the operation of the cereals market (as with most markets where support is offered under the CAP). Thus, in terms of the simple identities which define the 'net balance' within the EC, these storage operations need to be accounted for. In Section 5.5.5 below, attention will be focused on intervention operations since it is these which account for such a large element in the expenditure incurred under the CAP (see Chapter 4).

First however, market identities will be presented that include private stocks.

With cereals, a disposable surplus needs to be identified, and then allocated between alternative outlets. The 'surplus' can be thought of as usable production (Q), plus imports (M), minus consumption (C). The outlets for this 'surplus' can be identified as exports from the open market (X) and changes in stocks (Δk). This last element can be split into changes in intervention stocks (Δk^i) and changes in private stocks (ΔkP).

$$Q + M - C = X + \Delta k = X + \Delta k^i + \Delta kP \qquad 1$$

In estimating Δk^i, there are two ways from the available data that this can be done. One can either subtract opening stocks in year t from closing stocks in year t; or subtract opening stocks in year t from opening stocks in year t+1. Whilst these two approaches should theoretically give the same result, they sometimes give varying results for purely practical reasons, the main one being that the latter approach allows the closing/opening stock data to be updated (as noted above). This can be thought of as being more accurate, with the extra time period involved allowing the authorities to collect more up to date data. Thus:

$$\Delta k^i = ko^i_{t+1} - ko^i_t \qquad 2$$

where ko refers to opening stocks in the relevant time period.

This is also equal to net domestic intervention minus exports to third countries from intervention. That is, total intervention purchases from the domestic EC market, less sales back onto the domestic EC market (≡ net domestic intervention - NDI), less sales to other markets:

$$\Delta ki = NDI - Xi \qquad 3$$

ΔkP can then be established from Δk and Δk^i.

Furthermore, X (ie exports to third countries) consists of both exports from the open market (Xom) and exports from intervention (Xi):

$$X = Xom + Xi \qquad 4$$

Thus, if equations 3 and 4 are substituted into equation 1, the expression obtained is:

$$Q + M - C = Xom + Xi + NDI - Xi + \Delta kP \qquad 5$$

Cancelling the positive and negative Xi's leaves the following expression:

$$Q + M - C = Xom + NDI + \Delta kP \qquad 6$$

from which ΔkP can be estimated. Unfortunately, neither the sources of cereals going into private stocks, nor the destination of cereals coming out of private stocks can be identified. Moreover, it is not inconceivable that some cereals (though probably only a small quantity), could be counted twice if it is first classified as part of the consumption (total internal use) figure when purchased by a farmer, but then for whatever reason isn't consumed, but added to on-farm stocks instead. This quantity would however probably be insufficient to seriously affect any estimates of private stock changes.

5.5: INTERVENTION BEHAVIOUR IN THE EC CEREALS MARKET

As was discussed in greater detail in Chapter 4, intervention plays a central role in the operation of the CAP. In order to maintain levels of market support within the Community, both intervention and refunds on exports to third countries are used extensively. As that chapter showed, the EC has had recourse to the intervention system increasingly as the net exportable surplus in the EC has grown, and this has been reflected in the increase in the expenditure incurred for intervention operations, detailed in that chapter. In the late 1970's, cereals intervention stocks totalled about 2 million tonnes. They peaked at almost 18 million tonnes in 1986/7, and after falling slightly in the wake of that experience, and the US drought in 1988 which offered the EC greater market opportunities to export and at higher world prices (therefore lower unit refund costs), in the year 1990/1 they returned to that order of magnitude. By the current 1992/3 crop year however, cereals stocks have risen to their highest ever level - over 24 million tonnes, or about 12-15% of current average cereals production.[22]

In the intervention balance sheet, data are available for stock opening and closing levels, for movements into and out of store in general terms, and for details of the different destinations for stocks sold from intervention (as food aid, back onto the home market, and to third countries). Relating this to the budget, the main elements of expenditure are financial costs (which are related to the level of stocks held), technical costs (related to the volume of stocks moving into and out of store), and 'other public storage costs', which are effectively export refunds on sales from intervention to third countries (excluding food aid).

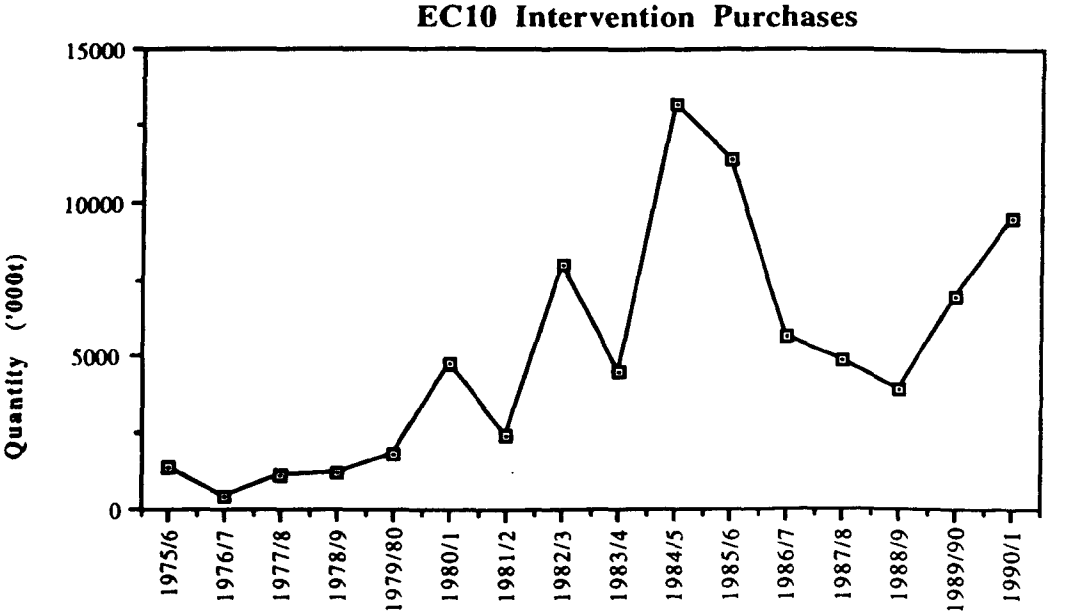
5.5.1: Intervention Purchases

From an average of just over 1 million tonnes per year in the mid 1970's, intervention purchases (IP) have risen sharply. During the late 1980's, the average was closer to 5 or 6 million tonnes but in some years, the figure rose to over 10 million tonnes. The factors potentially influencing the level of IP are varied. Intervention may have a short term market stabilisation role, in which case production residuals around trend (Qres) would be influential.[23] A longer term role for intervention may be picked up by a time trend (t), but this would have to be treated with extreme caution. Larger purchases into intervention may reflect solely the rising trend in production - for

[22] Se Agra Europe 1505, 21 August 1992, page P/2.

[23] For the following regressions, the production residuals are taken from the production regression with time trend and two dummy variables. For the two observations with dummies, and therefore zero residuals, the regression coefficients on the dummy variables were inserted.

intervention now to have taken on a longer term role, the stocks of products would now have to be staying in store longer. Otherwise a significant time trend variable would simply be reflecting the production trend, and a rising trend on IP would be accompanied by a rising trend on sales from intervention - either back onto the domestic market or for export to third countries.



Another possible factor influencing intervention purchase volumes is the state of the world market. The use of United States' production residuals (USQres) is used to try and reflect the ease with which the EC can export its disposable surplus. If US production is above trend, it would be expected that there would be few opportunities for the EC to export to other than its established destinations.[24] A fourth factor to be considered is the level of opening stocks (opst). If opening stocks are very large, this may indicate that stores are near to capacity which without large sales from store, would possibly act as a constraint on the quantity that could be sold into store. Having set the model up like this, the following regression was run:

$$IP = 1390.576 + 332.116t + 0.016USQres + 0.262Qres + 0.114opst$$
$$(1.225) \quad (1.644) \quad (1.01) \quad (3.009) \quad (0.631)$$
$$Rsq=0.784 \quad Rbsq=0.706 \quad DW=1.464$$

[24] The converse holds too - witness EC exports following the 1988 US drought.

With this regression, the first three coefficients are of the right sign, but only Qres is significant at the 5% level. *A priori*, the sign on the opening stocks variable is expected to be negative. The estimated coefficient is however positive but is not significantly different from zero. Next, a regression was run with only time and production residuals as the independent variables:

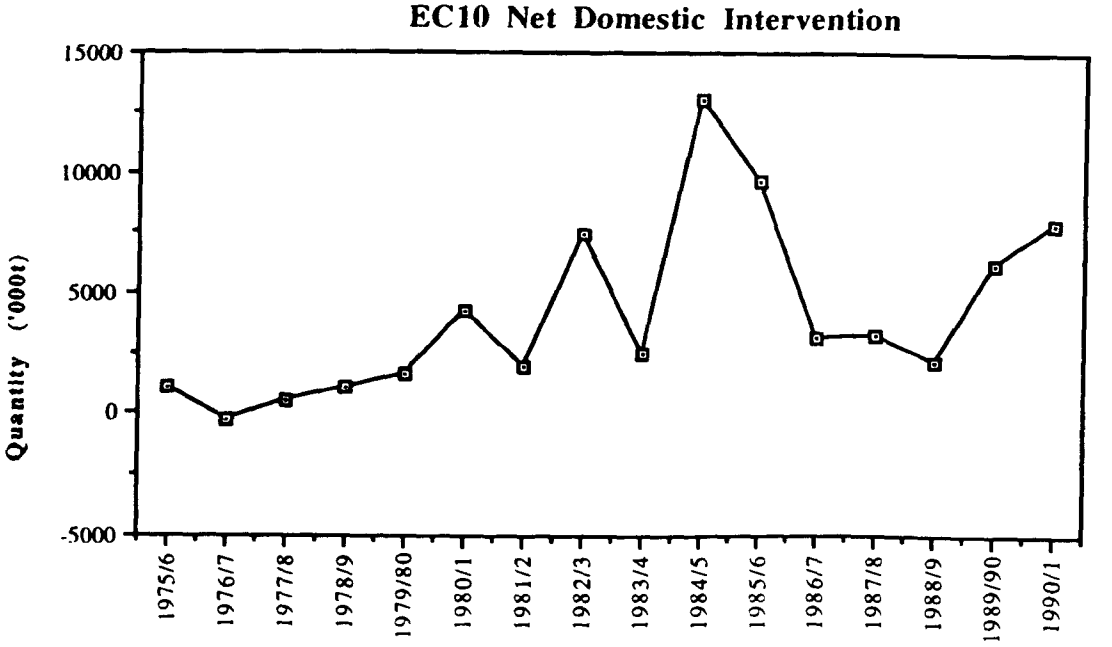
$$IP = 1380.281 + 419.309t + 0.286Qres$$
$$(1.255) \quad (3.649) \quad (4.109) \qquad Rsq=0.749 \quad Rbsq=0.711 \quad DW=1.496$$

Two interesting features emerge from the analysis. First, only a relatively small part of the increase in cereals production finds its way into intervention. The trend coefficient suggests that the rise in intervention purchases is only about 15% of the trend growth in cereals production (see regressions from Section 5.3.2).[25] Second, just under 30% of production variation around trend is sold into intervention, with that trend being adjusted for the presence of two outliers. Thus IP is shown to have an important role in short term market stabilisation. Despite this, IP doesn't absorb all the production variation. At least some of the variation will be absorbed by exports from the open market and, to the extent that changes in production levels affect market prices, consumption could absorb some production variation as well.

5.5.2: Net Domestic Intervention

Net domestic intervention (NDI) differs from intervention purchases in that it allows for that quantity of stocks released back onto the internal EC market. This may occur if there is a shortage of cereals on the internal market (unlikely to occur generally, but which may occur in a localised area, or with respect to a particular quality of a particular grain), or perhaps if the stock has deteriorated to such an extent that the grain is released for non-food uses (for example the production of ethanol or certain bio-degradable plastics). *A priori*, it may therefore appear likely that the coefficient on the production residual variable would be negative. A further consideration however indicates that is unlikely to be the case, as the quantity of cereals bought into intervention each year has, with the sole exception of 1976/7, been greater than the quantity sold back onto the internal market. Other than this, the same variables would be thought of as having a possible influence on NDI as IP before.

[25] Note that this is the marginal figure. The average figure around 1990 is 6-7%.



NDI = 1141.52 + 357.941t + 0.02USQres + 0.268Qres - 0.033opst
(0.992) (1.747) (1.247) (3.042) (-0.18)
Rsq=0.767 Rbsq=0.682 DW=1.61

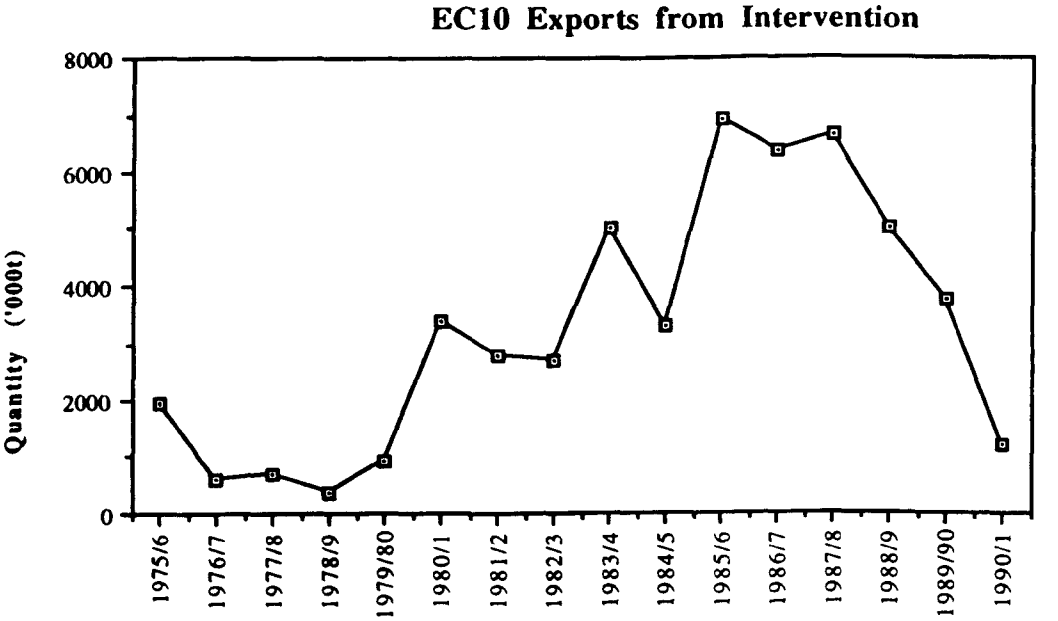
NDI = 1314.078 + 309.786t + 0.323Qres
(1.188) (2.68) (4.614) Rsq=0.734 Rbsq=0.693 DW=1.876

Although the trend variable is on the border of significance, this regression performs much better than one with just production residuals as the independent variable. The adjusted R-squared is also better with half the number of independent variables compared with the first regression. The lower t-statistic on the trend variable compared with the regression on IP suggests that the factors determining the quantity of sales from store back onto the internal market are not related to time. Thus the trend in the IP data set is partially offset, and that trend weakened as a result. Net domestic intervention represents about one third of production residuals around trend.

5.5.3: Intervention Exports

The volume of stocks exported to third countries (IX) gives rise to a large element of EC budgetary expenditure - other public storage costs - as has been described in Chapter 4.[26] Again, a number of possible influencing variables were considered. EC

and US production residuals were considered for essentially the same reasons as before, as was a time trend. Opening stocks were considered, as they reflected the quantity available for export and also, if store capacity was being reached, they'd also reflect the need to export to release space for new purchases. In addition, the unit ECU refund and $:ECU exchange rate variables were considered to see the extent of the influence of the cost of exporting the stored commodity on the export decision itself. Note that whilst the refund data set used is for open market exports, the principle is the same when considering exports from intervention.



IX = 3137.846 - 15.131t - 0.006USQres + 0.03Qres + 0.31opst + 18.03REF - 2095.252er

(1.498) (-0.143) (-0.92) (0.79) (3.622) (1.487) (-1.236)

Rsq=0.913 Rbsq=0.848 DW=2.608

The coefficient on the trend is the wrong sign, but highly insignificant. Moreover, concern that US dominance on the world cereals market might mean the existence of collinearity between USQres and REF resulted in the regression being re-run with REF excluded:

[26] although unit expenditure UNDER THIS HEADING is now lower following compulsory stock depreciation - again, see Chapter 4.

$$IX = 1810.371 + 54.696t - 0.004USQres + 0.036Qres + 0.348opst - 955.313er$$
$$(0.897) \quad (0.54) \quad (-0.591) \quad (0.879) \quad (3.971) \quad (-0.593)$$
$$Rsq=0.889 \quad Rbsq=0.828 \quad DW=1.952$$

For most of the variables, the coefficients are qualitatively the same. With the time trend however, the coefficient is now the correct sign, but still insignificant. Given the collinearity between time and opst, a simple model of IX over time was looked at. 1990/91 was found to be an outlier, so with a dummy in place on this observation, the regression came out as:

$$IX = 147.96 + 402.85t - 5383.5D90/91$$
$$(0.203) \quad (3.899) \quad (-5.115) \quad Rsq=0.667 \quad Rbsq=0.616 \quad DW=1.677$$

Exports from intervention are shown to be growing at about 400,000 tonnes per year, which is approximately equal to the rate of increase in intervention purchases. After 1988, the financial arrangements for disposing of intervention stocks changed (see especially Chapter 3, Appendix 2). The subsequent depletion of intervention stocks may account for the appearance of 1990/1 as an outlier.

5.5.4: Conclusion on Intervention

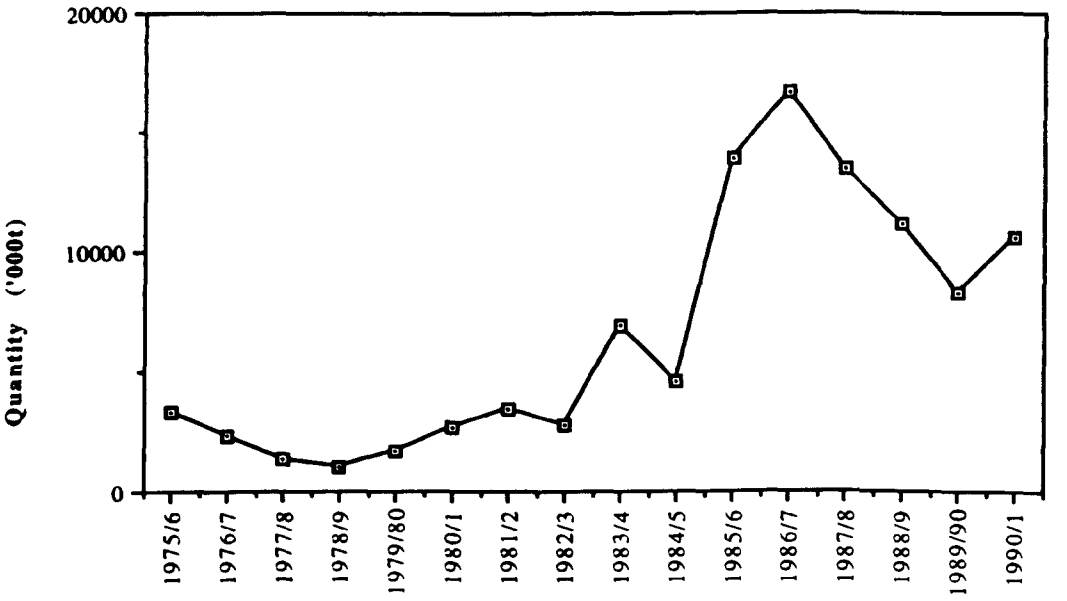
At the beginning of this section of work, the notion of intervention having a short-run stabilising role and a long-run market outlet role was mooted.[27] Looking first at the possibility of a short term role, it appears that there is such a role, but when considering net domestic intervention, it appears that this role is limited - only about a third of production variability around trend is involved. In looking at the longer term role however, the notion was suggested earlier that this is unlikely unless stocks were held for a long time. Otherwise, all that would happen is the volume of stocks passing through intervention would increase - but just reflecting intervention's short term stabilising role. The last sub-section seems to confirm that intervention doesn't have a long term role - with 40% of opening stocks being sold each year (for export alone), that represents, on average, a maximum length of stay of no more than two and a half years for surplus grain sold into intervention, (assuming grain operates on a first-in first-out principle). It is technically feasible for grain to be stored longer than that without suffering significant quality deterioration[28], and the fact that the EC isn't

[27] Where the short term is conceived as being under about three to three and a half years, and the long term above that.

storing its surplus grain for up to the maximum possible period supports the notion that intervention indeed is not operated with a long term structural aim in mind. What appears to be happening instead is that with the rising structural surplus in the cereals market, the cereals management committee is having to accept greater and greater quantities being sold into intervention. As was noted at the beginning, that is supported by the intuitive notion that for intervention to perform such a deliberate role, stocks would have to be accumulated indefinitely in the face of the rising structural surplus.

Further, it should be noted that opening stocks exhibit an upward trend, but so do exports from intervention, especially when the impact of 1990/1 is removed by a dummy variable.[29] Thus it appears that the use made of intervention is that just of short term stabilisation, that the quantities passing through intervention are in general rising over time, but that their length of stay appears not to be rising.

EC10 Opening Stocks



There is no LONG TERM build-up of stocks, as the regression coefficients indicate quite a fast turn round of under three years, but rather an increase in the volumes passing through intervention in the short term. If the data set on opening stocks is examined, whilst it shows stocks building up to very high levels in three to four year periods, it then generally falls again before rising once more (even though a rising trend appears to underpin the data).

[28] so long as the grain is kept dry and cool.

[29] as, it has been argued, it is considered quite valid to do.

One final point on the regressions in the above section is that if the trend coefficients are examined, they tend to suggest that more is coming out of intervention than is going in. They key aspect here however is that each was examined in turn to see the influencing factors. Thus each regression has different independent variables included, rendering them incompatible for the sort of comparison carried in the previous section for production, consumption, imports and exports.

5.6: CEREALS MARKET RESIDUALS ANALYSIS

5.6.1: Introduction

The work above that analysed the cereals market demonstrated that most if not all of the key variables are dominated by time trends. From a statistical point of view, carrying out a regression analysis on trend-dominated data can cause serious problems. Data exhibiting a trend have mean and variance depending on time, and are known as non-stationary series. This violates one of the basic assumptions of regression analysis, namely that the series should be stationary, with constant mean and variance σ_u^2. Granger and Newbold[30] indicate that such errors can lead to spurious regressions with inefficient regression estimates, sub-optimal forecasts based on the regressions, and the usual significance tests invalidated.

The fact that trends dominate so many variables examined in this analysis however comes as no surprise. Most variables under consideration derive their values in some way from production, which itself is dominated in the EC by a rising time trend via yields.[31] As the earlier analysis has demonstrated, these trends are actually consistent with each other. Being based on balance sheet data, this too is not surprising. What all this means however is that for this analysis to be advanced, whilst avoiding "equations having such symptoms", yet being "presented as though they have some worth"[32], a different approach must be adopted. The approach taken in this section is to examine the residuals around the trends for each of the variables, rather than the core data exhibiting the trend. Whilst this is not strictly the most accurate approach for some purposes (see Chapter 6), it does permit certain useful analyses to be carried out.

Put another way, the approach is one of seeing which variables have 'absorbed' production VARIATION over time. The absorbents considered have been consumption, net exports and net domestic intervention.

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[30] see Granger, C. W. J. and P Newbold. (1974).

[31] For more details, see McClelland, J. W. and H. Vroomen. (1988).

[32] see Granger, C. W. J. and P Newbold. (1974), p117.

Consumption

The reasoning behind having consumption as an absorbent is two-fold. Firstly, to the extent that, within a protected market like the EC, variations in production can affect market prices, then this will feed through to impact on the demand for cereals. Secondly, there is scope for on-farm substitution between purchased and own grains in animal feed especially if, for example, a very large harvest is associated with lower quality grains, perhaps only fit for consumption by animals. Whilst it wouldn't be expected that consumption would vary such as to absorb great quantities of production variation it would, for the above reasons, be expected to absorb at least some of them.

Net Exports

This variable can be separated into three distinct elements, imports from third countries, exports from the open market to third countries, and exports from intervention to third countries. The earlier trend analysis showed that with stable consumption, imports have fallen and exports risen so as to fully account for the rise in production over the period under analysis. It may well therefore also be expected that short term variations around the production trend would also, to a large degree, be accounted for by net exports. The distinction needs to be made between exports from the open market and intervention for budgetary reasons. In the EC budget, expenditures incurred by exporting from these two distinct sources are treated quite separately. Moreover, even if it is assumed that cereals from both sources are sold on third country markets at the same price, and if the 'internal' price of cereals from either source is the same, giving the same unit refund[33], cereals from intervention incur additional costs for the budget in the form of storage costs. Thus the quantities need to be identified separately.

Exports were felt to be very important as the quantities exported from the EC are controlled directly by the Commission's Cereals Management Committee, via the setting of refund levels, the acceptance or rejection of tenders for exports (from either source), and by the quantities it wishes to release from intervention in a given period. Imports were also included as it was felt that to the extent that imports can substitute for domestic production, if for example production was below trend, imports might rise.

Net Domestic Intervention (NDI)

This variable consists of quantities of cereals sold into intervention from the EC

[33] though note that for exports from intervention, this is actually termed 'Other Public Storage Costs' in the EC Budget.

market, NET of quantities sold back onto the EC market from intervention. The earlier trend analysis suggested that intervention had an important short term stabilising role in the cereals market. Therefore in the analysis of the cereals market now being undertaken, which utilises residuals around trend, this short term role would be expected to reveal itself by showing that variations in production around trend are absorbed, to a significant degree, by variations around trend in NDI.

Thus in these three variables, all the major outlets for cereals have been incorporated. Cereals produced can either be consumed domestically directly, or after a period spent in intervention, or can be exported to third countries, again either directly or after a period in intervention. Offsetting this is imports of cereals, which can also increase domestic consumption. One would, therefore, expect a positive relationship between variations in production and variations in consumption, NDI and exports from the open market, a negative relationship between variations in production and variations in imports, and probably a negative relationship between production variations and variations in exports from intervention, if higher production means higher exports from the open market, and if total exports are subject to some constraint, either financial (the costs of exports refunds), and/or diplomatic (implicit market shares with other cereal exporters), resulting in reduced export opportunities for exports from intervention. If there is also some stockholding constraint, one would expect this in turn to mean that NDI would be relatively lower in years of high production variation than in years of low variation, through lower scope to export, and a pressure to sell additional stocks back onto the domestic market, in order to remain within the stock capacity limit.

5.6.2: A Note on the Data

Before considering the results of the residuals analysis in detail, a note must be made of how the residual data set was arrived at. Initially the data for the variable in question were regressed against time and the residuals saved. In most cases, at least one observation was found to be an outlier.[34] A dummy was inserted for that observation, and the regression rerun with the variable regressed against time and the dummy. This process was repeated until no more outliers were found (at most, four dummies had to be used, typically two or three). The coefficients on the dummy variables were then inserted as the residuals on those observations, and the residuals around trend for each variable had been established, without loss of observations, and without outliers distorting the position of the trend line, and hence the residuals around trend.

[34] According to the definition set out earlier.

5.6.3: Analysis of the Data

5.6.3.1: Introduction

Two data sets were used in two separate analyses. One was for the EC10 over the whole period of analysis, and the second was for EC10 up to 1984/5, and EC12 from 1985/6. This was done to see if the enlargement of the EC affected the relative roles of the different absorbents with the accession of the Iberian countries.

For each data set, a number of regressions were initially run individually for each absorbent against production residuals (Qres). Following this, the regressions were run in a system with the restriction imposed that the coefficients on the absorbents had to sum to unity - that is, production residuals (Qres) had to be fully accounted for by consumption residuals (Cres), net export residuals (XMres) and net domestic intervention residuals (NDIres). For reasons to be discussed later, net exports had to be considered in aggregate within the system, rather than each of the three individual elements being considered separately.

The systems were rerun a number of times, with additional independent variables added, each with their own restrictions imposed. These will be discussed below.

5.6.3.2: Individual Regressions, EC10 Data

For this analysis, the constant term was suppressed in all regressions. Xres refers to total exports, Xom to exports from the open market, IX to exports from intervention, and Mres to imports.

	Rsq	Rbsq	DW
Cres = 0.218Qres (3.029)	0.396	0.353	2.133
Xres = 0.187Qres (2.239)	0.264	0.211	2.205
IXres = -0.033Qres (-0.517)	-0.015	-0.088	0.739
Xomres = 0.194Qres (2.406)	0.293	0.243	1.649

Mres = -0.218Qres (-3.115)	0.39	0.346	1.587
XMres = 0.42Qres (3.526)	0.451	0.412	1.68
NDIres = 0.326Qres (4.207)	0.481	0.444	1.451

From the above figures, it can be seen that the residual of consumption absorbs about 22% of variations in production, NDI about 33% and net exports about 42%, with roughly 22% reflected in changes in imports, 19% in open market exports, and 3% in exports from intervention. It can also be seen that the diagnostics presented for IX are particularly poor. The earlier trend analysis suggested that cereals remained in store for an average of two to three years, and so IXres was regressed against Qres lagged two years and then three years to reflect the time held in store. The following results were obtained:

IX = -0.064Qres t-2 (-1.427)	0.126	0.053	1.975
IX = -0.024Qres t-3 (-0.468)	-0.023	-0.116	1.86

Thus for a two year lag if not a three year lag, the specification for IX appears to be much better with regard to the Durbin-Watson statistic, as well as making more economic sense by lagging the independent variable.

Returning to the initial set of results, one feature is that whilst each regression was run separately, and no restriction was imposed on the coefficients to ensure they summed to unity, the results came out very close to that figure, although the exact figure depends on whether XMres is considered, or the sum of each of the different elements. At worst, the sum of the coefficients on Cres, Xres, Mres and NDIres is 0.946, and at best, by separating Xres into Xomres and IX, 0.984. Thus even this simple analysis identifies the absorbents of between 95% and 98% of production variation around trend. The signs on the coefficients are all as one would have

expected, *a priori*.

5.6.3.3: Individual Regressions, EC10/12 Data

Here, the residuals were established as for the EC10 data, but with the addition of a dummy variable on the EC12 observations:

	Rsq	Rbsq	DW
Cres = 0.253Qres (2.665)	0.337	0.289	2.138
Xres = 0.236Qres (2.728)	0.347	0.3	2.674
IXres = 0.037Qres (0.499)	-0.018	-0.091	0.834
Xomres = 0.199Qres (2.181)	0.254	0.2	1.818
Mres = -0.126Qres (-1.553)	0.114	0.051	1.687
(X-M)res = 0.362Qres (2.557)	0.291	0.241	1.791
NDIres = 0.326Qres (3.559)	0.421	0.379	1.291

Comparing these results with those for the EC10 data, it can be seen that NDIres absorbs exactly the same Qres in either situation. Consumption absorbs more with the EC10/12 than with the EC10, and net exports less. The absorption of imports nearly halves, open market exports rises only marginally, and IXres interestingly becomes positive. This last point may be accounted for by the fact that the period of EC12 approximates to the period when the EC was disposing of its accumulated surpluses and attempting to impose budgetary discipline. Thus the positive relationship could be described as a spurious one in that it occurred as a quirk of fate for these reasons.

For the drop in absorbency of imports, a possible explanation could be found in the imports of Spain. At the time of accession, the USA was concerned about continued market access for its exports of maize to Spain, and so a temporary agreement was signed. This could be thought of as making total imports and domestic production less substitutable - an above trend year for production won't be reflected in greatly lower imports as those imports are controlled by an outside factor - the trade agreement. The sum of the coefficients on the variables indicates that 94.1% of variation in production is accounted for by the variables considered. Given an average annual variation in production of 4.8 million tonnes (in absolute terms), this leaves less than 25000 tonnes per year of variation unaccounted for.

5.7: REGRESSION SYSTEMS[35]

5.7.1: Introduction

The initial system was run with a single independent variable in each regression, Qres. The coefficients on this variable were set to sum to unity, so that the dependent variables in the system were to fully account for variations in production. The earlier unrestricted work, reported above, suggests that this can be fully justified in that no other variable could absorb significant production variation. Further systems were then set up that added different independent variables. For each variable added, the restriction was imposed that the coefficients on that variable should sum to zero. This was done so that the absorbency of each dependent variable could be established IN THE PRESENCE of additional considerations.

The second system added a variable representing production variation in the rest of the world (ROWQres). This was to see if the role of any one absorbent changed significantly when world market conditions, as represented by production variation on that market, were taken into account. The third system added the variable OPres to that, residuals around the trend in opening stocks. Earlier work had found this to be an insignificant absorbent, but was re-run here to see if its presence in the system had a different effect, should there be an effective stock capacity constraint to EC market operations. Finally a system was run that replaced OPres with ER, the $:ECU exchange rate.[36] The earlier analysis had found all the 'economic' variables to be insignificant in their role of determining operations in the cereals market, but again it was felt that this

[35] The regression systems were run on Shazam, a package that allows a number of regressions to be run simultaneously, and also for restrictions to be imposed on the coefficients in the regression system.

[36] That is to say, the exchange rate expressed in the number of $ per ECU.

might change when the variable was considered within a system.

The dependent variables used were Cres, XMres and NDIres. Ideally, XMres would have been separated into IXres, Xomres and Mres, and ROWQres separated into US, USSR and THEN rest of the world production residuals, but this was not possible.[37]

Presented below are the regression results for the EC10, followed by those for the EC10/12. After that, a table summarising the independent variable coefficients is presented comparing data sets and system specifications. Next a table is presented which summarises some of the regression diagnostics, and which is followed by a discussion pulling together all the results from above.

5.7.2: Regression Systems, EC10 Data

Presented here are the regression results. Summaries of the results are given below.

5.7.2.1: One Independent Variable

Cres = 0.22Qres
(3.22)

XMres = 0.45Qres
(5.64)

NDIres = 0.33Qres
(4.44)

5.7.2.2: Two Independent Variables

Cres = 0.18Qres + 0.02ROWQres
(2.61) (1.64)

XMres = 0.50Qres - 0.02ROWQres
(6.30) (-1.99)

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[37] The problem lay in how the restrictions could be specified in Shazam. With all these different variables identified, some had negative coefficients (for example, imports, and exports from intervention). The restriction however had to be specified linearly, and couldn't be set out in terms of summing the absolute values of the coefficients to unity. In the linear restriction, putting a negative sign on the coefficients where a negative sign was expected on the variable distorted the estimates derived.

NDIres = 0.31Qres + 0.01ROWQres
(3.88) (0.55)

5.7.2.3: Three Independent Variables - OPres

Cres = 0.18Qres + 0.02ROWQres - 0.02OPres
(2.47) (1.65) (-0.14)

XMres = 0.50Qres - 0.02ROWQres - 0.07OPres
(5.91) (-1.95) (-0.44)

NDIres = 0.32Qres + 0.01ROWQres + 0.09OPres
(3.85) (0.52) (0.57)

5.7.2.4: Three Independent Variables - Exchange Rate

Cres = 0.18Qres + 0.02ROWQres + 179.72ER
(2.53) (1.67) (0.39)

XMres = 0.52Qres - 0.03ROWQres - 1195.2ER
(7.89) (-3.02) (-2.85)

NDIres = 0.30Qres + 0.01ROWQres + 1015.5ER
(4.25) (1.10) (2.23)

5.7.3: Regression Systems, EC10/12 Data

5.7.3.1: One Independent Variable

Cres = 0.26Qres
(3.16)

XMres = 0.40Qres
(4.26)

NDIres = 0.34Qres
(4.33)

5.7.3.2: Two Independent Variables

Cres = 0.18Qres + 0.02ROWQres
(2.47) (1.67)

XMres = 0.51Qres - 0.02ROWQres
(6.27) (-1.98)

NDIres = 0.31Qres + 0.01ROWQres
(3.79) (0.52)

5.7.3.3: Three Independent Variables - OPres

Cres = 0.18Qres + 0.02ROWQres + 0.003OPres
(2.36) (1.66) (0.018)

XMres = 0.50Qres - 0.02ROWQres - 0.1OPres
(5.91) (-1.96) (-0.66)

NDIres = 0.32Qres + 0.01ROWQres + 0.1OPres
(3.79) (0.51) (0.64)

5.7.3.4: Three Independent Variables - Exchange Rate

Cres = 0.17Qres + 0.02ROWQres + 193.6ER
(2.38) (1.71) (0.43)

XMres = 0.53Qres - 0.03ROWQres - 1214.7ER
(7.95) (-3.07) (-2.91)

NDIres = 0.30Qres + 0.01ROWQres + 1.021.1ER
(4.10) (1.09) (2.23)

5.7.4 Regression Systems - Summary and Diagnostics

Note that the figures may not sum exactly to one, because of rounding.

EC10 DATA	a	b	c	d	e
Cres	0.22	0.22	0.18	0.18	0.18
XMres	0.42	0.45	0.50	0.50	0.52
NDIres	0.33	0.33	0.31	0.32	0.30

EC10/12 DATA	a	b	c	d	e
Cres	0.25	0.26	0.18	0.18	0.17
XMres	0.36	0.40	0.51	0.50	0.53
NDIres	0.33	0.34	0.31	0.32	0.30

KEY

a) regressions run individually for each variable against Qres

b) a system run with Qres as the sole independent variable

c) a system run with Qres and ROWQres as the independent variables

d) a system run with Qres, ROWQres and OPres as the independent variables.

e) a system run with Qres, ROWQres and exchange rate as the independent variables.

The following table shows for each variable in turn (Cres, XMres and NDIres), each data set and each system specification, the R-squared, Durbin Watson, and R-squared between observed and predicted, respectively. For the regressions run individually, the diagnostics are presented with the regression results above.

EC10

b			c			d			e		
0.3958	2.06	0.3970	0.4563	2.47	0.4585	0.4510	2.50	0.4549	0.4581	2.49	0.4622
0.4482	1.64	0.5028	0.5741	1.35	0.6516	0.5595	1.36	0.6242	0.6871	1.67	0.6875
0.4809	1.31	0.6228	0.4851	1.24	0.6421	0.5049	1.38	0.6294	0.6060	1.64	0.6101

EC10/12

b			c			d			e		
0.3358	2.03	0.3366	0.4599	2.47	0.4623	0.4597	2.47	0.4624	0.4622	2.50	0.4663
0.2883	1.78	0.3309	0.5721	1.35	0.6509	0.5530	1.37	0.6133	0.6886	1.68	0.6889
0.4197	1.26	0.5243	0.4844	1.25	0.6412	0.5070	1.40	0.6277	0.6059	1.66	0.6099

5.7.5: Discussion

The first point to note from the summary table above is that with systems c, d and e, the results are virtually identical, regardless of whether EC10 or EC10/12 data are used. Moreover, with both data sets, the inclusion of more than one independent variable has a very similar impact - the role of consumption and net domestic intervention falls, and that of net exports rises. Thus the outputs from regressions a and

b, by excluding external independent variables, overstates the roles of Cres and NDIres in absorbing Qres, and understates XMres.

In moving from a system with just Qres as the independent variable to one with two independent variables, including ROWQres as well, it can be seen that whilst in the individual regressions the influence of this second variable is statistically insignificant, in terms of its impact on the roles of the three absorbents it IS very important. The summary table above indicates that its addition reduces slightly the role of net domestic intervention, but reduces the role of consumption markedly, with the role of net exports rising against this background. With regard to the signs on ROWQres in each regression within this and later systems, they are exactly as expected. If for example there is a particularly good harvest in the rest of the world, then export opportunities are lowered, and hence the coefficient on XMres should be and is negative. This would then require a greater role for domestic consumption and domestic intervention in disposing of any domestic production variation. If domestic consumption from current production rises, this would reduce the scope for sale of products from intervention back onto the domestic market, hence reinforcing the positive coefficient on ROWQres in the NDIres regression.

The impact of adding residuals around the trend in opening stocks has a negligible impact on the role of any of the absorbents in the system. This is reinforced by the fact that in all regressions including OPres, this variable has a t-statistic of never more than |0.66|. This suggests that there is no effective stock constraint in EC cereals market operations, as more stock capacity can readily be brought on line from the private sector as and when required, and thus this variable has no impact on the role of the absorbents, as could be expected if there WAS a stock capacity constraint.[38]

Finally there is the system which replaces OPres with the $:ECU exchange rate. With both data sets it can be seen that the addition of this variable is important as its inclusion results in a greater role for net exports, at the expense of net domestic intervention. In the individual regression outputs from the systems, it can also be seen that now, in the XMres regressions, ROWQres has also become statistically significant. In the Cres regressions, ER is insignificant, and this is reflected in a much lower coefficient than on ER in the other regressions in the systems. As with ROWQres, all the signs on the coefficients are as would be expected. With the exchange rate

[38] In National Audit Office. (1986), it was indicated that with regard to the UK, commercial stores were obtained by tender on short term contracts, typically year by year. Moreover, "nearly 30% of IBAP's expenditure on hired cereals storage in the past five years has related to capacity reserved but not used." Although written in relation to financial 'wastage', this indicates that indeed there has been no difficulty in obtaining more storage capacity, in the UK at least.

expressed in US dollars per ECU, a fall in that rate means that EC exports have become relatively cheaper, when expressed in US$. Thus the competitiveness of EC exports has risen and, ceteris paribus, one would expect from this that net exports would rise with that fall in the $:ECU exchange rate. This confirms the negative coefficient on ER in the XMres regressions. From this, as with ROWQres earlier, one would expect the coefficients on ER in the other regressions to be positive - that as the exchange rate rose, and the competitiveness of EC exports fell, then greater use would be made of 'domestic' outlets for cereals production variation - consumption and intervention purchases (remember from what was said earlier, 'trade' is perhaps THE main variable controllable by the cereals management committee. If this economic variable acts to restrict this function, then they will resort, directly or indirectly, to the other variables).

Turning to the diagnostics table, even a brief examination shows that the best system overall is that including the exchange rate as an independent variable. Thus this system specification is the one that can be used in the later analysis.

One problem remains however. This last system gives a figure for the absorbency for net exports, but not for the individual elements of imports, exports from the open market, and exports from intervention. As before however, individual regressions were run of Mres, Xomres and IXres against Qres, ROWQres and ER for EC10 and EC10/12. The following results were obtained:

EC10 Data

				Rsq	Rbsq	DW
Mres = -0.247Qres	+ 0.012ROWQres	+ 706.492ER				
	(-3.374)	(1.053)	(1.511)	0.509	0.386	1.603
Xomres = 0.2Qres	- 0.002ROWQres	+ 25.917ER				
	(2.135)	(-0.168)	(0.043)	0.295	0.118	1.646
IXres = -0.031Qres	-0.001ROWQres	- 407.45ER				
	(-0.425)	(-0.095)	(-0.888)	0.047	-0.191	0.784

EC10/12 Data

Mres = -0.165Qres	+ 0.013ROWQres	+ 559.75ER				
	(-1.923)	(1.262)	(1.244)	0.274	0.093	1.611

Xomres = 0.187Qres + 0.004ROWQres + 151.237ER

(1.771) (0.3) (0.272) 0.262 0.078 1.827

IXres = 0.051Qres - 0.005ROWQres - 451.053ER

(0.614) (-0.5) (-1.035) 0.072 -0.16 0.797

All these regressions were run individually, without any restriction imposed. The outcome of this is that for the EC10 data, the sum of the coefficients on Qres is 0.478 and for the EC10/12 data 0.403. With the systems reported earlier, the figures came to 0.52 and 0.53 respectively. For the reasons discussed earlier, these regressions cannot be run within a system where the coefficients could be constrained to 0.53

5.7.6: Conclusions on Residuals Analysis

The residuals analysis reported above has taken cereals market data, which trend strongly owing to the dominance of the production data set in determining so many of the other variables, and which itself is very heavily determined by cereals yields, which trend strongly, and attempted to analyse a particular feature of the operation of the cereals market. Owing to problems caused by the statistical properties of data that trend strongly, the earlier trend analysis was inappropriate in this case, so residuals around trend were taken, and then used to examine how production variation around trend is accounted for in the management and operation of the cereals market. Owing to limitations in the computer package used, this couldn't be performed in the detail desired, but an alternative approach is available to give the required detail, even if the approach is less satisfactory.

5.8: CONCLUSION TO CEREALS MARKET ANALYSIS

This chapter has provided a general overview of the cereals market, as well as an analytical introduction to certain features of the market. The opening section considered trends in certain key variables. It showed that, for the period 1973-1991 production is rising, on average, at 2.75 million tonnes per year, or 2.2%. This can be attributed to a yield increase of 2.5% per year, against an area decline of 0.3% per year. Consumption is shown to be roughly static over the period of analysis, with the increase in production therefore reflected in changes in trade volumes. Exports are rising at over 1.5 million tonnes per year, with imports falling at over 1.1 million tonnes per year. On average, less than 4% of grain goes into intervention, but when the proportion of the increase in production is considered, that figure rises to 15%.

The second section considered the impact of fluctuations in production on the other key variables in the market. The three absorbents of production are net trade, consumption and intervention storage. The main one of these has been shown to be trade, taking up to 50% of production variation each year, on average. Despite price support, consumption has taken 20%, with intervention absorbing the other 30%. It has moreover, been shown that these proportions are influenced by world market conditions, especially fluctuations in third countries' production. It has also been shown how exchange rate movements also influence these shares, particularly of trade and intervention.

From this, the next two chapters go on to look at the key variables of the cereals market in more detail. The nature of the analysis in this chapter has focussed on certain statistical properties of the data, in particular utilising the fact that much data exhibit a time trend. This is considered more in the following chapters, where such features are more important to the outcome. Chapter 6 and 7 go on to examine and model cereals production and consumption, accounting specifically for the trends present in the data. The residuals analysis in the later part of Chapter 5 is able to allow different estimates of future expenditure to be made given different end uses of production and variation in that production.

APPENDIX 1

Following Stewart[39], two 'regions' can be identified using the following models:

$$Y_t = \alpha_1 + \beta_1 X_t + u_t \qquad \text{in region 1}$$

$$Y_t = \alpha_2 + \beta_2 X_t + u_t \qquad \text{in region 2}$$

Region 1 is taken to be the period 1975/6 to 1984/5, that is the period when the data set is for the EC10; and region 2 is the period 1985/6 to 1990/1, when the data set is for EC12. The above equations suggest that both the y-intercept term and the slope coefficient are different in the two regions or data periods, The procedure here is used to consider this hypothesis.

By creating two dummy variables, the two equations above can be re-written as one estimable equation.

[39] Note that this follows very closely pp138ff of Stewart, J. (1984).

D_{1t} = 1 in region 1 and 0 in region 2

D_{2t} = 0 in region 1 and 1 in region 2.

Thus:

$$Y_t = \alpha_1 D_{1t} + \alpha_2 D_{2t} + \beta_1 (D_1 X)_t + \beta_2 (D_2 X)_t + u_t$$

Given the data set however, this cannot be estimated as it is singular. Since $D_{1t} + D_{2t} = 1$ for all t however, D1 can be eliminated from the regression by replacing it with $1-D_2$. This gives an equation that can be estimated of:

$$Y_t = \alpha_1 + \delta_2 D_{2t} + \beta_1 X_t + \gamma_2 (D_2 X)_t + u_t$$

where

$\delta_2 = \alpha_2 - \alpha_1$

$\gamma_2 = \beta_2 - \beta_1$

If for any of these regressions $\delta 2$ is insignificant, the intercept is the same for both regions, and if γ_2 is insignificant, the slope of the regression line is the same for both regions.

In the regressions described on pages 12 and 13, Y_t is respectively production, imports, consumption and exports. D_2 is the dummy which takes the value 1 for the last six years, ie those years with data for the EC12, X_t is the time trend for the whole data period, and D_2X is the trend for the last six observations.

For production:

$\alpha 1 = 91948.667$

$\delta 2 = 41267.733$

$\beta 1 = 4918.624$

$\gamma 2 = -2902.024$

The null-hypothesis is set up to test the statement that there is no difference between the two regions. That is, the test is considering the restriction $\delta_2=0$, and $\gamma_2=0$. If this is so, the enlargement of the EC has no statistically significant effect on, in turn, production, imports, consumption and exports of the EC grouping. The test statistic is given overpage:

$F = (S_R - S)/g \; / \; S/(n-k)$

where:

S is the residual sum of squares without the restriction imposed,

S_R is the residual sum of squares with the restriction imposed,

g is the number of restrictions under test (here, g=2),

n is the total number of observations in the whole of both regions (here, n=16), and

k is the number of parameters estimated in the unrestricted equation (here, k=4 - α1-hat, δ2-hat, β1=hat, and γ2-hat).

The degrees of freedom df1=g and df2=(n-k).

This gives critical values for the F-test of 3.89 at the 5% level and 6.93 at the 1% level.

The estimated F values for the four variables are as follows:

Production = 1.921

Imports = 9.379

Consumption = 29.527

Exports = 1.906

Referring back to the earlier regressions using one dummy variable, it would appear that with consumption, it is α rather than β that is significantly different, ie the intercept coefficient is different, but the slope coefficient is the same, ie the enlargement affects the quantity of cereals consumed, but not the rate of change of that quantity. The regression for imports suggests there, it is the slope coefficient that is different between EC sizes, with the intercept being the same. For production and exports, the enlargement of the Community has no statistically significant effect.

CHAPTER 6: PRODUCTION ANALYSIS

The threshing-floors will be full of grain, the vats overflow with wine and oil.
(Joel 2:24, Jerusalem Bible).

6.1: INTRODUCTION

From the discussion of policy in Chapter 4 above, it can clearly be seen that the level of production of cereals has been a key variable in determining the level of expenditure incurred by the EC in supporting the cereals sector under the CAP. In the analysis which follows, the level of production is treated as the product of area and yield. These two variables are influenced by a number of factors. As will be seen, time series data on both of these variables exhibit distinct patterns, and an analysis considering just production could result in important influencing factors being overlooked, and important information being lost.

Before turning to the analysis however, it needs to be stated clearly what is meant by 'area', in order to see what is meant by 'production'. The area of a crop can be defined either as the area *planted* to that particular crop, or alternatively the area of that particular crop that is *harvested*. These two will generally diverge to some extent, depending on such factors as local prices, or local weather conditions, and the influence this will have on crop quality and potential profit or loss opportunities from harvesting and selling the product. Thus the production referred to in the following analysis relates to harvested area rather than planted area (though the term 'harvested production' seems rather superfluous)[1]. This chapter develops by first considering the data used, and more importantly, certain key problems with the data, before discussing the analysis of cereals yields, then cereals area. The latter analysis extends beyond just the cereals sector to consider land use for other crops, principally oilseeds, which can be viewed as the main substitutes for cereals in the use of land.

6.2: YIELD AND AREA DATA

The data used in the analysis have been obtained from a number of sources. The principal source has been the Agricultural Situation in the Community, published by Eurostat. Where data from here were quoted only for EC9 and EC10, supplementary data were obtained from the FAO's Production Yearbook, in order to obtain a data set

[1] Note that for the purposes of Chapter 8 below, an analysis of expenditures under the old cereals regime refers to harvested area. For the new regime however, both harvested and planted areas impact on budgetary expenditures.

for the EC12 for the full data period from 1973. For 1991, the only source that excluded the five länder of the former East Germany was the HGCA's Weekly Digest 18/3 of 15.7.1991. One point to note is that the data for yields, area and production are not precisely consistent because of errors due to rounding.

6.2.a: DATA PROBLEMS - NON STATIONARY SERIES[2]

In recent years, there have been a number of advances made in the analysis of supply response, utilising certain new statistical techniques. McClelland and Vroomen[3] (McC&V) are just two of many applied economists to have incorporated these new ideas into their analysis. Of particular relevance for the current work is the development of a framework that tests for stationarity in data. Such analysis has highlighted particular shortcomings in traditional econometric analysis with respect to much economic data (especially relating to agriculture), as well as providing a means of overcoming such difficulties.

What is required for the statistical tests employed in regression analysis to be reliable is that the data set is invariant with respect to time, and for it therefore to possess a constant mean and variance, and a covariance between observations dependent only on distance apart in time. If non-stationary variables are incorporated into a standard regression, the R-squared is biased towards unity, t-statistics are biased upwards, and the Durbin Watson tends to zero. Adding a time trend variable can appear to give 'good' statistical results, but as Nelson and Kang point out, such an indication can be misleading.[4] Granger and Newbold have shown how regressions between unrelated non-stationary series suggested statistically significant relationships when the regressions are actually spurious.[5]

Many data sets however exhibit a time trend, and if the following representation accurately fits the data for a variable y_t, it is said to be trend stationary[6]:

$$y_t = a + bT + u_t \qquad 6.1$$

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[2] A great debt of thanks is owed to Tim Lloyd for explaining the following ideas so accessibly, although any misunderstandings are my own fault.

[3] McClelland, J. W. and H. Vroomen (1988).

[4] Nelson, C. R. and H. Kang. (1984).

[5] Granger, C. W. J. and P. Newbold. (1974).

[6] That is to say, the data can be de-trended either by using the residuals from a regression of y_t against time, or alternatively by incorporating a time trend variable in the model. Either approach is acceptable in making a trend-stationary series stationary.

where u_t is itself a stationary series. Here, the data exhibit a zero mean and constant variance AROUND a rising trend. Note that with many series where the absolute data rise over time, the variance rises in absolute terms also, although remaining at a stable percentage rate. It is therefore common practice with such data to take the natural logarithms, as this eliminates such problems, and allows the use of standard statistical tests.

The second form of stationarity exhibited by much economic data is that of difference stationarity (where the data exhibit a stochastic trend rather than a deterministic one). Here, if the data set is not stationary in its absolute form, but becomes stationary after first-differencing, that absolute data are said to be integrated of order one - I(1) - and have a unit root. Here:

$$Y_t - Y_{t-1} = a + u_t \qquad 6.4$$

where u_t is stationary, and 'a', the mean, is a constant. Y_t is said to be difference stationary with drift (drift being where $a \neq 0$). If the series of first differenced data are found to be stationary, this differenced data are then said to be I(0). In practice, much economic data are actually difference stationary, although historically, much empirical analysis has simply added a time trend variable in regression analysis, making the implicit assumption that because the data set exhibited a trend it was, in Nelson and Plosser's terminology, trend stationary.

Thus in the following analysis, attention is given to the statistical properties of the data used, to establish if they are trend stationary (TS) or difference stationary (DS). This then allows the main focus of the work, the policy analysis, to be carried out with confidence in the statistical results gained. It must also be noted however that the current work, in dealing just with data since 1973, involves a relatively very limited data set. The significance of this can be seen simply by noting that the tables of significance values for the test statistics calculated by Dickey and Fuller quote a sample of 25 as the smallest.

6.3: CEREALS YIELDS

The use of a deterministic time trend variable in the modelling of agricultural crop yields has long been an unquestioned practice. Typically, the use of time has been justified as a proxy variable for technical change, that implicitly being taken as a key explanatory variable, perhaps THE key explanatory variable for yields. Whilst individual changes in technology could be thought of as being 'lumpy' in terms of their

effects on yields, the net effect over all technological advances is however assumed to be smooth and deterministic.

A further issue that needs consideration is whether or not yields are increasing at a fairly stable absolute rate or percentage rate. Other than the matter referred to earlier about statistical considerations, this will determine whether it is appropriate to log the data or not. This was examined in a very simple way. Looking first at the first-differenced yield data for the period 1973 to 1991, the average year on year change for the second half of the period (1983 to 1991) came to 150% of the average annual change for the first half (1974 to 1982). This hopefully smoothes out the impact of any outliers, and also suggests that annual changes in yields have been increasing over time. Next, those annual changes were taken as a percentage of the previous year's yield level. Here, the average for second half (2.824%) was 122.5% of the average of the first half (2.306%). These figures suggest that yields are increasing at a rising absolute rate, and a fairly steady, though slightly rising, percentage rate. This supports taking logs of the yield data.

In examining cereals yields in the EC, even a cursory glance at the data over the period under consideration demonstrates a persistent tendency for yields to rise over time (see graph below). Following from the above discussion however, it can't simply be assumed that yield data set is trend stationary - this process must be tested for:

6.3.1: Testing for Stationarity in EC Cereals Yield Data

Consider the following regression.

$$Y_t = a + bY_{t-1} + cT + u_t \qquad 6.5$$

If $b<1$ (ie there is no unit root), and $c\neq0$, Y_t is trend stationary. If $b=1$ (ie there is a unit root) AND $c=0$, Y_t is difference stationary.[7] Testing is usually carried out on the transformation:

$$Y_t - Y_{t-1} = a + (b-1)Y_{t-1} + cT + u_t \qquad 6.6$$

or

$$\Delta Y_t = a + (b-1)Y_{t-1} + cT + u_t \qquad \text{for } t = 1 \text{ to } n. \qquad 6.7$$

[7] Note that the test for $b=1$ is also conditional on $c=0$. If the latter condition doesn't hold, the series will still be concluded to be trend stationary.

and the test for (b-1)=0 is identical to the test for b=1. With 6.7, if the coefficient (b-1) is not equal to zero, the null is rejected.

To test further however, the Augmented Dickey Fuller regression (ADF) is run. In this regression, a constant, a deterministic time trend, a non-differenced lagged yield variable, and a series of lagged differenced yield variables are all included. These are added until the error term in the ADF regression is white noise.[8]

$$\Delta \ln Y_t = a + cT + (b-1)\ln Y_{t-1} + \sum_{i=1}^{d} \Delta \ln Y_{t-i} + u_t \qquad 6.8$$

with the corrected t-statistic for (b-1) (Ho:(b-1)=0) given by Dickey and Fuller as the $\hat{\tau}_\tau$ (tau-hat-tau) statistic with a critical value of -3.95 for the 0.95 confidence level. The test for c (Ho:c=0) is Dickey and Fuller's $\hat{\tau}_{\beta\tau}$ statistic (tau-hat-beta-tau), and the critical value for the 0.95 Confidence Level is 3.20. For the intercept a, the test involves comparing the t-statistic with Dickey and Fuller's $\hat{\tau}_{\alpha\tau}$ statistic (tau-hat-alpha-tau), with a critical value also of 3.20.[9]

Below are the regression results relating to stationarity tests on the yield data.

	DF	DF	ADF
variable	Y_t	$\ln Y_t$	$\Delta \ln Y_t$
constant	29.068	3.132	3.96
t-statistic	(11.617)	(9.674)	(9.20)
trend	0.984	0.024	0.031
	(9.33)	(9.406)	(6.402)
Y_{t-1}	0.047		
	(0.663)		
$\ln Y_{t-1}$		0.089	-1.15
		(0.998)	(-8.96)

[8] That is, until the series is purely random. Such a series has no pattern or structure to it, and future values of the series cannot be predicted from past values - the best least squares estimate of future values is the mean of the series. For further details on this, see Granger, C. W. J. (1989), p47ff.

[9] The system aimed for is parsimonious; that is, d is minimised for u_t being white noise. It must be noted however that it might be that in examining the ADF regression, the parsimonious specification requires no lagged dependent variable terms, and the ADF regression collapses to the Dickey Fuller regression. Note also that with the Dickey Fuller equation, the dependent variable isn't expressed in first difference terms, whereas with the ADF equation, the dependent variable is.

$\Delta \ln Y_{t-1}$			0.19
			(1.23)
Rsq	0.867	0.860	0.538
Rbsq	0.849	0.842	0.431
DW	2.065	2.037	2.147

If the Dickey Fuller regression results are considered, firstly with the data in absolute values, and secondly in natural logarithms, it can be seen that it is strongly suggested that cereals yield is a trend stationary series. In extending this to the Augmented Dickey Fuller specification, it was found that the most parsimonious specification was acceptable regarding the absence of autocorrelation and therefore white noise residuals.[10]

The residual correlogram, reproduced below, indicates the presence of white noise residuals.

LM-test for HJ:RHO(J)=0, statistic is standard normal

LAG	RHO	STD ERR	T-STAT	LM-STAT	DW-TEST
1	-.0752	.2425	-.3100	.3566	2.1472
2	.1602	.2425	.6607	.7977	1.4447
3	-.2815	.2425	-1.1606	1.2071	2.3163
4	-.0801	.2425	-.3303	.3588	1.8588

chi-square with 4 D.F. is 1.989

With the ADF regression however, the coefficient on the lagged dependent variable is insignificant (Critical Value=1.771[11] for a 1-tailed test), and so it is deemed appropriate to return to the simpler-still DF regression specification. This is supported by the DW on the DF regression indicating no autocorrelation. These regressions demonstrate that cereals yield in the EC is a trend stationary process, requiring the use of residuals of yield around trend, or alternatively a time trend as an independent variable in the model specification of yield.

Beyond this however, all variables considered for inclusion in any regression modelling yields must also be tested for stationarity. This is required in order to ensure that all variables included in any one regression are integrated of the same order.

[10] Shazam permits the printing of the autocorrelation function of residuals, and associated test statistics.

[11] Under the null hypothesis, all terms are stationary, and thus the estimation of the parameters using standard t-tests is efficient.

Having established that cereals yield is I(0)[12], all other variables used in the estimation of yields must similarly be tested and adjusted to that same order of integration as appropriate (ie other variables must be either TS or I(0)).

6.3.2: The Simulation of Cereals Yields

The starting point for the analysis was to consider other people's work in this area. A number of articles were found, almost all of which were American. Virtually all the work done on yields included consideration of at least one weather variable in the regressions. For the US, the data are readily available. For the EC however, nothing of practical use is available.[13] Thus the decision was taken to proceed without any weather variable in the models.[14]

All earlier work included a time trend. Most also included a variable to account for fertiliser - either a measure of rate of use, or a (real) fertiliser price, or ratio of cereal price to fertiliser price.

The motivation for including the variables used came from two sources. Firstly, earlier work has shown certain years to be significant outliers. Thus dummy variables were examined for these few years to see if their inclusion was justified in this setting. Secondly, James Houck and Paul Gallagher (H&G)[15] included in their examination deflated fertiliser price to deflated cereals price. This idea was adopted as it was felt an important 'economic' variable in determining yields, as well as being one variable used in published work for which comparable data could be obtained for the EC12.[16] It

[12] All trend stationary variables are integrated of order I(0).

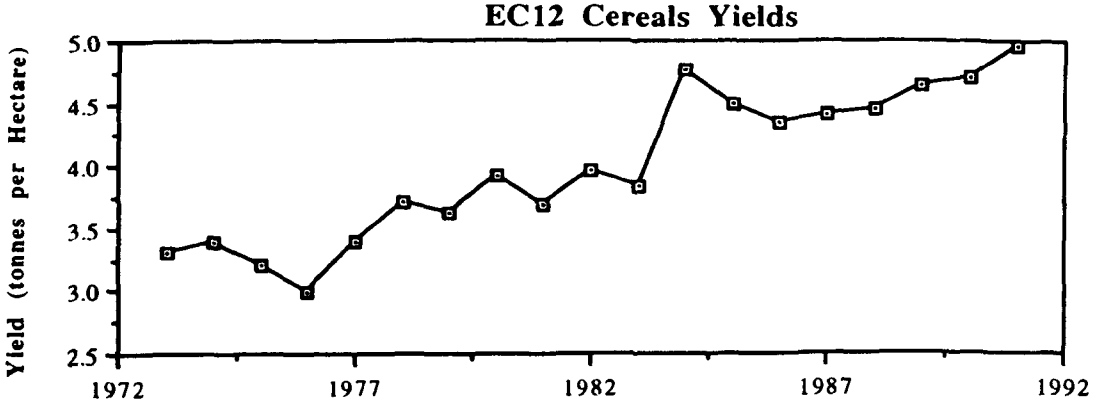
[13] Eurostat do publish climate data for 160 meteorological stations around the EC, but this data is too disaggregated to be of practical use in the current work.

[14] Having established that yields are TS however, it could be argued that climatic variation, although likely to generate some yield variation, has an insignificant impact on the overall pattern of cereals yields.

[15] see Houck, J. P. and P. W. Gallagher. (1976).

[16] The nominal price data is principally from Eurostat's ANNUAL Agricultural Prices. For 1990 and 1991, it is from the QUARTERLY Agricultural Prices, and for 1991 is the average of data for January to October, rather than the full year, as that is all that is available. The deflator is the annual percentage change, in national currency terms, of price deflator GDP at market prices, from European Economy No 46 of December 1990. The cereals included in the final figure were soft wheat and barley, in ECU per tonne, for Germany, France and the UK. Each nominal price was deflated for each member state, then a weighted 'EC' figure was derived. For wheat the weighting was 1WG:2FR:1UK, and 1:1:1 for barley. For the 'cereals' price, the weighting was 1.5wh:1bar. All these weightings were based on the approximate relative shares in total cereals production, which were fairly stable over time. The fertiliser price is for ternary fertiliser 1:1:1, in ECU per tonne (sources as for cereals). The 1990 and 1991

was however modified by inverting the ratio, as the focus of the work is on cereals rather than fertiliser use. Below is a graph showing cereals yield over time.



The modelling of cereals yields proceeds below, by first considering the absolute data. Note that the data presented in EC sources quote yields in quintals per hectare. All the following regressions have converted this figure to tonnes per hectare:

	Rsq	Rbsq	DW
$Y = 3.00 + 0.0987t$			
(28.173) (10.575)	0.868	0.860	1.852

Supporting earlier findings, 1976 and 1984 were found to be outliers. Isolating those observations with dummy variables gives the following result:

				Rsq	Rbsq	DW
$Y = 3.060 + 0.0919t + 0.607D84 - 0.447D76$						
(42.4)	(14.847)	(4.133)	(-2.953)	0.953	0.943	2.159

With 15 degrees of freedom, the critical value for a 0.95 confidence level is 2.131 (2-tailed test), so all variables are significant. For the 0.99 level, a critical value of 2.947 indicates that the dummy on the 1976 observation is now only marginally significant. The DW indicates no autocorrelation.

Whilst this indicates the presence of a strong time trend (also adjusted for the distorting effect of outliers), it excludes 'economic' variables that might influence cereals yields.

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figures include a guesstimated fertiliser price for France as no figure was given. This figure was chosen after looking at the relative prices in WG, UK and FR in earlier years, and estimating a similar relationship for 1991.

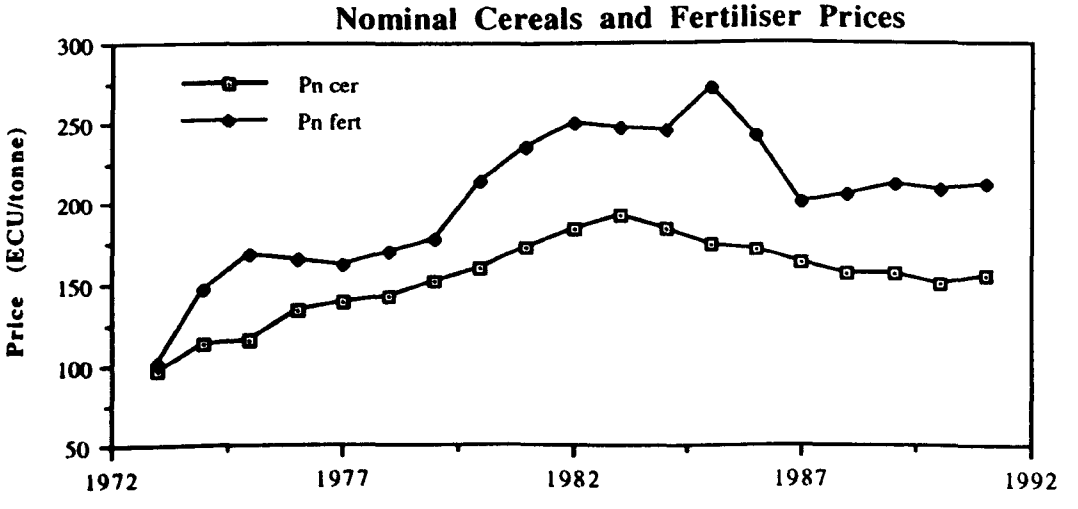
6.3.3: Stationarity and Price Variables

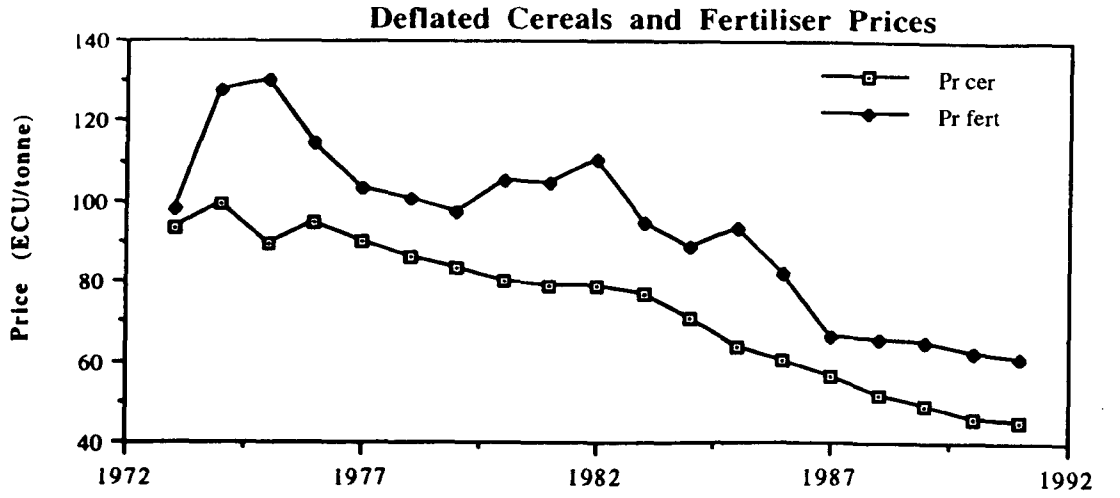
In the forecasting of cereals yields, the cereals to fertiliser price ratio must also be examined. Although this will be done in detail in Chapter 8, the series are introduced here. Below are presented graphs which show the nominal series, the deflated series, and then the nominal and deflated series for the ratios. The nominal cereals series can be seen to rise to 1983, and then gradually fall thereafter. Once deflated however, the series exhibit a strong downward trend over the period to 1991 as a whole, with slightly higher than trend prices for the period 1982 to 1984. The trend continues into 1991, but the observation for that year appears to be slightly above trend.

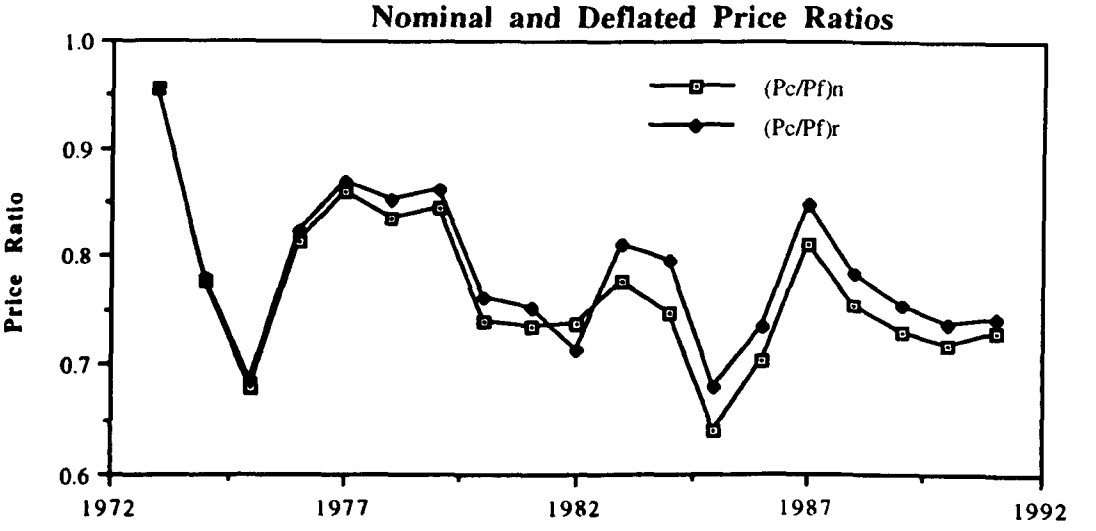
With the fertiliser price, the nominal series exhibits a generally similar pattern to the cereals price, but with more short term fluctuations. This also applies to the deflated series, though the slowdown in the decline of the series appears to date from 1987, the year when anti-dumping legislation was enacted over cheap imports from Eastern Europe, the Gulf States, and allegedly the US as well. Thus for current ends, with this legislation up for renewal, the most important data to consider are the last five observations. This is too few to perform any statistical analysis on, but a priori it would appear that a significant qualitative change occurred in 1987.

Note also how the value of the ratio relates to movements in oil prices (thus fertilise prices). Oil price hikes in 1973/4 and 1979/80 lead to sharp declines in the ratio in those periods, and the fall in oil prices in the mid 1980's led to a rise in the ratio.

Turning now to the price ratio, again both the nominal and deflated price ratio series exhibit similar patterns - perhaps an even stronger parallel than with the individual price series. Fitting a line of best fit 'by eye' for the period since 1980 suggests that the ratio is following a fairly stable trend, though with a notable low in 1985 and high in 1987.







Next, it must be established as to which process of stationarity applies to the price data. The following table summarises the results.

	DF	6.7	ADF
variable	ln(Pc/Pf)	Δln(Pc/Pf)	Δln(Pc/Pf)
constant	-0.203	-0.203	-0.262
t-statistic	(-3.576)	(-0.678)	(-3.364)
trend	-0.003	-0.003	-0.007
	(-0.874)	(-0.874)	(-5.343)
$\ln(Pc/Pf)_{t-1}$	0.101	-0.899	-1.297
	(2.925)	(-26.115)	(-4.964)
$\Delta\ln(Pc/Pf)_{t-1}$			0.544

			(4.04)
Rsq	0.076	0.521	0.641
Rbsq	-0.048	0.457	0.558
DW	1.689	1.689	2.096

These results indicate the price ratio is trend stationary.

Modelling Cereals Yields

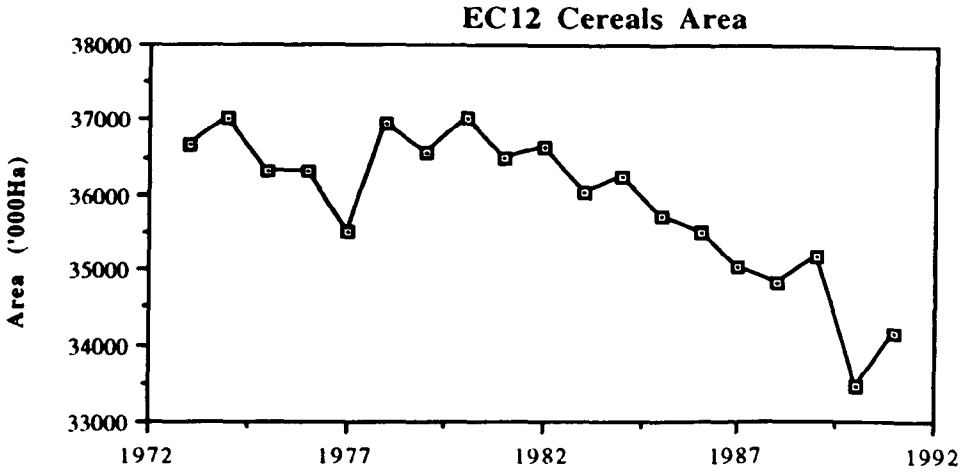
The regression results from the section above provide evidence that the price data set is trend stationary. Its inclusion in a regression against yield therefore requires that it be incorporated in the form of residuals around trend. In addition, such analysis as reported below has also identified an outlier, and isolated it by means of a dummy variable:

$$\ln Y = 1.131 + 0.026t + 0.470\ln(Pc/Pf)res_{t-1} + 0.135D84$$
$$(98.422)\ (16.967) \qquad (3.26) \qquad (12.232)$$
$$0.956 \quad 0.947 \quad 1.763$$

The trend variable is of the correct sign. In terms of lagging the price variable, it is important to note that the price figures are annual, calendar year data. It therefore relates to the January-December period, with the yield figure taken at July (or thereabouts) during that particular year. Thus if the price variable is not lagged, the model relates yield to some prices the farmer won't receive for up to another 6 months or so. Moreover, the yield in time t is in part determined by fertiliser applications in time t-1 which *a priori* will be affected by fertiliser prices in time t-1, and the relationship of that price to the price of cereals in t-1.[17] Note also that the DW indicates no autocorrelation (the critical value is 1.69).

[17] Thus affecting the attractiveness of applying fertiliser then.

6.4: CEREALS AREA



As noted above, the use of a time trend in the analysis of agricultural crop yields has for a long time been unquestioned. With regard to crop areas, the use of a time trend hasn't been so widespread or frequent, although a number of studies have used it as an explanatory variable.[18] The justification for using time as an explanatory variable for area can be summed up from Morzuch et al. It "is inserted to capture the effects of omitted variables that may have exerted systematic effects over time. For example, if technological change has tended to increase wheat yields less rapidly than the yields for competing crops, then for a given expected relative price, acreage planted to wheat would likely decline."[19]

The work of McClelland and Vroomen however indicates that, on the basis of their findings, area appears to be a difference stationary process. Therefore stationarity should be achieved by first differencing the area data, not by inserting a time trend.

6.4.1: Testing for Stationarity in EC Cereals Area Data

The area data set was examined in exactly the same way as the yield data above for stationarity. The results are set out below:

	DF	6.7	ADF
variable	$\ln A_t$	$\Delta \ln A_t$	$\Delta \ln A_t$
constant	7.013	7.013	1.776
t-statistic	(4.419)	(4.419)	(0.642)

[18] See for example Houck, J. P. and M. E. Ryan. (1972); Morzuch, B. J. et al (1980); Shideed, K, H, et al (1987); and some of the elements in Skold, K. D. and P. Westhoff. (1988).

[19] ibid p30.

trend	-0.297	-0.003	-0.002
	(-2.852)	(-2.852)	(-1.132)
$\ln A_{t-1}$	0.334	-0.666	-0.169
	(2.216)	(-4.423)	(-0.643)
$\Delta \ln A_{t-1}$			-0.637
			(-2.734)
Rsq	0.682	0.347	0.490
Rbsq	0.640	0.259	0.372
DW	2.242	2.242	1.780

With a critical value of 3.20, it can be seen from both the DF and ADF regressions that area is difference stationary (even with the DF regression, the DW indicates no autocorrelation).

6.4.2: The Simulation of Cereals Area

The general pattern of area shown in the graph above is one where area is relatively stable until the late 1970's, from which time it moves downwards quite markedly. This suggests a possible structural break in the data. The stationarity tests above are on the data for the full data period. As will be shown below, this has caused a problem in that none of the work carried out was able to account for such a pattern. Thus much work has been carried out using a shorter data period, starting in 1979. Below is the ADF regression for the shorter area data set.

$$\Delta \ln A_t = 8.218 - 0.007t - 0.780 \ln A_{t-1} - 0.494 \Delta \ln A_{t-1}$$
$$(4.503)\ (-10.365)\ (-4.495)\ \ (-18.339)\qquad 0.782\quad 0.710\quad 2.461$$

Whilst the statistical reliability of such a regression with so few data points could be questioned, this nonetheless indicates what might be expected - that this shorter data set for cereals area is a deterministic function of time. Initially however, the analysis has proceeded assuming a unit root in the area data, but over both periods.

As with yields, the starting point was a consideration of other people's work in this area. The first model is a Nerlovian-type model including lagged price and lagged area. This is however rather a narrow analysis, as potentially important variables are omitted. A priori reasoning suggests that, at least in the EC, the price of cereals is by itself perhaps insufficient - what needs to be examined is the cereals price relative to the price of one or more competing crops (eg oilseed rape). Moreover, the area planted to cereals

is declining over time, but consideration needs to be given to whether or not this trend applies to all crops, or if area formerly planted to cereals is now planted to, say, oilseeds, with the total area unchanged or perhaps even rising.

The first model to be examined, as already indicated, is the Nerlove model, over the full data period. The variables are expressed in logs and first differences, and the price data are deflated:

$$\Delta \ln A = -0.007 + 0.005\Delta \ln Prc_{t-1} - 0.538\Delta \ln A_{t-1} + 0.223\Delta \ln A_{t-2}$$

(-1.274) (0.381) (-2.511) (1.421)

0.402 0.253 2.019

As can clearly be seen, the test statistics are generally very unsatisfactory. They tend to support the *a priori* reasoning set out above, that such a specification, considering one incomplete 'economic' variable (cereals price, excluding the price of competing crops), and lagged values of the dependent variable, is too simplistic. In addition to this specification, an error correction model was examined, incorporating current price, and lagged area minus lagged price, but again the results were generally unsatisfactory.[20]

In considering the economic variables possibly having an influence on the area planted to cereals, the analysis started by examining what were considered the key price variables, real weighted EC prices for oilseed rape and cereals, and the ratio of cereals price to rape price.[21]

Below are graphs of the individual rape price series (see above for cereals) and also their ratio.

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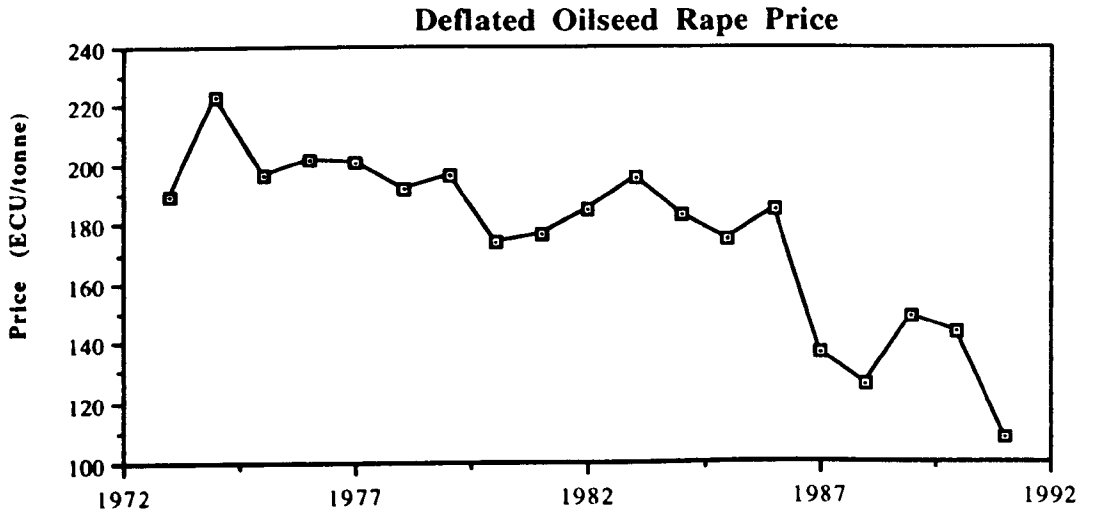
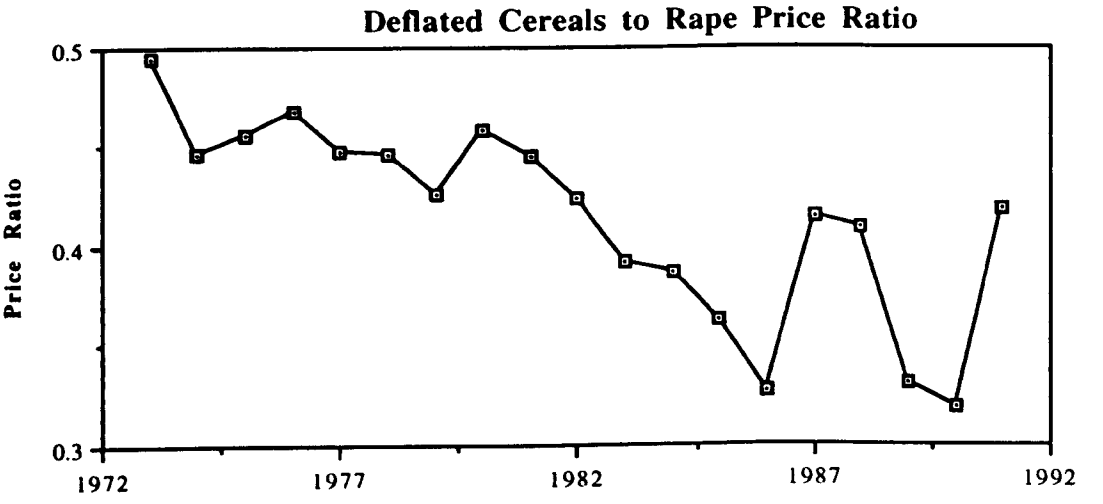
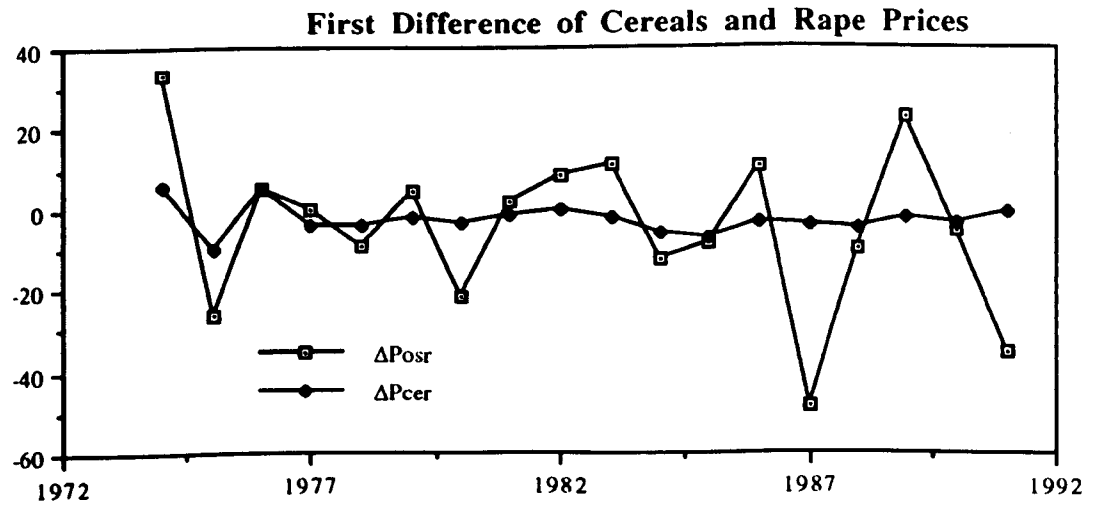
[20] For details of the methodology, see Stewart, J. (1991).

[21] The cereals price is that used in earlier analyses. The rape price was chosen over an 'oilseeds' price as the EC only publishes very limited price data for soya and sunflower. The price was taken as a weighted average of French and German prices in ECU/t from the same source as the cereals data. The production for those two countries was stated as a percentage of the EC12 production, then the EC price was calculated with the French price given a weighting of 1, and the German price given a weighting of output relative to the French output - usually between one third and one half. Note that the weighting wasn't fixed for all years, as happened for cereals, as the relative production shares changed significantly during the period under consideration. As with cereals the relative output level was compared with the EC12 level for the FULL data period, ASIC data being supplemented where necessary by FAO data.







It can be seen that, like cereals, the rape price moves down over time, although

there is more fluctuation in the rape series. This can clearly be seen from the last graph above. Also, the rape data initially fall more slowly than the cereals price. This could be accounted for by noting that the crisis in expenditure on oilseeds came much later than with cereals. Moreover, in the early eighties when cereals prices were already being cut back with the introduction of Guarantee Thresholds, attempts were being made to actually expand the supply of rape and other oilseeds to crushers from domestic production. By 1987 however, price cuts were also being implemented for rape under the arrangements for guaranteed maximum quantities.[22] With the introduction of the stabiliser measures in 1988, an oilseed cobweb was set up as the price cuts were non-cumulative (see Chapter 4 for a detailed discussion of this). The impact of this can clearly be seen in making prices much more unstable in the years from 1988. The impact of these can also be seen in the graph illustrating the ratio of cereals to oilseeds price.

Turning now to the analysis of the price data, as before, the series have been examined using Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) regressions. First, the cereals price data set is considered:

	DF	6.7	ADF (1lag)	ADF (2lag)
variable	lnPc	ΔlnPc	ΔlnPc	ΔlnPc
constant	1.543	1.543	0.766	1.593
t-statistic	(2.701)	(2.701)	(0.925)	(3.153)
trend	-0.018	-0.018	-0.012	-0.019
	(-3.987)	(-3.987)	(-1.46)	(-3.484)
$lnPc_{t-1}$	0.670	-0.330	-0.169	-0.344
	(5.356)	(-2.633)	(-0.953)	(-3.162)
$\Delta lnPc_{t-1}$			-0.372	0.059
			(-1.243)	(0.298)
$\Delta lnPc_{t-2}$				0.176
				(1.310)
Rsq	0.979	0.376	0.312	0.505
Rbsq	0.977	0.293	0.153	0.325
DW	2.294	2.294	1.336	1.54

The signs on the trend coefficients are as would be expected. Subject to the now-

[22] Note that this is NOT the same as the MGQ introduced the following year as part of the stabiliser package. See EC Commission (1987h) for details of the price package.

familiar caveat regarding the small size of the sample, and given the DF test statistics for a sample of 25 of about 3.6, both the trend variable and lagged dependent variable in the DF regression are statistically significant. The DW statistic too is significant.[23] With the ADF regressions, again the signs correspond to that which would be expected from a casual examination of the data. The DW is however of concern. With the second ADF specification, the sign on the $\Delta lnPc_{t-1}$ variable has changed but in both regressions they were statistically insignificant from zero anyway. The DW is only marginally less bad.

From this the main point to note is that, given the acceptability of the DW statistic from the DF regression, it would appear that cereals prices are trend stationary. Given the EC's practice in recent years of holding nominal ECU prices stable, and bearing in mind that the prices are deflated, such a consistent downward trend is not surprising. It must be noted however that acceptance of the suggestion that prices are a deterministic function of time requires that it is also accepted that the process of setting prices in ECU terms has been treated relatively passively by the EC, and that rising price levels, reflected in the rising deflators, is similarly persistent over time, or at least for the time period under consideration.

Repeating for the rape price series:

	DF	6.7	ADF (1lag)	ADF (2lag)
variable	lnPo	ΔlnPo	ΔlnPo	ΔlnPo
constant	4.118	4.118	1.236	2.591
t-statistic	(8.182)	(8.182)	(2.321)	(1.364)
trend	-0.025	-0.025	-0.029	-0.021
	(-5.54)	(-5.54)	(-2.379)	(-2.014)
$lnPo_{t-1}$	0.244	-0.756	-0.006	-0.476
	(2.468)	(-7.637)	(-2.301)	(-1.349)
$\Delta lnPo_{t-1}$			0.169	-0.057
			(0.597)	(-0.221)
$\Delta lnPo_{t-2}$				-0.481
				(-1.364)
Rsq	0.737	0.394	0.337	0.503
Rbsq	0.702	0.313	0.184	0.323
DW	1.624	1.624	1.432	1.826

[23] With n=18 and k'=2, the CV is 2.47.

Again, no definitive conclusion can be drawn from this about the nature of the data. The DW of 1.624 indicates no autocorrelation.[24] Examining the data for rape prices suggests that the downward trend is fairly consistent over the data period, but the variation in the data, especially for the most recent few years, makes it very hard to tell for certain.

Turning therefore to the consideration of the ratio of cereals to rape price using the same four regressions, the following results were obtained (PR is the ratio of cereals to rape price):

	DF	6.7	ADF (1lag)	ADF (2lag)
variable	lnPR	ΔlnPR	ΔlnPR	ΔlnPR
constant	-0.788	-0.788	0.776	0.575
t-statistic	(-5.122)	(-5.122)	(5.098)	(6.193)
trend	-0.018	-0.018	-0.012	-0.009
	(-4.984)	(-4.984)	(-6.360)	(-6.367)
$lnPR_{t-1}$	-0.068	-1.068	-1.621	-1.233
	(-0.297)	(-4.650)	(-5.026)	(-6.412)
$\Delta lnPR_{t-1}$			0.678	0.435
			(3.856)	(5.526)
$\Delta lnPR_{t-2}$				-0.284
				(-2.333)
Rsq	0.530	0.463	0.609	0.628
Rbsq	0.468	0.392	0.518	0.493
DW	1.787	1.787	1.526	1.832

As before with the individual series, the signs are as expected, and with the DF regression, the DW is not significantly different from two. This indicates that the price ratio is a trend stationary series. This is on the face of it contrary to what would probably be expected and, if accepted with the caveats noted, says a great deal about the decision making process in the EC with regard to setting prices, if they can be viewed as a deterministic function of time.

To summarise therefore, cereals area is DS, and the price ratio is TS. Strictly, these are incompatible over the full data period, but the structural break appears to nullify this.

From this, it was decided to proceed by testing certain regressions with cereals area

[24] The critical value is 1.53.

regressed against both logged and logged & differenced price data. The results were generally very unsatisfactory. One version that was run included the price ratio lagged. Note that with the price data relating to calendar years, and the area figure being for area harvested, it would have been the previous year's price that the farmer knew when planting at least some of that particular area. Therefore in general, lagged prices have been used in examining cereals area. Moreover, as the prices relate to the FULL calendar year, some part of the figure relates to months after harvest in time t, therefore having more influence over areas planted for harvesting in t+1:

$$\Delta \text{lncerA} = 7.061 + 0.129\ln(Pc/Po)_{t-1} - 0.031\Delta\ln(Pc/Po)_{t-1} - 0.663\ln A_{t-1}$$

(4.372) (4.599) (-0.531) (-4.360)

0.353 -0.204 2.308

The lack of data points and hence degrees of freedom causes problems interpreting the DW. A similar regression was also run for the shorter data period, with similar results.

Finally in this section, a partial adjustment model was tried, with cereals area regressed against lagged cereals area and alternately current and lagged prices. Both cereals price and the ratio of cereals to rape price were tried, and the regressions were run in both logged and logged/differenced forms. All four models tried gave better results than earlier models, but the regression statistics still perform only modestly:

variable	lnA	lnA	ΔlnA	ΔlnA
constant	9.379	6.433	-0.010	-0.007
t-statistic	(5.317)	(3.052)	(-2.624)	(-1.694)
$\ln Pc_{t-1}$	0.094			
	(3.905)			
$\Delta\ln Pc_{t-1}$			-0.040	
			(-2.613)	
$\ln A_{t-1}$	0.067	0.396		
	(0.380)	(2.005)		
$\Delta\ln A_{t-1}$			-0.629	-0.647
			(-11.598)	(-7.970)
$\ln(Pc/Po)_{t-1}$		0.114		
		(2.581)		
$\Delta\ln(Pc/Po)_{t-1}$				0.038

				(0.772)
Rsq	0.734	0.687	0.410	0.431
Rbsq	0.699	0.645	0.326	0.351
DW	2.254	2.495	1.693	1.898

6.5: TOTAL ARABLE AREA

The regression results above all have rather poor test statistics. The main problem appears to be the structural break in the data. What was done to try to get round this problem therefore was to broaden the analysis to what has been termed for simplicity total arable area. It was argued above that it was valid to incorporate rape prices in considering the change in the area planted to cereals in the EC. This section argues that this can be extended to include the change in the actual area of land used for these other crops, which can be seen as substitutes in production for cereals. The reasons for this relate to seeing whether or not the general downward movement in cereals area in more recent years reflects a downward movement in the area of all arable crops, or if it is occurring against a generally static or rising arable area planted.

The crops considered in addition to cereals were rape, sunflowers and soya. As was noted earlier, the EC only produces very limited price series for these other crops, but the area data set is better.[25] The total area of these four crops was termed total arable area (or AA). Crops such as sugar and potatoes were excluded as their substitutability for cereals is much more limited - specialised equipment would be needed, as well as quota to actually provide the entitlement to produce. It is conceivable that farmers already producing cereals and these other root crops could possibly expand their production, but the overall impact on AA was felt to be relatively insignificant.

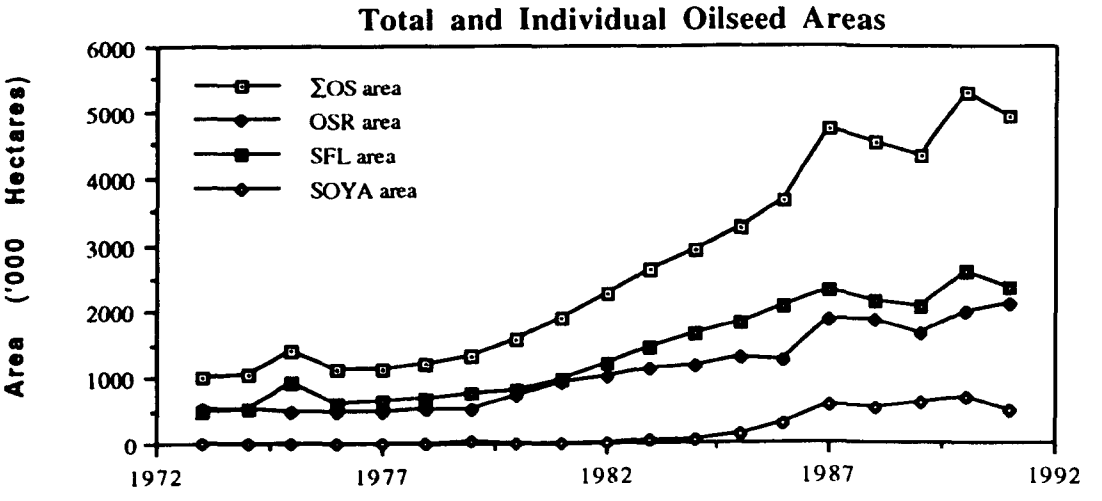
Secondly there is the question of set aside. Here it has been assumed that all land set aside was planted to the crops included in the calculation of AA. In this way, the problem of trying to guess the proportion of set aside land coming from other crops has been avoided.[26] The data that incorporates land area set aside have been termed net

[25] ASIC contains such data, and this can be supplemented by data from FAO in the standard way to get a complete series for the EC12. Note also that whilst the FAO produces some prices for these other two crops, the data is both incomplete, and also estimated on a different basis to the EC rape and cereals data.

[26] The source of data for land set aside under both the 5 year and 1 year schemes has been the HGCA's Weekly Digest 18/35 of 2.3.1992. This and other sources just give total figures for land area set aside. With crop rotations however, it would be impossible to realistically be able to do anything else. Note also with regard to work for Chapter 8, land to be set aside is from that area planted to arable crops, essentially as defined here.

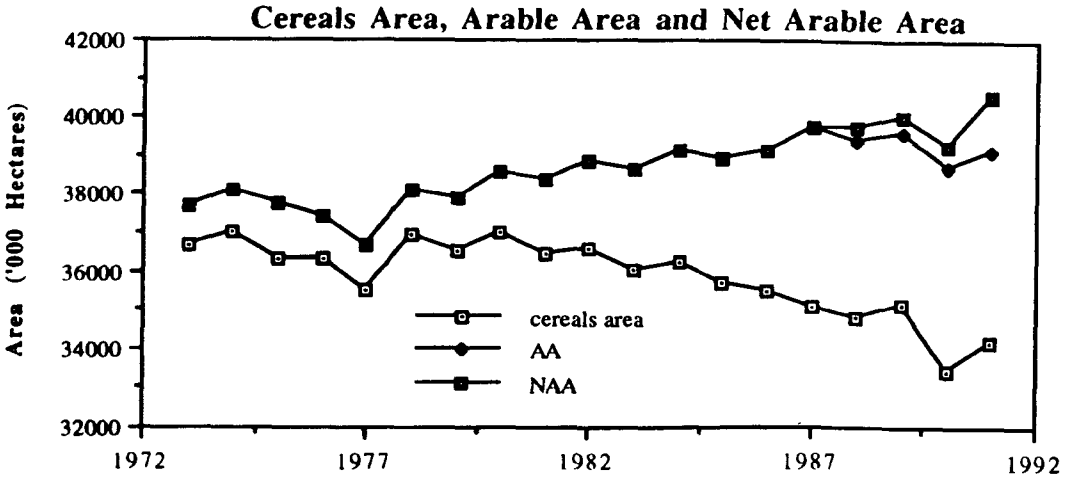
arable area or NAA.

It can be seen from the graph below that since the mid 1970's, sunflower has been planted to the largest area of all oilseeds. All three oilseeds follow the same general pattern however, with the Spearman correlation coefficient between the different series never falling below 0.92.

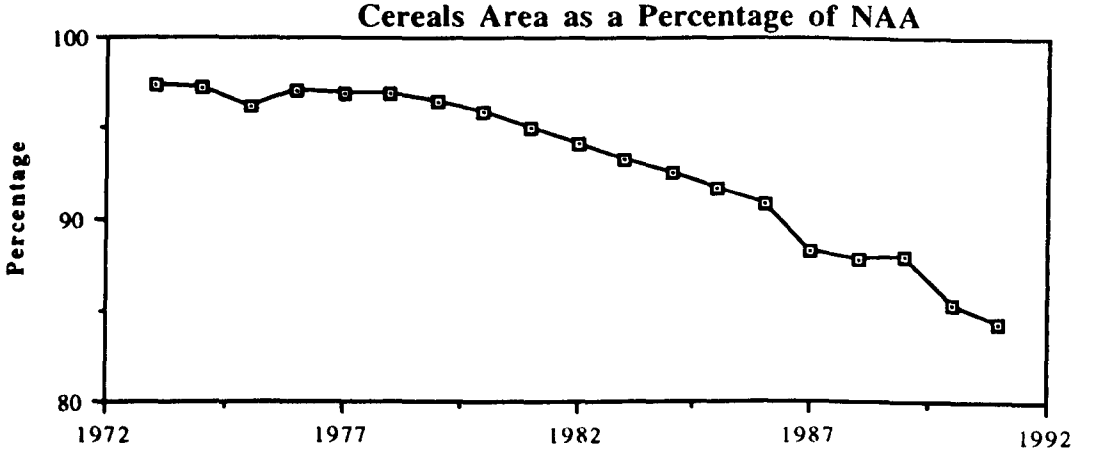


The following regressions consider NAA. As can be seen, they suggest the NAA data set is trend stationary. The graph of the NAA data is presented below the regression results.

	DF	6.7	ADF
variable	lnNAA	ΔlnNAA	ΔlnNAA
constant	10.581	10.581	11.016
t-statistic	(4.872)	(4.872)	(5.881)
trend	0.004	0.004	0.005
	(3.934)	(3.934)	(4.51)
$lnNAA_{t-1}$	-0.006	-1.006	-1.047
	(-0.027)	(-4.868)	(-5.87)
$\Delta lnNAA_{t-1}$			-0.085
			(-0.702)
Rsq	0.797	0.511	0.643
Rbsq	0.770	0.446	0.561
DW	2.017	2.017	1.548



Turning now to compare cereals area with NAA:



This clearly illustrates the decline in cereals area as a percentage of NAA. Below are the regression results that indicate the percentage of cereals area to NAA is trend stationary:

	DF	6.7	ADF
variable	ln%	ΔlnPo	Δln%
constant	0.702	-0.788	-1.236
t-statistic	(1.415)	(-4.984)	(-5.226)
trend	-0.002	-0.018	-0.031
	(-2.253)	(-4.650)	(-6.324)
$\ln\%_{t-1}$	0.848	-1.068	-1.699
	(7.896)	(-5.122)	(-5.402)
$\Delta\ln\%_{t-1}$			0.732

			(3.998)
Rsq	0.974	0.463	0.643
Rbsq	0.971	0.392	0.561
DW	2.488	1.787	1.548

Although the DF regression is inconclusive, the two versions of the ADF regression both indicate that cereals area as a percentage of NAA is a trend stationary series. A brief examination of the data presented in the graph above would suggest that this isn't unrealistic, with the figure clearly declining steadily over time. Note that the DW statistic for the '6.7' regression indicates no autocorrelation.[27]

6.6: AN ALTERNATIVE CEREALS AREA ESTIMATE

Given all the factors considered above about cereals area being part of a larger whole, an alternative method of estimating cereals area is to model NAA and cereals area as a percentage of NAA, and thus derive cereals area indirectly. Any shortcomings in modelling cereals area directly in terms of omitted variables relating to oilseeds can thus readily be overcome. Initially however, NAA was considered very simply in terms of a trend plus dummies on outliers[28]:

$$NAA = 37207 + 156.22t - 1348.7D77 - 782.02D90$$
$$(164.42)\ (8.475)\quad (-9.636)\quad (-6.013)$$
$$Rsq=0.924\quad Rbsq=0.908\quad DW=1.702$$

The main point to note from this is that whilst cereals area is clearly falling over time, the area defined here as NAA is rising over time, albeit at less than 0.5% per annum.

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[27] The critical value is 1.53 with n=18 and k'=2.

[28] According to HGCA Weekly Digest 16/51 of 25.6.90, there are a number of factors contributing to what turned out to be the lowest ever EC12 cereals area in 1990. In Spain in particular, plantings were very badly hit by wet weather just before Christmas. Other factors quoted by the HGCA are increased participation in set aside, and higher returns in 1989/90 for oilseed rape and linseed. The bad weather conditions can be expected to be just a one-off, and work discussed elsewhere suggests that the 'cobweb' in the oilseed rape sector would lead to falling area the following year. Thus as is confirmed by 1991 estimates, the very low area planted in 1990 can be thought of very much as an outlier - an exceptionally low figure which is unlikely to signify a change in trend. Note also that the percentage figure doesn't seem unduly disrupted by this, suggesting that this 'alternative' approach to model cereals area is appropriate.

The next step was to consider 'economic' variables that could possibly affect NAA. The ratio of cereals to oilseeds prices was excluded here as *a priori* it would be expected not to influence the total area planted to cereals and oilseeds - only the balance planted between the two alternatives. What was tried instead was a variable that attempted to pick up the relative returns from crop production and alternatives - milk production and livestock production. Two variables were considered: the ratio of cereals[29] price index to animal production price index, and the ratio of cereals price index to milk price index (all in nominal terms, converted to a consistent base of 1980, and EC10 as far as possible, and lagged one period). Both were difference stationary. The regressions for NAA over the full data period showed the price variables to be insignificant. Over the shorter period from 1979, both were significant, but the Durbin Watson's in both cases were around 3. The regressions were therefore re-run using maximum likelihood to correct for the autocorrelation. The following results were obtained:

$$\ln NAA = 10.544 + 0.005t + 0.099\Delta \ln Pc/Pa_{t-1} \qquad 0.950 \quad 0.940 \quad \rho = -0.724$$
$$(6358.5) \quad (20.010) \quad (3.894) \qquad \text{t-statistic} \quad (-3.785)$$

$$\ln NAA = 10.544 + 0.005t + 0.081\Delta \ln Pc/Pm_{t-1} \qquad 0.908 \quad 0.889 \quad \rho = -0.625$$
$$(4000.6) \quad (10.708) \quad (1.603) \qquad (-2.888)$$

where Pc/Pa is the ratio of cereals to animal products price indexes, and Pc/Pm is the ratio of cereals to milk price indexes. It can be seen that the latter performs less significantly than the former. This is perhaps not surprising, given that for much of the data period, milk quotas have been in operation, making dairy production a much harder enterprise to move in to.

Having examined NAA in detail, it is then necessary to consider cereals area as a percentage of NAA in order to arrive at an estimate for cereals area. Initially, this percentage was examined in relation to time alone. Given the note earlier about the pattern in cereals area, the percentage figure, not surprisingly, follows a similar pattern. To try to get round this problem, with the cause of the structural break never having been assigned to any variable considered, the regressions were run with the data just

[29] Ideally, an index for cereals and oilseeds would have been used. An index for oilseeds however is not available. An index for crop products is, but this includes other crops too, including some whose production is governed by quotas. A point to note with this is that cereals area dominates NAA - declining, but still over 80%.

from 1979. The results are summarised below in the first two regressions reported. The second pair of regressions incorporate an 'economic' variable. The first one is the ratio of deflated cereals to rape price. The second is the ratio of cereals to rape returns. This is defined as the price (as used in the above ratio) multiplied by the trend or expected yield. This variable is incorporated to reflect not just the unit returns to farmers but the EXPECTED total payments to farmers for each crop. *A priori*, this would be expected therefore to affect the areas planted by farmers to each crop to a different extent than the price ratio.

variable	%	ln%	ln%	ln%
constant	98.233	4.590	4.587	4.589
t-statistic	(290.66)	(1038.4)	(1420.3)	(1135.4)
trend	-1.03	-0.011	-0.011	-0.011
	(-24.100)	(-20.075)	(-36.812)	(-26.525)
$\ln(Pc/Po)res_{t-1}$			0.288	
			(5.682)	
$lnRRres_{t-1}$				0.035
				(3.913)
Rsq	0.978	0.974	0.981	0.978
Rbsq	0.976	0.972	0.977	0.973
DW	1.680	1.528	1.319	1.217

All variables used are significant. The DW's in the first two regressions against time alone are borderline. As can be seen, the price and return variables are significant, with the correct signs, and improve the R-bar squared, if only slightly. The fact they have the same trend coefficient is due to rounding (they differ by the fourth decimal place). The DW's are however of concern. As before therefore, the latter two regressions were corrected for autocorrelation using a maximum likelihood procedure:

$$lncerA\%NAA = 4.588 - 0.011t + 0.047lnRRres_{t-1} \quad 0.981 \quad 0.977 \quad \rho = 0.393$$
$$(882.72) \ (-16.935) \ (2.164) \qquad (1.542)$$

$$lncerA\%NAA = 4.586 - 0.011t + 0.318ln(Pc/Po)res_{t-1} \quad 0.982 \quad 0.979 \quad \rho = 0.304$$
$$(980.36) \ (-18.007) \ (2.429) \qquad (1.149)$$

6.7: CONCLUSION

This chapter has shown how yields have been progressively increasing over time. Variations in yields have reflected changes in the intensity of inputs, and the cereals:fertiliser price ratio was shown to influence cereals yields. For data reasons, weather factors were not specifically included in the analysis but 1976 and 1984 - years of unusual weather patterns, were shown to be outliers in the yield series.

A two-stage process was used in analysing the behaviour of cereals area. In the first stage, the combined area of cereals and oilseeds - which use similar production technologies - were modelled. It was shown that these actually increase over time. For recent years, the data series was extended to include set aside land. This helped to reinforce this movement. This was shown to be related to the relative prices of cereals and animal products. From this, cereals area was estimated as a percentage of this 'net arable area'. This was shown to be declining steadily in recent years, and that it is related to the relative returns to cereals and oilseeds. In the last section, a procedure for correcting for autocorrelation was adopted that will be important in the forecasting of cereals area in Chapter 8.

CHAPTER 7: CEREALS CONSUMPTION

'What costs little is valued less'. Cervantes, Don Quixote

7.1: INTRODUCTION

Cereals consumption, or total internal use (TIU), consists of five elements that need to be considered individually. Those five are losses, seed, human consumption, industrial use and animal feed. An earlier examination found that seed losses and human consumption exhibited no significant short term trend. Only the short term trend was considered initially as the member of DG VI who works on this for the Commission annual budget forecasts stated that they only considered such trends.[1] The Commission however is only concerned with forecasting the expenditure one year at a time, so it may be that for current purposes, a longer term view is more appropriate. A further factor that may be of significance in examining TIU is that the data for the last two years (1990/1 and 1991/2) are for the EC12 INCLUDING eastern Germany. As each end use for cereals can be thought of as independent of the others to a large degree, each is examined separately. The next section considers the first four end-uses for cereals listed above, as these represent a relatively small element in the total figure. Animal Feed, the main end-use for cereals, is considered in much greater detail in section 7.3.

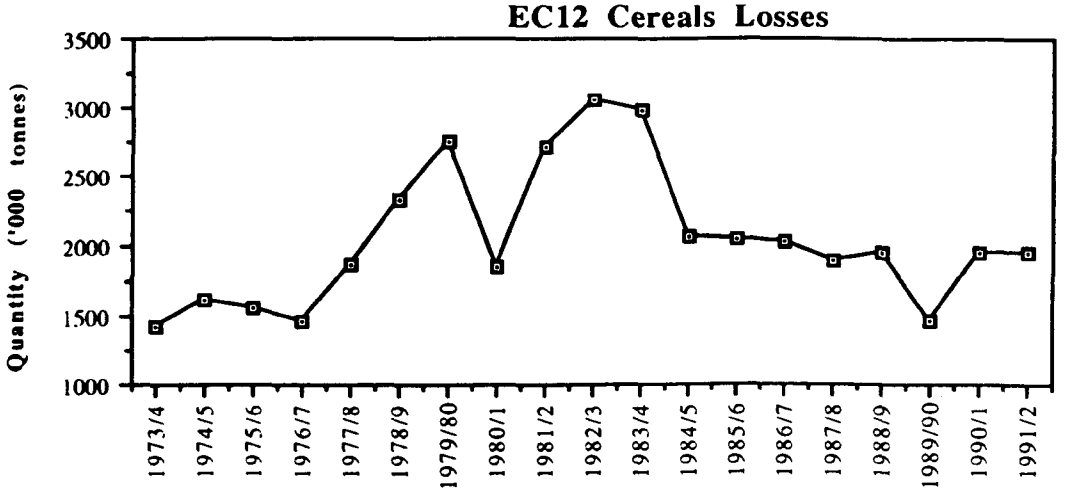
7.2: LOSSES, SEED, HUMAN CONSUMPTION AND INDUSTRIAL USE

7.2.1: Losses

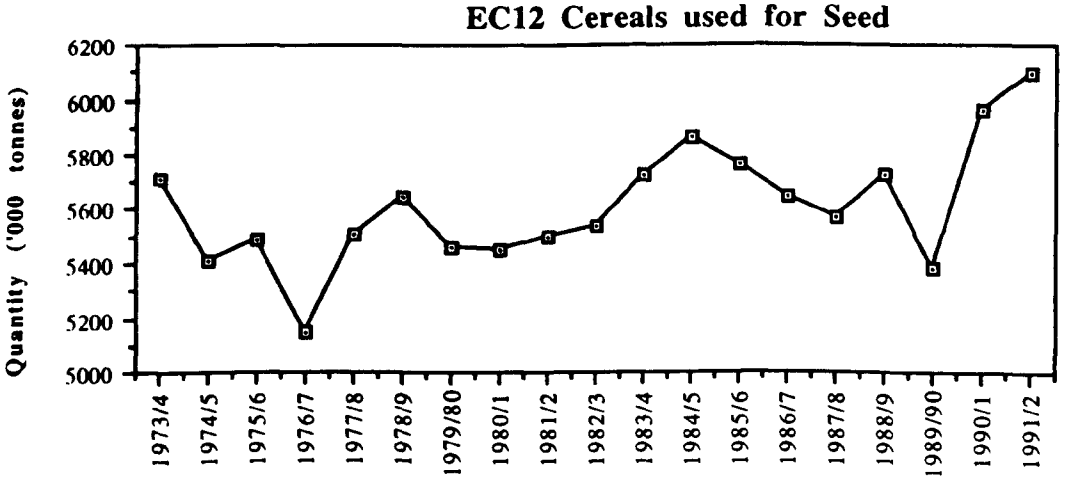
Losses represent the smallest of the five end-uses for cereals, constituting between 1% and 2% of total internal use. It can be seen from the graph below that for the period during the early to mid 1970's, the figure was relatively low and fairly stable. The late 1970's and early 1980's saw a period of greater fluctuation in losses, as well as a general rise in the quantity of cereals lost each year. Since then however, except for the 1989/90 observation, the quantity of losses has generally stabilised. Mainly because losses represent such a small percentage of TIU, the approach taken in estimating a figure for future losses has been a very simple one. It has involved considering patterns in the data and first differences of the data. As noted above, the data appear to exhibit particular patterns in particular periods. The average of the last 8 observations is 1.9 mt

[1] Personal communication, February 1990.

(for the period as a whole, the figure is about 2 mt). Given the point that losses are such a small part of TIU, it seems not too unreasonable to take the figure for losses as about 1.9 mt, whilst acknowledging that the last two observations include the former East Germany, and thus may be biased upwards.[2]



7.2.2: Seed



Seed, like losses, constitutes only a small percentage of total internal use. In recent years, excluding the two most recent observations (which include eastern Germany), it has represented an almost perfectly stable 4.05%. Thus as with losses, future levels of cereals use for seed will not be considered in too much detail.

Excluding the last two observations, it appears that the general pattern of seed use has been one of fluctuations around a stable trend. Thus the approach was a simple

[2] It has proved impossible to get a breakdown of TIU data for the last two years excluding East Germany.

trend analysis, with the last two observations isolated by a dummy variable (DEG), and other observations examined to see if they ought to be regarded as outliers. The following regression was found to be the one where no further outliers were observed:

$$\ln S = 8.616 + 0.001t - 0.074D1976/7 + 0.064DEG$$
$$(1056.8)\ (1.249)\quad (-12.275)\qquad (7.887)\qquad 0.663\quad 0.595\quad 1.549$$

The DW is in the indeterminate range (CV=1.68), but for current purposes, no further attention is being given to this. As with earlier work, 1976/7 was found to be an outlier because of exceptional weather conditions, and thus the dummy variable can be justified on *a priori* grounds. The time trend variable was insignificant. Excluding the last two observations, the average quantity of cereals used for seed comes out at 5.56 mt per annum for 1973/4 to 1989/90. For the old EC12 therefore, excluding the former East Germany[3], a reasonable figure could be taken as 5.5-5.6 million tonnes per annum. As noted before, this is a fairly rough and ready approach, but one that could be justified given the small percentage of total internal cereals use represented by seed. A consideration of cereals production as a possible explanatory variable proved fruitless.[4] [5]

7.2.3: Human Consumption

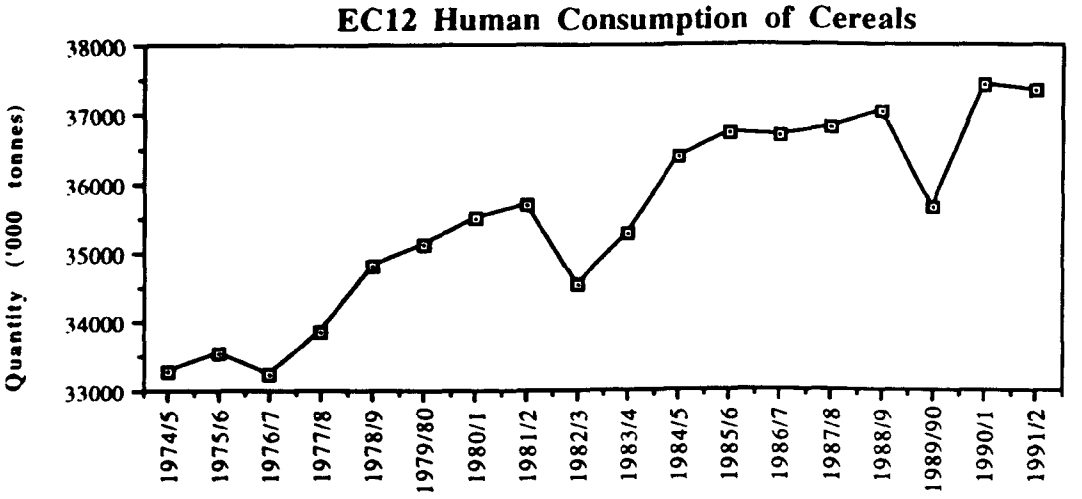
Human consumption (HC) of cereals represents around a quarter to three tenths of total cereals use, and thus a simple approach may be less valid or excusable. Earlier work followed the Commission by assuming stable consumption in the short term. As can be seen from the updated data set however, this assumption is perhaps questionable. One feature observable from even a cursory glance at the data on the accompanying graph below is that there is a remarkably consistent cyclical pattern over the period under consideration. It can also be seen that the data exhibit a rising trend. It has been established that residuals around this trend aren't related to residuals around the trend in production.

[3] Further consideration of the handling of eastern Germany is given in Chapter 8.

[4] The idea here was that if production was higher, more grain would be available for use as seed.

[5] Note also that the HGCA Digest 18/31 of 3.2.1992 has an article that notes that since 31.3.1992, organo-mercury treatments of seed have been banned. They feel this will result in more untreated own seed being used by farmers, as alternatives will be very costly. Thus this end use of cereals could rise in the future, though they give no indication of by how much they expect this to rise. Moreover they note that such a move could result in lower yields. The main problem with such information is how it can be used practically in any modelling work.

Because of the greater significance of human consumption in total cereals consumption, certain 'economic' variables were examined to see if they had an influence on human consumption. Variables considered included population, GDP, GDP per capita, long run and short run interest rates, level of cereals production and percentage change in 'occupied population'.[6] None of these variables were able to explain the cycle in the consumption data. Moreover, unlike say 1976 and 1984 with yields and production, no *a priori* reason could be established for why 1976/7, 1982/3 and 1989/90 had such markedly low consumption levels.



A simpler representation for human consumption was therefore considered. Two assumptions were made. Firstly, consumption was assumed likely to rise over time with population increases (assuming further that for the period under consideration, population would continue to increase - not unrealistic for the EC as a whole, even if the populations of some member states are roughly stable). Secondly, that the increase in consumption was likely to be at a progressively slower and slower rate, reflecting such factors as the Engel relationship, as well as a physical capacity constraint on food consumption. Thus the form of the regression examined was:

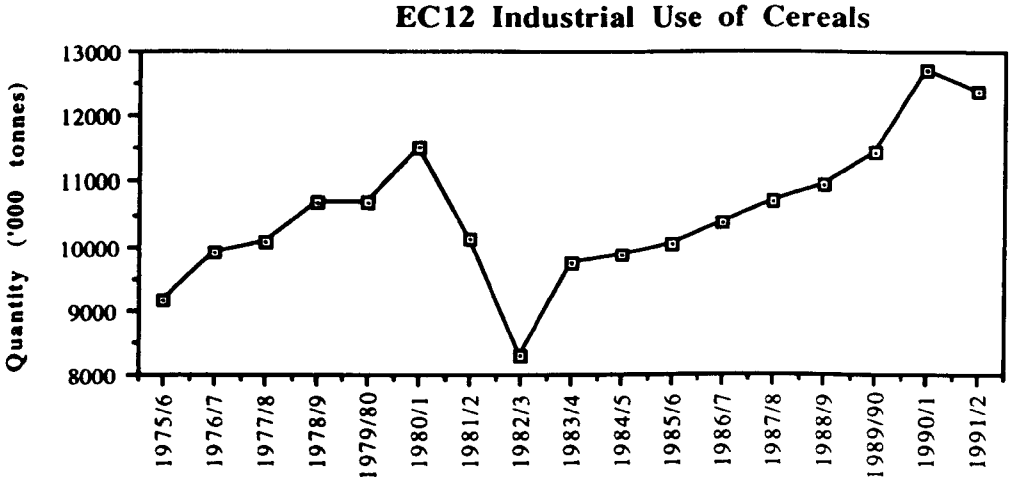
$$HC = 32324 + 1566.2\ln T$$
$$(60.747) \quad (6.773) \qquad\qquad 0.803 \quad 0.791 \quad 1.56$$

where HC is the quantity of cereals consumed by humans, and lnT is the log of a time trend.

[6] All data from European Economy No 50, December 1991.

Note that at the 5% level, with n=18 and k'=1, the critical value for the DW statistic is 1.39, thus the low-looking DW figure is actually insignificantly different from 2, and therefore indicates no serial autocorrelation. Note also that with this specification, no observations are found to be outliers.

7.2.4: Industrial Use



In the earlier work on cereals use by industry, the results confirmed the EC's belief that the short term trend was rising. It currently represents about 8.5 - 9% of total cereals consumption. That earlier work suggested that cereals use by industry was rising at over 200000 tonnes per year. Discussion with DG VI confirmed this trend would be likely to continue for the foreseeable future.

In 1989, the EC Commission issued a report explicitly looking at the use of agricultural commodities for non-food uses.[7] The House of Lords responded to this by examining the issue themselves.[8] Moreover, the EC's submissions to both the GATT negotiations and the debate on reform of the CAP have included analyses of non-food uses of agricultural raw materials. Both the old and the new regimes offer aid to producers of cereals and potatoes (under the cereals regime) which go into the manufacture of starch. This is given in order to offset the price-increasing effect of support for cereals under the CAP and to make starch made from such commodities protected under the CAP manufacture competitive against starch made from other raw materials. It is also encouraged because of the continuing surpluses produced in the cereals sector. The personal view of DGVI is that the use of cereals in such end-uses is likely to continue to rise. In the HoL report however, in considering 'non-food' uses

[7] see EC Commission (1989b). Note that IU and non food uses aren't exactly congruent.

[8] see House of Lords. (1991).

they cast doubt on any major upward trend in the quantity of cereals used for such purposes.

In looking for variables that could influence this end use of cereals, the first that could be included is the level of refund available for cereals going for the manufacture of starch. Unfortunately however, a run of such data does not seem to be available. The real price of cereals was also considered (suitably adjusted for non-stationarity), both lagged and not, but proved to be insignificant in both cases.

From the graph, it appears that the latter few years exhibit a trend from 1983/4. It was felt that there were far too few data points to justify a detailed examination of stationarity, but if a trend is put through those last 9 data points, the following regression is obtained:

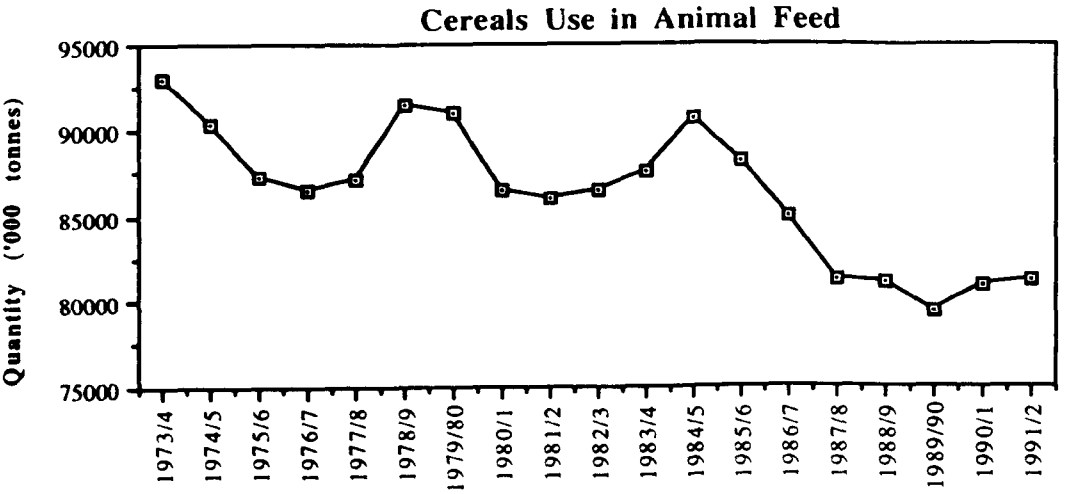
$$\ln IU = 9.124 + 1.035t$$
$$(550.87)\ (11.221) \qquad 0.925 \quad 0.914 \quad 1.780$$

Thus it appears that the quantity of cereals going for industrial uses is growing at about 1% per annum.

At the time of writing, the EC Commission are preparing legislation regarding 'non-food set aside'. A wide range of CAP commodities are to be included in the legislation, including oilseeds, the meals from which can only really be disposed of on the animal feed market. Payment are to be made in such a way as to ensure farmers don't receive returns from selling the crop for non food uses, and also claiming payments under the new regime as if the crop had been sold for food uses. Overall however, it would appear that the legislation is such that the overall impact on non-food uses of agricultural production, especially cereals (given current purposes), is going to be very limited.[9]

[9] See Agra Europe 1502 of 31.7.1992, page E3.

7.3: ANIMAL FEED



Within the overall framework of this thesis, the consideration of the determinants of the quantity of cereals used in animal feed is very important. The reason for this lies in animal feed being the dominant end-use for cereals. Thus the trend for total cereals use has generally been dominated by the trend in this particular end-use for cereals.

For the EC12, the quantity of cereals going to animal feed, as expressed as a percentage of total internal cereals use, has remained very stable. In 1973, it was 65%, by 1980 had gently fallen to 62%, and by 1989, had fallen slowly to become 60% of total cereals consumption. In absolute terms however, the figures indicate a very different pattern. Whilst total EC12 cereals use fell from 144mt to 133mt between 1973 and 1989 (a 7.6% fall), the quantity of cereals going into animal feed fell from 93mt to 79mt (15.05% fall). Later, the results of attempts to quantify the determinants of the use of cereals in animal feed (hereinafter referred to as AF) are discussed, but initially, certain likely factors can be considered.

7.3.1: Demand for Animal Feed

Demand for animal feed is a demand derived from the number of livestock, with the number of animals in the EC taken as a proxy for this.[10] Rather than simply take the number of head of each type of animal however, a series was constructed that tried to

[10] Animal numbers were taken from the FAO's Production Yearbook. In a private communication with F Pariboni, the chief of the basic data unit, statistics division, it was confirmed that this data is based on December census figures: "In the specific cases of the EEC countries, the data refer to the [last day] of the preceding year or the first day of the indicated year." Note that FAO data were used in order to ensure a consistent data set for the full EC12 for the full data period for all animal types.

reflect the quantity of feed demanded by each animal type, and the likely contribution that cereals would make to this overall intake (given the information available, this had to be rather ad hoc, but hopefully fairly consistent).[11] This was done by reference to cereals' contribution to energy requirements for different animal types.

From EC Commission (1990b), examples were given of the energy requirements (in Mj/year, or per litre of milk), required by certain different types of animal. From EC Commission (1988b), table 1 on page 8/6 showed the share of energy requirements of dairy, beef and monogastrics provided by grains. In Kenneth Wilson (1985?), for barley (the main cereal going to animal feed), the stated energy value (in Mj/kg DM - 'dry matter'), was given as 13.0. From this information, estimates can be made regarding cereals consumption by animals in the EC.

Before examining the estimates in detail, certain points need to be made. Firstly, within each animal type, there exist different categories, each with different feed requirements. For example, EC Commission (1990b) breaks cattle into veal, beef and milk producing animals. To a large extent, such a disaggregated approach just isn't possible here, given data limitations. Thus a certain amount of what might be called aggregation errors will arise. A second point is that different data sources give slightly different figures for the energy content of barley. Reported below are two approaches. The first uses the Kenneth Wilson figure for barley. Because however different cereals have different energy contents, a second estimate was made using a weighted estimate of energy content of different cereals, using MAFF data[12].

The approach used started by taking the energy requirements for different animal types. The main source of this information was EC Commission (1990b). Energy requirements were used as the basis as cereals are generally referred to as an energy source, although they do provide some protein as well. Details weren't given however for all animal types so for some, figures were taken from similar animals for which data were provided (see below for details). Secondly, reference was made to EC Commission (1988b). There, figures are quoted which show the proportion of total energy requirements for different animal types that are derived from grains. Again, data weren't provided for all different animal types, so certain assumptions had to be made from the limited data available (again see below for more details). Finally, a figure for energy content in Mj per kg dry matter of grains was needed. As noted above, the first estimate was made using just a figure for barley. This was taken from the Kenneth

[11] The main sources of the data were as follows: 1) Wilson, K. (1985?), 2) EC Commission. (1990b) 3) EC Commission. (1988b), in particular Chapter 8, Linkages in the EC animal feed sector. (Is it significant that this document stretches to 20 chapters and 711 pages?!)

[12] MAFF (1986).

Wilson document, and was quoted as 13Mj/kg DM. A second estimate was used using MAFF data for different cereals. These energy content figures were then weighted by their different proportionate contributions to total animal feed. The energy content figures in Mj/kg DM were:

barley	12.8
maize	13.8
oats	12.0
wheat	13.6

These were then weighted by relative importance in animal feed.[13] In this source, data were given for production and consumption, for 1990/91 and 1991/92. The consumption data were used, with 'other' cereals in the Agra Europe table being proxied by oats from MAFF (1986). These calculations showed the average weighted energy content of 'cereals' to be 13.182Mj for 1990/91 and 13.196Mj for 1991/92. A figure of 13.19Mj was taken for the calculation set out in more detail below. This then allowed an estimation of the quantity of cereals consumed by each animal type per year to be made. Cattle numbers were split up with dairy cattle considered separately. These were treated slightly differently to the other animals, and the approach taken is set out below. For the other animals however, the following table sets out the figures used in the calculations, with comments on certain figures used made after it.

animal type	energy reqt Mj/ann/head	% energy from grains	energy (in Mj) from grains	cereals consumption kg/head/year	
				a	b[14]
cattle	17012	11.6	1973.4	151.8	149.6
pigs	10678.5	57.7	6161.5	473.96	467.1
hens	509.7	57.7	294	22.6	22.3
horses	20477	10.6	2171	167	164.6
donkeys	13475	10.6	1428	109.8	108.3
ewes	4754	10.6	504	38.8	38.2
dairy	see below	10.6	see below	162.6	160.3

[13] Data from Agra Europe 1494, 5.6.1992, page M/10.

[14] 'a' is the implied cereals consumption estimated from the Kenneth Wilson data for barley, and 'b' is the figure using the weighted cereals figure from MAFF data.

Cattle

As noted above, EC Commission (1990b) discusses a number of different categories of cattle. The energy requirement figure of 17012Mj per head per annum is the average of ten different cattle types' energy requirements, unweighted owing to lack of appropriate data.[15] This is one of the main potential areas for so-called 'aggregation errors', but data constraints prevent a more disaggregated and accurate analysis. Moreover, the 11.6% figure for the energy content of grains is for 'beef' animals, whereas in practice, it may well be that not all 'cattle' are for beef production.

Pigs

Again, EC Commission (1990b) had a number of different examples to work with. The two examples used were fattening pigs and requirements for producing piglets. The former were indicated as needing 26.7Mj per day, which multiplies up to an annual requirement of 9746Mj. For producing piglets, the stated figures were 9104Mj for maintenance, 2507Mj for replacement, and 8604 for piglets. It was taken that just the first two figures related to the main pig, and so the sum of those two figures, or 11611Mj, was used. Then the unweighted average of 11611 and 9746, or 10678.5Mj was used in the calculation.

Hens

The one comment to be made here was that although the 57.7% figure from EC Commission (1988b) relates to 'monogastrics', presumably principally pigs, this figure was also used for poultry, as it was assumed poultry production is similarly feed-based.[16]

Mules and Asses

From the FAO, there are data for mules and asses. In EC Commission (1990b), a figure is quoted for the energy requirement for donkeys. For these purposes, these different animals were treated as having the same energy requirements.

Sheep and Goats

The figure used for sheep is the one quoted in EC Commission (1990b) for breeding ewes. No directly comparable figure was given for goats, and so for

[15] "standard" heifer, under 1 year and 1-2 years, and male and female animals for meat production, variously under 1 year, 1-2 years, over 2 years, and intensively or extensively fed.

[16] There is no specific indication in the text as to the accuracy or not of this assumption.

simplicity the same figure was used as for ewes. Note that there is only a relatively modest goat population in the EC.

Dairy Cows

The data from FAO are for 'Cows Milk Whole Fresh'. The first point to note is that this figure is consistently higher than the MMB data for deliveries to dairies. That is not surprising, assuming that some milk will be used on farm by the farm family, or in animal feed, or in a farm dairy for small scale dairy product manufacture, for example. This figure was chosen as the MMB type data would naturally exclude some milk whose production would still require cereals in the animals' feed, regardless of the end-use of the milk.

Given the slightly different nature of the production of milk in terms of the current analysis, a different procedure was used to estimate the cereals requirement for dairy animals' feed. The average yield per cow (in kg/year) was multiplied by the energy requirement per kg as stated in EC Commission (1990b). This figure will vary depending on the fat content of the milk. The two examples given are 5.27Mj for milk with 4% fat, and 4.82Mj for milk with 3.3% fat. Not knowing the average fat content of EC milk, an energy requirement figure of 5Mj per kg was used in the calculation. From here, the same procedure as before was used to get a figure for the contribution of grains to the energy intake required for that year's level of milk production. Throughout the 1980's, it appears that the rise in the contribution of grains to energy requirements has flattened out, and so the figures appearing in the above table are the average grain intake figures for the period 1981 to 1991.

The livestock categories for which data are available from Eurostat are horses, mules, asses, cattle, buffaloes, pigs, sheep, goats, chickens, ducks, and turkeys. Buffaloes were given the same energy requirement as cattle, mules and asses the same as donkeys, goats and sheep the same as ewes, and ducks and turkeys the same as chickens.

The purpose of the above work is to enable all the data for the different animal types to be expressed as a single figure. This is achieved by weighting the raw numbers of population size for each animal type by the cereals intake for energy purposes relative to that for cattle. What is then derived is a 'cattle equivalent' figure for the total animal population in the EC, based on cereals consumption. The weightings are derived from the figures in the last column of the above table (the data in column 'a' and column 'b' give the same weightings). The following weightings have been used:

cattle	1
pigs	3.1
hens	0.15
horses	1.1
donkeys	0.72
ewes	0.26
dairy	1.07

Mules and asses were then given the weighting as donkeys, buffaloes the same as cattle, goats the same as ewes, and ducks and turkeys the same as hens. This, as noted before, may not be very accurate, but there is insufficient information available for a more accurate approach than this.

From this, a calculation can easily be made to see if these figures feed through to give a figure for cereals consumption close to the figure given by Eurostat. The final estimate is close to the actual figure, 84.37 million tonnes being about 5-6% above the actual figure for 1991.[17] With so many approximations made in getting to this figure, it is probably acceptably close.

7.3.2: The Substitution of Cereals

The last 25 years has seen the increased substitution of other feed inputs for cereals. Note that it is better to talk of inputs other than cereals as non-grain feeds (NGF's) rather than cereals substitutes, given the technical inaccuracy of the latter term.[18] Despite this however, the term cereals substitutes is nonetheless frequently used to describe one group of NGF's, specifically the group known as Annex D products (since they appear in annex D to Regulation (EEC)2727/75, the regulation governing the common organisation of the market in cereals up to the beginning of the1993/4 marketing year). The other inputs into animal feed are then normally classified in accordance with whether they provide primarily energy or protein.

[17] Although this actual figure is in reality hard to obtain, as all Eurostat quotations include the 5 länder of the former East Germany.

[18] That is, the ability of other feeds to replace cereals exactly in terms of its contribution of energy and protein to the feed.

Annex D products are as follows[19]:

manioc (cassava)	sweet potatoes
maize and rice brans: max 35% starch	maize and rice brans: over 35% starch
wheat brans: max 28% starch	wheat brans: over 28% starch
maize gluten feed	sugar beet pulp
brewers and distillers grains	maize germ cake: less than 3% fat
maize germ cake: 3-8% fat	grape marc
citrus pulp	other fruit waste

In addition to these, which are classified as 'energy-rich', there are molasses and compound feedingstuffs (as an imported product), which are also classified in this way[20].

There are also products classified as 'protein-rich'. These are specified as soya beans, soya cake, other seeds, other cake (except maize germ cake), meat and fish meal, and 'other', given as "oilseed meals, lucerne, lupins, fodder beet, hay, etc".

The Problem This Causes

The main reason why these products have been substituted for cereals over time is the price at which the inputs can be bought by feed manufacturers. Cereals have been supported under the CAP at a price above the world price, whereas domestically produced NGF's such as oilseeds (from which meal is made) trade internally at a price around the world level, and imported NGF's are allowed into the EC at low or zero rates of tariff (see Chapter 4 for more details). Thus the relative prices of cereals and NGF's may well be influential in determining the level of cereals demanded for animal feed.

Discussion of the Data Series

First, the AF series represents the quantity of cereals going into animal feed each year in the EC. It would appear that the data from Agra Europe include eastern Germany for 1990/1 and 1991/2, and no source separates their data out from the rest of the EC 12. An estimate of east German cereals use in animal feed has therefore made in the following way in order to get a set of data that totally excludes eastern German consumption. Firstly, using data from a personal communication with the FAO, the CE total animal numbers were established for 1990 and 1991 for eastern and western

[19] as amended in Annex III of Reg (EEC) 3989/87, OJL377, 31.12.87, P13-14.

[20] see 1988 ASIC page T245.

Germany. Over the two years, the average figure for the west was found to be about 94.67% of the total 'German' CE figure. Making the assumption that eastern and western German farmers use the same quantity of cereals in feed to their animals, the data for total German cereals consumption in animal feed were taken from Agra Europe No.1463 (25.10.91). 5.33% of this was calculated (1.012 million tonnes for each of the two years), and subtracted from the total AF figure to give a quantity for the EC12 excluding eastern Germany.

The results of the ADF regression on the AF data reported below clearly indicate a trend stationary process.

The background to the CE series is given above. In essence, it is concerned with converting all animal numbers in the EC into a single series, on the basis of the estimated relative cereals requirements for the provision of energy in their total feed intake. As with the AF series, the ADF regression result below for CE also clearly indicates trend stationarity.

The price ratio consists of the nominal cereals price, discussed at length elsewhere in this thesis, and the nominal price of a 'cereals substitute'. From other work[21] it would appear that the closest substitute to cereals in terms of energy and protein provision in animal feed is a combination of manioc and soya bean meal (weighted 80% manioc to 20% SBM)[22] This data set is from the FAO and is calculated principally from monthly figures for crop years matching those for cereals. In the EC, this was August to July up to 1985/6, and from 1986/7, was July to June. This means that the crop year 1985/6 was only 11 months long (ie from August 1985 to June 1986). For some early years, the FAO only had annual price data, and so the crop year figures were based on 5/12 of the calendar year figure for the first year, and 7/12 of the following calendar year's figure.[23]

The manioc price is for pellets, cif Rotterdam; and the SBM price is for US 44% cif Rotterdam up to and including 1989/90, and Argentine 45/46% cif Rotterdam for the last two years (for which period this quotation has replaced the US quotation in the FAO publications). Note that for both series, the 1991/2 figure is actually the average of July to September 1991 as those were the only figures released.

---

[21] Hillberg, A. M. (1986).

[22] This ratio to provide the best substitute for cereals has been in my mind for some time now. Unfortunately, I can't for the life of me remember where I got it from, and I have been unable to track it down in all my notes.

[23] So for example, the price for the crop year 1973/4 consisted of 5/12 of the 1973 calendar year figure, and 7/12 of the 1974 calendar year figure.

The FAO quotes both series in terms of US dollars. The ECU exchange rate has been calculated from monthly data from Eurostat on the same crop year basis as the price figures. From 1973/4 to 1980/1, this meant deriving the figure from annual data. For the 1991/92 figure, only July 1991 to March 1992 data were available.

The regression results below indicate that the nominal price ratio series is stationary.

Data Analysis

As before, prior to any regression analysis of the quantity of cereals going to animal feed, stationarity tests need to be run on the data to be used. Below are reported the Dickey-Fuller, Augmented Dickey Fuller, and '6.7' specifications for, respectively, the quantity of cereals going for use in animal feed (AF), the cattle equivalent series of livestock numbers (CE), and the ratio of cereals to cereals substitute price (PCPS). The data series themselves are discussed further after the stationarity test results.

	DF	6.7	ADF
variable	lnAF	ΔlnAF	ΔlnAF
constant	4.535	4.535	7.059
t-statistic	(2.936)	(-4.984)	(5.892)
trend	-0.003	-0.003	-0.004
	(-1.433)	(-1.433)	(-5.177)
$\ln AF_{t-1}$	0.603	-0.397	-0.617
	(4.473)	(-2.590)	(-5.880)
$\Delta \ln AF_{t-1}$			0.585
			(5.288)
Rsq	0.742	0.201	0.470
Rbsq	0.707	0.095	0.348
DW	1.253	1.253	2.097

	DF	6.7	ADF
variable	lnCE	ΔlnCE	ΔlnCE
constant	5.799	5.799	11.265
t-statistic	(3.961)	(3.961)	(4.657)
trend	0.005	0.005	0.010
	(2.648)	(2.648)	(4.080)
$\ln CE_{t-1}$	0.557	-0.443	-0.863

	(4.953)	(-3.947)	(-4.648)
$\Delta lnCE_{t-1}$			0.788
			(5.790)
Rsq	0.947	0.208	0.662
Rbsq	0.940	0.102	0.584
DW	1.178	1.178	2.168

	DF	'n.7'	ADF
variable	lnPCPS	ΔlnPCPS	ΔlnPCPS
constant	0.122	0.122	0.154
t-statistic	(2.583)	(2.583)	(2.601)
trend	-0.004	-0.004	-0.006
	(-1.273)	(-1.273)	(-1.572)
$lnPCPS_{t-1}$	0.252	-0.748	-0.869
	(2.565)	(-7.599)	(-4.397)
$\Delta lnPCPS_{t-1}$			-0.075
			(-0.502)
Rsq	0.157	0.597	0.515
Rbsq	0.044	0.543	0.403
DW	2.370	2.370	2.166

In addition, each of the nominal price series were examined separately for stationarity. Reported below are the Dickey-Fuller's for both series. The Augmented Dickey Fuller's were not needed as the regression Durbin-Watsons below indicate no serial autocorrelation.

$$lnPn\ cer = 0.738 - 0.005t + 0.868 lnPn\ cer_{t-1}$$

(2.6) (-2.155) (13.694) 0.946 0.939 2.052

$$lnPn\ cersub = 2.403 + 0.010t + 0.492 lnPn\ cersub_{t-1}$$

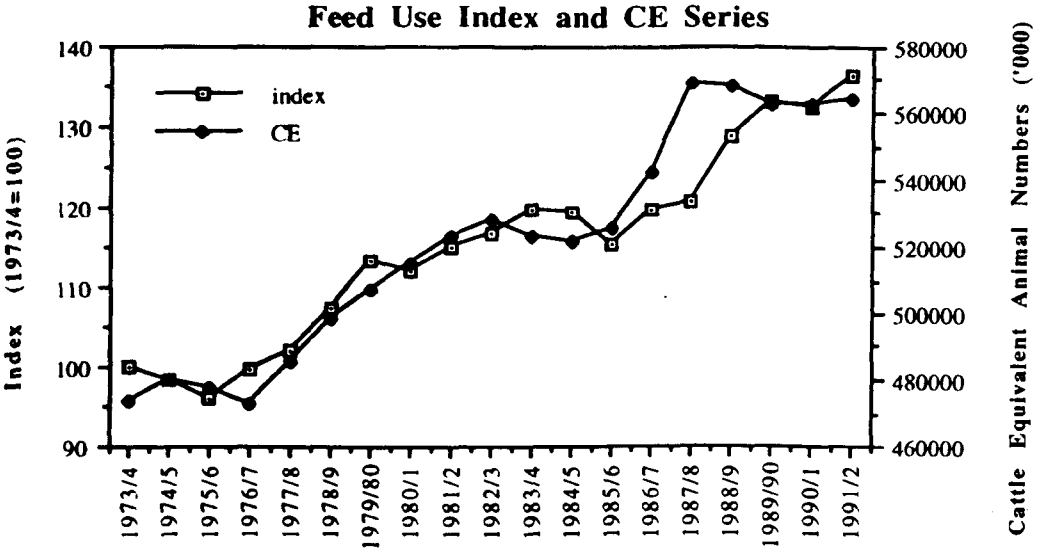
(4.889) (2.009) (4.507) 0.566 0.512 1.872

Both confirm stationarity.

7.4: THE MODELLING OF THE DEMAND FOR CEREALS FOR ANIMAL FEED

This analysis follows the approach taken earlier, where the total demand for feed is considered, followed by an examination of the substitution of non-cereal feed inputs for cereals.

The following graph presents a feed use index and the cattle equivalent animal number series:



where the index (1973/4=100) has been calculated in the following way:

$$Index_t = 100((Wc_{t-1} * \frac{AF_t}{AF_1}) + (Ws_{t-1} * \frac{QS_t}{QS_1}))$$

where

$$Wc_t = \frac{Pc_t * AF_t}{R_t} \qquad Ws_t = \frac{Ps_t * QS_t}{R_t}$$

where

$$R_t = Pc_t * AF_t + Ps_t * Qs_t$$

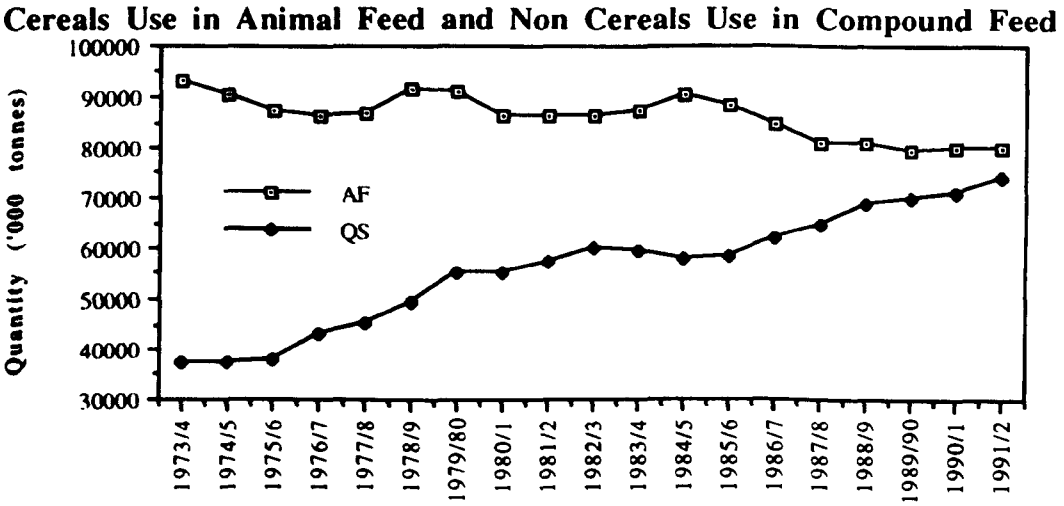
AF_1 is AF in the base year 1973/4, and QS_1 is the QS figure in the base year 1973/4.

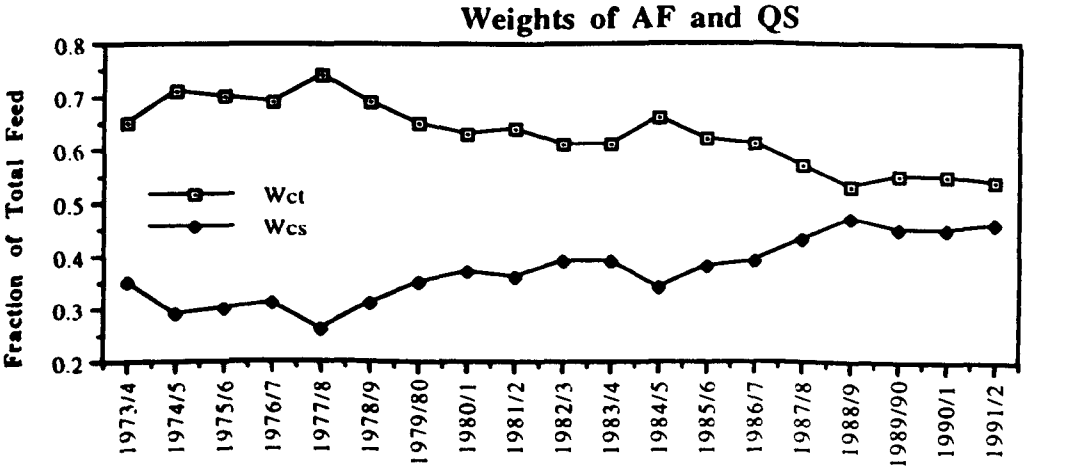
From this, the following regression was obtained:

Index = 0.00022CE + 0.944t

(73.477) (5.348) 0.932 0.928 1.181

The following graphs show the balance of cereals and non cereal feed inputs in total animal feed, and also the weights given to the cereals content of animal feed (AF) and the non cereals content (QS):





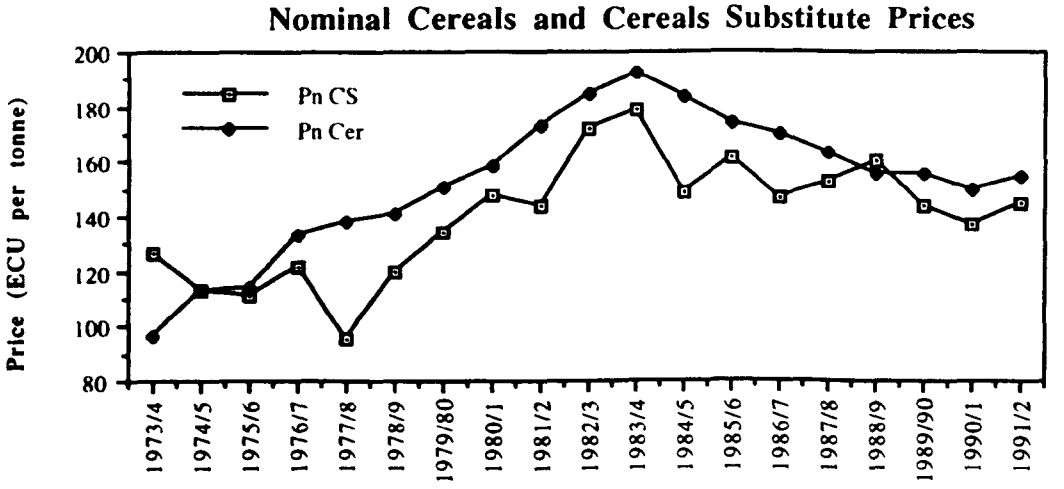
From this base, the following model was run, which took the ratio of the quantity of cereals used in animal feed (AF) to the quantity of non cereals used in compound feed (QS).[24] The number of animals in the EC could be expected to influence this, as well as the ratio of cereals to cereals substitute prices. For the period 1973/4 to 1991/2,

[24] This being the only variable for which data was available.

the following result was obtained:

$$AF/QS = 6.369 - 0.003t - 0.000007CE - 0.578PR$$
$$(4.372)\ (-1.595)\ \ (-2.516)\ \ (-2.988)\ \ 0.943\ \ 0.931\ \ 1.365$$

where t is a time trend, CE is the cattle equivalent series and PR is the ratio of nominal cereals to cereals substitute prices. This set of price data is presented in the following graph:



Thus a model has been formulated that relates the quantity of cereals used in animal feed to the price of cereals, the price of cereals substitutes, and also the number of animals in the EC.

7.5 CONCLUSION

This chapter has examined all the different factors that go to make up the consumption of cereals. Four of those factors, seed, losses, human consumption and industrial use are relatively easily dealt with. The first two, seed and losses, together represent less than 10% of total cereals use each year. Each of the other two are modelled using very simple approaches in each case. The most complex element, and also the most important in terms of cereal usage, is animal feed. Different animals have different energy/protein requirements, and also generally require different amounts of cereals and feed generally. This was dealt with by the construction of a series that expressed the requirements for different animals relative to that of cattle, and in relation to energy requirements (cereals providing more energy than protein). From this, the demand for feed has been estimated in terms of the ratio of AF to the quantity of non-

cereals inputs in compound feed, to reflect the changes in the use of cereals in total animal feed over time. This has been related to three key variables - the price of cereals, the price of cereals substitutes and the number of animals.

CHAPTER 8: SIMULATING POLICY CHANGE IN THE CEREALS MARKET

"Pon my word, Watson, you are coming along wonderfully. You have really done very well indeed. It is true that you have missed everything of importance, but you have hit upon the method."
Sir Arthur Conan Doyle, A Case of Identity.

"Life can only be understood backwards,
but it must be lived forwards." Soren Kierkegaard

8.1: INTRODUCTION

Appendix 3 of Chapter 2, and the first section of Chapter 3, detailed reforms to the CAP in general, and the cereals regime in particular, prior to the 1992 MacSharry package. In comparing the new system of support with the previous approach, it must be noted that the 1992 reforms (operative from 1993/4) were the first to bring about a fundamental change in the nature of support in the EC. The change, from price support to a system based principally on direct government payments, will have very important implications for the EC budget. It is the purpose of this chapter to explore these changes, and the impact they will have on the EC budget.

The previous two chapters introduced the analysis of cereals production and consumption, upon which much of the work in this chapter is based. In addition, sections of earlier chapters will be returned to, in order to build up a complete picture of the cereals market and the budgetary expenditures incurred in its operation. Each variable will be considered in turn, as was the approach in earlier chapters, before the different parts are drawn together to give a picture of the whole market.

As has been highlighted already with certain data series, the period under consideration is a very short one, starting in 1973. During that time moreover, there have been three enlargements of the EC (1973, 1981 and 1986), two oil price shocks (1973/4 and 1979/80), two commodity price booms (1973/4 and 1980/81), a series of major budgetary crises for the EC (most of the 1980's), and a serious drought in the US (1988). All these factors act against there being any long run relationships being established between data series. The focus has therefore been primarily on short term relationships. At times, as will be seen, this has necessitated the use of judgement in forecasting the future value of certain variables as much if not more than econometrics. This applies most significantly to the assumptions used in evaluating the impact of the

abandonment of stabilisers, and the adoption instead of the 'MacSharry' reforms. It must always be remembered that this analysis is essentially short term. If a long term analysis were to be carried out, it is likely that very different assumptions would have to be made, and possibly a rather different approach to modelling employed.

The approach taken in this chapter is to compare the impact of the MacSharry reforms with two 'base' models. The first assumes that stabilisers continue to be applied strictly over the forecast period to 1999. The second assumes that prices are held at 1992 levels for the forecast period: Whilst unsustainable, this shows the consequence of an unreformed policy.

8.2: CEREALS YIELDS

8.2.1: Introduction

From the work in Chapter 6, the model for cereals yield that has been chosen is:

$$\ln Y = 1.132 + 0.026t + 1.805\ln(Prc/Prf)res_{t-1} + 0.131D84$$
$$(95.748)\ (16.671) \qquad (3.007) \qquad\qquad (10.813)$$
$$0.956 \quad 0.946 \quad 1.769$$

In specifying a model with lagged prices, it is worth reiterating that the price data set is of annual, calendar year data. It therefore relates to the January-December period, with the yield figure taken at July (or thereabouts) during that particular year. Thus if the price variable is not lagged, the model relates yield to some prices the farmer won't receive for up to another 6 months or so. Moreover, the yield in time t is in part determined by fertiliser applications in time t-1 which *a priori* will be affected by fertiliser prices in time t-1, and the relationship of that price to the price of cereals in t-1. *A priori*, it would be expected that a higher cereals price relative to fertiliser price (ie higher income to expenditure) would encourage farmers, at the margin, to use more fertiliser and hence increase yields.[1]

The DW is inconclusive at the 5% level, but indicates no autocorrelation at the 1% level.

[1] The ratio of REAL prices was used rather than nominal prices as it was felt more appropriate, given the role of oil prices in fertiliser production.

8.2.2: Forecasting Cereals and Fertiliser Prices

In forecasting future values for cereals yield, the key variables that need to be considered as inputs into the yield equation are the prices that go into the price ratio variable. In the ratio, both are specified in real terms.

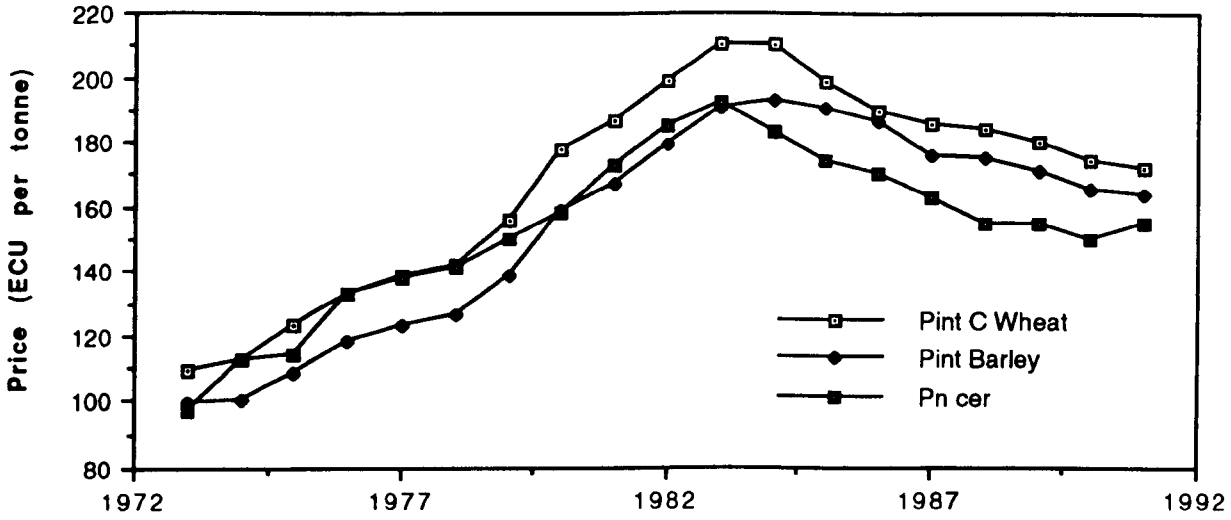
Real Cereals Price

The movement in nominal cereals support prices in recent years have been dominated by the operation of the stabiliser mechanism. Under this, every time the MGQ has been exceeded, support prices have been cut by 3% cumulatively. Moreover, the intervention price has been undermined throughout the 1980's and early 1990's by a number of measures. The principal one is that buying-in now takes place at the buying-in price, set below the intervention price. There are however a number of other factors that have acted to reduce the effective returns to producers from selling into intervention. These include delaying payments to farmers when they sell into intervention, tightening quality requirements before intervention purchase will occur, as well as MCA manipulations in some member states. The HGCA[2] estimate that these together are equivalent to significant real cuts in the intervention price. They estimate, for example, that in real terms, the effective barley intervention price in the UK fell by 38% between January 1984 and January 1989.

In considering the movements of the cereals price variable therefore, it is important to bear these points in mind, given that the data set is defined as the 'selling price' of cereals, rather than any institutional price, *per se*. If the intervention prices of wheat and barley, and the nominal cereals price series are examined, it can be seen that since all the measures noted above have been implemented, the nominal selling price of 'cereals', generally below the common wheat intervention price, has also now fallen below the barley intervention price. Estimating a 'cereals' intervention price on the same basis as the nominal selling price[3] indicates that since 1984, the selling price of cereals has averaged 89% of the 'cereals' intervention price:

[2] see HGCA Weekly Digest 15/30 of 30.1.1989.

[3] Using the weightings 1.5 wheat to 1 barley.



The following data set is for the nominal cereals price. The data sets for the intervention prices can be found in the data appendix on page app.11.

year	Pn cer
1973	96.90
1974	112.87
1975	114.09
1976	133.30
1977	137.98
1978	141.40
1979	150.24
1980	158.50
1981	172.61
1982	184.69
1983	192.16
1984	183.75
1985	174.16
1986	170.27
1987	163.00
1988	155.28
1989	155.23
1990	149.91
1991	154.96

It can be seen that whereas the intervention prices have continued to fall, given the practice in recent years of not changing the 'basic' intervention price, but operating price cuts under the stabiliser system on top of this, the selling price of cereals has started to flatten out somewhat.

Given that the prices in the regression are stated in real terms, the rate of inflation needs consideration also. It is becoming clear that , even with German unification, and the economic difficulties they face, the key EC economies appear to be keeping the 'fight against inflation' at the forefront of the political and economic agenda, even at the expense of economic growth[4]. Thus it seems reasonable to assume a continued decline in the EC's rate of inflation. It is beyond the scope of the current work to model future EC inflation rates, and thus the impact on nominal cereals prices, so assumptions must be made in the light of the above observations.

Under the stabiliser mechanism, nominal price cuts of 3% are imposed every time the MGQ is exceeded. Given German unification with no increase in the MGQ, it is as certain as anything can be that the MGQ would have been exceeded every year. Thus the decline in nominal support prices would have continued (in the short run at least). Selling prices too would almost certainly follow these prices downwards, although in local markets in short term periods, prices could always rise. On the whole however, one would expect the price decline to have continued.

Given this, it is perhaps inappropriate to simply look at the future movements of institutional prices and inflation rates in seeing what will happen to selling prices of crop products, but one would expect a price decline of about 5-7% per year. If the actual decline in the real cereals price over recent years is considered, it can be seen that over the 6 year period 1986 to 1991, the decline averaged 5.5% per annum. Thus as a base figure, this rate of decline in the real price would appear to be not out of line with *a priori* reasoning based on the above evidence.

Real Fertiliser Price

Initially, a formal modelling procedure was adopted for this variable. Augmented Dickey Fuller regressions showed that both the real fertiliser price and the real oil price (used as an input in fertilisers) were both difference stationary. The following regression was then run:

[4] Though at the time of writing, the future of the ERM is in question. If this breaks up, the ability of some governments to control inflation as effectively as in the recent past could be undermined.

$$\Delta \ln Prf = -0.028 + 0.135 \Delta \ln Pr\ oil$$
$$(-1.910) \qquad (2.622) \qquad\qquad 0.316 \quad 0.274 \quad 2.295$$

There have however been so many political influences on fertiliser selling prices that it was felt pointless trying to model those prices using economic variables. As with the cereals price series therefore, judgment was reverted to.

Turning first to the oil price, it would seem likely that prices won't rise much, if at all, in real terms, in the short to medium term. The following quote from a senior Shell manager sums up the likely future price movements:

> "Taken together [OPEC and non-OPEC], surplus capacity means that price levels can only be maintained at present levels by a sustained effort of production restraint on the part, mainly, of major Gulf producers. In the past, they have never found this easy and there is no reason why, with the additional pressures of paying for the ravages of the Gulf war, they should find it any easier now. I repeat, I can see little logic in expecting higher prices *and many reasons for testing new investments against lower ones.*"[5]

Other than for unforeseen circumstances causing another oil price hike, it would therefore appear unlikely that oil price movements would lead to higher fertiliser prices. The comment highlighted in the above quote suggests rather that prices will fall slightly. This suggests that the real fertiliser price is likely to be fairly stable over the next few years, though possibly with a slight decline. The market currently is very depressed, with cheap imports entering the EC despite the anti-dumping legislation currently being operated. Moreover, there is still a significant degree of excess capacity amongst fertiliser producers.

On the basis of the features of the price series outlined above, the decision has been taken to assume that the real fertiliser price will decline by 2% per annum over the forecast period. This decline is assumed to remain unchanged under MacSharry.[6] Note that under the second base scenario, the fertiliser price remains unchanged at 1992

[5] Jennings, J. J. (1991), Page2. Shell. London, this author's emphasis.

[6] It could be argued that the switch to area-based payments could encourage more environmentally friendly farming with farmers using fewer inputs, with less support based on the volume of output. This could result in a different rate of change in the fertiliser price.

levels.[7]

The assumptions made about the cereals price are also based largely on the comments set out above. The first scenario - the continuation of the stabiliser mechanism - assumes a price cut of 5.5% per annum, for the reason given above. The second scenario has the real cereals price unchanged from 1992 to 1999.[8]

The third scenario is a little more complex. The movements in institutional prices under MacSharry are specified in current nominal terms. This has been translated to the deflated price series used in the yield model by reference to the percentage change year by year. The price cut for 1992/3 to 1993/4 has been taken as the percentage difference between the 1992/3 soft wheat intervention price[9] and the 1993/4 intervention price as specified in the reform package. This implicitly also makes the assumption that there is a fixed differential between the 'selling price of crop products' and the intervention price. Note also that it has been assumed that once the (nominal) intervention price level of 100 ECU per tonne is reached, no further price cuts are imposed for the rest of the forecast period to 1999. It is also assumed, perhaps more controversially, that the compensatory payments made to producers under the reforms are production-neutral and therefore yield-neutral. They are therefore excluded from this calculation.

From these calculations of cereals and fertiliser prices, it is then possible to obtain the price ratio. Finally to move to the residuals of price ratio, as specified in the yield regression, the difference between the trend value for the price ratio (that is, the trend through the data for the period 1973 to 1991, extrapolated to 1999) and the value of the price ratio as estimated under each of the three scenarios, is taken.

8.2.3: Forecasts of Cereals Yields

From this, the three estimates of cereals yield under the three scenarios can be made. The figures are presented overpage, after the historical series for yields from 1973 to 1991:

year	cereals yield
1973	3.31
1974	3.4
1975	3.19
1976	2.98

[7] That is, the 1991 price less 2%.

[8] That is for 1992, the 1991 price less 5.5%.

[9] as quoted in CAP Monitor.

1977	3.4
1978	3.71
1979	3.62
1980	3.91
1981	3.68
1982	3.97
1983	3.83
1984	4.77
1985	4.49
1986	4.34
1987	4.41
1988	4.44
1989	4.64
1990	4.71
1991	4.96

	base 1	base 2	MacSharry
1992	5.21	5.21	5.21
1993	5.27	5.27	5.27
1994	5.34	5.43	4.64
1995	5.41	5.59	4.59
1996	5.47	5.76	4.55
1997	5.54	5.93	4.72
1998	5.61	6.11	4.89
1999	5.67	6.29	5.08

These are based on the following price ratios:

	base 1	base 2	MacSharry
1992	0.92	0.92	0.92
1993	0.91	0.92	0.83
1994	0.90	0.92	0.81
1995	0.89	0.92	0.79
1996	0.88	0.92	0.79
1997	0.87	0.92	0.80
1998	0.86	0.92	0.80
1999	0.85	0.92	0.80

The first aspect to note concerning the yield forecasts is the extent to which price cuts reduce cereals yields given the model specification of the model. Much thinking in the past has suggested that price cuts will not affect yields and production significantly. If however the model is correct in assuming the structure of yields as modelled up to 1991 still holds after the change in policy, then significant reductions in yields can be realised, at least in the short term. The key point here however is that the price cut from 1992/3 to 1993/4, of between 28 and 29% (31% in real terms)[10], is far greater than has ever been implemented under any policy operated before by the EC in the cereals sector. The low point of 1996 though STILL only cuts yields back to just below their 1989 level. After that, they soon rise rapidly again.

8.3: CEREALS AREA

8.3.1: Forecasting Net Arable Area

As was detailed in Sections 6.4 to 6.6, the approach taken in modelling cereals area has been an indirect one. It arrived at a model for cereals area as a percentage of net arable area (NAA), having first represented NAA itself.
Three different representations were given for NAA, reproduced below:

$$NAA = 37207 + 156.22t - 1348.7D77 - 782.02D90$$
$$(164.42)\ (8.475)\quad (-9.636)\quad (-6.013)$$
$$Rsq=0.924\quad Rbsq=0.908\quad DW=1.702$$

$$\ln NAA = 10.544 + 0.005t + 0.099\Delta \ln Pc/Pa_{t-1} \qquad 0.950\quad 0.940\quad \rho = -0.724$$
$$(6358.5)\ (20.010)\quad (3.894) \qquad \text{t-statistic}\quad (-3.785)$$

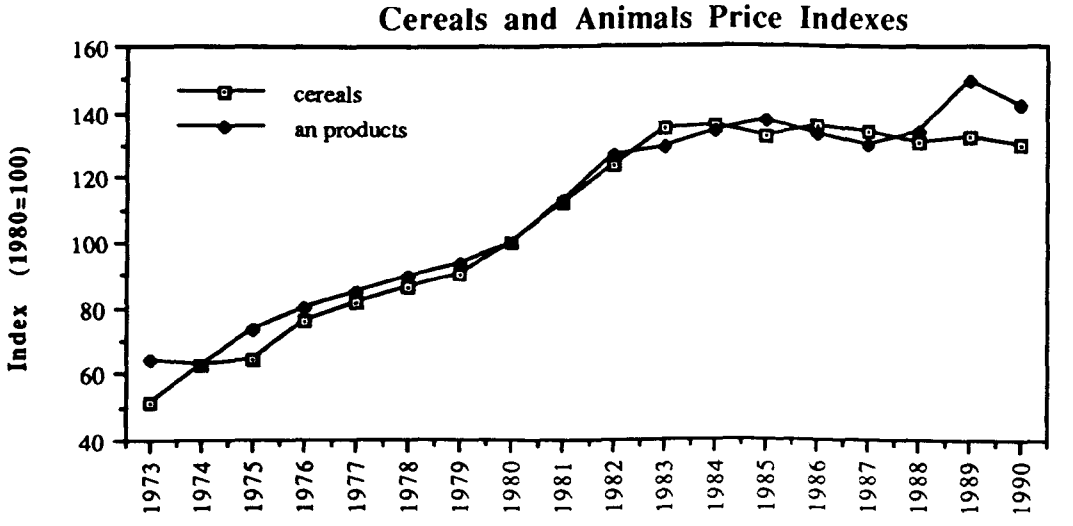
$$\ln NAA = 10.544 + 0.005t + 0.081\Delta \ln Pc/Pm_{t-1} \qquad 0.908\quad 0.889\quad \rho = -0.625$$
$$(4000.6)\ (10.708)\quad (1.603) \qquad (-2.888)$$

where the latter two used a maximum likelihood procedure to correct for autocorrelation. The first model is over the full data period from 1973, whereas the second two, for the reasons outlined in Chapter 6, are over a shorter period, from

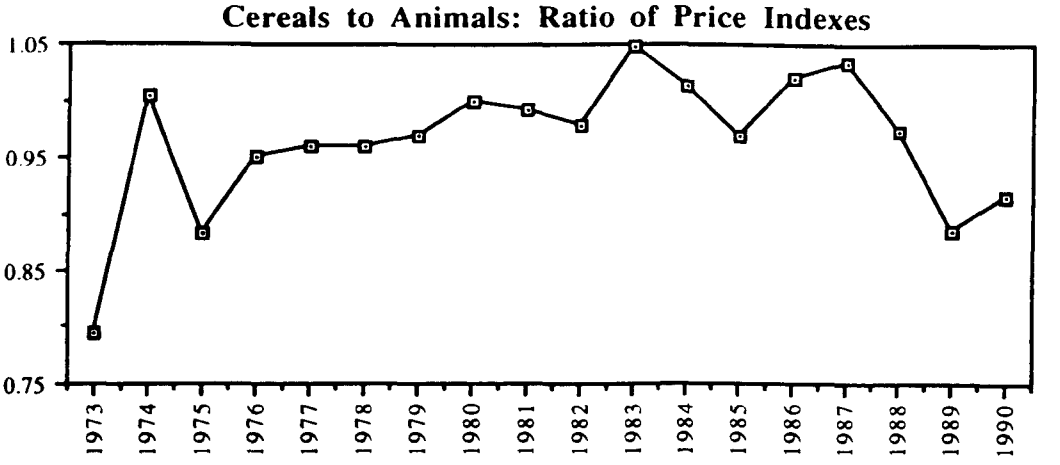
[10] The 1993 price cut is taken as 28.44% in nominal terms, 31% in real terms; for 1994, it is 7.69%/10.2%, and for 1995, 7.41%/9.9%. This assumes 2.5% price inflation, derived from the point above that the average price cut in real terms recently has been 5.5%. This has been assumed to consist of 3% stabiliser cut, and 2.5% inflation effect.

1979. The first model is self explanatory, with a trend variable and dummies on the two outlying observations. The second and third have as an added variable the ratio of price indexes to try and account for land given to arable crops rather than alternative enterprises. The reasons for just using a cereals index, rather than an index relating to the crops include in NAA was given in Chapter 6. With the third regression, correcting for autocorrelation resulted in the price ratio variable becoming insignificant. This is not surprising, given that milk production has been governed by quotas since 1984. It therefore seems most appropriate to examine the second regression, with the price ratio cereals to animals for slaughter and export index.[11]

The graphs below illustrate both the individual series (in absolute terms), and also the ratio of cereals to animals for slaughter and export price indexes. They clearly show that the two series have moved very closely together over the years, with the only divergence coming in the last two years.



[11] Strictly speaking, cointegration theory shows that TS and DS variables are generated under different systems. There can thus be no long term relationship between them, and they ought not to be included in the same regression. The key problem with this regarding the current model is that there is only a very limited data set. Moreover, as has been discussed elsewhere, it is highly unlikely that long run relationships will be determined in many of the regressions discussed in this thesis, given the number of factors that could generate 'structural breaks'. Thus *a priori* reasoning was given a higher priority in this model than econometric theory.



The average value of the ratio over the period of the regression (the last 13 observations), is 0.981 (including those two divergent observations). Data discovered very late on indicate that for 1991, the ratio returns to its previous level (the 1991 ratio figure is actually 0.978). Excluding the observations for 1989 and 1990, the average value of the ratio over the 14 year period to 1991 is 0.994. The closeness of the ratio to 1 can be seen on the second of the two graphs above, especially in the more recent years covered by the model above.

In considering the above model it therefore appears quite reasonable, in taking the value of the price ratio over the last few years as 1, to say that the log of the ratio is zero, with the expected value of the 1st difference of the ratio also being zero. Whilst this notionally therefore reduces the model to the specification of the first one presented above, it is a trend-based model where the trend coefficient is estimated in the presence of the price ratio. It also means that there is no difference between the base 1 and base 2 estimates of NAA, as prices are excluded from their estimation.

In correcting for autocorrelation with maximum likelihood, the following procedure can be used, where Y is cereals area, X is the time trend, and ρ is taken from the regression output given above:

let

$$Y_t = a + bX_t + u_t$$

where

$$u_t = \rho u_{t-1} + \varepsilon_t$$

therefore

$$Y_t = a + bX_t + \rho(Y_{t-1} - a - bX_{t-1}) + \varepsilon_t$$

or

$$Y_t = a(1-\rho) + bX_t - \rho bX_{t-1} + \rho Y_{t-1} + \varepsilon_t$$

In forecasting therefore

$$\hat{Y}_{t+1} = a + b\hat{X}_{t+1} + \hat{u}_{t+1}$$

where

$$\hat{u}_{t+1} = \rho (Y_t - a - bX_t)$$

That applies to BOTH base models. What has to be decided next is how the price ratio is likely to change under MacSharry. Considering the cereals index first, it will be assumed that the cuts in support prices under MacSharry will be fully reflected in changes in the price index for cereals. The nominal cuts will therefore be 3% in 1992[12], 28.44% in 1993, 7.69% in 1994 and 7.41% in 1995. With the animal series, It will be assumed that the series falls at half the rate of the cereals series. For beef, intervention prices are being cut, but headage premia are being increased. It is therefore assumed that these two offset each other to result in an approximately neutral policy. This applies to sheep as well. With pigs and poultry however, it is assumed that the fall in the price of cereals will be fully reflected in a fall in the price index for these animals and their products. To arrive at a fall in the index of half the rate of the fall in the cereals index, it must also be assumed that these two groups of animals make up equal weights in the index. From this, an estimate of NAA from the second regression above can be made.

8.3.2: Cereals Area as a Percentage of NAA

In Section 6.6, two alternative ways of estimating cereals area as a percentage of NAA were given. These are reproduced below:

$$\text{lncerA\%NAA} = 4.588 - 0.011t + 0.047\text{lnRRres}_{t-1} \quad 0.981 \quad 0.977 \quad \rho = 0.393$$
$$(882.72) \; (-16.935) \quad (2.164) \qquad\qquad (1.542)$$

$$\text{lncerA\%NAA} = 4.586 - 0.011t + 0.318\ln(Pc/Po)\text{res}_{t-1} \quad 0.982 \quad 0.979 \quad \rho = 0.304$$
$$(980.36) \; (-18.007) \quad (2.429) \qquad\qquad (1.149)$$

The key feature from these is that the t-statistic on the ratio of returns variable is insignificant.[13] Thus the model from which cereals area as a percentage of NAA will

[12] The regressions were run with data up to 1990. The 1991 index figures arrived in the library soon enough for this calculation to be carried out, but too late to incorporate in a full re-run of the model.

be estimated is the latter, involving the price ratio (specified as residuals around trend).

As with the yield work for base 1 above, it is assumed that real cereals prices fall at 5.5% per year to 1999. For base 2, the real cereals and rape prices are held at 1992 levels (the cereals 1991 price is cut by 5.5% and the rape price set as 2.1 times that, in accordance with the 1991 oilseeds reform package - see Chapter 4). Note that this last point can be justified even in non MacSharry case, as the oilseeds reforms establishing this price relationship were agreed in 1991, independently of the 1992 MacSharry reforms. As has already been demonstrated, these latter reforms actually changed this established price relationship. Note that with base 1, there are a whole host of possible scenarios that could be considered. One could assume that the cobweb will continue. If so, assumptions would have to be made as to the extent of the overshoot one year, the impact of this on prices, the effect of this on the following year's area, and so on. For this reason more than any other, a very simple (too simple?) approach is being taken in looking at future rape prices.

For MacSharry, the real price cuts will be as for the yield prediction (28.44%+2.5% for 1993), then (7.69%+2.5% for 1994), then (7.41%+2.5% for 1995), ie cuts of 31%, 10.2% and 9.9%. The real oilseed rape price will then be based on these cereals prices. The 1992 price ratio is set to be 2.1:1. After that, Section 4.6.3 demonstrated that from 1993/4, this is set to fall to approximately 2.03:1. Thus these figures will be used in determining the real rape price - as a percentage of the real cereals price.[14]

These estimates then give the following figures for NAA, the percentage of NAA planted to cereals and finally, the estimates for cereals area under the different scenarios. Set aside is not included here - it receives a separate analysis later. This allows for an assessment of MacSharry with and without the compulsory set-aside obligation.

NAA/T is derived from the estimate of NAA from the first NAA regression above, against time, with dummy variables on the outliers. The second pair of area estimates 'NAA/T ML' are based on the second NAA regression above, incorporating the price ratio, and corrected for autocorrelation using maximum likelihood.

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[13] Critical value=2.228.

[14] This assumes that the cost inflation faced by producers of both crops is the same. This seems quite reasonable, *a priori*.

year	NAA				cerA%NAA		
	base 1		base 2	MacSharry			
	T	T/ML			base 1	base 2	MacSharry
1992	40331.40	40654.94	NA	41129.55	85.02	85.02	85.02
1993	40487.62	40938.00	NA	40489.25	83.83	84.51	84.29
1994	40643.84	41085.51	NA	40153.13	83.05	83.79	83.45
1995	40800.06	41333.42	NA	41734.77	82.22	83.01	82.55
1996	40956.28	41510.06	NA	40945.92	81.37	82.23	81.77
1997	41112.50	41740.35	NA	42155.93	80.53	81.44	80.99
1998	41268.72	41933.41	NA	41633.71	79.69	80.66	80.21
1999	41424.94	42155.36	NA	42374.85	78.85	79.89	79.44

Cereals Area Estimates

		NAA/T		NAA/T ML	
	MacSharry	base 1	base 2	base 1	base 2
1992	34967.57	34289.00	34289.00	34564.07	34564.07
1993	34129.22	33938.85	34215.41	34316.38	34596.02
1994	33508.25	33754.47	34055.41	34121.27	34425.48
1995	34453.12	33544.19	33869.66	33982.70	34312.42
1996	33481.01	33326.29	33676.57	33776.90	34131.92
1997	34140.75	33106.29	33481.72	33611.87	33993.04
1998	33394.63	32885.84	33286.79	33415.51	33822.92
1999	33663.09	32665.44	33092.32	33241.41	33675.82

8.4: CEREALS PRODUCTION

The estimates made are for MacSharry, and two for each base model, one with NAA estimated by the trend model, one with the corrected trend and price model. Remember that these are estimates based on no set aside.

year	MacSharry	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	182030.18	178497.74	179929.67	178497.74	179929.67
1993	179945.47	180399.94	182406.69	178941.78	180932.31
1994	155602.64	181829.90	183805.80	183290.14	185281.90
1995	158234.49	183097.07	185490.61	187593.76	190046.09
1996	152247.87	184295.83	186787.74	191946.99	194542.35
1997	161038.62	185454.40	188286.59	196380.35	199379.40

1998	163406.49	186580.65	189585.77	200904.53	204140.36
1999	170889.12	187676.23	190985.43	205524.00	209147.90

When set-aside is incorporated into the model later, it will need to be remembered that in a recent Agra Europe article, it was felt that the changes to the price relative (discussed above) will result in farmers concentrating most of their set aside requirement into non cereals arable crops. If this is so, it will also have to be decided how much of their set aside requirement will be put against cereals.

8.5: CEREALS CONSUMPTION

8.5.1: Losses

An examination of the graph presented in Chapter 7 shows that from 1973/4 to 1976/7, there is a fairly low and fairly stable rate of loss of cereals. There is then a sharp increase with greater fluctuations. Since 1984/5, the figure has been much more stable, with the exception of 1989/90. In Chapter 7, it was suggested that a constant rate of losses could reasonably be assumed. The average for the full data period is 2.047mt. For the last 8 years, when the data set has been much more stable again, the average is 1.914mt; and for that period, but excluding 89/90, the average is 1.977mt. Given the small amount of total cereals consumption represented by losses, and the points made above, it seems reasonable to take that last figure above of 1.977 million tonnes as the quantity for losses over the next few years .

8.5.2: Seed

At first sight, the data shown in the graph in Chapter 7 seem to suggest an upward trend. Note however that the last two figures include eastern Germany. Moreover, the regression from Chapter 7 confirms that those two observations are outliers. That regression shows that when those observations, and also the figure for 1976/7, are excluded with DV's, the trend coefficient is insignificant. Thus it again appears reasonable to take a single figure for cereals use for seeds for each year in the forecasting period. The regression in Chapter 7 has an intercept of about 5.52 million tonnes. The average quantity of cereals going for seed over the full data period is 5.609 million tonnes. Excluding the observations that include eastern Germany, this falls to 5.56 million tonnes. Excluding 1976/7 as well gives a figure of 5.586 million tonnes. A figure that seems reasonably consistent with these is 5.59 million tonnes. It is close to the last figure, based on the data excluding the outlying observations, and the

rounding-up can be justified by noting that as the HGCA pointed out (see footnote in Chapter 7) the use of cereals for seed may go up a bit with the banning of the use of organo-mercury treatments.

8.5.3: Human Consumption

Unlike the first two end-uses of cereals, the figure for human consumption of cereals should be estimated rather more formally. This was done using the regression model reported in Chapter 7, where the quantity of cereals consumed by humans is regressed against the log of time. Overall, the quantity appears to be rising, but at a progressively slower rate, as would be expected, *a priori*. This formulation captures that. Note that with no quantity reported for 1973/4, in that regression, n=18 and observation number 1 is the 1974/5 figure.

8.5.4: Industrial Use

The regression reported in Chapter 7 suggested that industrial use of cereals is growing at about 1.035% pa. This figure shall be used here. The graph in Chapter 7 generally suggests a steady growth in recent years. With moves to continue subsidies for starch production, and also recent moves to encourage the use of set aside land for non-food uses, it seems likely that this upward trend will continue. That having been said, it appears likely that such moves won't substantially increase the quantity of cereals used by industry. Therefore, such a figure, that allows for a constant percentage increase, and a small absolute increase each year, seems appropriate.

8.5.5: Animal Feed

From the models of animal feed in Section 7.4, the forecasting equation for the quantity of cereals used for animal feed is:

$$A\hat{F} = \hat{I}_t \,/\, \{100(\frac{Wc_{t-1}}{AF_1} + \frac{Ws_{t-1}}{\hat{r}_t}\frac{1}{QS_t})\}$$

where $\hat{r}_t = \frac{AF_1}{QS_t}$

$\hat{I}$ can be estimated from the regression in Chapter 7:

Index = 0.00022CE + 0.944t

(73.477) (5.348) 0.932 0.928 1.181

During the period 1985 to 1987, the CE numbers rose sharply owing to increases in the numbers of pigs, poultry and sheep and goats. Since then, they have been very stable, as the graph in Chapter 7 illustrates. For forecasting purposes, a constant CE figure is to be assumed. The average of those last seven observations for CE is 564.910 million head of animals, cattle equivalent. From this, future values of the index can be derived.

The following regression then allows estimation of the ratio of AF/QS:

$$AF/QS = 6.369 - 0.003t - 0.000007CE - 0.578PR$$
$$(4.372)\ (-1.595)\quad (-2.516)\quad (-2.988)\qquad 0.943\quad 0.931\quad 1.365$$

This requires the future values of nominal cereals and cereals substitutes prices PR to be examined. The forecasting of cereals prices will follow the approach taken earlier in this chapter. With the price of cereals substitutes, the graph in Chapter 7 shows that whilst they have fluctuated year by year, for a number of years now the general path has been fairly flat. Therefore a constant figure will be taken. The average of the last 12 observations, which include a peak at the time of the 1980/1 price boom, is 153.22 ECU per tonne. For the last 8 years, the average has been 149.48 ECU per tonne. A figure of 150 ECU per tonne will therefore be taken for forecasting purposes.

In the forecasting equation therefore, this leaves the lagged weights to be derived. These are calculated using the equations given in Chapter 7. Note that in each case, QS is derived from the equation above, from AF/QS (ie r-hat) from the regression, and AF_t as estimated using the lagged weights.

The table below shows the weight of cereals in the index of total animal feed, and below that are the estimates for cereals use in animal feed under the different scenarios:

	base 1	base 2	MacSharry
1992/3	0.55	0.55	0.55
1993/4	0.54	0.55	0.50
1994/5	0.53	0.54	0.48
1995/6	0.52	0.53	0.46
1996/7	0.51	0.53	0.45
1997/8	0.50	0.52	0.45
1998/9	0.49	0.51	0.44
1999/20	0.48	0.51	0.43

	base 1	base 2	MacSharry
1992/3	83581.73	83581.73	83581.73
1993/4	84619.94	83868.96	90677.42
1994/5	84043.31	82765.86	88372.00
1995/6	83412.22	81594.60	87931.87
1996/7	82726.74	80354.28	86259.06
1997/8	81987.06	79044.14	85231.11
1998/9	81193.53	77663.58	84148.37
1999/20	80346.60	76212.17	83010.42

From this, the following estimates of total internal use can be derived:

	TIU base1	TIU base2	TIU MacS
1992/3	140603.56	140603.56	140603.56
1993/4	141851.68	141100.70	147909.16
1994/5	141482.37	140204.93	145811.06
1995/6	141056.42	139238.79	145576.06
1996/7	140574.20	138201.73	144106.52
1997/8	140036.20	137093.28	143280.25
1998/9	139443.02	135913.08	142397.86
1999/20	138795.36	134660.92	141459.17

It can be seen from the MacSharry estimates that the decline in cereals prices is insufficient to reverse the decline in the use of cereals in animal feed (dominant in the movement of TIU), although it does slow down that decline. The one year where cereals consumption does rise is from 1992/3 to 1993/4, when there is a very large price cut. The main factor that would most likely turn around the general decline would be a rebalancing in animal production away from those animals for whom concentrate feed plays the most important part. This thesis has not focussed on the reforms of the livestock regimes, and the full impact of the cereals reforms on those regimes, but it is possible that the cereals reforms, plus the reforms aimed at extensifying animal production, could help in the restoration of previous levels of cereals consumption.

8.6: Cereals Trade

8.6.1: Cereals Imports

Rather than model cereals imports, a simplifying assumption will be made that these imports will stabilise at about the current level. With a great deal of product differentiation between grains, the EC has traditionally imported certain types that it has had a deficit in. *A priori*, this can be expected to continue in the future for a number of reasons. Firstly, with controls on production being tightened with the MacSharry reforms, it seems unlikely that production will be allowed to expand markedly, even into these deficit cereal types. Moreover, climatic and other 'natural' factors are likely to ensure that the EC cannot expand production of these cereals significantly. Secondly, trade agreements, such as between the EC and the US following Spain's accession to the Community are geared to ensuring past trade patterns aren't altered dramatically. In particular, they are set up to guarantee the US in particular continued market access for certain cereal types to certain markets.

In the other direction, even if the reform package does dramatically cut EC cereals production, with a large surplus already existing as well as historically unprecedented levels of cereals intervention stocks, it seems unlikely that the EC will need to INCREASE its imports significantly in the short term.

This work will follow Rayner et al (forthcoming) and assume imports continuing at a level of 5 million tonnes per year.

8.6.2: Cereals Exports

Following the work of Chapter 5, the quantity of cereals exports, more accurately defined at this stage as the quantity of cereals available for export, shall be estimated as the residual of total available supplies (defined as production plus imports), minus total internal use, or quantity of cereals consumed. Initially this analysis will ignore sales of 'surplus' cereals into intervention stores. If the simplifying assumption is made however that there are only two outlets for surplus cereals - sale into intervention or sale to third countries; and that all, or nearly all, the quantity sold into intervention eventually is sold onto third country markets, then this isn't a problem. The analysis can then readily be amended later to account for this, once a figure for disposable cereals surplus is established. If the figure for exports plus intervention purchases (effectively what is being estimated by Q+M-C), is considered, then the figures shown below for the estimates of exportable surplus under the different scenarios aren't as high relatively as they at first appear.

	MacSharry	base1: T	base 1: T ML	base 2: T	base 2: T ML
1992	46426.62	42894.18	44326.11	42894.18	44326.11
1993	37036.31	44299.24	46305.99	42090.10	44080.63
1994	14791.57	46624.97	48600.87	46807.77	48799.53
1995	17658.43	48858.27	51251.82	51537.35	53989.68
1996	13141.36	51094.10	53586.01	56372.79	58968.16
1997	22758.37	53361.12	56193.31	61344.15	64343.20
1998	26008.63	55667.57	58672.70	66461.51	69697.34
1999	34429.95	58015.31	61324.51	71728.65	75352.55

8.7: Export Refund Estimation

As was discussed in Chapter 4, the calculation of refunds for exports from the open market is, in essence, based on the EC's internal market price and the third country price at which exporters feel their exports will be competitive with grain from other exporting countries. From earlier work, the unit export refund can therefore be estimated as the difference between the EC's price[15] and the third country selling price of EC exports. In turn, this last price can be related to the 'world price' of cereals exports from other exporters. The main quantities considered are generally 'hard' wheats not produced in great quantities in the EC, and which fetch a price premium over EC standard wheat on the world market. Thus the third-country selling price of EC exports can either be conceived directly, or as a percentage of the third country selling price of cereals from other exporters. The other factor to consider is the ECU:US Dollar exchange rate. Thus changes in this can affect the third country selling price of EC exports (world prices generally denominated in US dollars) with all other factors being held equal. The following regression incorporates such factors:

$$r_t = 0.998z_t + 40.879k_t$$
$$(8.394) \quad (6.394) \qquad\qquad 0.500 \qquad 0.468 \qquad 1.160$$

where r_t is the unit export refund, z_t is the gap between the EC internal price and the ECU 'world' price, and k_t is the exchange rate (given as number of ECU per dollar). r_t and z_t can be found in Appendix 18, and k_t in Appendix 6. The coefficient of 0.998 shows that movements in the EC market price are just about fully reflected in movements in the unit export refund. Moreover, there is a gap of nearly $41 per tonne

[15] the 'Selling Price of Crop Products', that is, the market price measured in market ECU (see Appendix 4).

between the 'world' price and the third country selling price of EC exports. The DW is however rather poor.[16]

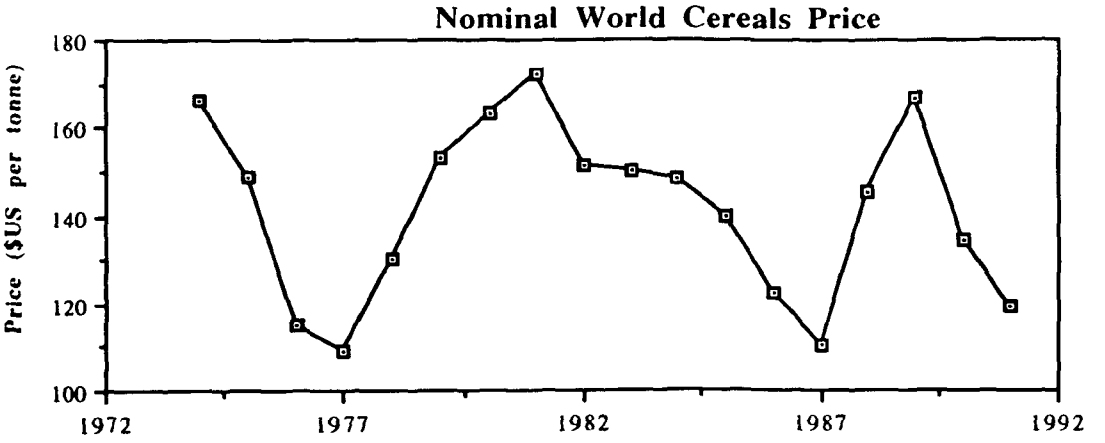
For forecasting purposes, the estimation of unit refund will therefore be based on the relationship

$$r_t = z_t + 41k_t$$

What this regression says is that the unit ECU refund on exports of cereals from the EC is related to the gap (in ECU) between the EC market price and the 'world' cereals price, plus a gap that relates to the fact that EC cereals exports trade at a price below those cereals whose prices go into the 'world' cereals price (see Appendix 10). This is measured in dollars like the world price, and must therefore be converted to ECU. Note that with a world dollar price that appears unrelated to the exchange rate, it matters little if the unit refund is measured in ECU or dollars. With the expenditure implications for the EC budget being in ECU, it was therefore decided to look at the unit refund directly in ECU. This regression is also based on the nominal cereals market price for the EC. As with all cases before, the assumption will be made that changes in the institutional prices will be fully reflected in this price series. The changes in EC cereals price will also be as before, assuming a 3% cut each year under stabilisers, a price freeze on the 1992 price level for the second base scenario, and cuts of 3%, 28.44%, 7.69% and 7.41% under MacSharry. Initially, just one exchange rate scenario will be considered, along with one world price scenario.

Looking first at the exchange rate, it can be seen that other than for the period 1982 to 1986, when the dollar was particularly strong for reasons connected with US domestic economic policy, the rate has fluctuated about 0.8 to 0.9 ECU per US dollar. The average value for the full period, including the early 1980's, is 0.9177 ECU to the dollar, but with those five years excluded, the average has been 0.8285 ECU to the dollar. Given the tendency for the exchange rate to fluctuate around this value, it seems reasonable as a first run to take k_t as 0.8285. This implies a future gap of 34 ECU per tonne between the 'world' price of North American grains and the third country selling price of EC grains.

[16] It is inconclusive at 5%, and only marginally so at 1%.



This graph clearly shows how the price fluctuates notably, but around a steady figure of about $140 per tonne (the actual average is $141 per tonne). Rather than take this figure however, the 'base' price will be taken as a five year ROLLING average. This will tend to smooth out the series by 1999, but will pick up something of the cyclical movement in the short term.

Making these assumptions then gives the following unit refunds for the three scenarios for the period 1992 to 1999, in ECU per tonne:

year	base 1	base 2	MacSharry
1992	72.56	72.56	72.56
1993	63.87	68.38	25.63
1994	60.34	69.22	18.20
1995	60.72	73.85	15.47
1996	56.69	73.93	15.55
1997	50.35	71.59	13.21
1998	46.29	71.39	13.02
1999	43.13	72.00	13.62

Thus it can be seen that, given the assumptions made, by 1995 the internal EC price will be around 13 to 15 ECU per tonne above the world price.

From this and the data presented above in Section 8.6.2, estimates can be made of total export refund expenditure assuming that all of the exportable surplus can be and is exported at the unit refunds estimated:

Total Refund Expenditures in million ECU.

	MacSharry	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	3368.84088	3112.51747	3216.422	3112.51747	3216.422
1993	949.335683	2688.38534	2815.52458	3029.24995	3166.47441
1994	269.180667	2824.1644	2944.33818	3227.32783	3364.09704
1995	273.219757	3129.56909	3278.48507	3608.21564	3784.9806
1996	204.391871	3195.74814	3342.87808	3777.46398	3961.69462
1997	300.658045	3088.9828	3239.99947	3820.07234	4022.82581
1998	338.532197	3076.36211	3226.14172	3974.34879	4188.89756
1999	468.89138	3093.96095	3250.27512	4176.92177	4415.17378

Thus it can be seen that the moves to reduce the market support price under Macsharry lead to significant reductions in total refund expenditures, although with the internal price, under the given assumptions, not reaching the level of the world price, these expenditures do not fall to zero. Moreover, as has been hinted throughout this chapter, under the assumptions that prices are frozen after 1995, rather than cut further, refund expenditures start to rise again under MacSharry. It is clear however that these figures are still well below the sums indicated by the base scenarios.

These figures can further be amended to examine the impact of different world prices on the MacSharry estimation. Taking the world price figures in the above calculations as 'average', the figures can be re-estimated using 'high' and 'low' world prices. The high price is taken as the average world dollar price plus $20 per tonne, and the low price is taken as the average price minus $20 per tonne. This gives the following unit refund levels:

	rt average Pw	rt high Pw[17]	rt low Pw
1992	72.5626944	55.9926944	89.1326944
1993	25.6325661	9.06256605	42.2025661
1994	18.1982432	1.6282432	34.7682432
1995	15.4724855	0	32.0424855
1996	15.5533324	0	32.1233324
1997	13.2108764	0	29.7808764
1998	13.0161481	0	29.5861481
1999	13.6187068	0	30.1887068

[17] It is very important to note that here, and in many of the following tables, the zero reflects the fact that in estimating that particular number, the estimated value came out as a negative. Negative unit refunds, export quantities etc have no economic meaning however, and are therefore recorded as zero.

The significance of the high world price scenario is that by 1995, internal and world prices are at the same level, and therefore no export refunds are needed.

	MacS av Pw	MacS high Pw	MacS low Pw
1992	3368.84088	2599.55173	4138.13003
1993	949.335683	335.644013	1563.02735
1994	269.180667	24.0842802	514.277053
1995	273.219757	0	565.819894
1996	204.391871	0	422.144132
1997	300.658045	0	677.764276
1998	338.532197	0	769.495218
1999	468.89138	0	1039.39563

For 1999, the high and low world price scenarios represent price levels of plus and minus 14.75% of the average world price. This however eliminates the need for export refunds under the high price scenario, but leads to an increase in refund expenditure under the low price scenario of over 120%.

8.8: INTERVENTION OPERATIONS

The calculations presented above assume that all of the exportable surplus is exported in the year of production, and without passing through intervention first. Consideration of USDA data for imports and exports to and from the main exporters and importers suggests that import opportunities are going to get tighter. Export opportunities too look like they will get harder. The total export market is generally fairly static, with the US holding its market share. With the recently announced expansion of its EEP programme, and Canadian and Australian exports generally stable and well-established, the EC will probably find it very difficult to increase exports.

Given the recent expansion of the EEP programme, then it seems reasonable to take a maximum export figure of about 30 million tonnes each year from the EC. This is a somewhat artificial assumption, as there are many factors determining export opportunities, but it is illustrative of something that might happen. This means that if this is a correct assumption, then the EC are going to have to resort even more to intervention under the base scenarios, although under MacSharry the exportable surplus falls very rapidly. If the assumption is made that the unit export refund from the open market is equal to the unit 'export refund' from intervention, then the only factors to

consider are the storage costs. If it is further assumed that carryover stocks from 1991 to 1992 are 18 million tonnes, and that sales from intervention back onto the domestic EC market require no budget expenditure, then it is possible to very roughly estimate stock figures each year on which storage costs are payable. Net domestic intervention and exports from intervention are estimated from the regressions in Sections 5.5.2 and 5.5.3 respectively, where both are regressed against time and production residuals. The latter figures are estimated as the difference between the trend of production from 1973 to 1991, extrapolated to 1999, and the production estimates under the five different scenarios presented in Section 8.4 above.

year	MacSharry	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	20531.063	19379.4874	19846.2958	19379.4874	19846.2958
1993	21328.6525	20325.235	21446.2431	19849.875	20965.5952
1994	13136.622	20683.2926	22448.4425	20683.9705	22449.0055
1995	4748.71861	20400.5885	22946.0344	21867.1904	24431.6848
1996	0	19454.8261	22812.6346	23415.7044	26826.2871
1997	0	17832.8996	22114.0004	25355.6382	29743.9086
1998	0	15524.2724	20785.0436	27716.5957	33159.7461
1999	0	12518.948	18858.5181	30529.6447	37154.1864

This suggests that under MacSharry, from 1996, with export opportunities not constrained as production falls under the price cuts imposed, then intervention will play no major role in holding stocks over one year.

As a simple comparison of policies however, the following figures relate to costs of holding those stocks retained for over one year. The main problem is getting accurate estimates of the storage costs themselves. Direct contact with the EC Commission lead to the answer that for commercial and trade reasons, the member states, who operate the intervention policies, are most unwilling to reveal these figures. An estimate was therefore derived by looking at closing stock levels and technical and financing cost expenditures for a period in the 1980's. From this, a unit storage cost of about 25 ECU per tonne seems an acceptable figure. Note that with compulsory stock depreciation, this figure only considers the technical costs of storage. It is assumed that financing costs are small enough to ignore with the depreciation policy (figures in '000 ECU):

year	MacSharry	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	513276.575	484487.184	496157.395	484487.184	496157.395
1993	533216.313	508130.875	536156.078	496246.874	524139.881
1994	328415.551	517082.315	561211.061	517099.263	561225.138
1995	118717.965	510014.713	573650.86	546679.76	610792.12
1996	0	486370.653	570315.864	585392.611	670657.177
1997	0	445822.489	552850.011	633890.956	743597.716
1998	0	388106.811	519626.09	692914.892	828993.652
1999	0	312973.701	471462.952	763241.119	928854.661

It can be assumed that the negative figures for MacSharry simply indicate that after that period, costs will be negligible. Thus the export costs of the policy as estimated above without reference to intervention can have these above figures added to them. This therefore makes allowance for the additional costs of storing some surplus first, prior to export, given the assumptions set out above.

8.9: COMPENSATORY PAYMENTS

Under the MacSharry reforms, two different and distinct compensatory payments are payable. The first is the payment designed to offset the cut in institutional prices, and is added to the target price each year (now redefined as the reference price for aid) to give a constant figure of 155 ECU per tonne for each year to 1995/6. This set at 25 ECU per tonne for 1993/4, rising to 35 ECU per tonne in 1994/5 and 45 ECU per tonne in 1995/6. For all farmers other than those designated 'small'[18], this payment is made only if the farmer sets aside 15% of his arable land. It is, moreover, an area-based payment rather than a quantity based payment. The yield is set as a 'regional' yield. This is set by the national governments, and can be the average yield for the whole country, or just one region within it. The calculations here will, for simplicity, work on EC average cereals yields. The payment per hectare can then be calculated from the compensatory payment per tonne and the average yield figure. The calculation for the average yield is set out in the relevant legislation.[19] The yield figures for the years 1986/87 to 1990/91 are taken, the highest and lowest figures are dropped, and the average of the other three is taken for the area payment calculation.

A second, separate payment is one due to farmers to compensate for the setting

[18] That is, those farming an area giving no more than 92 tonnes at average yields.

[19] Article 3, paragraph 2 of Council Regulation (EEC) No 1765/92, of 30 June 1992, in OJL181, page 12.

aside of land. This is specified in ECU per hectare, and is set for all years at a level equal to the area compensatory aid payment due in 1995/6.[20]

The average yield for 1986 to 1990 from the yield data used earlier is 4.5 tonnes per hectare. This gives total compensatory payments equal to the figures set out in the table below. CP is the compensatory payment, and SAP is the set aside compensatory payment:

year	CP (ECU/t)	Area Aid (ECU/Ha)	SAP (ECU/Ha)
1993/4	25	112.5	202.5
1994/5	35	157.5	202.5
1995/6	45	202.5	202.5

Note that the set aside requirement is for arable land in total, with the compensation paid on the basis of cereals compensatory payments.

In determining the area to be set aside, it must be noted that areas set aside under the old five year set aside scheme are not eligible for compensation under the new system as well. Farmers can choose to keep their set aside land in the old five year scheme or transfer it to the new scheme.

A decision must also be made as to the likely allocation of set aside land between cereals and other eligible crops (principally rape, sunflower and soya, but also peas, field beans and sweet lupins). Important here is a recent article in Agra Europe.[21] It argues that the cereals to oilseeds price ratio set out in the legislation will result in farmers concentrating as much of the set aside requirement as possible on non-cereal crops. For the period 1987 to 1991, the area planted to oilseeds came to an average of 12% of NAA. Ignoring the protein crops included in the regulation, this figure indicates that farmers overall will be unable to concentrate all the set-aside requirement into oilseeds. It is under any assumption very unlikely that oilseeds area will fall to zero overnight. It has also been made known that the US, through the GATT negotiations, would like the EC oilseeds area to halve. Without trying to justify or defend such a demand, let it be assumed that, under MacSharry and the relative prices established, the US's wishes are granted. First however, the total set aside area needs to be established. This is given by the forecasts of NAA to 1999 (all in '000 Ha):[22]

[20] Article 7, paragraph 5.

[21] Agra Europe No. 1495, June 12th 1992, page P/1ff.

[22] Note that land set aside under the five-year set aside scheme is incorporated in the base area, 15% of which has to be set aside. The only requirement is that all of this land previously set aside must be

year	NAA MacSharry	15% SA area
1992	41129.55	6169.43
1993	40489.25	6073.39
1994	40153.13	6022.97
1995	41734.77	6260.21
1996	40945.92	6141.89
1997	42155.93	6323.39
1998	41633.71	6245.06
1999	42374.85	6356.23

The area planted to oilseeds in the EC rose significantly for a number of years, but has recently flattened out (subject to fluctuations under the stabiliser mechanism discussed in Section 4.2.2). The average for the years 1987 to 1991 is just under 4.8 million hectares, with the last two figures around 5 million hectares. 1992 plantings were already starting to fall, given the uncertainty surrounding the 1991 reforms of the oilseeds regime, so let it be assumed that the points noted lead to a fall in oilseeds area of 2.5 million hectares.

This means that each year, 2.5 million hectares of the area to be set aside, as shown above, is to be taken out of the area planted to oilseeds (assuming a total oilseeds area figure of 5 million hectares). The following figures therefore show the amount of set aside land taken from the cereals area, and the resulting cereals area net of this:

year	cereals SA	area - no SA	area with SA
1992	3669.43	34967.57	31298.14
1993	3573.39	34129.22	30555.83
1994	3522.97	33508.25	29985.28
1995	3760.21	34453.12	30692.91
1996	3641.89	33481.01	29839.12
1997	3823.39	34140.75	30317.36
1998	3745.06	33394.63	29649.57
1999	3856.23	33663.09	29806.87

Thus with the set aside requirement allocated between cereals and oilseeds under the given assumptions, cereals area will tend settle fairly rapidly at about 30 million hectares.

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cultivated in the first year of the operation of the new policy, as part of the rotation requirements set down to minimise the problem of slippage.

The following table then shows the cost of compensatory payments and set aside compensatory payments (CP and SAP) under MacSharry, and assuming that the levels of aid in 1995 continue to the end of the forecast period:

year	CP	area aid	area for CP	area payments	SAP	SA area	SA payments
1992	na		34960.12	m ECU		6169.43	m ECU
1993	25	112.5	34415.86	3871.78	202.5	6073.39	1229.86
1994	35	157.5	34130.16	5375.50	202.5	6022.97	1219.65
1995	45	202.5	35474.55	7183.60	202.5	6260.21	1267.69
1996	45	202.5	34804.03	7047.82	202.5	6141.89	1243.73
1997	45	202.5	35832.54	7256.09	202.5	6323.39	1280.49
1998	45	202.5	35388.65	7166.20	202.5	6245.06	1264.62
1999	45	202.5	36018.62	7293.77	202.5	6356.23	1287.14

One key point arising from this table is that with area stabilising under MacSharry, expenditures on the two compensatory payments stabilise at around 8.5 billion ECU.

The impact of this reduction in cereals area however must now be traced back through production to exports and export refund costs. The following table compares the MacSharry reforms on export refund expenditures with and without the 15% set aside requirement:

	With set aside				Without set aside		
year	Production	Exports	unit ref	ref exp	Production	Exports	ref exp
1992	162928.27	27324.71	72.56	1982.75	182030.18	46426.62	3368.84
1993	161104.87	18195.71	25.63	466.40	179945.47	37036.31	949.34
1994	139242.98	0	18.20	0	155602.64	14791.57	269.18
1995	140964.77	388.71	15.47	6.01	158234.49	17658.43	273.22
1996	135687.15	0	15.55	0	152247.87	13141.36	204.39
1997	143004.06	4723.81	13.21	62.41	161038.62	22758.37	300.66
1998	145081.19	7683.34	13.02	100.01	163406.49	26008.63	338.53
1999	151313.16	14854.00	13.62	202.29	170889.12	34429.95	468.89

As was done earlier in the chapter, the calculations for export refund expenditure with set aside too can be re-estimated with different world price assumptions:

year	refexp high Pw	refexp low Pw
1992	1529.984	2435.525
1993	164.8998	767.90569
1994	0	0
1995	0	12.455214
1996	3.476359	0
1997	0	140.67933
1998	0	227.32032
1999	0	448.4228

The earlier sections of this chapter showed the importance of the price cuts under MacSharry on the cereals market and expenditure on supporting cereals. This table shows that the impact of the compulsory set aside requirement on production and export refund expenditures is also very important within that.[23] What has also been shown however is that the cost of the compensatory payments will, as many expected, push up the cost of the cereals regime to the EC budget. The main way in which this has been illustrated in this chapter is by assuming that there is no reduction in the compensatory payments to farmers after the initial period to 1995.

Certain assumptions can therefore be made in order to allow for estimates of the impact of degressive compensatory payments. In the Agra Europe from immediately after the reform agreement[24], there is a quote from Ray MacSharry on this matter. When asked if the payments would be degressive or not, he is reported to have said that they would be "fixed in stone until 1997.". What the following calculations assume is that from 1997, the CP level falls. The first set of figures assume it falls by 5 ECU per tonne per year, and the second by 10 ECU per tonne. In both cases it is assumed that the level of the set-aside compensatory payment falls each year in line with the falling area aid payment.

year	CP	area aid	area for CP	area payments	SAP	SA area	SA payments
1992	na		34960.12	m ECU		6169.43	m ECU
1993	25	112.5	34415.86	3871.78	202.5	6073.39	1229.86
1994	35	157.5	34130.16	5375.50	202.5	6022.97	1219.65
1995	45	202.5	35474.55	7183.60	202.5	6260.21	1267.69

[23] The incorporation of set aside, the impact of MacSharry etc does not assume that fewer EC exports has no impact on the world price. Specifically, it assumes that fewer EC exports has no impact on the international trading price of certain North American hard wheats and Canadian barley.

[24] Agra Europe No 1492, 22nd May 1992, page P/12.

1996	45	202.5	34804.03	7047.82	202.5	6141.89	1243.73
1997	40	180	35832.54	6449.86	180	6323.39	1138.21
1998	35	157.5	35388.65	5573.71	157.5	6245.06	983.60
1999	30	135	36018.62	4862.51	135	6356.23	858.09

year	CP	area aid	area for CP	area payments	SAP	SA area	SA payments
1992	na		34960.12	m ECU		6169.43	m ECU
1993	25	112.5	34415.86	3871.78	202.5	6073.39	1229.86
1994	35	157.5	34130.16	5375.50	202.5	6022.97	1219.65
1995	45	202.5	35474.55	7183.60	202.5	6260.21	1267.69
1996	45	202.5	34804.03	7047.82	202.5	6141.89	1243.73
1997	35	157.5	35832.54	5643.63	157.5	6323.39	995.93
1998	25	112.5	35388.65	3981.22	112.5	6245.06	702.57
1999	15	67.5	36018.62	2431.26	67.5	6356.23	429.05

Thus the three alternatives give the following figures for the total of compensatory payments plus set aside compensatory payments:

year	no cut in CP	5% cut in CP	10% cut in CP
1992			
1993	5101.65	5101.65	5101.65
1994	6595.15	6595.15	6595.15
1995	8451.29	8451.29	8451.29
1996	8291.55	8291.55	8291.55
1997	8536.58	7588.07	6639.56
1998	8430.83	6557.31	4683.79
1999	8580.91	5720.60	2860.30

This clearly shows the significance of cutting the compensatory payments. a cut of 5 ECU per year from 1997 cuts 1999 expenditure by 33% (this results from a cut in the 1999 CP of 22% compared with the base scenario). A 10 ECU cut lowers expenditure by 55% (a 67% cut in the base 1999 CP).

8.10: CONCLUSION

This chapter has developed the work of Chapters 6 and 7 to produce estimates of future expenditures incurred in supporting the cereals regime to 1999 under different policy assumptions. The three basic scenarios developed are firstly where there is a strict continuation of the stabiliser system, one where the policy is unreformed and real prices are held at their 1992 levels, and one where the MacSharry reforms are imposed. The first two 'base' scenarios are further developed by considering two different estimates for cereals area. The consequences of the MacSharry reform package are examined by considering the likely future budgetary expenditures with and without the compulsory set aside requirement. The impact of 'high' and 'low' world prices is also considered.

Examining first the impact of different policy scenarios on export refund expenditure, the following results have been obtained:

	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	3112.51747	3216.422	3112.51747	3216.422
1993	2688.38534	2815.52458	3029.24995	3166.47441
1994	2824.1644	2944.33818	3227.32783	3364.09704
1995	3129.56909	3278.48507	3608.21564	3784.9806
1996	3195.74814	3342.87808	3777.46398	3961.69462
1997	3088.9828	3239.99947	3820.07234	4022.82581
1998	3076.36211	3226.14172	3974.34879	4188.89756
1999	3093.96095	3250.27512	4176.92177	4415.17378

This compares with the following estimates under the MacSharry reforms. The first table presents refunds under average high and low world prices with exports based on no set aside, with the second table examining the impact of set aside on this expenditure.

	average Pw	high Pw	low Pw
1992	3368.84088	2599.55173	4138.13003
1993	949.335683	335.644013	1563.02735
1994	269.180667	24.0842802	514.277053
1995	273.219757	0	565.819894
1996	204.391871	0	422.144132
1997	300.658045	0	677.764276

1998	338.532197	0	769.495218
1999	468.89138	0	1039.39563

year	average Pw	refexp high Pw	refexp low Pw
1992	1982.75	1529.984	2435.525
1993	466.40	164.8998	767.90569
1994	0	0	0
1995	6.01	0	12.455214
1996	0	0	0
1997	62.41	0	140.67933
1998	100.01	0	227.32032
1999	202.29	0	448.4228

If however not all of the exportable surplus can be exported in any one year, some will have to be sold into intervention. Allowing for this, and also the stock overhang of large carryover stocks from earlier years, the following table summarises the additional costs of having to store a certain amount of the exportable surplus[25], given an assumed ceiling on the total amount of exports possible in any one year:

year	MacSharry	base 1: T	base 1: T ML	base 2: T	base 2: T ML
1992	513276.575	484487.184	496157.395	484487.184	496157.395
1993	533216.313	508130.875	536156.078	496246.874	524139.881
1994	328415.551	517082.315	561211.061	517099.263	561225.138
1995	118717.965	510014.713	573650.86	546679.76	610792.12
1996	0	486370.653	570315.864	585392.611	670657.177
1997	0	445822.489	552850.011	633890.956	743597.716
1998	0	388106.811	519626.09	692914.892	828993.652
1999	0	312973.701	471462.952	763241.119	928854.661

The main way in which the MacSharry policy differs from the base policies in terms of expenditures incurred by the EC budget is with regard to the direct payments made to farmers.

[25] It is assumed, for simplicity, that the unit export refund on exports from the open market, and the equivalent figure for exports from the open market, are identical. Thus total refund expenditure remains unchanged, regardless of where the exports originate. The only difference is that cereals that have been stored first incur these additional costs for the budget.

The table below indicates estimates of expenditures incurred on both the compensatory payment made for lower support prices (CP), as well as the payments made to compensate for the setting aside of land (SAP). The first column assumes no cut in compensatory payments after 1996, with the second and third columns assuming different rates of cut in those payments:

year	no cut in CP	5% cut in CP	10% cut in CP
1992			
1993	5101.65	5101.65	5101.65
1994	6595.15	6595.15	6595.15
1995	8451.29	8451.29	8451.29
1996	8291.55	8291.55	8291.55
1997	8536.58	7588.07	6639.56
1998	8430.83	6557.31	4683.79
1999	8580.91	5720.60	2860.30

Thus an examination of the 1999 expenditure estimates reveals the following. Export refunds under no policy change (base 2) could range from 4176 to 4415 million ECU. If prices were to be cut under a strict continuation of the stabiliser mechanism (base 1), this figure falls to between 3100 and 3250 million ECU. Under MacSharry, the fall is very significant. Without the set aside requirement, expenditures fall to zero under a high world price scenario, 469 million ECU under an average price scenario, and 1040 million ECU under a low price scenario. With the set aside requirement, these figures fall to zero, 202 million ECU and 448 million ECU respectively.

To these must be added intervention storage costs. under base 2, these could be as high as 763 to 929 million ECU under base scenario 2, or 313 to 471 million ECU under a continuation of stabilisers. Under MacSharry however, by 1999 they could, under the given assumptions, fall to zero.

Thus the sum of refund and intervention costs in 1999 under the three scenarios (base 1, base 2 and MacSharry) are therefore 3413 to 3721 million ECU for a continuation of stabilisers, 4939 to 5344 million ECU for base 2 (a real price freeze from 1992), and a maximum of 450 million ECU under MacSharry.

To this last figure however must be added the combined cost of the two types of compensatory payment available under MacSharry. These come to 8580 million ECU if there is no cut in the basic payment per tonne from 1997 to 1999, 5720 million ECU if there is a 22% cut by 1999 and 2860 with a 67% cut.

If the MacSharry reforms are therefore to achieve budgetary savings in the long term (here given as 1999), then the implication of these calculations is clear: the level of the compensatory payments must be cut, and they must be cut significantly. Even if they are not cut until 1997, it is possible to realise savings for the budget (relative to alternative policy scenarios) very quickly. Without this however, the EC will have adopted an even more expensive policy than it had with stabilisers.

CHAPTER 9: CONCLUSION, POLICY IMPLICATIONS, AND FUTURE RESEARCH

The budget of the European Communities has historically been dominated by expenditure on agricultural price support, under the mechanisms of the Common Agricultural Policy. The share of the total EC budget taken up by agriculture has ranged from nearly 80% in 1973 to just under 60% in 1990. Initially it was accepted that the CAP would take a high percentage of the budget, as it was the only common policy that had been developed - as time went on, more common policies would be formed, and the share of the budget taken by the CAP would naturally decline. As things turned out however, this was not the case. Rising production generated progressively higher budgetary expenditures at a time when the European Communities were looking to develop new policies. By the time the decision came to move the EC forward to become a single market, the level of agricultural expenditure was so high that the Community was technically bankrupt.

During the 1980's, rising agricultural production had generated surpluses that were causing the EC in general, and the Commission in particular, a great deal of political embarrassment. Not only did the media pick up on stories like cheap butter being sold to Russia, but the well publicised build-up of intervention stocks came at a time when there were a number of major famines in the third world. It has however never been these pressures that have encouraged the EC to attempt major reforms of the CAP. The main pressure for reform has consistently been budgetary, and reform agreements have always been preceded by financial difficulties.

The historical basis of the CAP was discussed in Chapter 2. In this chapter, the support policies operated by certain countries that would later become members of the EC were examined. This was done in the context of the financial transfers between producers, consumers and taxpayers, in order to understand both the political and economic influences that acted to shape the CAP. It demonstrated that France and Germany, who were most closely involved in the formation of the CAP, had a history of policies that transferred income from consumers to taxpayers via high market prices. In contrast, the UK and Denmark, who joined subsequently, more commonly operated policies that let consumers buy food at low prices, with support for farmers coming more from direct government payments.

This chapter went on to confirm that it was the rise in agricultural production, stimulated by such a high price policy, that led to the rise in productivity and the

consequent higher expenditures. It also explored the issue of funding the EC budget. It thus demonstrated why a country such as the UK, relatively poor in GNP per capita terms, should find itself paying a relatively large share towards the EC budget.

Chapter 3 then took up the ideas developed in Chapter 2 to give the background to the first of the major reform packages of the CAP. These 1988 reforms linked the two issues of agricultural reform and budgetary reform and control, producing the two linked policies of stabilisers and budgetary discipline. It was seen from this that whilst at the time they were heralded as a major breakthrough in policy reform, they were fundamentally flawed. It had been argued by many that the main problem with the main tools of support under the CAP was that they were open-ended. Thus support was offered on all production, regardless of the volume. Many felt that the system of maximum guaranteed quantities had ended this. In fact, even under stabilisers, support has been open ended. Farmers have still been able to get support for all their production; the only consequence of the MGQ has been that the production has been eligible for support at a slightly lower price the following year. Thus production and expenditure levels have continued to rise. The growth in support expenditure did slow down at this time, but this has been shown to be due to a drought in the US rather than these reforms.

The three appendices to Chapter 3 then examined budgetary issues that have a direct consequence for agricultural expenditure. The first demonstrated how uncontrolled growth in agricultural expenditure, against a budgetary ceiling as exists with the EC budget, can lead eventually to a financial crisis. This shows clearly what happened to the EC budget through the early 1980's. The second appendix focused on the way in which intervention stocks are dealt with financially. With lax budgetary rules, a budget nearing exhaustion, and rising surplus production, it was shown how the EC attempted to limit current support expenditures by selling into intervention rather than to third countries, only to raise the total cost in the long term. It also showed how the 1988 reforms attempted to resolve this problem, and how, if the same surplus was to build up again, the financial consequences would be felt immediately by the EC budget. The third appendix then considered the significance of the US$:ECU exchange rate to the budget. It showed that, *ceteris paribus*, changes in this exchange rate would increase or decrease the total amount of support expenditure on the CAP, because of the importance of this rate in determining the level of export refunds, coupled to the significance of these refunds in total CAP support expenditure.

Chapter 4 took the general policies discussed in the preceding two chapters, and examined them in detail for two particular sectors, cereals and oilseeds. The cereals

sector is currently the second biggest spending sector under the CAP, with oilseeds being one half of the biggest spender (oils and fats). These sectors were chosen for this reason, and also the significant economic links that exist between the two sectors.

The nature of the different ways in which financial transfers have been effected under the two regimes were highlighted, and how oilseeds took a higher share of the EC budget relative to total production than did cereals. This chapter examined in detail how expenditures under the two regimes are determined. It also considered how financial mismanagement and fraud can adversely affect attempts at controlling budgetary expenditures on these two sectors. In preparation for subsequent chapters, the details of the 1992 MacSharry reforms (the second major reform package of the CAP) were also discussed, although they were given less weight here as the focus was more historical, detailing the causes of the build up of surpluses and expenditures.

Chapter 5 then went on from Chapter 4 to analyse the operation of the cereals market in much greater detail. Utilising the fact that most key variables in the market trend over time, it showed how, with cereals consumption fairly stable, the rise in production has been reflected in a fall in imports and a rise in exports. It went on to examine the importance of intervention operations in the short term management of the cereals market. It showed that, on average, sales of grain to intervention account for less than 4% of total production. If the rise in production is considered however intervention takes, at the margin, 15% of production. This analysis suggested moreover that intervention does not play any long term role in the operation of the cereals market. It is used much more as a short term stabilising instrument, with the rise in volumes sold into intervention matched overall by a rise in volumes sold out of intervention in the medium to long term. The significance of this was drawn out by the residuals analysis, that showed that changes in intervention account for (or absorb) 30% of production variation around trend. The main variable absorbing production variation however was shown to be net trade, absorbing 50% of production variation. The remaining 20% was accounted for by changes in consumption.

From Chapters 4 and 5, it was made clear that the two most important variables in determining the level of expenditure on cereals were production and consumption. Chapters 6 and 7 therefore took this up, modelling each in turn in order to allow forecasting in Chapter 8.

Chapter 6 examined production as the product of area and yield. Yield was represented as being a function of time, generally thought of as being a proxy variable for technological change, and the ratio of cereals to fertiliser prices. Thus yields were linked to farmers costs and returns, as well as a key input influencing yield levels.

Area on the other hand was modelled indirectly. Net arable area was modelled first, with the percentage of this planted to cereals modelled separately, and the area planted to cereals derived from these figures. This approach was important in the work of Chapter 8, as the MacSharry reforms also relate to arable crops as a whole, rather than cereals in isolation.

In analysing cereals consumption, Chapter 7 broke the data down into its five constituent parts. Losses and seed, the two smallest elements, were shown to be relatively stable. Human consumption is rising, but at a progressively slower rate over time, as microeconomic theory suggests it should. Industrial uses of cereals appear to be growing at a fairly steady rate.

The single largest element in cereals use, and the part on which this chapter focussed on most, was animal feed. The analysis took the approach of examining the share of cereals in total feed use. A weighted index of total feed use was constructed for this purpose. The analysis also constructed a series relating different animals to a common base - their dependence on cereals as a provider of energy. It further related cereals' share of total feed to the relative prices of cereals and non-cereals inputs in feed.

Chapters 6 and 7 then formed the basis for the analysis, presented in Chapter 8, of the impact of agricultural policy reforms on cereals budget expenditure. The impact of the MacSharry reforms was compared to two bases - the first was a strict continuation of the stabiliser price cuts through to 1999. The second was a price freeze, in real terms, from 1992 to 1999, to allow comparison with an unreformed policy.

One feature of the work on cereals yields that would impact significantly on the rest of the chapter was the estimated impact on cereals yields of the very large price cut from 1992/2 to 1993/4. Whilst debatable, it needs to be remembered that there has never, in the lifetime of the CAP, been a year to year cereals price cut of that order of magnitude. Even so, the yield figure forecast for 1994 under MacSharry is still only the same as the 1989 level.

The initial cereals area estimate then assumes no set aside requirement. This allows comparison later between MacSharry with and without this aspect, in order to assess the impact on expenditures of taking this land out of production.

When considering total internal use, or consumption, it was shown that initially, the large price cut to 1993/4 results in cereals use in animal feed rising, and hence total consumption rising. After that time however, total use starts to fall again, albeit at a slower rate.

When examining cereals trade, Chapter 8 argued that it was reasonable to assume a

stable figure for imports over the next few years. From the figures of production, consumption and imports thus estimated, figures for the exportable surplus were derived. From this, an estimate of export refund expenditure was made assuming no restriction on the total volume of cereals the EC could export each year. The financial consequences of placing cereals in store, only for them to be exported later that same year, were ignored. The following section however produced expenditure estimates under the assumption that world market conditions limited the export opportunities for the EC. Thus some of the exportable surplus had to be placed in store instead. Note that the difference in expenditures between the MacSharry scenario and the four base scenarios depends not only on the exportable surplus from 1992, but also the extent to which the EC is able to dispose of the stock overhang. Stocks in 1991 were around 18 million tonnes. Just prior to the time of writing, they had risen to over 22 million tonnes. With a rising exportable surplus and large carryover stocks, the EC could face a rapid rise in budgetary expenditures in trying to dispose of this total surplus. Given the limits on expenditure discussed in appendix 1 of Chapter 3, and the reform of the financial treatment of stocks discussed in appendix 2 of Chapter 3, the consequences could be disastrous for the EC budget. It is therefore vital for the EC that the cuts in production and exportable surplus, predicted in Chapter 8, are realised.

Offsetting export refund and intervention storage expenditure savings realised from the Macsharry reforms however is the added cost of the two types of compensatory payment discussed in detail in Chapter 8. Under the initial assumption of no cuts in the level of these payments through to the end of the forecast period in 1999, it was demonstrated that the total cost of supporting the cereals regime will actually rise relative to the base alternatives. Note that this also assumed that there would be no slippage with the set aside land. This assumption is justified if it is also assumed that the rotational requirement placed on the land under MacSharry is fully implemented and fully effective. Thus farmers will not be able to set aside just their lower yielding land, but must set aside all of their land in turn. The only qualification to the forecasts that needs to be made therefore is that in any one year, if lower than average or higher than average yielding land is set aside, production may be higher of lower than forecast, thus leading to higher or lower budgetary expenditures. On average however, over the period to 1999, the impact of this should be neutral.

Chapter 8 also had to assess how much of the land needed to be set aside would be taken from area previously planted to cereals. Given research referred to above from Agra Europe, it was felt that farmers would try to concentrate set aside onto land on

which crops other than cereals had been grown. Thus oilseeds would take a share of set aside well in excess of their share in net arable area.

Finally calculations were made to assess the impact for the budget of reducing the level of compensatory payments after 1996. Two alternative scenarios wee examined, and it was concluded that total budgetary savings could be realised, but only if the cuts were of a significant size. One point in favour of such action however was shown to be that if these cuts ARE made, then budgetary savings can be realised very quickly.

This highlights another feature of the budgetary impact of the MacSharry reforms. Given that a much higher proportion of total expenditure will now be dependent on fixed direct payments rather than market vagaries, it should become much easier to get a more accurate forecast of future budgetary expenditures. In the past, mechanisms such as guarantee thresholds, as well as certain aspects of the budgetary discipline rules, have proved ineffective in keeping budgetary expenditure within the required guideline. Now however, a system is in place that gives the Commission a much more effective tool with which to control expenditure, if they need and wish to.

Thus the main policy implications to be drawn from the findings of Chapter 8 are therefore that the MacSharry reforms offer an ideal opportunity to reduce expenditure on agriculture and free budgetary resources for other policies. For this to be realised however, the level of compensatory payments must be reduced. If they are, significant savings can be realised very quickly. If they are not however, the new policy could well turn out to be more expensive than the stabiliser system it replaces next year.

One of the major limitations inherent in modelling EC policy reforms is the extent to which one needs to make assumptions regarding the future actions and decisions of the Council of Ministers and EC Commission, especially the cereals management committee (in this case). Thus there is much scope for extending the work presented here to examine different political scenarios, and the extent to which they impact on the EC budget.

It also needs to be borne in mind that the EC is currently engaged internationally in agricultural policy reform negotiations under the auspices of GATT. The model discussed here presents a framework within which it is possible to consider whether or not the reforms of the CAP, implemented under MacSharry, result in the changes that the US are demanding for an agreement to be reached. If it is found that the changes under MacSharry are insufficient to get agreement from the US in GATT, it would be possible within the framework of the model to see what would have to be changed in the MacSharry package in order for the EC to match US demands. The model also

highlights one significant feature of the world cereals market that the negotiating parties appear to have overlooked - that is the importance of product differentiation in determining just what the world price is. Thus as the EC exports lower quality grains than many types exported by the US, Canada and Australia, they will trade internationally at different prices with, as has been demonstrated above, different unit refunds (and therefore total refund expenditures) being required.

Intervention activity in the EC has generally been under-researched in the past, and the models and forms of market analysis developed in Chapters 3 and 5 offer a strong framework within which this element of the CAP can be examined further. Moreover, the residuals analysis presented in Chapter 5 allows for the role of intervention in the cereals market as a whole to be examined more closely, as well as permitting a different approach to the study of the interaction of all the main variables in the cereals market as a whole.

DATA APPENDIX

'The government are very keen on amassing statistics. They collect them, add them, raise them to the nth power, take the cube root and prepare wonderful diagrams. But you must never forget that everyone of these figures comes in the first instance from the village watchman, who just puts down what he damn well pleases.'

Anonymous, quoted in Sir Josiah Stamp 'Some Economic Factors in Modern Life, and quoted itself on P39 of the Shazam manual.

EC 12 CEREALS AREA, YIELD AND PRODUCTION

YEAR	cereals area	cereals yield	cereals prod
1973	36678	33.1	121404.2
1974	37031	34	125905.4
1975	36316	31.9	115848.0
1976	36298	29.8	108168.0
1977	35493	34	120676.2
1978	36928	37.1	137002.9
1979	36540	36.2	132274.8
1980	36998	39.1	144662.2
1981	36482	36.8	134253.8
1982	36615	39.7	145361.6
1983	36039	38.3	138029.4
1984	36242	47.7	172874.3
1985	35712	44.9	160346.9
1986	35516	43.4	154139.4
1987	35053	44.1	154583.7
1988	34839	44.4	154685.2
1989	35178	46.4	163225.9
1990	33463	47.1	157610.7
1991	34177	49.6	169517.9

SOURCES:

Eurostat. Agricultural Situation in the Community

HGCA. Weekly Digest

FAO Production Yearbook

EC12 CEREALS CONSUMPTION

	Animal Feed	Losses	Seed	Human C	Ind Use	TIU
1973/4	93040.7	1421.1	5711.5	0.0	0.0	143604.6
1974/5	90354.2	1614.9	5409.7	33275.0	0.0	140696.0
1975/6	87265.5	1557.5	5490.5	33525.8	9159.9	136999.2
1976/7	86434.0	1462.4	5149.6	33230.2	9895.0	136171.3
1977/8	87096.6	1871.5	5512.1	33833.2	10069.0	138382.3
1978/9	91482.3	2320.5	5645.2	34819.9	10686.0	144953.9
1979/80	91041.4	2756.7	5461.4	35099.7	10681.0	145040.2
1980/1	86475.0	1840.0	5450.0	35502.0	11533.0	140800.0
1981/2	86082.3	2711.8	5495.6	35686.7	10107.0	140083.4
1982/3	86413.3	3058.2	5534.9	34519.5	8273.0	137798.9
1983/4	87610.0	2978.0	5725.0	35263.0	9746.0	141322.0
1984/5	90677.0	2061.0	5860.0	36382.0	9874.0	144854.0
1985/6	88220.0	2033.0	5762.0	36739.0	10040.0	142794.0
1986/7	84862.0	2019.0	5643.0	36692.0	10355.0	139571.0
1987/8	81142.0	1890.0	5565.0	36801.0	10686.0	136084.0
1988/9	80970.0	1946.0	5725.0	37039.0	10925.0	136605.0
1989/90	79376.0	1469.0	5381.0	35666.0	11423.0	133315.0
1990/1	80815.0	1949.0	5954.0	37437.0	12717.0	138872.0
1991/2	81191.0	1942.0	6088.0	37330.0	12391.0	138942.0

SOURCES:

Eurostat. Agricultural Situation in the Community

Agra Europe. Agra Europe.

PRICE DEFLATORS

YEAR	UK	FR	WG	EC12
1972	96.21	96.55	97.48	96.69
1973	103.55	104.25	103.20	104.55
1974	115.08	115.17	110.12	116.41
1975	139.73	129.77	117.26	133.00
1976	168.22	145.26	122.85	150.74
1977	192.54	159.63	127.34	168.68
1978	216.63	174.84	132.44	187.51
1979	244.76	192.59	137.93	207.59
1980	286.79	213.65	144.01	232.51
1981	330.06	238.20	150.33	260.14
1982	361.08	266.11	156.65	288.09
1983	384.22	294.67	162.66	315.45
1984	403.20	319.41	166.96	339.64
1985	423.81	340.25	170.46	361.49
1986	442.97	358.94	174.99	382.25
1987	461.41	373.55	179.44	400.53
1988	487.80	385.33	182.57	417.77
1989	521.01	398.24	186.32	437.85
1990	559.36	411.98	192.21	461.52
1991	599.82	426.19	200.00	487.36

SOURCE:

Eurostat. European Economy.

NOMINAL PRICE DATA (ECU/TONNE)

	Soft Wheat			Barley		
year	Germany	France	UK	Germany	France	UK
1972	103.3	88.1	69.5	92.8	81.4	63.3
1973	116.7	95.5	96	104.1	83.5	85
1974	128.6	103	120.6	119.6	99.5	115.3
1975	140.3	111.9	101.2	128.8	102.3	101.1
1976	166.2	129.2	116.5	153	118.3	119.7
1977	172.3	133	128.5	157.8	118.4	121
1978	180	138.7	131.5	159	118.8	120.2
1979	182.1	141.6	149.9	164.4	128.3	142
1980	185.4	150.2	167.6	164.6	132.4	156.7
1981	190.1	161.7	198.9	167.4	141.3	184.4
1982	208.5	170.3	204.1	187.2	152.2	198.4
1983	218.4	174.2	215.5	196.7	159.5	204.9
1984	209.8	166.4	192.8	200.4	159.9	190.5
1985	188.9	163.1	189.8	179	153.2	181
1986	192.5	170.9	164.8	175.3	153.9	161.3
1987	191.2	161.5	157.8	173.7	138.5	154.3
1988	175.2	148.2	160.9	161	131.1	160.9
1989	168.8	150.9	161.6	152.7	134.5	165.8
1990	162.9	145.7	158.4	148.3	129.9	156.8
1991	165.8	152.7	168.1	149.8	133	160.2

SOURCES:

Eurostat. Agricultural Prices (Annual)

Eurostat. Agricultural Prices (Quarterly)

NOMINAL FERTILISER PRICES

Year	UK	France	Germany
1973	99.7	103.3	99.5
1974	142.8	153.3	132.3
1975	160.7	180.1	151.4
1976	152.5	170.3	162.9
1977	136.6	169.4	166.5
1978	147.9	177.5	173.3
1979	160.9	185.5	178.7
1980	208	228.6	192.4
1981	253.3	234.8	216
1982	287.4	236.5	240.1
1983	273.8	240.9	233.9
1984	282.6	237.1	227.3
1985	305.8	270	243
1986	238	243.5	243
1987	188.3	202.4	209.6
1988	199.6	206.9	209.2
1989	208.1	215.5	210.1
1990	202.3	212	210.1
1991	202.9	213.5	218.4

SOURCES:

Eurostat. Agricultural Prices (Annual)

Eurostat. Agricultural Prices (Quarterly)

DOLLAR:ECU AND ECU:DOLLAR EXCHANGE RATES

Year	1ECU:x$	1$:xECU
1973	1.2294	0.8134
1974	1.1916	0.8392
1975	1.2402	0.8063
1976	1.1175	0.8949
1977	1.1408	0.8766
1978	1.273	0.7855
1979	1.3702	0.7298
1980	1.3903	0.7193
1981	1.1148	0.8970
1982	0.9801	1.0203
1983	0.8902	1.1233
1984	0.7877	1.2695
1985	0.7595	1.3167
1986	0.9825	1.0178
1987	1.1535	0.8669
1988	1.1828	0.8455
1989	1.1017	0.9077
1990	1.2712	0.7867
1991	1.2266	0.8153

SOURCE:

Eurostat. European Economy

CEREALS SUBSTITUTE PRICES IN ECU/TONNE

year	Manioc	Soya Bean Meal	80%M20%S
1972/3	0	168.217905	151.396115
1973/4	0	140.91135	126.820215
1974/5	110.180328	125	113.144262
1975/6	103.079555	142.001711	110.863986
1976/7	99.1777188	210.212202	121.384615
1977/8	78.4823626	163.519278	95.4897457
1978/9	105.687453	175.304282	119.610819
1979/80	125.090383	170.281996	134.128706
1980/1	128.285946	226.783103	147.985378
1981/2	124.394966	223.939981	144.303969
1982/3	158.148547	226.942949	171.907427
1983/4	151.646635	286.262019	178.569712
1984/5	131.268966	218.731034	148.761379
1985/6	151.88764	199.280899	161.366292
1986/7	140.610546	172.756707	147.039778
1987/8	142.201835	192.727273	152.306922
1988/9	138.644068	248.813559	160.677966
1989/90	131.647972	192.95082	143.908542
1990/1	133.281972	151.640986	136.953775
1991/2	141.233766	159.090909	144.805195

SOURCES:

FAO. Production Yearbook.

FAO. Quarterly Bulletin of Statistics.

FAO. Monthly Bulletin of Statistics.

NOMINAL OILSEED RAPE PRICES (ECU/TONNE)

year	Pn OSR FR	Pn OSR WG
1973	191.900	210.600
1974	256.300	246.200
1975	242.200	259.900
1976	262.800	312.500
1977	253.700	336.100
1978	262.600	358.400
1979	290.200	370.900
1980	307.800	378.100
1981	342.600	400.300
1982	374.300	443.400
1983	393.600	481.500
1984	404.800	497.500
1985	410.400	459.900
1986	402.400	461.000
1987	344.300	409.800
1988	330.200	371.300
1989	374.500	404.400
1990	347.700	403.100
1991	271.900	317.300

SOURCES:

Eurostat. Agricultural Prices (Annual)

Eurostat. Agricultural Prices (Quarterly)

NOMINAL PRICE INDEXES

year	cereals	an products	milk
1973	51.33	64.56	53.14
1974	62.62	62.42	59.57
1975	64.70	73.40	69.30
1976	75.38	79.39	77.01
1977	81.32	84.84	84.45
1978	86.27	89.83	88.07
1979	90.65	93.68	93.24
1980	100.00	100.00	100.00
1981	112.43	113.29	108.14
1982	123.90	126.80	121.30
1983	134.90	128.90	130.20
1984	135.90	134.10	133.30
1985	132.70	137.00	140.10
1986	135.60	133.10	144.50
1987	133.90	129.60	146.30
1988	130.80	134.40	154.40
1989	132.13	149.18	166.17
1990	129.73	141.93	161.97
1991	135.36	138.35	

SOURCES:

Eurostat. Agricultural Situation in the Community.

Eurostat. Agricultural Prices (Quarterly).

WORLD CEREALS PRICES

year all P's $/mt	Wheat US HW No2 ord. protein fob Gulf	Wheat Can CWRS No1 13.5% in store Thunder Bay	Barley Can No1CW in store Thunder Bay	Pw wh $	Pw cer $
1973	127	158		137	
1974	165	193	124	174	166
1975	149	172	109	157	149
1976	117	124	92	119	115
1977	113	124	69	117	109
1978	138	151	71	142	130
1979	163	172	85	166	153
1980	164	193	112	174	163
1981	177	196	115	183	172
1982	161	166	91	163	151
1983	158	169	92	162	150
1984	153	165	102	157	148
1985	138	174	89	150	140
1986	115	168	71	133	122
1987	114	133	56	120	110
1988	146	180	83	157	145
1989	171	201	96	181	167
1990	137	156	86	143	134
1991	129	131	66	130	119

SOURCES:

FAO. Production Yearbook.

FAO. Quarterly Bulletin of Statistics.

FAO. Monthly Bulletin of Statistics.

NOMINAL INTERVENTION PRICES (ANNUAL AVERAGES)

Units - ua up to 1978/79, ECU from 1979/80[1]

year	Common Wheat	Barley
1973	109.20	99.29
1974	112.43	100.69
1975	123.32	108.86
1976	133.31	118.33
1977	138.27	123.05
1978	141.64	126.16
1979	155.67	138.82
1980	177.81	158.75
1981	186.54	167.10
1982	199.18	179.65
1983	210.03	190.74
1984	209.91	193.45
1985	198.46	191.00
1986	190.00	186.26
1987	186.07	175.87
1988	183.98	174.98
1989	180.20	171.34
1990	174.41	165.85
1991	172.01	163.63

SOURCES:

EC Commission. Green Europe Newsflashes.

Agra Europe. CAP Monitor.

[1] 1978/79 prices in ECU and ua are comparable by multiplying the ua price by 1.208953.

EC10 INTERVENTION BALANCE SHEET

year	opst	int purch's	dom sales	net dom int	int exports	closing st
1975/6	3287	1401	400	1001	1961	2328
1976/7	2325	438	658	-220	613	1489
1977/8	1312	1134	693	441	700	1053
1978/9	989	1225	183	1042	393	1641
1979/80	1640	1778	202	1576	937	2280
1980/1	2710	4741	503	4238	3417	3531
1981/2	3484	2432	529	1903	2793	2590
1982/3	2744	7982	520	7462	2699	7502
1983/4	6925	4488	1992	2496	5007	4414
1984/5	4514	13159	156	13003	3281	14233
1985/6	13860	11355	1700	9655	6952	16526
1986/7	16702	5664	2572	3092	6352	13413
1987/8	13431	4883	1587	3296	6641	10076
1988/9	11103	3895	1764	2131	5031	8173
1989/90	8179	6910	696	6214	3784	10611
1990/1	10534	7784	1554	6230	1210	15548
1991/2	17309	6962	415	6547	7793	17272

inc's EG

SOURCES:

HGCA. Cereals Statistics.

HGCA. Weekly Digest.

EC10/12 INTERVENTION BALANCE SHEET

year	opst	int purch's	dom sales	net dom int	int exports	closing st
1975/6	3287	1401	400	1001	1961	2328
1976/7	2325	438	658	-220	613	1489
1977/8	1312	1134	693	441	700	1053
1978/9	989	1225	183	1042	393	1641
1979/80	1640	1778	202	1576	937	2280
1980/1	2710	4741	503	4238	3417	3531
1981/2	3484	2432	529	1903	2793	2590
1982/3	2744	7982	520	7462	2699	7502
1983/4	6925	4488	1992	2496	5007	4414
1984/5	4514	13159	156	13003	3281	14233
1985/6	14620	11548	1704	9844	6973	17454
1986/7	17657	6276	3225	3051	6368	14311
1987/8	14283	5197	1951	3246	6643	10876
1988/9	11748	4545	2065	2480	5052	9145
1989/90	9156	7270	761	6509	3802	11860
1990/1	11795	8361	1947	6414	1227	16974
1991/2	18750	7432	415	7017	7886	17877

inc's EG

SOURCES:

HGCA. Cereals Statistics.

HGCA. Weekly Digest.

ARABLE AREAS FOR NAA CALCULATION

year	Cereals Area	Oilseeds Area	Set Aside Area	NAA	cer%NAA
1973	36678	1001		37679	97.34
1974	37031	1055		38086	97.23
1975	36316	1413		37729	96.25
1976	36298	1110		37408	97.03
1977	35493	1147		36640	96.87
1978	36928	1195		38123	96.87
1979	36540	1319		37859	96.52
1980	36998	1553		38551	95.97
1981	36482	1886		38368	95.08
1982	36615	2261		38876	94.18
1983	36039	2614		38653	93.24
1984	36242	2890		39132	92.62
1985	35712	3223		38935	91.73
1986	35516	3608		39124	90.78
1987	35053	4718		39771	88.14
1988	34839	4525	361	39725	87.70
1989	35178	4425	433	40036	87.87
1990	33463	5263	511	39237	85.28
1991	34177	4929	1455	40561	84.26

SOURCES:

Eurostat. Agricultural Situation in the Community.

HGCA. Weekly Digest.

QUANTITY OF NON CEREALS INPUTS IN COMPOUND FEED

year	Qcersub
1973	37482.4122
1974	37611.4827
1975	38124.4739
1976	43157.9332
1977	45329.5492
1978	49552.9324
1979	55048.8408
1980	55145.5829
1981	57335.0204
1982	59756.8977
1983	59651.101
1984	57656.132
1985	58252.5326
1986	62354.0337
1987	64966.1538
1988	69136.4191
1989	70062.5581
1990	71003.3333
1991	74148.9

SOURCE:

Derived from Eurostat. Agricultural Situation in the Community.

EC CEREALS IMPORT AND EXPORT DATA

year	ECx	imports	exports
1973/4	9	40319	28151
1974/5	9	21210	10807
1975/6	9	21574	12581
1976/7	9	26493	6607
1977/8	10	20256	11281
1978/9	10	19549	15281
1979/80	10	17925	17422
1980/1	10	15426	22390
1981/2	10	14297	22682
1982/3	10	8767	21362
1983/4	10	8688	22336
1984/5	12	13582	29399
1985/6	12	11081	27500
1986/7	12	7050	27302
1987/8	12	7573	26886
1988/9	12	7349	25705
1989/90	12	5776	33875
1990/1	12+EG	5899	30624
1991/2	12+EG	4733	33822

SOURCES:

Eurostat. Agricultural Situation in the Community.

Agra Europe. Agra Europe.

EC12 ANIMAL NUMBERS ('000 HEAD) AND MILK PRODUCTION ('000t)

year	horses	mules	asses	cattle	buff's	pigs	sheep	goats	chickens	ducks	turkeys	milk animals	milk prod	yield kg/hd/an
1973	1895	813	1143	84039	75	78974	81007	9438	753316	5385	9923	30821	102026	3310.28
1974	1868	761	1090	87124	87	80296	81495	9393	749487	4801	9105	31256	103414	3308.61
1975	1844	717	1043	86548	96	79596	81003	9507	757932	4373	7819	30923	104398	3376.06
1976	1846	700	1014	85871	87	79964	80877	9617	720683	4244	8570	30816	105994	3439.58
1977	1862	627	970	85734	80	82932	80922	9612	727022	12589	18315	31243	108722	3479.88
1978	1827	568	913	85914	84	86970	83697	9710	723878	13128	19980	31072	112663	3625.87
1979	1804	543	834	85876	88	89729	84013	9520	722016	13456	22101	31096	114963	3697.03
1980	1780	523	819	85856	91	91693	85297	9432	732738	13975	24207	31063	118553	3816.53
1981	1706	493	776	85139	104	92571	88306	9893	743000	12000	47000	30251	119091	3936.76
1982	1696	459	751	85323	108	93451	90170	10184	748000	16000	48000	30447	120430	3955.40
1983	1649	424	716	84917	108	94142	79650	10341	724000	14000	48000	30878	125139	4052.69
1984	1624	406	691	84966	109	94354	79434	10325	713000	14000	47000	30865	123618	4005.12
1985	1630	389	664	84694	101	94835	79864	10419	725000	14000	50000	30477	121522	3987.33
1986	1599	362	634	84005	102	100208	83409	10937	722000	15000	52000	27997	117466	4195.66
1987	1608	345	615	82569	103	105555	90786	12673	773000	15000	60000	28700	111773	3894.53
1988	1559	337	610	80457	105	103934	98330	12774	796000	17000	66000	27950	109459	3916.24
1989	1563	326	606	80005	107	102389	100729	12928	785000	19000	68000	27713	108975	3932.27
1990	1560	325	604	79720	113	101841	105435	12467	785000	21000	71000	27438	109024	3973.47
1991	1650	314	598	79716	113	101680	102923	13226	801661	20822	73493	26993	108587	4022.78

SOURCES:

FAO. Production Yearbook plus personal communication.

MMB. EEC Dairy Facts and Figures.

r_t AND z_t USED IN EXPORT REFUND ESTIMATION

r_t	z_t
3.91180472	-26.395203
29.288524	-5.8296011
42.081026	30.5889125
44.0814428	42.6765093
74.1188269	38.9315611
88.0917965	38.9423792
57.696172	40.9827343
50.3881439	18.3687366
53.7833625	30.9041728
70.2474018	23.594465
38.8012564	-3.9272037
42.3357953	-9.950688
72.7899237	45.6961563
121.65414	67.9751963
113.444676	32.7315062
86.7862424	3.79736559
73.2631705	44.667604
95.5284028	57.9002322

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